



SCHOOL OF CIVIL ENGINEERING

HANDBOOK

M. Tech. in Construction Technology and Management

2019-21

Rukmini Knowledge Park,

Kattigenahalli, Yelahanka, Bangalore - 560 064

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Rukmini Educational
Charitable Trust

www.reva.edu.in

Chancellor's Message

"Education is the most powerful weapon which you can use to change the world."

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when 'intellectual gratification' has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of 'Knowledge is power', we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I'm always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centric and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said 'A University should be a place of light, of liberty and of learning'. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.



Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in



knowledge enhancement and bridging the gap between academia and industry.

A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry- specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of Reva University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr.M. Dhanamjaya

Vice Chancellor,

REVA University

Director's Message

The M. Tech in Construction Technology and Management is designed keeping in view future developments, both at national and global levels.

Construction technology and management are interlinked with each other. A construction engineer knows everything what that can be helpful build plans and to reshape an existing design. Construction industry has developed very much and has great importance in every society. A construction engineer does all efforts and use creative mind to build an architect.



With the help of project management software and mobile technology, an engineer uses his personal experience and knowledge to plan. Technology is playing an important role in delivering quality service to the consumer according to his/ her expectations level. If someone is interested but have no clear vision what to do and what not do than he/ she should get help from construction technology and management course to get confidence and practical to get opportunities and chances to design something.

Designing, planning, construction, and management of infrastructures shows the actual potential of a construction engineer. Doing practice on infrastructures such as highways, bridges, airports, railroads, buildings, dams, and utilities shows the worth and creative approach of an expert engineer. People can help for any type of ideas before constructing their homes and other type of architectures. Project manager uses 3D and 4D software to build architectures and houses for the people. Construction Costs Analysis helps a professional to make plans on behalf of available resources and delay the less important items to accomplish tasks early. The construction industry is experiencing technological revolution to make unique and creative plans. Taking more and more interest by the new generations means creating much opportunities and potentials for newbies. People should take admissions to learn to constructions related courses and professional degrees to become professionals and best engineers

- ☐ The benefits of choosing this Programme are:
- ☐ Flexibility to choose various fields upon post-graduation.
- ☐ Opportunity to work on live problems.
- ☐ Opportunity to work on latest technologies.
- ☐ Opportunity for designers & planner to plan & design live projects.

I am sure the students choosing M Tech in Construction Technology and Management in REVA University will enjoy the curriculum, teaching and learning environment, the vast infrastructure and the experienced teachers involvement and guidance. The curriculum caters to and has relevance to local, regional, national, global developmental needs. We will strive to provide all needed comfort and

congenial environment for their studies. Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, Gender, human values, environment and Sustainability. We will strive to provide all needed comfort and congenial environment for their studies. I wish all students pleasant stay in REVA and grand success in their career.

Dr. Y. Ramalinga Reddy,

Director

School of Civil Engineering,

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. **Rukmini Educational Charitable Trust (RECT)** is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Commerce, Education, Engineering, Environmental Science, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Degree College (Evening), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Engineering, Commerce, Management, Education, Arts and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notch educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to M. Phil and PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 11,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University established under the Government of Karnataka Act 80 of the year 2012 and notified in the Karnataka Gazette dated 7th Feb, 2013, is located 14 kms away from the Bangalore International Airport on the way to Bangalore city. The university has a sprawling lush green campus spread over 42 acres of land equipped with state-of-the-art infrastructure and conducive environment for higher learning.

The REVA campus has well equipped laboratories, custom-built teaching facilities designed specifically to emulate working conditions, fully air-conditioned library and central computer centre. The well planned sports facility for variety of sports activities, facilities for cultural programs and friendly campus lifestyle add to the overall personality development of students. The campus also has residential facility for students, faculty and other staff.

Currently, REVA University offers 18 Post Graduate programs and 15 Graduate and P.G Diploma programs in Engineering and Technology, Science, Commerce and Management in addition to research degrees leading to PhD in different disciplines. The University aims to offer many more PG and UG programs in Science, Arts, Commerce, Engineering & Technology, Management Studies, Education, in the years to come.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS–CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

ABOUT SCHOOL OF CIVIL ENGINEERING

The School of Civil Engineering is headed by highly experienced Professor of Civil Engineering and is supported by well qualified faculty members. The school has the state-of-art class rooms and well equipped laboratories. It offers B.Tech in Civil Engineering and M. Tech in Computer Aided Structural Engineering and M Tech in Transportation Engineering & Management. The school also has research program leading to doctoral degree. The curriculum of both graduate and post graduate degree programs have been designed to bridge the gap between industry – academia and hence they are industry application oriented. The M. Tech in Computer Aided Structural Engineering program aims to prepare human resources to play a leading role in the competitive construction field and excel in their endeavors. The program focuses on research and design in the core and Computer Aided Structural Engineering. The M.Tech in Transportation Engineering & Management aims to supplement and create a sustainable world and to enhance the global quality of life by adopting enhanced techniques of design and application. This is reflected in various core subjects offered within the program. Currently Civil Engineering teaching was limited to planning, analysis, design and execution of different types of infrastructure like buildings, roads, bridges, dams and power plants. However, due to increase of technological sophistication and demand for higher living standards geared up by economic growth and concerns about environmental impact have changed the scope of Civil Engineering. The challenges of today's Civil Engineering infrastructure are much more complex and interdependencies between resources.

Even though there are a large number of institutions in the country which are producing Civil Engineers, there is acute shortage of quality Civil Engineers. The REVA University would like to offer Civil Engineering Programme to produce quality engineers who are effective and efficient in problem solving and providing economical and sustainable infrastructural solutions.

Vision

To produce young Engineers of caliber, who would be committed to their profession with ethics, will be able to contribute to Civil Engineering and allied fields in optimizing usage of resources globally making the world more eco-friendly to live in.

Mission

- *To make the Department centre of excellence for training the undergraduate students.*
- *To promote involvement of staff and students in research and advanced training.*

- *To develop good understanding skills in student communities about Civil Engineering, ethical practices, automation design and society need centric teaching and learning and imparting value addition skills.*

ACADEMIC OBJECTIVES

- To prepare graduates and post graduates in CIVIL ENGINEERING who will excel in their professional career and contribute with commitment and dedication to the progress of the society and the nation.
- To enhance the understanding of the engineering principles of Civil Engineering systems.
- Graduates will be prepared with a solid foundation in mathematics, sciences, and technical skills needed to analyze and design civil infrastructure systems.
- The professional careers of our graduates will be distinguished with a high degree of awareness of moral, ethical, legal and professional obligations to protect human health, human welfare, and the environment.
- A commitment to continue assessment in continuing education.
- Our graduates will become team leaders, and will successfully address open-ended problems applying critical thinking.
- To promote faculty, researchers and students to participate in national and international conferences, seminars, workshops etc. and present their research outputs. Also research output to publish in journals of repute, publish books in relevant fields and popular articles for the benefit of the society at large.
- To organize conferences, seminars, workshops, special lectures, summer schools, technical talks, faculty development programmes etc. on emerging areas.
- To establish incubation centre and center of excellence in thrust areas in collaboration with industries.
- To organize and promote co-curricular and extra-curricular activities that inculcate among students concerned to the society.

ADVISORY BOARD

Sl. No.	Name of Members
1	<p>Dr. A. Veeraraghavan, Professor, Department of Civil Engineering, IIT Madras, Room No:#234, Building Sciences Block, IIT Madras, Chennai-600036 (o) 044-22574272 Fax:044-22570509 Email: av@iitm.ac.in</p>
2	<p>Mr. Nagaraj Kulkarni, Vice-President DivyaSree Developers (P) Ltd., DivyaSree Chambers, A Wing, #11, O'Shaughnessy Road, Shanthi Nagar, Bangalore 560 025. (M) 98452 11750 Email: nagaraj@divyasree.com</p>
3	<p>Dr. V. Ramachandra Zonal Head, Technical Services, Ultra Tech Cement Ltd., Industry House, 6th floor, #45, Race Course Road, Bangalore 560 001, (M)97432-47985 Email: Ramachandra.v@adityabirla.com</p>
4	<p>Dr. Mattur C Narasimhan, Professor, Department of Civil Engineering, NIT, Surathkal, Karnataka 575 025 (O) 0824-2474000Ext 3336 (R) 0824-2474336 (M) 94491-63427 Email: mattur.cn@gmail.com mattur@nitk.ac.in</p>
5	<p>Dr. R.V. Ranganath. Dean (Academic), Principal Professor & HOD, Department of Civil Engineering, BMS College of Engineering, Bull Temple Road, Bangalore-560 019 Currently Principal BMSIT, Yelahanka, Bangalore (M) 98450-86602 Email: rangarv@yahoo.com</p>

Program Educational Objectives (PEO's)

The programme educational objectives of the Civil Engineering of REVA University is to prepare graduates

PEO-1	To have successful professional careers in industry, government, academia and military as innovative engineers.
PEO-2	To successfully solve engineering problems associated with the lifecycle of Civil Engineering system, in particular construction technology and management by communicating effectively either leading a team or as a team member
PEO-3	To continue to learn and advance their careers through activities such as research and development, acquiring doctoral degree, participation in national level research programmes, teaching and research at university level etc.,
PEO-4	To be active members ready to serve the society locally and internationally, may take up entrepreneurship for the growth of economy and to generate employment; and adopt the philosophy of lifelong learning to be aligned with economic and technological development.

Program Outcomes (POs)

After successful completion of the programme, the graduates shall be able to

- PO1. **Demonstrate in-depth knowledge** of Construction Technology and Management, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge.
- PO2. **Analyze complex engineering problems critically**, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in construction technology , wider theoretical, practical and policy context.
- PO3. **Think laterally and originally, conceptualize and solve Construction Management problems**, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in construction management .
- PO4. **Extract information pertinent to unfamiliar problems** through literature survey and experiments, apply appropriate **research methodologies, techniques and tools, design**, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in construction technology and management .

- PO5. **Create, select, learn and apply** appropriate techniques, resources, **and IT tools**, including prediction and modeling, to complex construction management activities with an understanding of the limitations.
- PO6. Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to **collaborative-multidisciplinary scientific research**, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.
- PO7. Demonstrate knowledge and understanding of construction technology principles and apply the same to one's own work, as a **member and leader in a team**, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.
- PO8. **Communicate with the engineering community**, and with society at large, regarding complex construction management activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.
- PO9: Recognize the need for, and have the preparation and ability to engage in **life-long learning** independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.
- PO10. Acquire professional and intellectual integrity, professional **code of conduct, ethics of research** and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.
- PO11. Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and **learn from mistakes** without depending on external feedback (**SELF learning**).

Programme Specific Outcomes (PSO's)

- 1) Apply knowledge of Construction Technology and management in real time.
- 2) Analyse a system, component or process in the knowledge areas of Construction Technology in real time problems.
- 3) Design a system, component, or process in more than one areas of Construction Technology and management
- 4) Conduct investigations and address complex Construction management problems; Utilize and develop innovative tools and techniques that are appropriate in Construction Technology and management discipline.

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/ COs	PO1	PO2	PO3	PO4	PO5	PO6	P7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3	PSO4
M19CT1010	CO1		3								2	1	3			2
	CO2	3		3	2				2	3		3	3	3		3
	CO3	3			3	2	1			2	1		3	1	2	3
	CO4	3		3									3	2	3	3
M19CT1020	CO1	3	3										3			2
	CO2	3		3						2			3			2
	CO3	3								3			3			1
	CO4	3		3						3			3			2
M19CT1030	CO1	2	3		3	3			2	3			3	3	3	
	CO2	2	3	3	3	3			2	3			3	3	3	
	CO3	3	3	2	3	3			2	2			3	3		
	CO4	3	3	3	1	3	1					1	3	3		
M19CT1040	CO1		3	3	2	1						2	3			2
	CO2		3	3						2			3			2
	CO3	3	3	3						3			3			1
	CO4	3	3	3						3			3			2
M19CT1051	CO1	3	3	3		1	1						3			3
	CO2	3	3	3	3	2	3			3			3	3	3	
	CO3	3	3	2	3	2	3			3			3	3	3	
	CO4	3	3	3	2			2					3	3		
M19CT1052	CO1	3	3		2			2	1	3		1	3	2	3	1
	CO2	3		3			2	1	2	2			3	2	2	2
	CO3	3	3		3			2	2	1			3		1	1
	CO4	3		3	2								3			2
M19CT1061	CO1		3	3						2		2	2		2	
	CO2		3	3	3	1		2		2	1	2	3	2	3	1

	CO3	3	3	3	3	1		2		2	1	2	3	2	3	1
	CO4	3	3	3	3	1		2		2	1	2	3	2		
M19CT1062	CO1			3			2	2	1	1			3			1
	CO2	3		3		2	1		3	2		2	3	2		2
	CO3	3		3	3	2	1			3			3	2		2
	CO4	3		3	3	3		2	3				3			3
M19CT1070	CO1		3	2	3		2	2	1	1			3	2	3	1
	CO2	3	2	3	3	2	1		3	2		2	3	1	3	2
	CO3	3	3	3	3	2	1			3			3	2	3	2
	CO4	3	2	3	3	3		2	3				3	2	3	3
M19CT2010	CO1	3	3	3		1	2	3	2			2		3		
	CO2	3	3	3		2	3					1	2	3	1	
	CO3	3	3	3	2		3		1					3	2	
	CO4	3	3	3		3		1				3			2	
M19CT2020	CO1	3	3	3	2	1				1			3			2
	CO2	3	3	3		2				2		2	3	2	1	2
	CO3	3	3	3	2	3				3	3	1	3			2
	CO4	3	3	3		2				3		2	3		2	2
M19CT2030	CO1		3	3						3		2	3	2	3	
	CO2		3	3				1		3		2	3	2	3	3
	CO3		3	3	2	2				3	2	1	3			
	CO4		3	3						3		2	3	2	3	
M19CT2040	CO1	3	3	3						3		2	3	2	3	2
	CO2	3	3	3		3				2			3	2	1	1
	CO3	3	3	3	2					3		2	3	2	3	
	CO4	3	3	3									3	1	2	
M19CT2051	CO1	3	3	3		2				2		2		3		3
	CO2	3	3	3				2		2		2	3			1
	CO3	3	3	3	2							2		2	3	
	CO4	3	3	3							3	2	3	2		1
M19CT2052	CO1		3	3	2				3		3	2	3	2	3	2
	CO2		3	3			3		2				3	2		2
	CO3	3	3	3	2						3		3	2		1
	CO4	3	3	3									3			2
M19CT2053	CO1	3	3						3	3		3	3		2	3
	CO2	3		3		2			2	1	2	2	3	3	3	2
	CO3	3			2			2					2	2		1
	CO4	3		3					3	3		3	3		2	3
M19CT2061	CO1	3	3						2		3		3			3
	CO2	3	3	3					2		3		3		1	
	CO3	3	3						2		3		3		2	
	CO4	3	3	3					2		3		3			3
M19CT2062	CO1	3	3	3			2		2		3		3	2	1	2

	CO2	3							2		3		3	1	2	
	CO3	3		3	3				2		3		3			3
	CO4	3					2		2		3		3		2	
M19CT2063	CO1	3	3								2		3	2	1	2
	CO2	3		3									3	1	2	
	CO3	3	3		3				2	2			3			
	CO4	3		3									3			
M19CT2070	CO1	3	3	3	3	3						3	3	2	1	2
	CO2	3	3	3	3	3						3	3	2	1	
	CO3	3	3	3	2				2	2		1	3	2	1	2
	CO4	3	3	3	2							1	3	2	1	
M19CT3010	CO1		3								2	1	3			2
	CO2	3		3	2				2	3		3	3	3		3
	CO3	3			3	2	1			2	1		3	1	2	3
	CO4	3		3									3	2	3	3

Mapping of PEOS with Respect to POs

	PO1	P2	PO3	PO4	PO5	PO6	P7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3
PEO1	√	√	√	√	√	√	√	√	√	√	√	√	√	√
PEO2	√	√	√	√	√	√	√	√	√	√	√	√	√	√
PEO3	√	√	√	√	√	√	√	√	√	√	√	√	√	√
PEO4	√	√	√	√	√	√	√	√	√	√	√	√	√	√

CBCS (CHOICE BASED CREDIT SYSTEM) AND CAGP (CONTINUOUS ASSESSMENT AND GRADING PATTERN) OF EDUCATION AND ITS ADVANTAGES

CBCS is a proven, advanced mode of learning in higher education. It facilitates students to have freedom in making their own choices for acquiring a Degree / Master's Degree program. It is more focused towards the student's choice in providing a wide range of Units available in a single campus across various disciplines offered by experts in the subjects. It leads to quality education with active teacher-student participation.

Studying under CBCS has following advantages:

- Students may undergo training in cross-disciplinary and multi-disciplinary subjects and acquire more focused and preferred knowledge.
- Students may get more skills from other subject(s) which are required for the career path in addition to their regular subject knowledge.
- Students may get ample opportunities to use the laboratories and gain practical exposure to the much needed Units available in other departments/schools for want of scientific inputs.
- Courses are conducted by subject experts identified on the basis of their experiences. Courses taught by such experts may provide in-depth information and clear understanding of the Units.
- Students may get an opportunity to study courses with other students of different programs and exchange their views and knowledge in a common class room.
- CBCS provides a cross-cultural learning environment.
- Students may benefit much from selecting the right options to successfully face the public service examinations like UPSC, KPSC, IES wherein the knowledge of additional subjects become mandatory for general or optional papers.
- Students are exposed to the culture of universal brotherhood during their campus life.
- Students are allowed to practice various methods of learning a subject.

Summary of REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Post Graduate Degree Program

1.0 Teaching and Learning Process

The teaching and learning process under CBCS-CAGP of education in each course of study will have three components, namely-

(i) L= Lecture (ii) T= Tutorial (iii) P= Practice, where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / self-study/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session and it consists of Hands on Experience / Laboratory Experiments / Field Studies / Case Studies that equip students to acquire the much required skill component.

2.0. A course shall have either or all the three components. That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

2.1. Various course of **study** are labeled and defined as: (i) Core Course (CC) (ii) Hard Core Course

(HC), (iii) Soft Core Course (SC), (iv) Foundation Core Course (FC) and (v) Open Elective Course (OE).

- (i) **Core Course:** A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course.
- (ii) **Foundation Course (FC):**
The foundation Course is a core course which should be completed successfully as a part of graduate degree program irrespective of the branch of study.
- (iii) **Hard Core Course (HC):**
The **Hard Core Course** is a Core Course in the main branch of study and related branch (es) of study, if any that the candidates have to complete compulsorily.
- (iv) **Soft Core Course (SC):**
A Core course may be a **Soft Core** if there is a choice or an option for the candidate to choose a course from a pool of courses from the main branch of study or from a sister/related branch of study which supports the main branch of study.
- (v) **Open Elective Course:**
An elective course chosen generally from other discipline / subject, with an intention to seek exposure is called an **Open Elective Course**.

2.2. Project Work:

Project work is a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem.

2.3. Minor Project:

A project work up to **Six to Eight credits** is called **Minor Project** work. A Minor Project work may be a hard core or a Soft Core as decided by the BOS / concerned.

2.4. Major Project / Dissertation:

A project work of **EIGHT, TEN, TWELVE, SIXTEEN or TWENTY** credits is called **Major Project** work. The Major Project / Dissertation shall be Hard Core.

3.0. Minimum Credits to be earned:

3.1. A candidate has to earn 96 credits for successful completion of M Tech degree with a distribution of credits for different courses as prescribed by the university.

3.2. A candidate can enroll for a maximum of 26 credits per Semester. However he / she may not successfully earn a maximum of 26 credits per semester. This maximum of 26 credits does not include the

credits of courses carried forward by a candidate.

3.3. Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to IV semester and complete successfully 96 credits in 4 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full time students and for hostel facilities.

4.0. Add- on Proficiency Certification:

In excess to the minimum of 96 credits for the M. Tech Degree program, a candidate can opt to complete a minimum of 4 extra credits either in the same discipline/subject or in different discipline / subject to acquire **Add on Proficiency Certification** in that particular discipline / subject along with the M .Tech degree.

4.1. Add on Proficiency Diploma:

In excess to the minimum of 96 credits for the M. Tech degree program, a candidate can opt to complete a minimum of 18 extra credits either in the same discipline/subject or in different discipline / subject to acquire Add on Proficiency Diploma in that particular discipline / subject along with the B. Tech degree. The **Add - on Proficiency Certification / Diploma** so issued to the candidate contains the courses studied and grades earned.

5.0. Continuous Assessment, Earning of Credits and Award of Grades.

5.1. The assessment and evaluation process happen in a continuous mode. However, for reporting purpose, **a semester is divided into 3 components as C1, C2, and C3.**The performance of a candidate in a course will be assessed for a maximum of 100 marks as explained below.

(i) Component C1:

The first Component (C1), of assessment is for 25 marks. This will be based on test, assignment / seminar. During the first half of the semester (i.e. by 8th week), the first 50% of the syllabus (Unit 1&2) will be completed. This shall be consolidated during the first three days of 8th week of the semester. A review test based on C1 will be conducted and completed in the beginning of the 9th week. In case of courses where test cannot be conducted, the form of assessment will be decided by the concerned school and such formalities of assessment will be completed in the beginning of the 9th week. The academic sessions will continue for C2 immediately after completion of process of C1.

The finer split - up for the award of marks in C1 is as follows:

Assignment	05 marks for Unit 1&2
Seminar	05 marks for Unit 1&2
Test (Mid-Term)	15 marks for Unit 1&2
Total	25 marks

(ii) Component C2:

The second component (C2), of assessment is for 25 marks. This will be based on test, assignment /seminar. The continuous assessment and scores of second half of the semester (9th to 16th week) will be consolidated during 16th week of the semester. During the second half of the semester the remaining units in the course will be completed. A review test based on C2 will be conducted and completed during 16th week of the semester. In case of courses where test cannot be conducted, the form of assessment will be decided by the concerned school and such formalities of assessment will be completed during 16th week.

The 17th week will be for revision of syllabus and preparation for the semester - end examination.

The finer split - up for the award of marks in C2 is as follows:

Assignment	05 marks for Unit 3 & 4
Seminar	05 marks for Unit 3 & 4
Review Test (Mid-Term)	15 marks for Unit 3 & 4
Total	25 marks

(iii) Component C3:

The end semester examination of 3 hours duration for each course shall be conducted during the 18th & 19th week. **This forms the third / final component of assessment (C3) and the maximum marks for the final component will be 50.**

5.2. Setting Questions Papers and Evaluation of Answer Scripts:

- 5.2.1. There shall be three sets of questions papers set for each course. Two sets of question papers shall be set by the internal and one set by external examiner for a course. The Chairperson of the BoE shall get the question papers set by internal and external examiners.
- 5.2.2. The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation.
- 5.2.3. There shall be single valuation for all theory papers by internal examiners. In case, the number of internal examiners falls short, external examiners may be invited. The answer scripts evaluated both by internal and external examiners shall be moderated by the external examiner / moderator.
- 5.2.4. The examination for Practical work/ Field work/Project work will be conducted jointly by two examiners (internal and external). However, in case of non-availability of external examiner or vice versa, the Chairperson BoE at his discretion can invite internal / external examiners as the case may be, if required.
- 5.2.5. If a course is fully of (L=0): T: (P=0) type, then the examination for C3 Component will be as decided by the BOS concerned.
- 5.2.6. In case of a course with only practical component a practical examination will be conducted with two examiners (ref: 6.3.4 above) and each candidate will be assessed on the basis of: a) Knowledge of relevant processes, b) Skills and operations involved, and c) Results / Products including calculation and reporting.
- 5.2.7. The duration for semester-end practical examination shall be decided by the School / Council.

5.3. Evaluation of Minor Project / Major Project / Dissertation:

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the supervisor. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

Component – I	(C1)	Periodic Progress and Progress Reports (25%)
Component – II	(C2)	Results of Work and Draft Report (25%)
Component– III	(C3)	Final Evaluation and Viva-Voce (50%). Evaluation of the report is for 30% and the Viva-Voce examination is for 20%.

5.4. The schedule of continuous assessment and examinations are summarized in the following Table below.

Component	Period	Syllabus	Weightage	Activity
C1	1 st Week to 8 th Week Last 3 days of 8 th Week	First 50% (two units)	25%	Instructional process and Continuous Assessment
	1 st Week to 8 th Week Last 3 days of 8 th Week	First 50% (two units)	25%	Consolidation of C1
C2	9 th week to 16 th week	Second 50% (remaining two units)	25%	Instructional process and Continuous Assessment
	Last 3 days of 16 th week	Second 50% (remaining two units)		Consolidation of C2
C3	17 th and 18 th week			Revision and preparation for Semester end examination
	19 th week to 20 th week	Entire syllabus	50%	Conduct of semester end examination and Evaluation concurrently
	21 st week			Notification of Final Grades
<p>*Evaluation shall begin very first day after completion of the conduct of examination of the first course and both examination and evaluation shall continue concurrently. The examination results / final grades be announced latest by 21st week</p>				

Note: 1. Practical examination wherever applicable shall be conducted before conduct of C2 Examination. The calendar of practical examination shall be decided by the respective School.

2. Finally, **awarding the Grades** be announced latest by 5 days after completion of the examination.

6.0 Requirements to Pass a Course

6.1. A candidate's performance from all 3 components will be in terms of scores, and the sum of all three scores will be for a maximum of 100 marks (25 + 25 + 50). A candidate who secures a minimum of 30% in C1 and C2 together, and 40% and above in aggregate of C1, C2 and C3 in a course is said to be successful.

6.2. **Eligibility to Appear for C3 (Semester - end) Examination and Provision to Drop the Course.**

Only those students who fulfill 75% attendance requirement and who secure minimum 30% marks in C1 and C2 together in a course are eligible to appear for C3 examination in that course.

6.3. Those students who have 75% of attendance but have secured less than 30% marks in C1 and C2 together in a course are not eligible to appear for C3 examination in that course. They are treated as dropped the course and they will have to repeat that course whenever it is offered.

Teachers offering the courses will place the above details in the School Council meeting during the last week of the Semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Director of the School before commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

6.4. In case a candidate secures more than 30% in C1 and C2 together but less than 40% in aggregate of C1, C2 and C3 in a course is considered as unsuccessful and such a candidate may either opt to DROP that course or appear for C3 examination during the subsequent semesters / years within the stipulated period.

In such a case wherein he / she opts to appear for just C3 examination, then the marks secured in C1 and C2 shall get continued. Repeat C3 examination will be conducted in respective semesters.

6.5. In case a candidate opts to drop the course he / she has to re-register for the dropped course only in subsequent semesters whenever it is offered if it is Hard Core Course and he / she may choose alternative course if it is Soft Core Course or Open Elective course or Skill Development Course.

The details of any dropped course will not appear in the Grade Card.

6.6. **Provision to Withdraw Course:**

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is soft core/open elective. **A DROPPED course is automatically considered as a course withdrawn.**

7.0. **Provision for Make- up Examination:**

For those students who have secured less than 40% marks in C1, C2 and C3 (end semester examination) together; the university shall conduct a make-up C3 examination within three weeks after the end of each semester.

Such of those students who have secured more than 30% marks in C1 and C2 together and less than 40% marks in C1, C2, and C3 together in a course shall appear for make-up examination in that course. This make-up examination is only for C3 examination.

A student who is absent to End Semester Examination (C3) due to medical emergencies or such other exigencies and fulfills the minimum attendance and performance requirements in C1 & C2 shall appear for make-up examination.

7.1 The candidate has to exercise his/her option immediately within 10 days from the date of notification of results. A MAKE-UP examination will be conducted within 25 days from the date of notification of results. If the candidate still remains unsuccessful after MAKE-UP examination he/she is said to have DROPPED that course

7.2 **Re-Registration and Re-Admission:**

A candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University and is considered as dropped the semester and is not allowed to appear for end semester examination (C3) shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

In case a candidate fails in more than 2 courses in odd and even semesters together in a given academic year, he / she may either drop all the courses and repeat the semester or reappear (C3 semester end examination) to such of those courses where in the candidate has failed during subsequent semester / year within a stipulated period.

7.3 In such a case where in a candidate drops all the courses in semester due to personal reasons, it is considered that the candidate has dropped the semester and he / she shall seek re-admission to such dropped semester.

7.4 **Requirements to Pass the Semester and Provision to Carry Forward the Failed Subjects / Courses:**

7.4.1 A candidate who secures a minimum of 30% in C1 and C2 and 40% and above in aggregate of C1, C2 and C3 in all the courses with credits prescribed in a semester is said to have passed that semester.

7.5. **Provision to Carry Forward the Failed Subjects / Courses:**

A student who has failed in 4 courses in 1st and 2nd semesters together shall move to 3rd semester. And he / she shall appear for C3 examination of failed courses of the said semesters concurrently with 3rd semester end examinations (C3) and 4th semester end examinations (C3) of second year of study.

8.0 **Attendance Requirement:**

- 8.1. All students must attend every lecture, tutorial and practical classes.
- 8.2. In case a student is on approved leave of absence (e g:- representing the university in sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.
- 8.3. Any student with less than 75% of attendance in a course in aggregate during a semester shall not be permitted to appear to the end semester (C3) examination.
- 8.4. Teachers offering the courses will place the above details in the School / Department meeting during the last week of the semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Head of the School before the commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

8.5. **Absence during mid semester examination**

In case a student has been absent from a mid semester examination due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Head of the School, for make-up examination. The Head of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and permit such student to appear for make-up mid semester examination.

8.6. **Absence during end semester examination:**

In case a student is absent for end semester examination on medical grounds or such other exigencies, the student can submit request for make-up examination, with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Director of the School. The Director of the School may consider such request depending on the merit of the case and after consultation with class teacher, course instructor and permit such student to appear for make-up mid semester examination

9. **Provisional Grade Card:**

The tentative / provisional Grade Card will be issued by the Registrar (Evaluation) at the end of every Semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average (SGPA)**. This statement will not contain the list of DROPPED courses.

9.1 Challenge Valuation:

A student who desires to apply for challenge valuation shall obtain a Xerox copy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the Grade awarded to him/her by surrendering the Grade Card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 15 days after the announcement of the results. This challenge valuation is only for C3 component.

The answer scripts for which challenge valuation is sought for shall be sent to another external examiner. The marks awarded will be the higher of the marks obtained in the challenge valuation and in maiden valuation.

9.2 Final Grade Card: Upon successful completion of the Post Graduate Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Registrar (Evaluation).

9.3 The Grade and the Grade Point: The Grade and the Grade Point earned by the candidate in the subject will be as given below.

Marks P	Grade G	Grade Point (GP=V x G)	Letter Grade
90-100	10	v*10	O
80-89	9	v*9	A
70-79	8	v*8	B
60-69	7	v*7	C
50-59	6	v*6	D
40-49	5	v*5	E
0-39	0	v*0	F

O - Outstanding; A-Excellent; B-Very Good; C-Good; D-Fair; E-Satisfactory; F - Fail;

Here, P is the percentage of marks ($P=[(C1+C2)+M]$) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the grade point.

9.4 Computation of SGPA and CGPA

The Following procedure to compute the Semester Grade Point Average (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$\text{SGPA (Si)} = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A	9	4X9=36
Course 2	4	B	8	4X8=32
Course 3	4	C	7	4X7=28
Course 4	4	O	10	4X10=40
Course 5	4	D	6	4X6=24
Course 6	4	O	10	4X10=40
	24			200

Thus, $\text{SGPA} = 200 \div 24 = 8.33$

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	5	A	9	5X9=45
Course 2	5	C	7	5X7=35
Course 3	5	A	9	5X9=45
Course 4	5	B	8	5X8=40
Course 5	4	O	10	4X10=40
	24			205

Thus, $\text{SGPA} = 205 \div 24 = 8.54$

9.5 Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for two year post graduate degree in Computer Science & Engineering is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e

$$\text{CGPA} = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

Where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration:**CGPA after Final Semester**

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	8.33	24 x 8.33 = 199.92
2	24	8.54	24 x 8.54 = 204.96
3	24	9.35	24x9.35=224.4
4	24	9.50	24x9.50=228.0
Cumulative	96		857.28

$$\text{Thus, CGPA} = \frac{24 \times 8.33 + 24 \times 8.54 + 24 \times 9.35 + 24 \times 9.50}{96} = 8.93$$

CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Illustration: CGPA Earned 8.93 x 10 = 89.30

9.6 Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows.

CGPA	Numerical Index	FGP
		Qualitative Index
> 4 CGPA < 5	5	SECOND CLASS
5 >= CGPA < 6	6	
6 >= CGPA < 7	7	FIRST CLASS
7 >= CGPA < 8	8	
8 >= CGPA < 9	9	DISTINCTION
9 >= CGPA 10	10	

$$\text{Overall percentage} = 10 * \text{CGPA}$$

10.0. Provision for Appeal

If a candidate is not satisfied with the evaluation of C1 and C2 components, he/she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the

grievance cell is final.

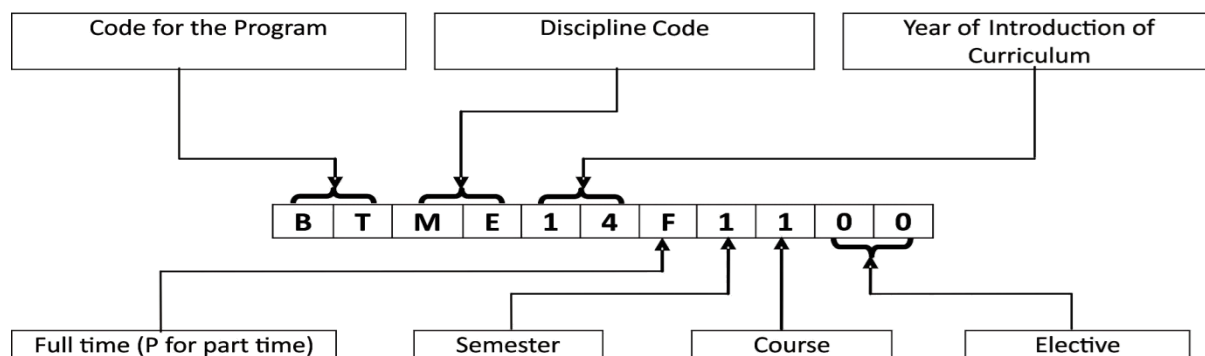
11.0. Grievance Cell

For every program there will be one grievance cell. The composition of the grievance cell is as follows:-

- The Registrar (Evaluation) - Ex-officio Chairman / Convener
- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department/discipline and/or from the sister schools / departments/sister disciplines – Member.
- One Senior Faculty Members / Subject Experts drawn from outside the University school / department – Member.

12.0. With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

Course Numbering Scheme



List of Codes for Programs and Disciplines / Branch of Study

Program Code	Title of the Program	Discipline Code	Name of the Discipline / Branch of Study
BA	Bachelor of Arts	AE	Advanced Embedded Systems
BB	BBM (Bachelor of Business	AI	Advanced Information Technology
BC	B.Com (Bachelor of Commerce)	AP	Advanced Power Electronics
BR	B. Arch (Bachelor of Architecture)	CA	Computer Aided Structural Engineering
BS	B Sc, BS (Bachelor of Science)	CE	Civil Engineering
BT	B.Tech (Bachelor of Technology)	CH	Chemistry
BP	Bachelor of Computer Applications	CO	Commerce
BL	LLB (Bachelor of Law)	CS	Computer Science and Engineering /
MA	Master of Arts	DE	Data Engineering and Cloud
MB	MBA (Master of Business Administration)	EC	Electronics and Communication Engineering
MC	M.Com (Master of Commerce)	EN	English
MS	M.Sc / MS (Master of Science)	MD	Machine Design and Dynamics
MT	M Tech (Master of Technology)	ME	Mechanical Engineering
MC	Master of Computer Applications	EE	Electrical & Electronics Engineering

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SCHOOL OF CIVIL ENGINEERING
M. Tech in CONSTRUCTION TECHNOLOGY & MANAGEMENT
(2019-2021)
I SEMESTER

Sl. No	Course Code	Title of the Course	HC/SC/OE	Pre requisite	Credit Pattern & Credit Value				Contact Hours	
					L	T	P	Total		
1	M19CT1010	Building planning and Design	HC	BE / B. TECH in Civil Engineering	3	1	-	4	5	
2	M19CT1020	Construction Methods and Equipment	HC		3	1	-	4	5	
3	M19CT1030	Advanced design of pre-stressed & precast structures	HC		3	1	-	4	5	
4	M19CT1040	Concrete Construction Technology	HC		3	1	-	4	5	
5	M19CT1051	Pavement Design , Construction and Management	SC		3	1	-	4	5	
	M19CT1052	Bridge Engineering	SC		3	1	-	4	5	
6	M19CT1061	Special Concretes	SC		3	1	-	4	5	
	M19CT1062	Environmental Engineering and Management	SC		3	1	-	4	5	
TOTAL								24	30	
Practical										
7	M19CT1070	Construction Materials lab	HC		0	0	4	4	3	
TOTAL								04	03	
TOTAL SEMESTER CREDITS								28		
TOTAL CUMULATIVE CREDITS								28		
TOTAL CONTACT HOURS								33		

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SCHOOL OF CIVIL ENGINEERING
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(2019-2021)
II SEMESTER

Sl. No	Course Code	Title of the Course	HC/SC/OE	Pre requisite	Credit Pattern & Credit Value				Contact Hours
					L	T	P	Total	
1	M19CT2010	Construction Costing and Financial Management	HC	BE / B. TECH in Civil Engineering	3	1	-	4	5
2	M19CT2020	Composite Materials	HC		3	1	-	4	5
3	M19CT2030	Building services	HC		3	1	-	4	5
4	M19CT2040	Foundation Design and Construction	HC		3	1	-	4	5
5	M19CT2051	Construction Planning and Control	SC		3	1	-	4	5
	M19CT2052	Modern Construction Materials	SC		3	1	-	4	5
	M19CT2053	Green Building Technology	SC		3	1	-	4	5
6	M19CT2061	Disaster Reduction and Management	SC		3	1	-	4	5
	M19CT2062	Low Cost Construction	SC		3	1	-	4	5
	M19CT2063	Shoring, Scaffolding and Formwork	SC		3	1	-	4	5
TOTAL								24	30
Practical									
7	M19CT2070	Construction Software Lab	HC		0	0	4	4	3
TOTAL								04	03
TOTAL SEMESTER CREDITS								28	
TOTAL CUMULATIVE CREDITS								56	
TOTAL CONTACT HOURS								33	

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SCHOOL OF CIVIL ENGINEERING
M. Tech in CNSTRUCTION TECHNOLOGY AND MANAGEMENT
(2019-2021)
III SEMESTER

Sl. No	Course Code	Title of the Course	Practical /Term Work / Sessions	Pre requisite	Credit Pattern & Credit Value				Contact Hours
					L	T	P	Total	
1	M19CT3010	Roads and Building Structures	OE	BE / B. TECH in Civil Engineering	4	0	0	4	4
2	M19CT3020	Internship with Report	Term Work and Viva - Voce		2	0	10	12	
3	M19CT3030	Project Phase-I	Report and Viva -Voce		0	0	4	04	
TOTAL								20	
TOTAL SEMESTER CREDITS								20	
TOTAL CUMULATIVE CREDITS								76	
TOTAL CONTACT HOURS								-	

Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru-560064

SCHOOL OF CIVIL ENGINEERING

M. Tech in CONSTRUCTION TECHNOLOGY AND MANAGEMENT

(2019-2021)

IV SEMESTER

Sl. No	Course Code	Title of the Course	Practical /Term Work / Sessions	Pre requisite	Credit Pattern & Credit Value				Contact Hours
					L	T	P	Total	
1	M19CT4010	Technical Seminar With Report	Term Work		0	0	4	4	
2	M19CT4020	Dissertation Phase-II	Thesis Submission and Viva-Voce		4	0	12	16	
TOTAL								20	
TOTAL SEMESTER CREDITS									20
TOTAL CUMULATIVE CREDITS									96
TOTAL CONTACT HOURS									-

Note: 1) OPEN ELECTIVE Courses are offered for the students of other Schools. The students of the School of Civil Engineering have to **choose ONE Open Elective offered by other schools.**

2) Open elective Classes will be conducted on Saturdays only

PROGRAMME OUTCOMES (PO's):

On successful completion of the Programme the students shall be able to:

- a. Apply the fundamental knowledge of mathematics topics like calculus, matrix theory, and Finite differences, Optimization methods and the fundamental knowledge of Physics, Chemistry, Basics of Engineering.
- b. Design and conduct experiments, as well as to analyze and interpret data.
- c. Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, Manufacturability and sustainability.
- d. Function on multidisciplinary teams
- e. Identify, formulate, and solve Civil Engineering problems in accordance with the relevant standard codes of practice.
- f. Understand the role of Civil Engineers and ethical responsibility.
- g. Communicate effectively through verbal, written, and graphical modes.
- h. Perform on the basis of broad education necessary to understand the impact of engineering Solutions in a global, economic, environmental, and societal context.
- i. Recognize the need for, and an ability to engage in life-long learning.
- j. Incorporate specific contemporary issues into the identification, formulation, and solution of specific civil engineering problems.
- k. Use the techniques, skills, and modern civil engineering tools necessary for engineering practice

FIRST SEMESTER

M19CT1010	BUILDING PLANNING AND DESIGN	L	T	P	C	Hrs.
Duration: 16weeks			3	1	0	4
<p>Prerequisite: Building Planning and Construction</p> <p>COURSE OBJECTIVES: Student will be able to learn</p> <ul style="list-style-type: none"> • To understand the byelaws and municipality act • To get the knowledge of soil characteristics for deciding the depth of foundations • To know the seismic affects to implement the design criteria • To practice the designs of different structural elements <p>COURSE OUTCOME: After successful completion of this course the student will be able to:</p> <ul style="list-style-type: none"> • To implement the byelaws and municipality act for planning of the buildings • To decide the type of foundation to be provided by knowing the bearing capacity of the soil and its characteristics • To be able to implement the design criteria required for earthquake prone zones • To design of different structural elements 						
UNIT-I						12HOURS
<p>Architecture: Land Acquisition Act 1894 (short titles, extent & definitions ONLY). Municipality act 1911 (short titles, extent & definitions only, Power of committee for making byelaws, for punishment, to sanction) Architectural Planning and Layout: Principles of planning a building, Factors affecting, selection of site for building, Sun & the building</p>						
UNIT-II						12HOURS
<p>SOIL: Soil formation, particle size analysis, Indian Standard Soil Classification, time-settlement curve, Proctor test, compaction of sand, factors affecting compaction, field compaction methods, calculation of Bearing Capacity of soil by Standard Penetration Test, soil investigation report, types of shear failures, effect of water table on B.C., Settlement cases, calculation of B.C. by Plate Load Test. Examples on determining area of foundation.</p>						
UNIT-III						12HOURS
<p>Structure: Earthquake: Hazardous affects on structures & Ground, General guidelines for earthquake resistance buildings. Liquefaction, factors affecting liquefaction & prevention, Various Loading Conditions and Analysis of Multistoreyed Complex (Kani's Method for vertical loads and Portal Method for Lateral loads)</p>						
UNIT-IV						12HOURS
<p>Structural Design of simply supported and cantilever reinforced concrete beams, columns, slabs, Foundations and Stairs. Structural Drawings with reference to seismic effects.</p>						
<p>REFERENCE BOOKS</p> <ol style="list-style-type: none"> 1. Soil Mechanics and Foundation Engg – Dr K R Arora – Standard Publishers. 2. Building planning designing and scheduling – Gurcharan Singh 3. Construction equipment and its planning and application Dr. Mahesh Verma. 						

4. Construction Planning equipment and Methods by RL Peurify Tata McGraw Hill.
5. IS- 1888 (1978): Plate Load Test
6. IS – 6403 (1981): Bearing capacity of shallow Foundation

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT1010	CO1		3								2	1	3			2
	CO2	3		3	2				2	3		3	3	3		3
	CO3	3			3	2	1			2	1		3	1	2	3
	CO4	3		3									3	2	3	3

M19CT1020	CONSTRUCTION METHODS AND EQUIPMENT	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Building Construction

COURSE OBJECTIVES: Student will be able to learn

- To study different methods of excavations and equipments used for excavation
- To get a knowledge of scaffolding and formwork used for high rise structures
- To know the construction and erection techniques for bridges
- To know the paving methods and equipments used

COURSE OUTCOME: After successful completion of this course the student will be able to:

- implement methods of excavations and equipments for the excavations
- To decide the provision of scaffolding and formwork to be used for high rise structures
- To implement construction and erection techniques for bridges
- To decide for implementing the different paving methods and equipments

UNIT-I

12HOURS

Earth Work: Methods: Trenching – Excavations - Braced Excavations – Shafts – Embankments – Dewatering Methods – compaction methods – Stabilising vertical cuts and slopes. Equipments: Compacting equipments, Scrapers, Dozers, Hydraulic Excavators, Trenching Machines, Graders,

Trimmers, Trucks and hauling equipments - Draglines and Cam Shells.	
UNIT-II	12HOURS
High Rise Structures: Methods and Equipments for foundations (Raft and pile foundations), well foundations, Shoring, Scaffolding, Formwork, Cranes and hoisting equipment. Slip form technique for tall chimneys and shafts.	
UNIT-III	12HOURS
Construction and Erection Techniques: Concrete Bridges - In-situ and precast construction methods, Balanced cantilever Methods, Span by Span Method, Incremental launching, Steel Bridges, Cable Stayed Bridges and Suspension Bridge.	
UNIT-IV	12HOURS
Highway Construction: Asphalt Plants, Paving Equipments, Tunnels-stages, methods and lining, Grouting Methods. Ports: Types, Breakwaters – berthing structures, mooring accessories – dredgers and dredging methods.	
REFERENCE BOOKS	
<ol style="list-style-type: none"> 1. Antil J.M., Civil Engineering Construction, McGraw Hill Book Co., 1982. 2. Peurifoy, R.L., Ledbette. W.B., Construction Planning, Equipment and Methods, McGraw Hill Co., 2000. 3. Ratay, R.T., Hand Book of Temporary Structures in Construction, McGraw Hill, 1984. 4. Koerner, R.M., Construction & Geotechnical Methods in Foundation Engineering, McGraw Hill, 1984. 5. Varma, M., Construction Equipment and its Planning & Applications, Metropolitan Book Co., 1979. 6. Smith, R.C, Andres, C.K., Principles and Practice of Heavy Construction, Prentice Hall, 1986. 	

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT1 020	CO1	3	3										3			2
	CO2	3		3						2			3			2
	CO3	3								3			3			1
	CO4	3		3						3			3			2

M19CT1030	ADVANCED DESIGN OF PRESTRESSED AND PRECAST STRUCTURES	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Design of Prestressed Concrete Structures

COURSE OBJECTIVES: Student will be able to learn

- To impart the knowledge about behaviour, analysis and design of pre-stressed concrete members
- To develop an understanding of the design of continuous beams and simple portal frames.
- To study the design of anchorage zones, composite beams, analysis and design of continuous beam
- To study the shear and Torsional resistance of prestressed members

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Develop skills in the analysis and design of pre-stressed concrete beams, columns and slabs
- Design anchorage zones and composite pre-stressed concrete members.
- Understand the concepts and techniques of precast construction and Select or design precast elements
- Is able to understand the shear and Torsional resistance of prestressed members

UNIT-I

12HOURS

Anchorage zone stresses in post-tensioned members: Introduction, stress distribution in end block, investigations on Anchorage zone stresses, Magnel and Guyon's Methods, Comparative Analysis, Anchorage zone reinforcement.

Shear and torsional resistance: Shear and principal stresses, ultimate shear resistance, design of shear reinforcement, Torsion, Design of reinforcement for torsion.

UNIT-II

12HOURS

Tension members: Introduction, Ties, Pressure pipes – fabrication process, analysis, design and specifications. Cylindrical containers- construction techniques, analysis, design and specifications.

Compression members: Introduction, Columns, short columns, long columns, biaxially loaded columns, Design specifications.

Composite beams: Introduction, types of composite beams, analysis for stresses, differential shrinkage, serviceability limit state. Design for flexural and shear strength.

UNIT-III

12HOURS

Statically indeterminate structures: Introduction, Advantages of continuous members, effect of pre-stressing in indeterminate structures, methods of analysis for secondary moments, concordant cable profile, Guyon's theorem, Ultimate load analysis, Design of continuous beams and portal frames.

Slab and grid floors: Types of floor slabs, Design of one way, two way and flat slabs. Distribution of pre-stressing tendons, Analysis and design of grid floors.

UNIT-IV

12HOURS

Precast elements: Introduction, Prestressed concrete poles manufacturing techniques, shapes and cross sectional properties, design loads, design principles. Railway sleepers-classification and Manufacturing techniques, design loads, analysis and design principles. Prestressed concrete

pavements, slab and wall panels.

REFERENCE BOOKS

1. Design of Prestressed concrete structures - Lin T.Y. and H. Burns- John Wiley & Sons, 1982.
2. Prestressed Concrete- N. Krishna Raju - Tata McGraw Hill, 3rd edition, 1995.
3. Prestressed Concrete Structures- P. Dayaratnam - Oxford & IBH, 5th Edition, 1991.
4. Prestressed Concrete- G.S. Pandit and S.P. Gupta – CBS Publishers, 1993.
5. Prestressed concrete- N. Rajagopalan; Narosa Publishing House.2nd edition, 2005.
6. Design of Prestressed Concrete- A. Nilson; John Willey & Sons.2nd edition, 1987.

IS : 1343 : 1980.

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT1 030	CO1	2	3		3	3			2	3			3	3	3	
	CO2	2	3	3	3	3			2	3			3	3	3	
	CO3	3	3	2	3	3			2	2			3	3		
	CO4	3	3	3	1	3	1					1	3	3		

M19CT1040	CONCRETE CONSTRUCTION TECHNOLOGY	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Concrete Technology

COURSE OBJECTIVES: Student will be able to learn

- To get a knowledge of chemical admixtures and mix design procedure
- To understand the concreting operations and equipments used
- To know different special concrete operations to be carried out
- To understand the prestressed concrete construction principles and statistical quality control

COURSE OUTCOME: After successful completion of this course the student will be able to:

- To decide the dosage of chemical admixtures to be used and mix design procedure
- To implement the concreting operations and equipments to be used
- To decide different special concrete operations to be carried out for specific requirements
- To implement and decide the prestressed concrete construction principles and statistical quality control

UNIT-I

12HOURS

Introduction of Concrete materials, Admixtures, Fly Ash, Polymers, Early Age Properties, Strength, Permeability & Durability. Principles of Concrete mix design, Concrete Mix Design procedure by: IS/ACI/British Standards.

UNIT-II

12HOURS

Concreting Operations-Practices and Equipment, Batching; Mixing; Transporting; Placing and Compacting; curing. Properties and technique of construction for concrete, Fiber reinforced concrete, light weight concrete, Heavy weight concrete, Foam concrete, High performance Concrete.

UNIT-III

12HOURS

Special concrete operations shot Crete, grouting, Grunting, under water concreting, hot and cold Weather concrete, pumpabale concrete. Construction techniques for reinforced concrete elements- materials, Principles and procedures for beams, slabs, columns, Foundations, walls and tanks, design and fabrication of form work for R.C.C elements.

UNIT-IV

12HOURS

Prestressed concrete construction-Principle, methods, materials, Tools and equipment for the construction of a prestressed bridge. Inspection and Quality Control of Concrete Construction- Stages, Principles, Checklist, Statistical Controls, procedures.

REFERENCE BOOKS

1. Concrete Technology by M.L. Gambhir
2. Concrete Technology, by Neville and Brooks
3. Properties of Concrete by Neville.
4. Concrete Microstructure, Properties and Materials
P.K. Mehta and PJM Monteiro
5. Concrete Technology – M.S. Shetty.

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT1040	CO1		3	3	2	1						2	3			2
	CO2		3	3						2			3			2
	CO3	3	3	3						3			3			1
	CO4	3	3	3						3			3			2

M19CT1051		L	T	P	C	Hrs.
Duration: 16weeks	PAVEMENT DESIGN ,CONSTRUCTION AND MANAGEMENT	3	1	0	4	5
Prerequisite: Transportation Engineering						
COURSE OBJECTIVES: Student will be able to learn						
<ul style="list-style-type: none"> • To know the different types of pavements and their functions • To understand the design of flexible pavements as per Indian Roads Congress standards and AASHTO standards • To understand the design of rigid pavements as per Indian Roads Congress standards and AASHTO standards • To understand the embankment constructions 						
COURSE OUTCOME: After successful completion of this course the student will be able to:						
<ul style="list-style-type: none"> • Implement the different types of pavements and their functions as per requirements • To design of flexible pavements as per Indian Roads Congress standards and AASHTO standards • To design of rigid pavements as per Indian Roads Congress standards and AASHTO standards • To implement the construction steps for embankment constructions 						
UNIT-I						12HOURS
Factors Affecting Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Legal Axle and Gross Weights. Tire Pressure, Contact Pressure, EAL and ESWL Concept, Lane Distributions and Vehicle Damage Factors, Subgrade support - CBR and plate bearing tests, CSA. Numerical examples						
UNIT-II						12HOURS
Design of Flexible Pavements: Design methods and principle, design steps, advantages and applications of different pavement design methods. IRC: 37-2001, AASHTO and Asphalt Institute methods. Specifications and guidelines. Numerical examples.						

UNIT-III	12HOURS
Design of Rigid Pavements: IRC: 58-2011 Method of design by stress ratio method. Design of continuously reinforced concrete pavements and airfield pavements. Design of joints. Specifications and guidelines.Design features of CRCP, SFRC and ICBP- Numerical examples.	
UNIT-IV	12HOURS
Embankment Construction: Specifications and steps for the construction of road in embankment and cut, construction steps for sub grade and preparation of sub grade.	
MANAGEMENT	
REFERENCE BOOKS	
<ol style="list-style-type: none"> 1. Khanna, S.K., Justo, C.E.G., and Veeraragavan, A., 'Highway Engineering', NemChandandBros, Roorkee. 2. Yoder, E.J., and Witzack, 'Principles of Pavement Design', 2nd Edition, John Wiley and Sons 3. Yang H.Huang, 'Pavement Analysis and Design', Prentice Hall Inc. 4. Yang, "Design of functional pavements"- McGraw Hill Book Co. 5. IS- 1888 (1978): Plate Load Test 6. IS – 6403 (1981): Bearing capacity of shallow Foundation 	

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT1051	CO1	3	3	3		1	1						3			3
	CO2	3	3	3	3	2	3			3			3	3	3	
	CO3	3	3	2	3	2	3			3			3	3	3	
	CO4	3	3	3	2			2					3	3		

M19CT1052	BRIDGE ENGINEERING	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5
Prerequisite: Design of RCC and PSC structures						
COURSE OBJECTIVES: Student will be able to learn						
<ul style="list-style-type: none"> • Construction of substructures such as pile foundations and pile concreting under various soil conditions • Caisson construction and sinking methods • Construction of superstructure in reinforced and prestressed concrete • Construction of box girder deck slab construction and segmental construction 						
COURSE OUTCOME: After successful completion of this course the student will be able to:						
<ul style="list-style-type: none"> • Conceptualise the Construction of substructures such as pile foundations and pile concreting under various soil conditions 						

- Design and implement Caisson construction and sinking methods
- Implement the methods of superstructure in reinforced and prestressed concrete construction
- Conceptualise the Construction of box girder deck slab and segmental construction

UNIT-I

12HOURS

Construction of Substructure for Bridges: Pile foundations – site investigation – depth of exploration – in-situ testing- soil exploration techniques. Piling methods – pile types – pile driving methods – non-displacement piles – micro piles – durability problems in pile construction – integrity testing – pile testing. Spacing of Piles - size of concrete piles - tolerance in pile alignment - pile cap. Pile concreting under various soil conditions.

UNIT-II

12HOURS

Caissons or well foundations: Caisson construction and sinking methods - construction of well curb (shoe) - towing a floating caisson to sinking site - bed preparation - supporting structures - lowering caissons - sinking open Well caissons - excavation method - de-watering for freeing a 'hanging' caisson. Sand Blow -jetting and lubrication - rectifying tilt in wells - skin friction in caissons - construction details of pneumatic sinking of caissons - construction methods of steining and bottom plugging

UNIT-III

12HOURS

Construction of superstructure - reinforced concrete superstructure- prestressed concrete superstructure - composite and steel superstructure - special superstructures. Geometrical alignment - lighting - Drainage - traffic lane width, road width, footpaths, and clearance for vehicles / boats - road kerb, crash barrier, parapet and handrail - expansion and roadway joints -super-elevation.

UNIT-IV

12HOURS

Slab, T-beam and Box girder deck slab construction: Slab type, T-beam and box-girder bridges Decks Construction methods. Span lengths -deck and stiffening system.Segmental Construction, Cantilever Construction and Successive Launching- Precast segmental construction for long-span bridges-cables and their profiling - deck section - soffit surface -deflection and pre-camber - expansion joint - bearings - aesthetics

REFERENCE BOOKS

1. Chew Yit Lin, Michael, Construction Technology for Tall Buildings (2nd Ed.), Singapore University Press, World Scientific, Hong Kong, 2001.
2. Victor.D.J, Essentials of Bridge Engineering, Oxford IBH, 2001
3. Ponnuswamy.S, Bridge Engineering, Tata McGraw Hill, 1989.
4. Raina V.K. Concrete Bridge practice, Tata McGraw Hill Publishing Co., 1991
5. Derrick Beckett, An Introduction to Structural Design of Concrete Bridges, Surry University Press, Oxford Shire, 1973.
6. Fleming. W. G. K., et al., Piling Engineering, Surrey University Press, London, 1985.

Mapping of Po's and Co's

Cour se Code	POS/ COs	PO 1	P O 2	PO 3	PO 4	PO 5	PO 6	PO 7	P O 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT1 052	CO1	3	3		2			2	1	3		1	3	2	3	1
	CO2	3		3			2	1	2	2			3	2	2	2
	CO3	3	3		3			2	2	1			3		1	1

	C04	3		3	2							3			2
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M19CT1061	SPECIAL CONCRETES				L	T	P	C	Hrs.
Duration: 16weeks					3	1	0	4	5
Prerequisite: Concrete Technology									
<p>COURSE OBJECTIVES: Student will be able to learn</p> <ul style="list-style-type: none"> • Components of modern concrete and developments in the process and constituent materials • High density concrete and ferrocement, their proportions and design • Fibre reinforced concrete, materials, mix proportioning and distribution • High performance concrete, their constituents and mix proportioning <p>COURSE OUTCOME: After successful completion of this course the student will be able to:</p> <ul style="list-style-type: none"> • Implement the modern concrete and developments in the process of constructions • Design High density concrete and ferrocement and their applications in the construction industry • Design Fibre reinforced concrete for special applications to increase the tensile strength characteristics of concrete • Design High performance concrete, their constituents and mix proportioning 									
UNIT-I								12HOURS	
Components of modern concrete and developments in the process and constituent materials: Role of constituents, Development in cements and cement replacement materials, pozzolona, fly ash, silica fume, rice husk ash, recycled aggregates, chemical admixtures. Mix proportioning of Concrete: Principles and methods. Light Weight concrete: Introduction, classification, properties, strength and durability, mix proportioning and problems.									
UNIT-II								12HOURS	
High density concrete: Radiation shielding ability of concrete, materials for high density concrete, mix proportioning, properties in fresh and hardened state, placement methods. Ferro cement: Ferrocement materials, mechanical properties, cracking of ferrocement, strength and behaviour in tension, compression and flexure, Design of ferrocement in tension, ferrocement constructions, durability, and applications.									
UNIT-III								12HOURS	
Fibre reinforced concrete: Fibre materials, mix proportioning, distribution and orientation, interfacial bond, properties in fresh state. Strength and behaviour in tension, compression and flexure of steel fibre reinforced concrete, mechanical properties, crack arrest and toughening mechanism, applications.									
UNIT-IV								12HOURS	
High Performance concrete: constituents, mix proportioning, properties in fresh and hardened states, applications and limitations. Ready Mixed Concrete, Self Compacting Concrete, Self Curing Concrete, Reactive powder concrete, Bacterial Concrete.									
REFERENCE BOOKS									
1.Neville A.M, "Properties of Concrete" Pearson Education Asis, 2000									

- 2.P. Kumar Mehta, Paul J.N.Monterio, CONCRETE, “Microstructure, Properties and Materials”-Tata McGraw Hill
- 3.A.R.Santhakumar, (2007) “Concrete Technology”-Oxford University Press, New Delhi, 2007.
- 4.Short A and Kinniburgh.W, “Light Weight Concrete”- Asia Publishing House, 1963
- 5.Aitcin P.C. “High performance concrete”-E and FN, Spon London 1998
- 6.Rixom.R. and Mailvaganam.N., “Chemical admixtures in concrete”- E and FN, Spon London 1999

Mapping of Po’s and Co’s

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT1061	CO1		3	3						2		2	2		2	
	CO2		3	3	3	1		2		2	1	2	3	2	3	1
	CO3	3	3	3	3	1		2		2	1	2	3	2	3	1
	CO4	3	3	3	3	1		2		2	1	2	3	2		

- Implement the modern concrete and developments in the process of constructions
- Design High density concrete and ferrocement and their applications in the construction industry
- Design Fibre reinforced concrete for special applications to increase the tensile strength characteristics of concrete
- Design High performance concrete, their constituents and mix proportioning

M19CT1062	Environmental engineering and management	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Environmental Engineering

COURSE OBJECTIVES: Student will be able to learn

- Concepts of environmental impact assessment
- Unique pollution problems and public participation
- Measurement of environmental impact and organisation
- Environmental management, principles and strategies

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Implement the assessment techniques for environmental impact
- Measure the pollution level and suggest solution to the problems and public participation
- Organise systematically to implement the methodologies for assessment

- Apply the principles and strategies for environmental management

UNIT-I

12HOURS

Environmental impact assessment (EIA):Introduction, definitions and concepts, rationale and historical development of EIA, EIA for civil engineers.

Broad components of EIA:Initial environmental examination, environmental impact statement, environmental appraisal, environmental impact factors and areas of consideration.

UNIT-II

12HOUR

Broad components of EIA:Pertinent institutional information, unique pollution problems, existing visual quality, public participation techniques.Composite consideration, potential cultural resources, potential visual impacts, geographical study area.

Status of EIA in India:EIA Regulations in India, TOR for Hydropower Projects and other projects.Case studies from hydropower projects, hazardous industries and mining.

UNIT-III

12HOURS

Methodologies:Measurement of environmental impact, organization, scope and methodologies of EIA pertinent environmental factors.Six generic steps, descriptive checklists, simple interaction matrix, stepped matrix, uniqueness ratio, habitat evaluation system.Public involvement techniques, comprehensive environmental impact study, various project types, archaeological properties, leachate testing, evaluation species, proposing agency, EIA Models.

UNIT-IV

12HOURS

Environmental management:Principles, problems and strategies; Review of political, ecological and remedial actions.Future strategies; multidisciplinary environmental strategies, the human, planning, decision-making and management dimensions.

Environmental audit:Definitions and concepts, partial audit, compliance audit, methodologies and regulations.

REFERENCE BOOKS

TEXTBOOKS:

1. Canter, R.L., "Environmental Impact Assessment", McGraw Hill Inc., New Delhi, 1996.
2. Shukla, S.K. and Srivastava, P.R., "Concepts in Environmental Impact Analysis", Common Wealth Publishers, New Delhi, 1992.

REFERENCES:

1. John G. Rau and David C Hooten "Environmental Impact Analysis Handbook", McGraw Hill Book Company, 1990.
2. "Environmental Assessment Source book", Vol. I, II & III. The World Bank, Washington, D.C., 1991.
3. Judith Petts, "Handbook of Environmental Impact Assessment Vol. I & II", Blackwell Science, 1999.

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT1062	CO1			3			2	2	1	1			3			1
	CO2	3		3		2	1		3	2		2	3	2		2
	CO3	3		3	3	2	1			3			3	2		2
	CO4	3		3	3	3		2	3				3			3

M19CT1070						L	T	P	C	Hrs.
Duration: 16weeks	CONSTRUCTION MATERIALS LAB					0	0	4	4	3

Prerequisite: Concrete Technology, Chemical admixtures

COURSE OBJECTIVES: Student will be able to learn

- To gain experience regarding the determination of properties of different building materials
- To provide an opportunity to learn how to measure the parameters, which governs the quality of the materials
- To impart knowledge of mix design of concrete
- to gain experimental knowledge of using bitumen for the pavements

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Implement good quality construction techniques
- Identify the quality of the materials used for construction
- Identify the proportion of the mix design
- Identify the usage of bitumen in the construction of pavements

LIST OF EXPERIMENTS:

1. Mix Design of Concrete
2. Tests on fresh concrete
3. Tests on hardened concrete
4. In-situ Strength determination by Rebound Hammer.
5. Measurement of Moisture content in aggregates, soil and hardened concrete surface using NDT techniques.
6. Pull-Out Tests on concrete
7. Effect of Chemical admixtures on fresh and hardened properties of concrete
8. Effect of mineral admixtures on fresh and hardened properties of concrete
9. Tests on Bitumen materials
10. Tests on Course aggregates for road construction

REFERENCE BOOKS:

- 1) Mehta P.K and Monteiro. P. J. M. " CONCRETE", Microstructure, Properties and Materials, Third Edition, Tata McGraw- Hill Publishing company Limited, New Delhi, 2006
- 2) Shetty .M.S., " Concrete Technology, Theory and Practice", Revised Edition, S. Chand & company Ltd., New Delhi,2006
- 3) Neville. A.M. , " Properties of Concrete", 4th Edition Longman,1995
- 4) Mindass and Young, " Concrete", Prentice Hall.1998

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/C Os	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PS O1	PS O2	PS O3	PS O4
M19CT1070	CO1		3	2	3		2	2	1	1			3	2	3	1
	CO2	3		3	3	2	1		3	2		2	3	1	3	2
	CO3	3	3	3	3	2	1			3			3	2	3	2
	CO4	3	2	3	3	3		2	3				3	2	3	3

M19CT2010	CONSTRUCTION COSTING AND FINANCIAL MANAGEMENT	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5
Prerequisite: Estimation and Costing, Engineering Economics						
COURSE OBJECTIVES: Student will be able to learn						
<ul style="list-style-type: none"> • Scope for financial management and supply-demand mechanism • Production and cost theory analysis and pricing • Time value for money and discounted cash flow • Accounting information and application in construction industry 						
COURSE OUTCOME: After successful completion of this course the student will be able to:						
<ul style="list-style-type: none"> • Implement financial management and supply-demand mechanism • Application of Production and cost theory analysis and pricing • Value for time management and getting discounts • Implementation in the construction industry 						
UNIT-I						12HOURS
Financial Management; Meaning and Scope, Economics and Scope, Supply and Demand						

Mechanism, analysis and forecasting. Balance sheet, profit & loss account, fund flow statement	
UNIT-II	12HOURS
Production and Cost theory, analysis. Pricing; objectives, determinants, absorption, marginal costing. Financial analysis, Decisions. Capital Budgeting, budgetary control, standard costing and variance, investment appraisal Practical problems and case studies	
UNIT-III	12HOURS
Engineering economics, Time value of money, discounted cash flow, NPV, ROR, Bases of comparison, Incremental analysis, Benefit-Cost analysis, Replacement analysis, Breakeven analysis, Capital budgeting, Taxation and Inflation, Working capital management, Construction accounting, Income statement, Financial statements.	
UNIT-IV	12HOURS
Construction Finance: Accounting information and application, Financial versus economic evaluation, financial statements and project appraisal. Project yield, taxation and inflation, risk and uncertainty, Turnkey activities; finance and working capital, depreciation and amortization; cost control, performance budgeting, equipment rentals. Bidding and awards, work pricing, cost elements of contracts, letters of credit, financing plans, multiple sources of finance. Qualifying, bidding, bidders, comparing the bids, under-writing. unforeseen revisions, costs and rates escalation, cost progress reporting. Legal aspects	
REFERENCE BOOKS	
1. Blank, L. T. and Tarquin, A. J., "Engineering Economy", Fourth Edition, WCB/McGraw-Hill, 1998.	
2. Bose, D. C., "Fundamentals of Financial management", 2nd ed., PHI, New Delhi, 2010.	
3. Boyer, C.B. and Merzbach, U. C., "A History of Mathematics", 2nd ed., John Wiley & Sons, New York, 1989.	
4. Gould, F.E., "Managing the Construction Process", 2nd ed., Prentice Hall, Upper Saddle River, New Jersey, 2002.	
5. Gransberg, D. G., Popescu, C. M. and Ryan, R. C., "Construction Equipment Management for Engineers, Estimators, and Owners, CRC/Taylor & Francis, Boca Raton, 2006.	
6. Harris, F. , McCaffer, R. and Edum-Fotwe, F., "Modern Construction Management", 6th ed., Blackwell Publishing, 2006.	
7. Jha, K. N., "Construction Project Management, Theory and Practice", Pearson, New Delhi, 2011.	

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS 01	PSO 2	PSO 3	PSO 4
M19 CT2	CO1	3	3	3		1	2	3	2			2		3		
	CO2	3	3	3		2	3					1	2	3	1	

010	CO3	3	3	3	2		3		1				3	2	
	CO4	3	3	3		3		1				3		2	

M19CT2020	COMPOSITE MATERIALS											L	T	P	C	Hrs.
Duration: 16weeks												3	1	0	4	5
Prerequisite: Building Materials																
COURSE OBJECTIVES: Student will be able to learn																
<ul style="list-style-type: none"> • Theoretical concept of composite materials • Behaviour, load bearing mechanism and designs • Flexible and rigid connections and seismic behaviour of composite structures • Behaviour of box girder bridges and design concepts 																
COURSE OUTCOME: After successful completion of this course the student will be able to:																
<ul style="list-style-type: none"> • implement the concept of composite materials • Behaviour, load bearing mechanism and designs • Flexible and rigid connections and seismic behaviour of composite structures • Behaviour of box girder bridges and design concepts 																
UNIT-I														12HOURS		
Introduction to steel - concrete composite construction - theory of composite structures –Comparison of composite and non-composite beam action- Introduction to steel - concrete - steel sandwich construction. Materials in composite construction- profiled steel decking-fabricated sections.																
UNIT-II														12HOURS		
Shear Connectors: types-behaviour-load bearing mechanism-failure mechanism-standard test. Design and strength of shear connectors. Design of Composite members – simply supported slabs – simple and continuous beams.Composite columns: Types-Design of concrete encased columns, concrete filled tubular columns. Design of Composite trusses.																
UNIT-III														12HOURS		
Connections in Composite construction- flexible and rigid connections- moment resisting connections. Seismic behaviour of composite structures..																
UNIT-IV														12HOURS		
Composite Box Girder Bridges: Introduction - behaviour of box girder bridges - design concepts. Case studies: Case studies on steel-concrete composite construction in buildings and bridges.																
REFERENCE BOOKS																
1. Johnson R.P, Composite structures of steel and concrete, Blackwell Scientific Publications (Second Edition), UK, 1994.																
2. Owens, G.W. and Knowles.P, Steel Designers manual (Fifth edition), Steel Concrete Institute (UK), Oxford Blackwell Scientific Publications, 1992.																
3. Nethercot, D.A. Composite Construction, Spon Press, London, 2003.																
4. Oehlers.O.J, Bradford, M.A. Elementary Behavior of Composite Steel and Concrete structural members, Butterworth-Heinemann, London, 1999.																

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT2020	CO1	3	3	3	2	1				1			3			2
	CO2	3	3	3		2				2		2	3	2	1	2
	CO3	3	3	3	2	3				3	3	1	3			2
	CO4	3	3	3		2				3		2	3		2	2

M19CT2030	BUILDING SERVICES				L	T	P	C	Hrs.
Duration: 16weeks					3	1	0	4	5
Prerequisite: building construction									
<p>COURSE OBJECTIVES: Student will be able to learn</p> <ul style="list-style-type: none"> • Applications of services for different types of buildings • Design considerations of the lifts, their locations and sizes • General requirements of fire resisting building • Electrical services in buildings <p>COURSE OUTCOME: After successful completion of this course the student will be able to:</p> <ul style="list-style-type: none"> • Design the required services for different types of buildings • Implementation and design of the lifts, their locations and sizes • Provisions to make fire resisting buildings • Design of Electrical services in buildings 									
UNIT-I								12HOURS	
Definitions, Objective and uses of services, Applications of services for different types building considering, Classification of building services, Types of services and selection of services, Natural and artificial lighting principles and factors, Arrangement of luminaries, Distribution of illumination, Utilization factors, Necessity of Ventilation Types – Natural and Mechanical Factors to be considered in the design of Ventilation									
UNIT-II								12HOURS	
Introduction of mechanical services, Lift -Definition, Types of Lifts, Design Considerations, Location, Sizes, Component parts- Lift Well, Travel, Pit, Hoist Way, Machine, Buffer, Door Locks, Suspended Rope, Lift Car, Landing Door, Call Indicators, Call Push, Elevators & Escalators-Different types of elevators and Escalators, Freight elevators, Passenger elevators, Hospital elevators, Uses of different types of elevators Escalators. Dumbwaiters, Different types of Dumbwaiters Uses of different types of Dumbwaiter. Conveyors -Different types of Conveyors, Uses of different types of Conveyors, Air Conditioning-Definition, Purpose, Principles, Temperature Control, Air Velocity Control, Humidity									

Control, Air Distribution system, Cleaners, Filters, Spray washers, Electric preceptors, Types of Air Conditioners, (Central type, Window Type, Split Unit).

UNIT-III

12HOURS

Introduction, Causes of fire and Effects of fire, General Requirements of Fire Resisting building as per IS and NBC 2005, Characteristics of Fire resisting materials, Maximum Travel Distance, Fire Fighting Installations for Horizontal Exit, Roof Exit / Fire Lifts, External Stairs, Requirement of good Acoustic, Various sound absorbent, Factors to be followed for noise control in residential building.

UNIT-IV

12HOURS

electrical services in the building Technical terms and symbols for electrical installations and Accessories of wiring, Systems of wiring like wooden casing, cleat wiring, CTS wiring conduit wiring, Types of insulation, electrical layout for residence, small work shop, show room, school building, etc

Rain water Harvesting for buildings, Concept of GREEN buildings, Components of GREEN building Introduction and Significance to Grey water, Components of Grey water system, Management of Grey water system.

REFERENCE BOOKS

1. Frederick S. Merritt, Jonathan T. Ricketts, Building design and construction Handbook, McGraw-Hill Inc., 5th edition, 1994
2. Fred hall and Roger Greeno, Building Services Handbook, Routledge, 7th edition, 2013
3. M. David Egan, Architectural Acoustics, J. Ross Pub., 2007
4. Gurcharan Singh, Jagdish Singh, Water Supply & Sanitary Engineering, Standard Publishers Distributors, 2007
5. Shri V.K. Jain, Fire Safety in Buildings, New age publishers, 2010
6. BIS, National Building Code 2005, New Delhi, 2005
7. Shan Wang, Handbook of Air Conditioning and Refrigeration, 2nd Edition, McGraw Hill, 2000
8. Krieder, J. F., Handbook of Heating Ventilation and Air Conditioning, Taylor & Francis, 2005
9. Barrie Rigby, Design of Electrical Services for Buildings, 4th Edition, Routledge, 2013
10. W. E. Steward, T. A. Stubbs, Modern Wiring Practice Design and Installation; 14 edition, Newnes, 2009

- Design the required services for different types of buildings
- Implementation and design of the lifts, their locations and sizes
- Provisions to make fire resisting buildings
- Design of Electrical services in buildings

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT2 030	CO1		3	3						3		2	3	2	3	
	CO2		3	3				1		3		2	3	2	3	3
	CO3		3	3	2	2				3	2	1	3			

	CO4		3	3					3		2	3	2	3	
M19CT2040	FOUNDATION DESIGN AND CONSTRUCTION										L	T	P	C	Hrs.
Duration: 16weeks											3	1	0	4	5

Prerequisite: RCC Design of Structures

COURSE OBJECTIVES: Student will be able to learn

- Function and settlement determination of shallow foundations
- Function and classifications of piles and concepts of raft foundations
- Caisson type and stability of caissons
- Types of machine foundations and general requirements

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Design of shallow foundations and settlement determination
- Load evaluation of piles and ground modification of raft foundations
- Design and construction aspects of Caissons
- Field tests for the provision of machine foundations

UNIT-I

12HOURS

Shallow Foundation -Functions and requisites of a foundation - Different types – Bearing capacity determination – Field Tests – Settlement determination – Proportioning of shallow foundation – Design guidelines - Codal recommendations - Construction aspects.

UNIT-II

12HOURS

Raft Foundation -Codal Recommendations – Construction aspects – Ground modification for shallow foundations.

Pile Foundation -Function – classification of piles – Factors governing choice of pile foundation – Load transfer principles - load evaluation of piles and pile groups – Static method – Dynamic method –pile load test – Under reamed piles - Pile raft system – Laterally loaded piles - Codal Recommendations – Construction aspects.

UNIT-III

12HOURS

Caisson Foundation

Caissons types – Stability of caissons – Loads - principles of analysis and design - IS Guidelines- Construction aspects.

UNIT-IV

12HOURS

Machine Foundation

Types of Machines and Foundations – General requirements –Principles of measuring dynamic properties – Field tests – Factors affecting dynamic properties- Mechanism of Liquefaction– Influencing factors-Evaluation of Liquefaction potential –Design of Block Foundation – Codal Recommendations – Construction aspects - Vibration Isolation.

REFERENCE BOOKS

1. Bowles, J.E., Foundation Analysis and Design, Fifth Edition, McGraw Hill, New York, 1995.
2. Das, B.M., Principles of Foundation Engineering, Design and Construction, Fourth Edition, PWS Publishing, 1999.
3. Vaidyanathan, C.V., and Srinivasalu, P., Handbook of Machine Foundations, McGraw Hill, 1995.
4. Koerner, R.M., Construction & Geotechnical methods in foundation engineering,

MGH, New York,1985

5. Hausmann.M.R. Engineering principles of Ground Modification, mcGraw-Hil

6. Peurifoy, R.L., Ledbette. W.B Construction Planning , Equipment and Methods
McGraw Hill Co, 2000

Mapping of Po's and Co's

- Design of shallow foundations and settlement determination
- Load evaluation of piles and ground modification of raft foundations
- Design and construction aspects of Caissons
- Field tests for the provision of machine foundations

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT2040	CO1	3	3	3						3		2	3	2	3	2
	CO2	3	3	3		3				2			3	2	1	1
	CO3	3	3	3	2					3		2	3	2	3	
	CO4	3	3	3									3	1	2	

M19CT2051	CONSTRUCTION PLANNING AND CONTROL	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Building Planning and Construction, Concrete Technology

COURSE OBJECTIVES: Student will be able to learn

- Utilization of actual resources required and tools of measurement of resources
- Time of purchase and quantity of materials and distribution
- Time and planning management
- Quality of materials to be maintained

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Identify actual resources required and tools of measurement of resources
- Confident in implementing the quantity of materials and distribution
- Implement time and planning management
- Strictly adhere to the quality of materials to be maintained

UNIT-I

12HOURS

Resource Planning: Resource Planning, Procurement, identification, Personnel, Planning for material, Labour, time schedule and cost control. Types of resources, manpower, Equipment,

Material, Money, Time. Resources: Systems approach in resource management, characteristics of resources, Resources, Utilization, measurement of actual resources required. Tools for measurement of resources, Labour, classes of Labour, Cost of Labour, Labour Schedule, optimum use of labour.

UNIT-II

12HOURS

Materials: Time of purchase, Quantity of material, sources, Transportation, Delivery and Distribution. Equipment: Planning and selecting by optimistic choice with respect to cost, Time, Source and handling.

UNIT-III

12HOURS

Time: Personnel time, Management and planning, Managing time on the project, forecasting the future, Critical path measuring the changes and their effects. Cost control: Cash flow and cost control, objectives of cost, Time and Quality.

UNIT-IV

12HOURS

Quality control: Construction Quality Control Inspection Program Content and Proposed Outline for QCIP, Field Tests and Frequency of Testing, Field Laboratory or Commercial Testing Facilities, Inspection Plan Including Documentation and Reporting, Sample Report Forms Nonconformance Report Environmental Deficiency Report, Sample Civil Inspection Checklists.

REFERENCE BOOKS

1. Andrew, D, Szilagg, Hand Book of Engineering Management, 1982.
2. Glenn, A. Sea's and Reichard, H Clough, Construction Project Management, John Willey and Sons, Inc. 1979.
3. Harvey, A. Levine, Project Management using Micro Computers, Obsome-McGraw Hill C.A. Publishing Co., Inc. 1988,
4. James, A., Adrain, Qauntitative Methods in Construction Management, American Elsevier Publishing Co., Inc. 1973.

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Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT2 051	CO1	3	3	3		2				2		2		3		3
	CO2	3	3	3				2		2		2	3			1
	CO3	3	3	3	2							2		2	3	
	CO4	3	3	3							3	2	3	2		1

M19CT2052	MODERN CONSTRUCTION MATERIALS	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Concrete Technology

COURSE OBJECTIVES: Student will be able to learn

- Properties and specifications of concrete making materials
- Different concreting techniques and types of concretes
- Use of waste industrial waste products
- Concept of painting and varnishing

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Implementing the specifications for concrete making materials
- Practical implementation of concreting techniques
- Practicing the waste industrial waste products
- Application of painting and varnishing

UNIT-I	12HOURS
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Properties and specifications of concrete making material – alternatives of cement – alternatives of aggregates. Properties of fresh concrete. Modern techniques in handling- compacting and curing concretes – Properties of hardened concrete- mechanical properties and durability aspects. Additives and admixtures of concrete.

UNIT-II	12HOURS
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Materials and methods: Hot and cold weather concreting – underwater concreting - mass concreting - high strength and high performance concretes - Polymer concrete composites- fibre reinforced concrete- GFRC- Ready mixed concrete - light weight concrete – Ferrocement- Self compacting concrete. Engineered cementitious composites.

UNIT-III	12HOURS
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Use of waste products and industrial by-products: Fly ash, micro-silica, GGBFS and other mineral products- Geo-textiles and geo-synthetics – applications in Civil Engineering – Concrete under special environment – high density concrete – concrete for nuclear reactors.

UNIT-IV	12HOURS
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Concept of painting, varnishing, white washing. Thermal insulation and acoustic absorption materials- Water proofing materials and compounds- Flooring materials, Repair materials- Hybrid systems in concrete- smart concrete.

REFERENCE BOOKS

1. Neville, A.M., Properties of Concrete, Pearson Education Asia (P) Ltd, England, 2000.
2. Mehta, P.K and Monteiro. P.J., Concrete- Microstructure, Properties and Materials, ICI, 1997.
3. Santhakumar, A.R, Concrete Technology, Oxford University Press, New Delhi, 2007.
4. Jackson, N., Civil Engineering Materials, ELBS, 1983.
5. Diamant, R.M.E., Thermal and Acoustic Insulation, Butterworths, 1986.
6. Vedhikizen Van Zanten, R., (Ed), Geotextiles and Geomembranes in Civil Engineering.
7. Koerner, R.M., Construction and Geotechnical Methods in Foundation Engineering, McGraw Hill Co., 1985.

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Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT2052	CO1		3	3	2				3		3	2	3	2	3	2
	CO2		3	3			3		2				3	2		2
	CO3	3	3	3	2						3		3	2		1
	CO4	3	3	3									3			2

- Implementing the specifications for concrete making materials
- Practical implementation of concreting techniques
- Practicing the waste industrial waste products
- Application of painting and varnishing

M19CT2053	GREEN BUILDING TECHNOLOGY	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Concrete Technology

COURSE OBJECTIVES: Student will be able to learn

- Life cycle impacts of materials and products and sustainable design concepts
- Building energy simulation and efficiency
- Indoor environmental quality management
- Green building concepts

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Implement the life cycle impacts of materials and products and adopt sustainable design concepts
- Simulate the building energy and design for efficiency
- To adopt indoor environmental quality management
- Implementation of green building concepts

UNIT-I

12HOURS

Introduction : Life Cycle impacts of materials and products – sustainable design concepts – strategies of Design for the Environment -The sun-earth relationship and the energy balance on the earth's surface, climate, wind – Solar radiation and solar temperature – Sun shading and solar radiation on surfaces – Energy impact on the shape and orientation of buildings – Thermal properties of building materials.

UNIT-II

12HOURS

Energy Efficient Buildings : Passive cooling and day lighting – Active solar and photovoltaic-Building energy analysis methods- Building energy simulation- Building energy efficiency standards- Lighting system design- Lighting economics and aesthetics- Impacts of lighting efficiency – Energy audit and energy targeting- Technological options for energy management.

UNIT-III	12HOURS
Indoor Environmental Quality Management : Psychometric- Comfort conditions- Thermal comfort- Ventilation and air quality-Air conditioning requirement- Visual perception- Illumination requirement- Auditory requirement- Energy management options- -Air conditioning systems- Energy conservation in pumps- Fans and blowers- Refrigerating machines- Heat rejection equipment- Energy efficient motors- Insulation.	
UNIT-IV	12HOURS
Green Building Concepts: green building concept- Green building rating tools- Leeds and IGBC codes. – Material selection Embodied energy- Operating energy- Façade systems- Ventilation systems- Transportation- Water treatment systems- Water efficiency- Building economics, green building design case study	
REFERENCE BOOKS	
TEXTBOOKS:	
<ol style="list-style-type: none"> 1. Kibert, C. “Sustainable Construction: Green Building Design and Delivery”, John Wiley & Sons, 2005 2. Edward G Pita, “An Energy Approach- Air-conditioning Principles and Systems”, Pearson Education, 2003. 	
REFERENCES:	
<ol style="list-style-type: none"> 1. Colin Porteous, “The New Eco-Architecture”, Spon Press, 2002. 2. Energy Conservation Building Codes: www.bee-india.nic.in 3. Lever More G J, “Building Energy Management Systems”, E and FN Spon, London, 2000. 4. Ganesan T P, “Energy Conservation in Buildings”, ISTE Professional Center, Chennai, 1999. 5. John Littler and Randall Thomas, “Design with Energy: The Conservation and Use of Energy in Buildings”, Cambridge University Press, 1984. 	

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Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT2 053	CO1	3	3						3	3		3	3		2	3
	CO2	3		3		2			2	1	2	2	3	3	3	2
	CO3	3			2			2					2	2		1
	CO4	3		3					3	3		3	3		2	3

M19CT2061	DISASTER REDUCTION AND MANAGEMENT	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5
<p>Prerequisite: Design of Earthquake resistant structures</p> <p>COURSE OBJECTIVES: Student will be able to learn</p> <ul style="list-style-type: none"> • Concept of natural and manmade disasters and risks involved • Phases of disasters and preparedness • Disaster life cycle, planning and preparations • Disaster management scenario in Indian context <p>COURSE OUTCOME: After successful completion of this course the student will be able to:</p> <ul style="list-style-type: none"> • Thorough understanding of natural and manmade disasters and risks involved and implementation • To design for preparedness to manage disasters • Plan and prepare for Disaster life cycle • Management of disasters with available resources in Indian scenario 						
UNIT-I						12HOURS
<p>Concepts of Hazard, Vulnerability, Risks, Natural Disasters (earthquake, Cyclone, Floods, Volcanoes), and Man Made Disaster (Armed conflicts and civil strip, Technological disasters, Human Settlement, Slow Disasters (famine, draught, epidemics) and Rapid Onset Disasters (Air Crash, tidal waves, Tsunami) Risks, Relationship between Disasters and Development and vulnerabilities, different stake holders in Disaster Relief. Refugee operations during disasters, Human Resettlement and Rehabilitation issues during and after disasters, Inter-sectoral coordination during disasters, Models in Disasters.</p>						
UNIT-II						12HOURS
<p>Disaster Risk Reduction Strategies, Disaster Cycle, Phases of Disaster, Preparedness Plans, Action Plans and Procedures, Early warning Systems Models in disaster preparedness, Components of Disaster Relief- (Water, food, sanitation, shelter, Health and Waste Management), Community based DRR, Structural non structural measures in DRR</p> <p>DRR Master Planning for the Future, Capacity Building, Sphere Standards. Rehabilitation measures and long term reconstruction. Psychosocial care provision during the different phases of disaster</p>						
UNIT-III						12HOURS
<p>MEDICAL MANAGEMENT Introduction to disaster medicine, Various definitions in disaster medicine, Disaster life cycle, Disaster planning, Disaster preparation, Disaster recovery in relation to disaster medical management, Medical surge, Surge capacity, Medical triage, National Assessing the nature of hazardous material - Types of injuries caused, Self protection contaminated area and decontaminated area – Pre hospital medical management of victims – Polytrauma Care - Specific treatment in emergency and Intensive Care Units – allocation of specialists in Local EMS System including equipments, safe use of equipments</p>						
UNIT-IV						12HOURS
<p>Hazard and Vulnerability Profile India,, Disaster Management Indian scenario, India's vulnerability profile, Disaster Management Act 2005 and Policy guidelines, National Institute of Disaster Management, , National Disaster Response Force (NDRF) National Disaster Management Authority,</p>						

States Disaster Management Authority, District Disaster Management Authority Cases Studies : Bhopal Gas Disaster, Gujarat Earth Quake, Orissa Super-cyclone, south India Tsunami, Bihar floods, Plague-Surat, Landslide in North East, Heat waves of AP& Orissa, 278 Cold waves in UP. Bengal famine, best practices in disaster management, , National Flood Risk Mitigation Project (NFRMP), Mines Safety in India, Indian Meteorological Department, National Crisis Management Committee, Indian NATIONAL Centre for Oceanic Information System (INCOIS)

REFERENCE BOOKS

1. Disaster Management Guidelines. GOI-UNDP Disaster Risk Reduction Programme(2009-2012.)
2. Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003
3. Guerisse P. 2005 Basic Principles of Disaster Medical Management. Act Anaesth.Belg;56:395-401
4. Aim and Scope of Disaster Management. Study Guide prepared by Sharman and Hansen. UW-DMC, University of Washington.
5. Sphere Project (2011). Humanitarian Charter and Minimum Standards in Disaster Response.

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Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19 CT2 061	CO1	3	3						2		3		3			3
	CO2	3	3	3					2		3		3		1	
	CO3	3	3						2		3		3		2	
	CO4	3	3	3					2		3		3			3

M19CT2062	LOW COST CONSTRUCTION TECHNOLOGY	L	T	P	C	Hrs.
Duration: 16weeks		3	1	0	4	5

Prerequisite: Building Construction

COURSE OBJECTIVES: Student will be able to learn

- Materials to be used in the low cost constructions
- Recycling of wastes in manufacturing materials used for housing
- Roof elements constructed used by low cost materials
- Laurie Baker's concept of low cost technology

COURSE OUTCOME: After successful completion of this course the student will be able to:

- Adopting the low cost materials in the low cost constructions
- Use of recycled wastes in manufacturing materials used for housing
- Implementation for roof elements constructed used by low cost materials
- Low cost technology adopted by Laurie Baker

Laurie Baker's concept of low cost technology

UNIT-I	12HOURS
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Improvement of mud , Stabilization, Non-erodible mud plaster , Terra-cotta skin to mud walls
Improved Thatch Roof, Wardha Tumbler Tiles, Ferro-Cement, Fly ash-sand Lime Bricks, Clay Fly ash Burnt Bricks, Cement Bonded Fiber Roofing Sheets, Gypsum Based Ceiling Tiles, Precast Stone Blocks, Precast Hollow Concrete Blocks, Holo-Pan system

UNIT-II	12HOURS
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Selection of Materials for Low Cost Housing, In Manufacturing of low cost building materials – Pollution prevention, Recycling of wastes in Manufacturing, Reducing Energy Consumption and use of Natural materials, Use of Local material, Foundation, Plinth, Walling, Concrete block walling

UNIT-III	12HOURS
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Soil cement block technology, Doors and windows, Lintels and Chajjas, Roofing, Filler slabs, Jack arch roof/floor, Ferrocement channel/shell unit, Finishing Work, Case histories in India, Sustainable building technology for mass application

UNIT-IV	12HOURS
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HUDCO Projects, project on Panchayat Raj, National Institute of Rural Development funded project: Access to Housing for the Rural Poor 2014, Laurie Baker Building Centre: Projects carried under low cost technology

REFERENCE BOOKS

1. Low-cost Concrete Houses"-1963. The Concrete Association of India, Cement House, 121, Queen's Road, Bombay.
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8. "Building Digest 45" Sept., 1966, Central Building Research Institute, Roorkee, U.P., India.
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Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT2062	CO1	3	3	3			2		2		3		3	2	1	2
	CO2	3							2		3		3	1	2	
	CO3	3		3	3				2		3		3			3
	CO4	3					2		2		3		3		2	

M19CT2063	SHORING, SCAFFOLDING AND FORMWORK					L	T	P	C	Hrs.
Duration: 16weeks						3	1	0	4	5
Prerequisite: Concrete Technology COURSE OBJECTIVES: Student will be able to learn <ul style="list-style-type: none"> • Understand the planning of formwork installations • Materials to be used in the form • Design the forms and shoring • Location of job mill and storage COURSE OUTCOME: After successful completion of this course the student will be able to: <ul style="list-style-type: none"> • Implement the planning of formwork installations • Decide the materials to be used in the form • Design the forms and shoring • Storage , installation and location of job mill and storage 										
UNIT-I									12HOURS	
PLANNING AND SITE EQUIPMENT & PLANT FOR FORM WORK At Tender stage – Development of basic system – Planning for maximum reuse – Economical form construction – Planning examples – Crane size, effective scheduling estimate – Recheck plan details										

– Detailing the forms. Overall Planning – detail planning – Standard units – Corner units – Schedule for column formwork – Formwork elements – Planning Crane arrangements – Site layout plan – Transporting plant – Formwork beams – Formwork ties – Wales and ties – scaffold frames from accessories – Vertical transport table form work.

UNIT-II

12HOURS

FORM MATERIALS

Lumber – Types – Finish – Sheathing boards working stresses – Repetitive member stress – Plywood – Types and grades – Textured surfaces and strength – Reconstituted wood – Steel – Aluminium Form lining materials – Hardware and fasteners – Nails in Plywood Concrete density – Height of discharge – Temperature – Rates of Placing – Consistency of concrete – Live loads and wind pressure – Vibration Hydrostatic pressure and pressure distribution – Examples – Vertical loads - Uplift on shores

UNIT-III

12HOURS

DESIGN OF FORMS AND SHORES

Basic simplification – Beam formulas – Allowable stresses – Deflection bending lateral stability – Shear, Bearing – Examples in wall forms – Slab forms – Beam forms – Ties, Anchors and Hangers – Column forms – Examples in each. Simple wood stresses – Slenderness ratio – Allowable load – Tubular steel shores patented shores – Site Preparation, Size and spacing – Steel Tower Frames – Safety practices – Horizontal shores shoring for multi stories – More concentrated shore loads T-heads – Tow Tier wood shores – Ellis shores – Dayton sure grip and Baker Roofs shores – Safeway Symons shores – Beaver – advance shores Dead shore – Raking and Flying shores.

UNIT-IV

12HOURS

FORMWORK FOR BUILDINGS

Location of job mill – Storage – Equipment – Footings – Wall footings – Column footings Sloped footing forms – Curb and gutter forms – Wall forms –Prefabricated panel systems – Giant forms curved wall forms – Column heads – Beam or girder forms – Beam pockets – Suspended forms – Concrete joint construction – Flying system forms. Causes of failures – Inadequate shoring inadequate bracing of members – improper vibration – Premature stripping – Errors in design – Failure to follow codes – How formwork affects concretes quality – ACI – Case studies – Finish of exposed concrete design deficiencies – Safety factors – Prevention of rotation – Stripping sequence – Advantages of reshoring

REFERENCE BOOKS

1. Robert L Hurd, M.K., Formwork for Concrete, Special Publication No.4, American Concrete Institute, Detroit, 1996
2. Michael P. Hurst, Construction Press, London & New York, 2003
3. Austin, C.K., Formwork for Concrete, Cleaver – Hume Press Ltd., London, 1996.
4. Peurifoy and Garold D. Oberlender, Formwork For Concrete Structures, McGraw – Hill , 1996.

Mapping of Po's and Co's

Course Code	POS/COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PSO 2	PSO 3	PSO 4
M19CT2063	CO1	3	3								2		3	2	1	2
	CO2	3		3									3	1	2	
	CO3	3	3		3					2	2		3			
	CO4	3		3									3			

M19CT2070						L	T	P	C	Hrs.
Duration: 16weeks	CONSTRUCTION SOFTWARE LAB					0	0	4	4	3
Prerequisite: AUTOCAD,STAAD PRO and ETABS										
<p>COURSE OBJECTIVES: Student will be able to learn</p> <ul style="list-style-type: none"> • Importing and exporting data • Project management modules • Linking the project management and Contract manager modules • Transferring the data to Primavera Contractor users <p>COURSE OUTCOME: After successful completion of this course the student will be able to:</p> <ul style="list-style-type: none"> • To plan the building and scheduling for multistoreyed building • To plan and schedule the road projects • To prepare resource sheet and assign the level of resources • Plot the variance graphs for the assigned Projects 										
<p>PRIMAVERA : Basics and application of Primavera software referring the Primavera Manual And solving the problems as following:</p> <ol style="list-style-type: none"> 1. Planning and Scheduling of Multi storeyed building 2. Planning and scheduling of Road Project 3. Prepare the resource sheet, assign and level the resource 4. Preparing different reports available in Primavera 5. Plot the variance graphs for the given Project <p>REFERENCE: Primavera® P6™ Project Management Reference Manual</p>										

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Mapping of Course Outcomes with programme Outcomes

Course Code	POS/C Os	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PS O1	PS O2	PS O3	PS O4
M19CT 2070	CO1	3	3	3	3	3						3	3	2	1	2
	CO2	3	3	3	3	3						3	3	2	1	
	CO3	3	3	3	2				2	2		1	3	2	1	2
	CO4	3	3	3	2							1	3	2	1	

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO and PO.

M19CT3010	ROADS AND BUILDING STRUCTURES	L	T	P	C	Hrs.
Duration:16week		3	1	0	4	5
<p>COURSE OBJECTIVE: Student will be able to learn</p> <ul style="list-style-type: none"> About traffic characteristics and control over the vehicles. The importance of highway geometric design and drainage systems. Understand the building planning and Bye-Laws. Different aspects of building construction. <p>COURSE OUTCOME:After successful completion of this course the student will be able to:</p> <ul style="list-style-type: none"> Describe about traffic characteristics and control over the vehicles. Provide conceptual details of highway geometric design and drainage systems Describe building planning and Bye-Laws. Provide different aspects of building construction. 						
UNIT-I						12HOURS
<p>Traffic Characteristics: Objectives and scope of traffic engineering. Components of road traffic: the vehicle, driver and road. Road user characteristics: human and vehicular characteristics.</p> <p>Traffic Regulation and Control: Driver, vehicle, traffic flow and general regulations and control. Traffic Control Devices: traffic signs, markings, islands and signals.</p>						
UNIT-II						12HOURS
<p>Elements of Highway Geometric Design: Design controls and criteria. Cross Section Elements: Pavement surface characteristics, width considerations for various components of cross section elements, right of way.</p> <p>Highway Drainage: Objects and requirements of highway drainage. Surface drainage systems – analysis and design. Sub-surface drainage systems types and design.</p>						
UNIT-III						12HOURS
<p>Building Planning: Introduction, Types of Buildings Based on Occupancy, Types of Residential Buildings, Basic Concepts of Building Elements, Methods of Construction, Cost-effective Building Techniques in Construction, Construction Management Techniques, Site Selection for Residential Buildings, Influence of Climate on Building Planning, Orientation of Building, Principles of Building Planning, Building bye-Laws, Planning of Residential Buildings, Building Services.</p>						
UNIT-IV						12HOURS
<p>Building Construction: Foundations, Shallow and Deep Foundations, Stone Masonry, Brick Masonry, Partitions, Lintels, Stairs, Doors, Windows And Ventilators, Floors And Flooring, Roofs, Pointing And Plastering, Painting, Varnishing And Distemping, Etc. Acoustics, Fire Protection in Buildings.</p>						
REFERENCE						
<ol style="list-style-type: none"> Khanna, S.K., Justo, C.E.G., and Veeraragavan, A., 'Highway Engineering', Nem Chand and Bros, Roorkee - 2014. Kadiyali, L.R., 'Traffic Engineering and Transport Planning', Khanna Publishers, Delhi – 2007. Relevant IRC Publications. "Building Drawing", Shah M.H and Kale C.M, Tata McGraw Hill Publishing co. Ltd., New Delhi. "Building Construction", Gurucharan Singh, Standard Publishers & distributors, New Delhi. National Building Code, BIS, New Delhi. 						

Mapping of Po's and Co's

Mapping of Course Outcomes with programme Outcomes

Course Code	POS/C Os	P O1	P O2	P O3	P O4	P O5	P O6	P O7	P O8	P O9	PO 10	PO 11	PS O1	PS O2	PS O3	PS O4
M19CT3010	CO1		3								2	1	3			2
	CO2	3		3	2				2	3		3	3	3		3
	CO3	3			3	2	1			2	1		3	1	2	3
	CO4	3		3									3	2	3	3

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO and PO.



REVA
UNIVERSITY

Bengaluru, India

SCHOOL OF
COMPUTING AND
INFORMATION
TECHNOLOGY

**M. TECH - COMPUTER SCIENCE AND
ENGINEERING HANDBOOK**

Rukmini Educational
Charitable Trust

2019-21



SCHOOL OF COMPUTING & INFORMATION TECHNOLOGY

HANDBOOK

M. Tech. in Computer Science and Engineering

2019-21

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Rukmini Educational
Charitable Trust

www.reva.edu.in

Chancellor's Message

“Education is the most powerful weapon which you can use to change the world.”

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when ‘intellectual gratification’ has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.



It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of ‘Knowledge is power’, we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I’m always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said ‘A University should be a place of light, of liberty and of learning’. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of Reva University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship

development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation, and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

**Dr. S Y Kulkarni Vice-Chancellor,
REVA University**

Director's –Message

I congratulate and welcome all the students to the esteemed school of Computing and Information technology (IT). You are in the right campus to become a computer technocrat. The rising needs of automation in Industry 4.0 and improvising living standards have enabled rapid development of computer software and hardware technologies. Thus providing scope and opportunity to generate more human resources in the areas of computers and IT. The B.Tech and M.Tech program curriculum and Ph.D areas in the school are designed to cater to the requirements of Industry and society.

The curriculum is designed meticulously in association with persons from industries (TCS, CISCO, AMD, MPHASIS, etc.), academia and research organizations (IISc, IIIT, Florida University, Missouri S & T University, etc.). This handbook presents the M.Tech in Computer Science and Engineering program curriculum. The program is of 2 years duration and split into 4 semesters. The courses are classified into foundation core, hard core, and soft core courses. Hard core courses represent fundamentals study requirements of CSE. Soft courses provide flexibility to students to choose the options among several courses as per the specialization, such as, AI, Data Science, and Systems. Theoretical foundations of engineering, science, and computer science are taught in first two semesters. Later, advanced courses and recent technologies are introduced in subsequent semesters for pursuing specialization. The important features of the M.Tech CSE are as follows: 1) Choice based course selection and teacher selection, 2) Studies in emerging areas like Machine Learning, Artificial Intelligence, Data Analytics, Cloud Computing, Python/R Programming, Genetic Engineering, NLP, Swarm Intelligence, IOT and Cybersecurity, 3) Short and long duration Internships 4) Opportunity to pursue MOOC course as per the interest in foundation and soft core courses, 5) Attain global and skill certification as per the area of specialization, 6) Self-learning components, 7) Experiential, practice, practical, hackathons, and project based learning, 8) Mini projects and major projects with research orientation and publication, 9) Soft skills training and 10) Platform for exhibiting skills in cultural, sports and technical activities through clubs and societies.

The curriculum caters to and has relevance to local, national, regional, and local developmental needs. Maximum number of courses are interpreted with cross cutting issues relevant to professional ethics generic human values environmental and sustainability

The school has well qualified faculty members in the various areas of computing and IT including cloud computing, security, IOT, AI, ML and DL, software engineering, computer networks, cognitive computing, etc. State of art laboratories are available for the purpose of academics and research.

Dr.Sunilkumar S Manvi
Director, School of C&IT

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 13,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette No. 80 dated 27th February, 2013. The University is empowered by UGC to award degrees any branch of knowledge under Sec.22 of the UGC Act. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

REVA consistently ranked as one of the top universities in various categories because of the diverse community of international students and its teaching excellence in both theoretical and technical education in the fields of Engineering, Management, Law, Science, Commerce, Arts, Performing Arts, and Research Studies. REVA offers 28 Undergraduate Programmes, 22 Full-time and 2 Part-time Postgraduate Programmes, 18 Ph. D Programmes, and other Certificate/ Diploma/Postgraduate Diploma Programmes in various disciplines.

The curriculum of each programme is designed with a keen eye for detail by giving emphasis on hands-on training, industry relevance, social significance, and practical applications. The University offers world-class facilities and education that meets global standards.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counselors and Placement Officers.

The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC2, VMware, SAP, Apollo etc, to facilitate student exchange and teacher-scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It

concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director IISc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

REVA organises various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognised by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga class's everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Vision

REVA University aspires to become an innovative university by developing excellent human resources with leadership qualities, ethical and moral values, research culture and innovative skills through higher education of global standards.

Mission

- To create excellent infrastructure facilities and state-of-the-art laboratories and incubation centers
- To provide student-centric learning environment through innovative pedagogy and education reforms
- To encourage research and entrepreneurship through collaborations and extension activities
- To promote industry-institute partnerships and share knowledge for innovation and development
- To organize society development programs for knowledge enhancement in thrust areas

- To enhance leadership qualities among the youth and enrich personality traits, promote patriotism and moral values.

Objectives

- Creation, preservation and dissemination of knowledge and attainment of excellence in different disciplines
- Smooth transition from teacher - centric focus to learner - centric processes and activities
- Performing all the functions of interest to its major constituents like faculty, staff, students and the society to reach leadership position
- Developing a sense of ethics in the University and Community, making it conscious of its obligations to the society and the nation
- Accepting the challenges of globalization to offer high quality education and other services in a competitive manner

About the School of Computing and Information Technology (C & IT)

The School has a rich blend of experienced and committed faculty who are well-qualified in various aspects of computing and information technology apart from the numerous state-of-the-art digital classrooms and laboratories having modern computing equipment. The School offers two undergraduate programs: B Tech in Computer Science and Engineering and B Tech in Computer Science and Information Technology. Three postgraduate programs offered in the school are: M Tech in Data Science, M Tech in Computer Science and Engineering(Both Full Time & Part Time). In addition, the school has a unique academic collaboration with the University of Alabama in Huntsville to jointly offer an MS program in Computer Science. In addition, the school has a research center in which students can conduct cutting edge research leading to a PhD degree.

Curricula of both undergraduate and postgraduate programs have been designed through a collaboration of academic and industry experts in order to bridge the growing gap between industry and academia. This makes the program highly practical-oriented, and thus industry-resilient. The B Tech program aims to create quality human resources to play leading roles in the contemporary, competitive industrial and corporate world. The masters' degrees focus on quality research and design in the core and application areas of computing to foster a sustainable world and to enhance the global quality of life by adopting enhanced design techniques and applications. This thought is reflected in the various courses offered in the masters' programs.

Vision

To create a pool of high-caliber technologists and researchers in computer science and information technology who have potential to contribute to the development of the nation and the society with their expertise, skills, innovative problem-solving abilities, and strong ethical values.

Mission

- Create a center of excellence where new ideas flourish and from which emerge tomorrow's researchers, scholars, leaders, and innovators.
- Provide quality education in both theoretical and applied foundations of computer science, information technology and related inter-disciplinary areas and to train students to effectively apply the education to solve real-world problems.
- Amplify students potential for life-long high-quality careers and give them a competitive advantage in the ever-changing and challenging global work environment of the 21st century.
- Forge research and academic collaboration with industries and top global universities in order to provide students with greater opportunities.
- Support the society by encouraging and participating in technology transfer.

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Program Overview

M Tech (Computer Science & Engineering) Program

Computer Science Engineering (CSE) encompasses a variety of topics that relates to computation, like development of algorithms, analysis of algorithms, programming languages, software design and computer hardware. Computer Science engineering has roots in electrical engineering, mathematics, and linguistics. In the past Computer Science was taught as part of mathematics or engineering departments and in the last 3 decades it has emerged as a separate engineering field. In the present information era (Knowledge era) computer science and engineering will see an exponential growth as the future machines work on artificial intelligence.

The oldest known complex computing device, called the Antikythera mechanism, dates back to 87 B.C., to calculate astronomical positions and help Greeks navigate through the seas. Computing took another leap in 1843, when English mathematician Ada Lovelace wrote the first computer algorithm, in collaboration with Charles Babbage, who devised a theory of the first programmable computer. But the modern computing-machine era began with Alan Turing's conception of the Turing Machine, and three Bell Labs scientists invention of the transistor, which made modern-style computing possible, and landed them the 1956 Nobel Prize in Physics. For decades, computing technology was exclusive to the government and the military; later, academic institutions came online, and Steve Wozniak built the circuit board for Apple-1, making home computing practicable. On the connectivity side, Tim Berners-Lee created the World Wide Web, and Marc Andreessen built a browser, and that's how we came to live in a world where our glasses can tell us what we're looking at. With wearable computers, embeddable chips, smart appliances, and other advances in progress and on the horizon, the journey towards building smarter, faster and more capable computers is clearly just beginning.

Computers have become ubiquitous part of modern life, and new applications are introduced every day. The use of computer technologies is also commonplace in all types of organizations, in academia, research, industry, government, private and business organizations. As computers become even more pervasive, the potential for computer-related careers will continue to grow and the career paths in computer-related fields will become more diverse. Since 2001, global information and communication technologies (ICTs) have become more powerful, more accessible, and more widespread. They are now pivotal in enhancing competitiveness, enabling development, and bringing progress to all levels of society.

The career opportunities for computer science and engineering graduates are plenty and growing. Programming and software development, information systems operation and management, telecommunications and networking, computer science research, web and Internet, graphics and multimedia, training and support, and computer industry specialists are some of the opportunities the graduates find.

The School of Computing and Information Science at REVA UNIVERSITY offers M.Tech., Computer Science and Engineering programme to create motivated, innovative, creative thinking graduates to fill ICT positions across sectors who can conceptualize, design, analyse, and develop ICT applications to meet the modern day requirements.

The M.Tech., in Computer Science and Engineering curriculum developed by the faculty at the School of Computing and Information Science, is outcome based and it comprises required theoretical concepts and practical skills in the domain. By undergoing this programme, students develop critical, innovative, creative thinking and problem solving abilities for a smooth transition from academic to real-life work environment. In addition, students are trained in interdisciplinary topics and attitudinal skills to enhance their scope. The above mentioned features of the programme, advanced teaching and learning resources, and experience of the faculty members with their strong connections with ICT sector makes this programme unique.

Program Educational Objectives (PEO's)

After few years of graduation, the graduates of M. Tech. (Computer Science and Engineering) will:

PEO-1: Have successful professional careers in industry, government, academia and military as innovative engineers.

PEO-2: Successfully solve engineering problems associated with the lifecycle of Computer Science and Engineering either leading a team or as a team member.

PEO-3: Continue to learn and advance their careers through activities such as research and development, acquiring doctoral degree, participation in national level research programme, teaching and research at university level etc.

PEO-4: Be active members ready to serve the society locally and internationally, may take up entrepreneurship for the growth of economy, to generate employment and adopt the philosophy of lifelong learning to be aligned with economic and technological development

Program Outcomes (POs)

After successful completion of the programme, the graduates shall be able to

PO1. Demonstrate in-depth knowledge of specific discipline or professional area, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge.

PO2. Analyze complex engineering problems critically, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.

PO3. Think laterally and originally, conceptualize and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise.

PO4. Extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.

PO5. Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations.

PO6. Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management

and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.

PO7. Demonstrate knowledge and understanding of engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

PO8. Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.

PO9: Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

PO10. Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

PO11. Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback (SELF learning)

Programme Specific Outcomes (PSO's)

On successful completion of the program, the graduates of M Tech. (Computer Science and Engineering) program will be able to:

PSO-1: Isolate and solve complex problems in the domains of **Computer Science and Engineering** using latest hardware and software tools and technologies, along with analytical and managerial skills to arrive at cost effective and optimum solutions either independently or as a team.

PSO-2: Implant the capacity to apply the concepts of wireless communications, advanced computer networks, network security, IoT and cyber physical systems, etc. in the design, development and implementation of application-oriented engineering systems.

PSO-3: Review scholarly work by referring journals, define a new problem, design, model, analyze and evaluate the solution and report as a dissertation in the area of Computer Science and Engineering.

Summary of REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Post Graduate Degree Program

1.0 Teaching and Learning Process

The teaching and learning process under CBCS-CAGP of education in each course of study will have three components, namely-

(i) L= Lecture (ii) T= Tutorial(iii) P= Practice, where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / self-study/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session and it consists of Hands on Experience / Laboratory Experiments / Field Studies / Case Studies that equip students to acquire the much required skill component.

2.0. A course shall have either or all the three components. That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

2.1. Various course of **study** are labeled and defined as: (i) Core Course (CC) (ii) Hard Core Course (HC), (iii) Soft Core Course (SC), (iv) Foundation Core Course (FC) and (v) Open Elective Course (OE).

(i) **Core Course:** A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course.

(ii) **Foundation Course (FC):**

The foundation Course is a core course which should be completed successfully as a part of graduate degree program irrespective of the branch of study.

(iii) **Hard Core Course (HC):**

The **Hard Core Course** is a Core Course in the main branch of study and related branch (es) of study, if any that the candidates have to complete compulsorily.

(iv) **Soft Core Course (SC):**

A Core course may be a **Soft Core** if there is a choice or an option for the candidate to choose a course from a pool of courses from the main branch of study or from a sister/related branch of study which supports the main branch of study.

(v) **Open Elective Course:**

An elective course chosen generally from other discipline / subject, with an intention to seek exposure is called an **Open Elective Course**.

2.2. Project Work:

Project work is a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem.

2.3. Minor Project:

A project work up to **Six to Eight credits** is called **Minor Project**work. A Minor Project work may be a hard core or a Soft Core as decided by the BOS / concerned.

2.4. Major Project / Dissertation:

A project work of **EIGHT, TEN, TWELVE, SIXTEEN or TWENTY** credits is called **Major Project** work. The Major Project / Dissertation shall be Hard Core.

3.0. Minimum Credits to be earned:

3.1. A candidate has to earn 96 credits for successful completion of M Tech degree with a distribution of credits for different courses as prescribed by the university.

3.2. A candidate can enroll for a maximum of 26 credits per Semester. However he / she may not successfully earn a maximum of 26 credits per semester. This maximum of 26 credits does not include the credits of courses carried forward by a candidate.

3.3. Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to IV semester and complete successfully 96 credits in 4 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full time students and for hostel facilities.

4.0. Add- on Proficiency Certification:

In excess to the minimum of 96 credits for the M. Tech Degree program, a candidate can opt to complete a minimum of 4 extra credits either in the same discipline/subject or in different discipline/ subject to acquire **Add on Proficiency Certification** in that particular discipline / subject along with the M .Tech degree.

4.1. Add on Proficiency Diploma:

In excess to the minimum of 96 credits for the M. Tech degree program, a candidate can opt to complete a minimum of 18 extra credits either in the same discipline/subject or in different discipline / subject to acquire Add on Proficiency Diploma in that particular discipline / subject along with the B. Tech degree. The **Add -on Proficiency Certification / Diploma** so issued to the candidate contains the courses studied and grades earned.

5.0. Continuous Assessment, Earning of Credits and Award of Grades.

5.1. The assessment and evaluation process happen in a continuous mode. However, for reporting purpose, **a semester is divided into 3 components as C1, C2, and C3.** The performance of a candidate in a course will be assessed for a maximum of 100 marks as explained below.

(i) Component C1:

The first Component (C1), of assessment is for 25 marks. This will be based on test, assignment / seminar. During the first half of the semester (i.e. by 8th Wk.), the first 50% of the syllabus (Unit 1&2) will be completed. This shall be consolidated during the first three days of 8th Wk. of the semester. A review test based on C1 will be conducted and completed in the beginning of the 9th Wk.. In case of courses where test cannot be conducted, the form of assessment will be decided by the concerned school and such formalities of assessment will be completed in the beginning of the 9th Wk.. The academic sessions will continue for C2 immediately after completion of process of C1.

The finer split - up for the award of marks in C1 is as follows:

Assignment.....	05 marks for Unit 1&2
Seminar	05 marks for Unit 1&2
Test (Mid-Term).....	15 marks for Unit 1&2
Total.....	25 marks

(ii) Component C2:

The second component (C2), of assessment is for 25 marks. This will be based on test, assignment /seminar. The continuous assessment and scores of second half of the semester (9th to 16th Wk.) will be consolidated during 16th Wk. of the semester. During the second half of the semester the remaining units in the course will be completed. A review test based on C2 will be conducted and completed during 16th Wk. of the semester. In case of courses where test cannot be conducted, the form of assessment will be decided by the concerned school and such formalities of assessment will be completed during 16th Wk.. The 17th Wk. will be for revision of syllabus and preparation for the semester - end examination.

The finer split - up for the award of marks in C2 is as follows:

Assignment.....	05 marks for Unit 3 & 4
Seminar	05 marks for Unit 3 & 4
Review Test (Mid-Term).....	15 marks for Unit 3 & 4
Total.....	25 marks

(iii) Component C3:

The end semester examination of 3 hours duration for each course shall be conducted during the 18th & 19th Wk. **This forms the third / final component of assessment (C3) and the maximum marks for the final component will be 50.**

5.2. Setting Questions Papers and Evaluation of Answer Scripts:

- 5.2.1. There shall be three sets of questions papers set for each course. Two sets of question papers shall be set by the internal and one set by external examiner for a course. The Chairperson of the BoE shall get the question papers set by internal and external examiners.
- 5.2.2. The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation.
- 5.2.3. There shall be single valuation for all theory papers by internal examiners. In case, the number of internal examiners falls short, external examiners may be invited. The answer scripts evaluated both by internal and external examiners shall be moderated by the external examiner / moderator.
- 5.2.4. The examination for Practical work/ Field work/Project work will be conducted jointly by two examiners (internal and external). However, in case of non-availability of external examiner or vice versa, the Chairperson BoE at his discretion can invite internal / external examiners as the case may be, if required.
- 5.2.5. If a course is fully of (L=0):T: (P=0) type, then the examination for C3 Component will be as decided by the BoS concerned.
- 5.2.6. In case of a course with only practical component a practical examination will be conducted with two examiners (ref: 6.3.4 above) and each candidate will be assessed on the basis of: a) Knowledge of relevant processes, b) Skills and operations involved, and c) Results / Products including calculation and reporting.
- 5.2.7. The duration for semester-end practical examination shall be decided by the School / Council.

5.3. Evaluation of Minor Project / Major Project / Dissertation:

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion

with the supervisor. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

Component – I	(C1)	Periodic Progress and Progress Reports (25%)
Component – II	(C2)	Results of Work and Draft Report (25%)

Component– III	(C3)	Final Evaluation and Viva-Voce (50%). Evaluation of the report is for 30% and the Viva-Voce examination is for 20%.
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5.4. The schedule of continuous assessment and examinations are summarized in the following Table below.

Component	Period	Syllabus	Weightage	Activity
C1	1 st Wk. to 8 th Wk.	First 50% (two units)	25%	Instructional process and Continuous Assessment
	Last 3 days of 8 th Wk.	First 50% (two units)		Consolidation of C1
C2	9 th Wk. to 16 th Wk.	Second 50% (remaining two units)	25%	Instructional process and Continuous Assessment
	Last 3 days of 16 th Wk.	Second 50% (remaining two units)		Consolidation of C2
C3	17 th and 18 th Wk.			Revision and preparation for Semester end examination
	19 th Wk. to 20 th Wk.	Entire syllabus	50%	Conduct of semester end examination and Evaluation concurrently
	21 st Wk.			Notification of Final Grades
*Evaluation shall begin very first day after completion of the conduct of examination of the first course and both examination and evaluation shall continue concurrently. The examination results / final grades be announced latest by 21stWk.				

Note: 1. Practical examination wherever applicable shall be conducted before conduct of C2 examination. The calendar of practical examination shall be decided by the respective school.

2. Finally, **awarding of the Grades** be announced latest by 5 days after completion of the examination.

6.0 Requirements to Pass a Course

6.1. A candidate's performance from all 3 components will be in terms of scores, and the sum of all three scores will be for a maximum of 100 marks (25 + 25 + 50). A candidate who secures a minimum of 30% marks in

C1 and C2 together, and 40% and above in aggregate of C1, C2 and C3 in a course is said to be successful.

6.2. Eligibility to Appear for C3 (Semester - end) Examination and Provision to Drop the Course.

Only those students who fulfill 75% of attendance requirement and who secure minimum 30% marks in C1 and C2 together in a course are eligible to appear for C3 examination in that course.

- 6.3. Those students who have 75% of attendance but have secured less than 30% marks in C1 and C2 together in a course are not eligible to appear for C3 examination in that course. They are treated as dropped the course and they will have to repeat that course whenever it is offered.

Teachers offering the courses will place the above details in the School Council meeting during the last Wk. of the Semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Director of the School before commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

- 6.4. In case a candidate secures more than 30% marks in C1 and C2 together but less than 40% marks in aggregate of C1, C2 and C3 in a course is considered as unsuccessful and such a candidate may either opt to DROP that course or appear for C3 examination during the subsequent semesters / years within the stipulated period.

In such a case wherein he / she opts to appear for just C3 examination, then the marks secured in C1 and C2 shall get continued. Repeat C3 examination will be conducted in respective semesters.

- 6.5. In case a candidate opts to drop the course he / she has to re-register for the dropped course only in subsequent semesters whenever it is offered if it is Hard Core Course. He / she may choose alternative course if it is Soft Core Course or Open Elective course or Skill Development Course.

The details of any dropped course will not appear in the Grade Card.

6.6. Provision to Withdraw Course:

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is soft core/open elective. **A DROPPED course is automatically considered as a course withdrawn.**

7.0. Provision for Make- up Examination:

For those students who have secured less than 40% marks in C1, C2 and C3 (end semester examination) together; the university shall conduct a make-up C3 examination within three Wk.s after the end of each semester.

Such of those students who have secured more than 30% marks in C1 and C2 together and less than 40%

marks in C1, C2, and C3 together in a course shall appear for make-up examination in that course. This make-up examination is only for C3 examination.

A student who is absent to End Semester Examination (C3) due to medical emergencies or such other exigencies and fulfills the minimum attendance and performance requirements in C1 & C2 shall appear for make-up examination.

7.1 The candidate has to exercise his/her option immediately within 10 days from the date of notification of results. A MAKE-UP examination will be conducted within 25 days from the date of notification of results. If the candidate still remains unsuccessful after MAKE-UP examination he/she is said to have DROPPED that course

7.2 Re-Registration and Re-Admission:

A candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University and is considered as dropped the semester and is not allowed to appear for end semester examination (C3) shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

In case a candidate fails in more than 2 courses in odd and even semesters together in a given academic year, he / she may either drop all the courses and repeat the semester or reappear (C3 semester end examination) to such of those courses where in the candidate has failed during subsequent semester / year within a stipulated period.

7.3 In such a case where in a candidate drops all the courses in semester due to personal reasons, it is considered that the candidate has dropped the semester and he / she shall seek re-admission to such dropped semester.

7.4 Requirements to Pass the Semester and Provision to Carry Forward the Failed Subjects / Courses:

7.4.1 A candidate who secures a minimum of 30% in C1 and C2 and 40% and above in aggregate of C1, C2 and C3 in all the courses with credits prescribed in a semester is said to have passed that semester.

7.5. Provision to Carry Forward the Failed Subjects / Courses:

A student who has failed in 4 courses in 1st and 2nd semesters together shall move to 3rd semester. And he / she shall appear for C3 examination of failed courses of the said semesters concurrently with 3rd semester end examinations (C3) and 4th semester end examinations (C3) of second year of study.

8.0 Attendance Requirement:

8.1. All students must attend every lecture, tutorial and practical classes.

8.2. In case a student is on approved leave of absence (e g:- representing the university in sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.

8.3. Any student with less than 75% of attendance in a course in aggregate during a semester shall not be permitted to appear to the end semester (C3) examination.

8.4. Teachers offering the courses will place the above details in the School / Department meeting during the last Wk. of the semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Head of the School before the commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

8.5. Absence during mid semester examination

In case a student has been absent from a mid semester examination due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Head of the School, for make-up examination. The Head of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and permit such student to appear for make-up mid semester examination.

8.6. Absence during end semester examination:

In case a student is absent for end semester examination on medical grounds or such other exigencies, the student can submit request for make-up examination, with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Director of the School. The Director of the School may consider such request depending on the merit of the case and after consultation with class teacher, course instructor and permit such student to appear for make-up mid semester examination

9. Provisional Grade Card:

The tentative / provisional Grade Card will be issued by the Registrar (Evaluation) at the end of every Semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average (SGPA)**. This statement will not contain the list of DROPPED courses.

9.1 Challenge Valuation:

A student who desires to apply for challenge valuation shall obtain a Xerox copy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the Grade awarded to him/her by surrendering the Grade Card and by submitting an application along with the

prescribed fee to the Registrar (Evaluation) within 15 days after the announcement of the results. This challenge valuation is only for C3 component.

The answer scripts for which challenge valuation is sought for shall be sent to another external examiner.

The marks awarded will be the higher of the marks obtained in the challenge valuation and in maiden valuation.

9.2 Final Grade Card: Upon successful completion of the Post Graduate Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Registrar (Evaluation).

9.3 The Grade and the Grade Point: The Grade and the Grade Point earned by the candidate in the subject will be as given below.

Marks	Grade	Grade Point (GP=V x G)	Letter Grade
P	G		
90-100	10	v*10	O
80-89	9	v*9	A
70-79	8	v*8	B
60-69	7	v*7	C
50-59	6	v*6	D
40-49	5	v*5	E
0-39	0	v*0	F

O - Outstanding; A-Excellent; B-Very Good; C-Good; D-Fair; E-Satisfactory; F - Fail;

Here, P is the percentage of marks ($P=[(C1+C2)+M]$) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the grade point.

9.4 Computation of SGPA and CGPA

The Following procedure to compute the Semester Grade Point Average (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$\text{SGPA (Si)} = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

Where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A	9	4X9=36
Course 2	4	B	8	4X8=32
Course 3	4	C	7	4X7=28
Course 4	4	O	10	4X10=40
Course 5	4	D	6	4X6=24
Course 6	4	O	10	4X10=40
	24			200

Thus, $SGPA = 200 \div 24 = 8.33$

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	5	A	9	5X9=45
Course 2	5	C	7	5X7=35
Course 3	5	A	9	5X9=45
Course 4	5	B	8	5X8=40
Course 5	4	O	10	4X10=40
	24			205

Thus, $SGPA = 205 \div 24 = 8.54$

9.5 Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for two year post graduate degree in Computer Science & Engineering is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e

$$CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

Where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration:

CGPA after Final Semester

Semester (ith)	No. of Credits (C_i)	SGPA (S_i)	Credits x SGPA ($C_i \times S_i$)
1	24	8.33	24 x 8.33 = 199.92
2	24	8.54	24 x 8.54 = 204.96
3	24	9.35	24x9.35=224.4

4	24	9.50	24x9.50=228.0
Cumulative	96		857.28

Thus, $CGPA = \frac{24 \times 8.33 + 24 \times 8.54 + 24 \times 9.35 + 24 \times 9.50}{96} = 8.93$

CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Illustration: CGPA Earned 8.93 x 10=89.30

9.6 Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows.

CGPA	Numerical Index	FGP
		Qualitative Index
> 4 CGPA < 5	5	SECOND CLASS
5 >= CGPA < 6	6	
6 >= CGPA < 7	7	FIRST CLASS
7 >= CGPA < 8	8	
8 >= CGPA < 9	9	DISTINCTION
9 >= CGPA 10	10	

Overall percentage=10*CGPA

10.0.Provision for Appeal

If a candidate is not satisfied with the evaluation of C1 and C2 components, he/she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the grievance cell is final.

11.0. Grievance Cell

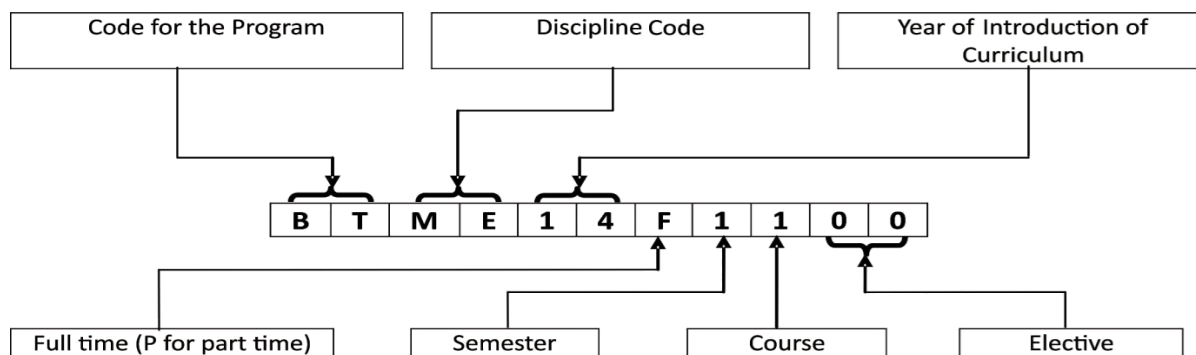
For every program there will be one grievance cell. The composition of the grievance cell is as follows:-

- The Registrar (Evaluation) - Ex-officio Chairman / Convener

- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department/discipline and/or from the sister schools / departments/sister disciplines – Member.
- One Senior Faculty Members / Subject Experts drawn from outside the University school / department – Member.

12.0. With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

Course Numbering Scheme



List of Codes for Programs and Disciplines / Branch of Study

Program Code	Title of the Program	Discipline Code	Name of the Discipline / Branch of Study
BA	Bachelor of Arts	AE	Advanced Embedded Systems
BB	BBM (Bachelor of Business	AI	Advanced Information Technology
BC	B.Com (Bachelor of Commerce)	AP	Advanced Power Electronics
BR	B. Arch (Bachelor of Architecture)	CA	Computer Aided Structural Engineering
BS	B Sc, BS (Bachelor of Science)	CE	Civil Engineering
BT	B.Tech (Bachelor of Technology)	CH	Chemistry
BP	Bachelor of Computer Applications	CO	Commerce
BL	LLB (Bachelor of Law)	CS	Computer Science and Engineering /
MA	Master of Arts	DE	Data Engineering and Cloud
MB	MBA (Master of Business Administration)	EC	Electronics and Communication Engineering

MC	M.Com (Master of Commerce)	EN	English
MS	M.Sc / MS (Master of Science)	MD	Machine Design and Dynamics
MT	M Tech (Master of Technology)	ME	Mechanical Engineering
MC	Master of Computer Applications	EE	Electrical & Electronics Engineering

M Tech (Computer Science and Engineering) (Full Time) Scheme of Instruction (Effective from the Academic Year 2019-21)

Sl. No	Course Code	Course Title	Course Type	Credit Pattern and Credit Value				No. of Hrs.
				L	T	P	Total	
FIRST SEMESTER								
1	M19CS1010	Advanced Database Management Systems	HC	4	0	0	4	4
2	M19CS1020	Machine Learning	HC	4	0	0	4	4
3	M19CS1030	Advanced Algorithms	HC	3	0	1	4	5
4	M19CS1040	Internet of Things	HC	4	0	0	4	4
5	M19CS1051	Wireless Networks	SC	4	0	0	4	4
	M19CS1052	Distributed Computing						
	M19CS1053	Advanced Java Programming						
6	M19CS1061	Data Science using R	SC	4	0	0	4	4
	M19CS1062	Research Methodology						
	M19CS1063	Mobile Application Development						
7	M19CS1070	ADBMS LAB	HC	0	0	2	2	4
8	M19CS1080	Advanced Web Technologies Lab	HC	0	0	2	2	4
Total Credits for the First Semester							28	
SECOND SEMESTER								
1	M19CS2010	Cloud Computing	HC	4	0	0	4	4
2	M19CS2020	Big Data and Analytics	HC	4	0	0	4	4
3	M19CS2030	Agile Software Development	HC	3	0	1	4	4

	M19CS202	Parallel Computing and Programming						
	M19CS203	Open Source Cloud Computing Tools						
5	M19CS201	Unix System Programming	SC	4	0	0	4	4
	M19CS202	Program Analysis						
	M19CS203	UI/UX Design						
6	M19CS201	Robotic Process Automation	SC	4	0	0	4	4
	M19CS202	Block Chain Technology						
	M19CS203	Deep Learning						
7	M19CS200	Bigdata & Analytics Lab	HC	0	0	2	2	4
8	M19CS200	Cyber Security lab	HC	0	0	2	2	4
Total Credits for the Second Semester							28	
THIRD SEMESTER								
1	M19CS3011	Virtual and Augmented Reality	SC	3	0	0	3	3
	M19CS3012	Computer Vision						
	M19CS3013	Data Privacy						
2	M19CS3020	Introduction to Machine learning	OE	4	0	0	4	4
3	M19CS3030	Project Work Phase-1	HC	0	0	4	4	4
4	M19CS3040	Internship	HC	-	-	4	4	4
5	M19CS3050	Global Certification	HC	-	-	4	4	4
6	M19CS3060	MOOC	HC	2	-	1	3	4
7	M19CS3070	Sports ,Yoga, Music ,Dance, Theatre	RULO	-	-	2	2	4
Total Credits for the Third Semester							24	32
FOURTH SEMESTER								
1	M19CS4010	Project-Work Phase-2 and Dissertation	HC	0	0	16	16	32

M Tech (Computer Science and Engineering) (Full Time)

Detailed Syllabus

Course Code	Course Title	Duration		L	T	P	C
M19CS1010	Advanced Database Management Systems	16 Weeks	HC	4	0	0	4

Course Descriptions:

This course introduces to new database technology with emphasis on object orientation. The focus is mainly on the data modeling aspect. The course gives an overview of motivation and background of the new developments, and is intended as an introduction to the most important advances with respect to the classical relational database systems. Effective collection, analysis, and maintenance of data is key to achieve rapid progress in almost all disciplines of science and engineering. This course covers the core principles and techniques of data and information management such as Object oriented concepts in relational databases, Architectures of Parallel and Distributed databases OLAP, Enhanced Data Models for Advanced Applications.

Course Objectives:

The objectives of this course are to:

Explain the concepts of DBMS and SQL

Discuss the Object oriented concepts and object relational Databases

Demonstrate the use of parallel and distributed databases in real world applications

Illustrate the development of Enhanced Data Model for given applications.

Course Outcomes:

On successful completion of this course; the student will be able to:

C01: Solve queries using SQL for real world applications

C02: Make use of the Object oriented concepts in relational databases for real world applications.

C03: Design parallel and distributed databases, Query database and incorporate recovery mechanisms.

C04: Develop Enhanced Data Model for given real world applications

Course Contents:

Unit 1

Overview of DBMS and SQL:

Introduction to DBMS and SQL, SQL Data Definition and Data Types, Schema change statements in SQL, Specifying basic constraints in SQL, Basic Queries in SQL, More Complex Queries in SQL, General Constraints as Assertions, Views in SQL, Database Programming, Embedded SQL

Unit- 2

Overview of Object-Oriented Concepts, Object and Object-Relational Databases:

Objects, Encapsulation, Polymorphism, Type and class hierarchies etc. Object model of ODMG, Object definition Language ODL; Object Query Language OQL; Overview of C++ language binding; Conceptual design of Object database; Overview of object relational features of SQL; Object-relational features of Oracle.

Unit -3

Parallel and Distributed Databases:

Architectures for parallel databases; Parallel query evaluation; Parallelizing individual operations; Parallel query optimizations; Introduction to distributed databases; Distributed DBMS architectures; Storing data in a Distributed DBMS; Distributed catalog management; Distributed Query processing; Updating distributed data; Distributed transactions; Distributed Concurrency control and Recovery.

Unit- 4

Enhanced Data Models for Some Advanced Applications:

Active database concepts and triggers; Temporal, Spatial, and Deductive Databases – Basic concepts. More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; OLAP - OLAP Architecture, Relational OLAP , Multidimensional OLAP , Relational vs. Multidimensional OLAP , Web based OLAP Major features & functions , Drill-Down and Roll-Up , Slice-and-Dice or Rotation

Self-Learning Component:

Data warehousing, Data Marts, Getting data into the warehouse , Extraction , Transformation ,Cleansing , Loading, Summarization, Meta data, Data warehousing & ERP, Data warehousing & KM , Data warehousing & CRM , Data Mining , Data mining algorithms, Clustering, Classification, association rules, Knowledge discovery: KDD process, Decision trees ,

Recommended Learning Resources :(Text Books)

1. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, 3rd Edition, McGraw- Hill, 2003.
2. Elmasri and Navathe, Fundamentals of Database Systems, 5th Edition, Pearson Education, 2007.

Reference Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan: Database System Concepts, 6th Edition, McGraw Hill, 2010.
2. C J Date, Database Design and Relational Theory: Normal Forms and All that Jazz, O 'Reilly, April 2012.
3. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier, 2011.
4. Connolly and Begg, Database Systems, 4th Edition, Pearson Education, 2002.
5. IEEE, IEEE Transactions on Knowledge and Data Engineering
6. Elsevier, Elsevier Data and Knowledge Engineering
7. ACM, ACM Transactions on Database Systems
8. Journal of Data and Information Quality (JDIQ)
9. ACM Transactions on Knowledge Discovery from Data (TKDD)

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	3	2	1	2	1	1	2	2	1	1
C02	3	3	2	3	2	2	1	2	3	2	1	2
C03	1	2	3	1	2	1	3	1	3	2	2	1
C04	3	3	3	3	3	3	3	2	2	2	1	3

Where, (1), M (2) and H (3) represents strength of correlation between CO ,PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS1020	Machine Learning	16 Weeks	H C	4	0	0	4

Course Descriptions:

The course introduces machine learning, with various aspects involved in machine learning, types of learning like supervised, unsupervised and reinforcement learning. It also introduces various methods of dimensionality reduction, reasons for dimensionality reduction, concepts of neural networks, different aspects involved in neural networks, their activation function, back propagation algorithm etc.

Course Objectives:

The objectives of this course are to:

- Explain the basic blocks of machine learning and the techniques involved.
- Discuss the various Learning trees used in real world problems.
- Illustrate the use of different Linear Models in real world problems
- Demonstrate the use of different dimensionality reduction techniques.

Course Outcomes:

On successful completion of this course; the student will be able to:

- CO1 Apply the basic blocks of machine learning and the techniques involved
- CO2. Analyze the various Learning trees used in real world problems.
- CO3. : Design simple linear models to solve real world problems.
- CO4. Formulate different dimensionality reduction techniques to real world problems.

Course Contents:

Unit-1

Introduction : Learning – Types of Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm -- Inductive bias [1] , Bayesian Learning [1]

Learning with trees: Learning with Trees, Decision Trees, Constructing Decision Trees, Classification and Regression Trees.

Unit-2

Learning with trees (contd...): Boosting, Bagging, Random Forest, Different ways to combine Classifiers

Probabilistic Learning – Gaussian Mixture Models, Nearest Neighbor Methods [2]

Support Vector Machines - Optimal separation, kernels, the support vector machine algorithm, extensions to the SVM

Unit-3

Linear models: Perceptron, Linear Separability, Linear Regression.

Multi-layer Perceptron, Going Forwards, Going Backwards: Back Propagation Error, Multi-layer Perceptron in Practice, Examples of using the MLP, Overview, and Deriving Back-Propagation

Unit-4

Dimensionality reduction and evolutionary models, Dimensionality Reduction - Linear Discriminant Analysis, Principal Component Analysis, Factor Analysis, Independent Component Analysis .

Unsupervised learning: Different types of clustering methods, K means Algorithms, Vector Quantization, and Self-Organizing Feature Map

Unsupervised learning: Classification, Association

Self- Learning:

Reinforcement learning -Introduction, Learning task, Q-learning –Qfunction, An Algorithm for Learning Q, An Illustrative Example, Convergence, Experimentation Strategies, Updating Sequence, Nondeterministic Rewards and Actions, Temporal Difference Learning.

Recommended Learning Resources (Text Books):

Tom M. Mitchell, –Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

Stephen Marsland, –Machine Learning – An Algorithmic Perspective||, Second Edition, Chapman and Hall/CRC

Machine Learning and Pattern Recognition Series, 2014.

Recommended Learning Resources (Reference books):

1. Ethem Alpaydin, –Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)||, Third Edition, MIT Press, 2014
2. Peter Flach, –Machine Learning: The Art and Science of Algorithms that Make Sense of Data||, First Edition, Cambridge University Press, 2012.
3. Jason Bell, –Machine learning – Hands on for Developers and Technical Professionals||, First Edition, Wiley, 2014
4. Machine Learning A-Z™: Hands-On Python & R In Data Science
5. <https://www.udemy.com/machinelearning/>
6. <https://www.coursera.org/learn/machine-learning>
7. <https://nptel.ac.in/courses/106106139/>

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3							3
CO2	3	3	3	3	3							3
CO3	3	2	2	2	3							2
CO4	3	3	2	3	3							3

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS1030	Advanced Algorithms	16 Weeks	H C	4	0	0	4

Course Descriptions:

Emphasis is placed on fundamental **algorithms** and **advanced** methods of algorithmic design, analysis, and implementation. ... Domains include string **algorithms**, network optimization, parallel **algorithms**, computational geometry, online **algorithms**, external memory, cache, and streaming **algorithms**, and data structures..

Course Objectives:

The objectives of this course are to:

Explain the problem solving methods and provide a solid foundation in algorithm design and analysis.

Discuss sorting & string matching algorithmic design paradigms.

Demonstrate a familiarity with major algorithms and data structures related to graph.

Design efficient algorithms for common engineering problems.

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1: Apply iterative and recursive algorithms to model engineering problems in real world

CO2: : Experiment with different sorting and string matching algorithms for real time data sets..

CO3: Analyse the search and graph algorithms for real world applications

CO4: Make use of Number Theoretic Algorithms and Probabilistic and Randomized Algorithms in real world applications.

Course Contents:

UNIT-1

Review of Fundamentals: Algorithms from Ancient to Modern Times – Toward a modern Theory of Algorithms – Computing in the Third Millennium – Guidelines for Algorithm Design – Recursion – Data Structures and Algorithm Design – Major Design Strategies – Analyzing Algorithm Performance – Designing and analyzing some basic comparison based list algorithms – Asymptotic behavior of Functions – Asymptotic order formulae for three important series – Recurrence relations for complexity – Mathematical induction and proving the correctness of algorithms – Establishing lower bounds for problems.

UNIT-2

Sorting and string matching Algorithms: Merge Sorting and its analysis, Quick Sorting and its Analysis, Bubble Sort, Selection Sort, Shell sort, Bingo sort and Radix sort. String-Matching Algorithms: Naïve string Matching; Rabin - Karp algorithm; String matching with finite automata; Knuth-Morris-Pratt algorithm; Boyer – Moore algorithms.

UNIT-3

Trees & Applications of Algorithms: Mathematical properties of Binary trees – implementation of trees and forests – Tree traversal – Binary search trees – Graph Algorithms: Bellman - Ford Algorithm; Single source shortest paths in a DAG; Flow networks and Ford-Fulkerson method; maximum bipartite matching. Extending the Limits of Tractability: Finding small vertex covers, Coloring a set of circular arcs, Tree decompositions of Graphs.

UNIT-4

Number Theoretic Algorithms: Elementary notions; GCD; Modular Arithmetic; Solving modular linear equations; The Chinese remainder theorem; Primality testing; Integer factorization. Probabilistic and Randomized Algorithms: Probabilistic algorithms; Randomizing deterministic algorithms, Monte Carlo and Las Vegas algorithms; Probabilistic numeric algorithms.

Self-Learning Component:

Mathematical induction and proving the correctness of algorithms – Establishing lower bounds for problems. Naïve string Matching; Mathematical properties of Binary trees – implementation of trees and forests – Tree traversal – Binary search trees.

Recommended Learning Resources (Text Books):

1. T. H Cormen, C E Leiserson, R L Rivest and C Stein: Introduction to Algorithms, 3rd Edition, Prentice-Hall of India, 2010. 2. Kenneth A. Berman, Jerome L. Paul: Algorithms, Cengage Learning, 2002.
2. Jon Kleinberg and Eva Tardos, Algorithm Design, Pearson, 2016
3. Kenneth A. Berman, Jerome L. Paul, Algorithms, Cengage Learning, 2008.

4. Recommended Learning Resources (Reference books):
5. Anany Levitin, Introduction to the Design & Analysis of Algorithms, Pearson, 2013
6. Ellis Horowitz, SartajSahni, S. Rajasekharan, Fundamentals of Computer Algorithms, 2nd Edition, Universities Press, 2007.
7. J. Kleinberg and E. Tardos, Algorithm Design, Addison Wesley, 2005.
8. V. Aho, J. E. Hopcraft, and J. D. Ullman, Design and Analysis of Algorithms, Addison-Wesley, 1974.
9. ACM Transactions on Algorithms
10. ACM Transactions on Modeling and Computer Simulation (TOMACS)
11. Transactions on Parallel and Distributed Systems

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3									3		
C02	3	3	3		3					3		
C03	3	3	3		3					3	2	
C04	3									3	2	

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO and PO.

Course Code	Course Title	Duration		L	T	P	C
M19CS1040	Internet of Things	16 Weeks	H C	4	0	0	4

Prerequisites:

Knowledge in basic electronics, Computer Networks, DBMS

Course Description:

This course introduces the Concept of connecting processing devices together through a network using which things can communicate with each other using internet as means of communication between them. All the things should be IP protocol enabled in order to have this concept possible. Not one but multiple technologies are involved to make IoT a great success.

Course Objectives:

The objectives of this course are to:

1. Explain the basics of embedded systems and embedded system design.
2. Describe Internet-of-Things and design principles.
3. Demonstrate the use of prototyping in development of real world application.
4. Illustrate the use of internet principles and techniques for writing embedded code.

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1: Summarize the foundation in the Internet of Things, including the components, tools, and analysis.

CO2: Apply Internet-of-Things and design principles in development of real-world applications.

CO3: Design prototypes for implementing IoT in Big Data and understand the utilization and modelling of extracted data development of real-world application.

CO4: Develop embedded IoT Solutions using sensors and components integration for the real time application.

Course Contents:

UNIT-1

Introduction to Internet of Things: Introduction-Definition & Characteristics of IoT , Physical Design of IoT- Things in IoT , IoT Protocols, Logical Design of IoT- IoT Functional Blocks, IoT Communication Models, IoT Communication APIs , IoT Enabling Technologies- Wireless Sensor Networks, Cloud Computing, Big Data Analytics , Communication Protocols , Embedded Systems, IoT Levels & Deployment Templates.

UNIT-2

IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, Software Defined Networking, Network Function Virtualization, IoT

Platform Design Methodology, Introduction, IoT Design Methodology, Step1: Purpose and requirement specification, Step2: Process Specification, Step 3: Domain Model Specification, Step 4: Information Model Specification, Step 5: Service Specification, Step 6: IoT Level Specification, Step 7: Function View Specification, Step 8: Operational View Specification, Step 9: Device and Component Integration, Step 10: Application Development, IoT System

UNIT-3

Logical Design Using Python, Introduction, Installing Python, Python Data Types and Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date Time applications, Classes, Python Packages of Interest for IoT.

IoT Physical Devices and End Points: What is and IoT Device, Exemplary Device Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry pi interfaces, programming raspberry pi with python, other IoT devices.

UNIT-4

Case Study & advanced IoT Applications: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards.

Self-Learning Component:

Various sensors available in market – application of various sensor – Their specifications – code used to connect these sensors into Microcontroller board – Various microcontroller boards available in market – Arduino IDE download – usage of this IDE to carryout projects.

Recommended Learning Resources (Text books):

1. Arshdeep Bahga , Vijay audiseti, Internet of Things, A Hands on Approach, University Press, 2014.
2. The Internet of Things, by Michael Millen, Pearson, 2015.
3. Recommended Learning Resources (Reference books):
4. Adrian McEwen & Hakim Cassimally, Designing the Internet of Things, ISBN 978-81-265-5686-1 Wiley Publication, 2013
5. Dr. Ovidiu Vermesan, Dr. Peter Friess, Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, River Publishers, 2013
6. IEEE Transactions on Wireless Communications
7. IEEE Sensors Journal
8. IEEE Internet of Things Journal
9. Elsevier, Journal of Network and Computer Applications,
10. Elsevier, Computer Law & Security Review
11. ACM, ACM Transactions on Internet Technology (TOIT)

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	2	3	3							
C02	2	1	3	3	2							
C03	3	2	2	3	3							
C04	3	2	2	3	3							

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO and PO.

Course Code	Course Title	Duration		L	T	P	C
M19CS1051	Wireless Networks	16 Weeks	SC	4	0	0	4

Course Descriptions:

A wireless network is a computer network that uses wireless data connections between network nodes. Wireless networking is a method by which homes, telecommunications networks and business installations avoid the costly process of introducing cables into a building, or as a connection between various equipment locations. Wireless telecommunications networks are generally implemented and administered using radio communication. This implementation takes place at the physical level (layer) of the OSI model network structure. Examples of wireless networks include cell phone networks, wireless local area networks (WLANs), wireless sensor networks, satellite communication networks, and terrestrial microwave networks

Course Objectives:

The objectives of this course are to:

Explain the different concepts of wireless media, communication and networks;

Describe the Wireless Body Area network and Personal Area Network;

Discuss the concepts of Wireless Local Area Network and Wide Area Network;

Demonstrate Wireless Ad Hoc Networks.

On successful completion of this course; the student will be able to:

Course Outcomes:

CO-1: Summarize the different concepts of wireless media, communication and networks;

CO-2: Develop the applications using WBAN and WPAN;

CO-3: Make use of WLAN and WWAN in real world scenario.

CO-4: Analyze the research Issues in Wireless networks.

Course Contents:

Unit 1

Fundamentals of wireless communication: Wireless Communication System, Wireless Media, Frequency spectrum, Technologies in Digital Wireless Communication, Wireless Communication Channel Specifications, types of Wireless Communication systems.

Fundamentals of wireless Networks: Wireless Personal Area Network, wireless Switching Technology, Wireless Network reference Model, Wireless Networking issues, Wireless Networking standards.

Unit- 2

Wireless Body Area Networks: properties, Network Architecture, Network components, Design issues, Network protocols, WBAN technologies, WBAN applications.

Wireless personal Area Networks: Network Architecture, WPAN components, WPAN technologies and protocols, WPAN applications.

Unit- 3

Wireless Local Area Networks: Network components, Design requirements of WLAN, Network Architecture, WLAN standards, WLAN protocols, IEEE 802.11p, WLAN applications.

Wireless wide Area Networks: Cellular networks, satellite networks, WLAN versus WMAN, Interworking of WLAN and WMAN, WMAN applications.

Unit- 4

Wireless Ad Hoc Networks: Features of Ad Hoc Networks, Mobile Ad Hoc networks, wireless Sensor networks, Wireless mesh networks, vehicular Ad Hoc Networks.

Research issues in Wireless networks: Modulation, Radio Resource management, channel Allocation, error control and coding, congestion control, Routing, Addressing and network Access control.

Self-Learning Component:

Flow control, Security and privacy, QOS management, Power management, Cross-layer Control, Network modelling, Traffic Modelling, Simulation modelling and network measurements

Recommended Learning Resources: (Text Books)

- 1.SunilKumar S. Manvi and Mahabaleshwar S. Kakkasageri, "Wireless and Mobile Networks concepts and Protocols", wiley publications, 2nd edition,2016
2. Asoke K. Talukder, Roopa R.Yavagal, Mobile Computing-Technology, Applications and Service Creation, Tata McGraw Hill, 2010.

Recommended Learning Resources (Reference books):

1. Walteneus Dargie, Christian Poellabauer, "Fundamentals of wireless sensor Networks - theory and practice", John Wiley & Sons, 2010
2. Ian F. Akyildiz, Mehmet Can Vuran, "Wireless Sensor Networks", John Wiley & Sons, 2010
3. C. Siva Ram Murthy, B. S. Manoj, "Ad Hoc Wireless Networks – Architecture and Protocols", Pearson Education, 2010

4. ACM Transactions on Sensor Networks (TSON)

5. IEEE Transactions on Wireless Communications

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	3	3	3	2	0	0	0	0	0	0	0
CO 2	3	3	3	2	2	0	0	0	0	0	0	0
CO 3	2	3	2	3	3	0	0	0	0	0	0	0
CO 4	2	3	2	3	2	0	0	0	0	0	0	0

Where, 1(Low), 2 (Medium) and 3(High) represents strength of correlation between CO and PO.

Course Code	Course Title	Duration		L	T	P	C
M19CS1052	Distributed Computing	16 Weeks	SC	4	0	0	4

Course Descriptions:

The course aims to provide an understanding of the principles on which the Internet and other distributed systems are based; their architecture, algorithms and how they meet the demands of contemporary distributed applications. The course covers the building blocks for a study of distributed systems, and addressing the characteristics and the challenges that must be addressed in their design: scalability, heterogeneity, security and failure handling being the most significant.

Course Objectives:

The objective of the course is to

Explain the various distributed systems and its architectures

Discuss various communication aspects in the distributed systems

Describe the consistency and replication, fault tolerance and security aspects

Illustrate the use of Distributed-Object based Systems, Distributed File Systems and Distributed Web-based Systems in real world applications.

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1: Apply the concepts of distributed computing systems

CO2: Analyze the various communication aspects in the distributed systems

CO3: Design applications for consistency and replication, fault tolerance and security aspects

CO4: Make use of Distributed-Object based Systems, Distributed File Systems and Distributed Web-based Systems in real world applications

Course Contents:

Unit-1

Introduction: Introduction to distributed systems; goals; types of distributed systems

Architecture: Architectural styles; system architectures; architectures versus middleware; self-management in distributed systems

Processes: Threads; virtualization; clients; servers; code migration

Unit-2

Communication: Remote procedure calls; message-oriented communication; stream-oriented communication; multicast communication

Naming: Names, identifiers and addresses; flat naming; structured naming; attribute-based naming

Synchronization: Clock synchronization; logical clocks; mutual exclusion; global positioning of nodes; election algorithms

Unit-3

Consistency and Replication: Introduction; data-centric consistency models; client-centric consistency models; replica management; consistency protocols

Fault Tolerance: Introduction; process resilience; reliable client-server communication; reliable-group communication; distributed commit; recovery

Security: Introduction; secure channels; access control; security

management Unit-4

Distributed-Object based Systems:

Architecture; Processes; Communication; Naming; Synchronization; Consistency and Replication; Fault Tolerance; Security

Distributed File Systems: Architecture; Processes; Communication; Naming; Synchronization; Consistency and Replication; Fault Tolerance; Security

Distributed Web-based Systems: Architecture; Processes; Communication; Naming; Synchronization; Consistency and Replication; Fault Tolerance; Security

Self-learning Component:

Explore the tools used in distributed computing: Availability Monitoring, Capacity and Performance Monitoring, Security Events Monitoring.

Recommended Learning Resources (Text books):

1. Andrew S. Tanenbaum, Distributed Operating System, Pearson, 2008.
2. George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems: Concepts and design, (4 th ed.) Pearson, 2011.

3. Recommended Learning Resources (Reference books):
4. Andrew S. Tanenbaum, Maarten Van Steen, Distributed Systems: Principles and Paradigms (2nd ed.), Pearson, 2007.
5. Pradeep K. and Sinha, Distributed Operating System: Concepts and Design (2nd ed.), PHI, 2009.

Mapping COs with POs (Program outcomes):

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	3	3	3	2	1	1	1	1	1	1	1
C02	3	3	3	3	2	1	1	1	1	1	1	1
C03	3	3	3	3	2	1	1	1	1	1	1	1
C04	3	3	3	3	2	1	1	1	1	1	1	1

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO and PO.

Course Code	Course Title	Duration		L	T	P	C
M19CS1053	Advanced Java Programming	16 Weeks	SC	4	0	0	4

Course Descriptions:

Advanced Java is everything that goes beyond Core Java – most importantly the APIs defined in Java Enterprise Edition, includes Servlet programming, Web Services, the Persistence API, etc. It is a Web & Enterprise application development platform which basically follows client & server architecture. Advance Java i.e. JEE (Java Enterprise Edition) gives you the library to understand the Client-Server architecture for Web Application Development. This course focuses on advanced concepts in the java programming starting from basic concepts of classes, objects, java database connection, servlets-The technology is used to create a web application (resides at server side and generates a dynamic web page) and java server pages, using which windows, web applications can be developed

Course Objectives:

The objectives of this course are to:

1. Describe the advanced concepts of java programming.
2. Explain the concepts used for developing web application.
3. Discuss different session management techniques used in web pages.
- 4 Demonstrate the establishment of communication between application and databases.

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1: Summarize the fundamentals of Java like object oriented programming, exception handling and multithreading to solve real world problems.

CO2: Choose proper component, like java servlets, java server pages etc., to develop a web application using J2EE

CO3: Apply advanced java concepts to manage sessions and cookies for optimal performance CO4: Develop an application to establish communication between application and database..

Course Contents:

Unit-1

Introduction to Java: Java and Java applications; Java Development Kit (JDK); Java is interpreted, Byte Code, JVM; Object-oriented programming; Classes: Classes in Java; Inheritance: Simple, multiple, and multilevel inheritance; Overriding, overloading. Exception handling: Exception handling in Java

Multi-Threaded Programming: What are threads? How to make the classes threadable; Extending threads; Implementing runnable; Synchronization; Changing state of the thread;

Unit-2

Java 2 Enterprise Edition Overview, Database Access : Overview of J2EE and J2SE The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; Resultset; Transaction Processing; Metadata, Data types; Exceptions.

Unit-3

Servlets : Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The javax.servlet Package; Reading Servlet Parameter; The javax.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking.

Unit-4

JSP, RMI : Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects. Java Remote Method Invocation: Remote Method Invocation concept; Server side, Client side. IDE: Eclipse IDE, Netbeans IDE & Myeclipse IDE; Servers: Apache Tomcat Glassfish Server, JBoss Server & Weblogic Server.

Self-learning Component:

JAVA Model-View-Controller Pattern & Spring Framework.

Recommended Learning Resources (Text books):

1. Head First Servlets & JSP, Bryan Basham, Kathy Sierra & Bert Bates, 2nd Edition.
2. Barry J. Holmes and Daniel T. Joyce, Object-Oriented Programming With Java; Second Edition; Jones And Bartlett Publishers, 2000
3. Dale Skrien; Object-Oriented Design Using Java; McGraw-Hill Higher Education; 2009
4. Danny Poo; Object-Oriented Programming and Java; Second Edition; Springer; 2008.

Recommended Learning Resources (Reference books):

1. Cay Horstmann; Big Java; 2nd Edition ; John Wiley and Sons
2. Herbert Schildt; The Complete Reference Java J2SE; 5th Edition; TMH Publishing Company Ltd, New Delhi

Mapping COs with POs (Program outcomes):

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	1	2				3	3	1	1
CO2	2	2	1	2	2					1		
CO3	2	2	1	2	2				1		1	
CO4	2	2	1	1	2						2	

Where 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS1061	Data Science using R	16 Weeks	SC	4	0	0	4

Course Descriptions:

This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication. The focus in the treatment of these topics will be on breadth, rather than depth, and emphasis will be placed on integration and synthesis of concepts and their application to solving problems. To make the learning contextual, real datasets from a variety of disciplines will be used. Data Science is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions.

Course Objectives:

The objectives of this course are to:

1. Explain data science concepts and methods to solve problems in real- world contexts and will communicate these solutions effectively
2. Illustrate using R programming.
3. Demonstrate and implement machine learning algorithms.
4. Develop the ability to build and assess data based models.

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1: Discuss the basics of Data Science and its applications.

CO2: Demonstrate the programs and packages available in R Programming using Real Time datasets..

CO3: Analyze the Machine learning algorithms using Real time data sets.

CO4: Apply Logistic Regression model using R Programming.

Course Contents:

Unit-1

Introduction: What Is Data Science? Big Data and Data Science Hype, Getting Past the Hype, Why Now?, Datafication, The Current Landscape (with a Little History), Data Science Jobs , A Data Science Profile, Thought Experiment: Meta-Definition OK, So What Is a Data Scientist, Really?, In Academia, In Industry

Statistical Inference, Exploratory Data Analysis, and the Data Science Process: Statistical Thinking in the Age of Big Data, Exploratory Data Analysis, The Data Science Process,

Case Study:

RealDirect Unit-2

R-programming : History and overview of R: R nuts and bolts, Getting Data In and Out of R, Interfaces to the Outside World, Subsetting R Objects, Managing Data Frames with the dplyr package, Control structures, Functions, Loop functions, R Graphics: Quickly exploring data, Bar graphs: Making a Basic Bar Graph, Grouping Bars Together, Making a Bar Graph of Counts, Using Colors in a Bar Graph, Line graphs: Making a Basic Line Graph, Adding Points to a Line Graph, Making a Line Graph with Multiple Lines, Changing the Appearance of Lines, Changing the Appearance of Points, Making a Graph with a Shaded Area, Scatter plots: Making a Basic Scatter Plot,

Unit-3

Machine Learning Algorithms, Three Basic Algorithms, Linear Regression, k-Nearest Neighbors (k-NN),k-means, Exercise: Basic Machine Learning Algorithms Solutions, Naive Bayes 98 Bayes Law 98 A Spam Filter for Individual Words 99 A Spam Filter That Combines Words: Naive Bayes, Comparing Naive Bayes to k-NN,

Case study: Jake's Exercise: Naive Bayes for Article Classification.

Unit-4

Logistic Regression: Thought Experiments, Classifiers, Runtime, Interpretability, Scalability, M6D Logistic Regression Case Study, Estimating α and β , Newton's Method, Stochastic Gradient Descent, Implementation, Evaluation, Sample R Code.

Self-Learning Component:

Amazon Case Study: Big Spenders, Breast Cancer Detection, Pneumonia Prediction.

Recommended Learning Resources (Text books):

1. Rachel Schutt and Cathy O'Neil, " Doing Data Science", Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472,2013.
2. Roger D. Peng, "R Programming for Data Science", Leanpub, 2015

3. Winston Chang, “R Graphics Cookbook Practical Recipes for Visualizing Data”, O'Reilly Media, 2012
4. Kuhn, Max, Johnson and Kjell, “Applied Predictive Modeling”, Springer eBook, 2012.

Recommended Learning Resources (Reference books):

1. John Maindonald, W. John Braun, “Data Analysis and Graphics Using R – an Example Based Approach”, 3rd Edition, Cambridge University Press, 2010. (Unit 1 & 2)
2. Johannes Ledolter, “DATA MINING AND BUSINESS ANALYTICS WITH R”, WILEY, 2013. (Unit 3)
3. W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”, Notes on R: A Programming Environment for Data Analysis and Graphics Version 3.2.4 (2016-03-10) (Unit 4)
4. Springer, International Journal of Data Science and Analytics.
5. Elsevier, Computational Statistics & Data Analysis
6. IEEE, Transactions on Big Data.

Mapping Cos With POs (Program Outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO1 1	PO1 2
CO 1	3	3	L	3	3							
CO 2	3	2	2	3	3							
CO 3	3	3	2	3	3							
CO 4	3	3	2	3	2							

where, 1(Low), 2(Medium) and 3 (High) represents strength of correlation between CO , PO,PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS1062	Research Methodology	16 Weeks	SC	4	0	0	4

Course Descriptions:

This course offers "An overview of research methodology including basic concepts employed in quantitative and qualitative research methods. Includes computer applications for research. Prerequisites: Admission to the Doctoral Program. Note: Meets requirements for a Level I research tool course" (Graduate Catalog, 2012-2013, online version). This course introduces research methods as they apply to the higher education (HIED) field of study. HIED 695 provides a macro perspective of the methods associated with conducting scholarly research in all follow-on core, elective, quantitative and qualitative courses; and the doctoral dissertation. Completion of HIED 695 is a prerequisite for follow-on tools courses.

Course Objectives:

The objectives of this course are to:

Explain the dimensions and methods of research.

Illustrate the design of informed choice from the large number of alternative methods and experimental designs available

Describe the features of a good research proposal.

Discuss the skills required for undertaking a research project and preparing a technical paper.

Course Outcomes:

On successful completion of this course; student shall be able to:

CO1. Identify and Formulate the research problem using state of art literature

CO2. Design the research for formulated problem.

CO3. Write the thesis/dissertation/technical document for the project.

CO4. Apply data preparation and statistical techniques on data.

Course Contents:

Unit-1

Research Methodology: An Introduction - meaning of research - objectives of research - motivation in research - types of research - research approaches - significance of research - research methods versus methodology - research and scientific method - importance of knowing how research is done - research processes - criteria of good research (Kothari)

Defining research problem: selecting the problem - necessity of defining the problem - techniques involved in defining a problem. (Kothari)

Unit-2

Research design: Meaning of research design - need for research design - features of good design - different research designs - basic principles of experimental design. (Kothari)

Originality in Research- research skills - time management - role of supervisor and scholar - interaction with subject experts. (Oliver, Stephen Covey, Slides from Net)

Review of Literature Description: Review of Literature: Significance of review of literature - source for literature: books -journals – proceedings - thesis and dissertations - unpublished items. On-line Searching: Database – SciFinder – Scopus - Science Direct - Searching research articles - Citation Index - Impact Factor - H-index etc, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism. (Slides from net)

Thesis Writing: The preliminary pages and the introduction - the literature review - methodology - the data analysis - the conclusions - the Reference Books (in IEEE and ACM format). (Oliver, Slides from Net)

Unit-3

Data Collection and Preparation: Sample surveys, sampling errors, types of sampling designs, experiment and surveys, collection of primary data and secondary data, methods, data preparation process, outliers, analysis, statistics. (Kothari)

Descriptive Statistics: measures of central tendency, dispersion, skewness, relationship, kurtosis, sampling distribution, central limit theorem, statistical inference (Kothari)

Introduction to Tools used in Computer Science: MATLAB, NS2/3, C, C++, Java, Web Service, SPSS, SAS, LOTUS, Excel, Latex and Ms Word. (From net)

Unit-4

Testing hypothesis: Concepts, testing, critical region, decision, and hypothesis testing for mean proportion and variance, limitations, chi-square test, one-way ANOVA. (Kothari)

Linear Regression Analysis: Simple model, multiple model and T-test. (Kothari)

LaTeX and Beamer Description: Writing scientific report - structure and components of research report - revision and refining' - writing project proposal - paper writing for international journals, submitting to editors - conference presentation - preparation of effective slides, pictures, graphs - citation styles. Software for detection of Plagiarism. IPR and Patent filing.

Self-learning component

Latex Tool

Note: Every batch of students comprising maximum of 4 members should define a research problem. Develop solution for the problem. Write a technical paper and publish it in IEEE/reputed conference/ Journal.

Recommended Learning Resources (Text Books):

1. C. R. Kothari, Research Methodology Methods and Techniques, 2nd. ed. New Delhi: New Age International Publishers, 2009.
2. R. Panneerselvam, Research Methodology, New Delhi: PHI, 2005.
3. P. Oliver, Writing Your Thesis, New Delhi: Vistaar Publications, 2004.
4. F. Mittelbach and M. Goossens, The LATEX Companion, 2nd. ed. Addison Wesley, 2004.

Recommended Learning Resources (Reference Books):

1. J. W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 3rd. ed. Sage Publications, 2008.
2. Kumar, Research Methodology: A Step by Step Guide for Beginners, 2nd. ed. Indian: PE, 2005.
3. B. C. Nakra and K. K. Chaudhry, Instrumentation, Measurement and Analysis, 2nd. ed. New Delhi: TMH publishing Co. Ltd., 2005.
 - I. Gregory, Ethics in Research, Continuum, 2005.
4. COLIN NEVILLI, " The complete guide to referencing and avoiding plagiarism" , Second Edition published by Open Up Study Skills.
5. RUDRA PRATAP , " Getting Started with MATLAB " , published by Oxford University Press- 2010
6. Teerawat, Issariyakul, Ekram, Hossain – 2008 , "Introduction to Network Simulator NS2"
7. <https://www.stir.ac.uk/media/services/registry/quality/BookofPlagiarism.pdf>
8. ceur-ws.org/Vol-706/poster22.pdf
9. <https://books.google.co.in/books?isbn=1446281094>

10. www.nalsarpro.org/pl/projects/modelproject2.pdf

11. www.uninova.pt/cam/teaching/SRMT/SRMTunit11.pdf

12. http://matlab_tools.myetang.com/index_e.htm

Mapping COs with POs (Program outcomes)

Course Outcomes	Program outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	L	2	-	-	-	-	-	-	3
CO2	-	-	-	3	-	-	-	-	-	-	-	2
CO3	-	-	-	-	-	-	-	-	-	3	-	2
CO4	3	2	2	-	2	-	-	-	-	-	-	-

Where, 1 (Low), 2(Medium) and 3 (High) represents strength of correlation between CO ,PO,PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS1063	Mobile Application Development	16 Weeks	SC	4	0	0	4

Course Descriptions:

This course introduces programming technologies, design and development tools related to mobile applications. Topics include accessing device capabilities, industry standards, operating systems, and programming for mobile applications using OS Software Development Kit (SDK).

Course Objectives:

The objectives of this course are to:

1. Explain basics of Mobile communication.
2. Demonstrate the use of fundamentals of Android Application development.
3. Illustrate the use of Menus and Graphics in app development.
4. Describe the concepts related to views and activity.

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1 Analyse Android Platform, its architecture and features.

CO2: Design and implementation of user interface, database and content providers.

CO3: Make use of activities, layouts and Graphics in the development of apps for android platform devices.

CO4: Evaluate multimedia, camera and location based services in Android application.

Course Contents:

Unit-1

Introduction to mobile communication and computing: Introduction to mobile computing, Novel applications, limitations and GSM architecture, Mobile services, System architecture, Radio interface, protocols, Handover and security, Smart phone operating systems and smart phones applications.

Unit-2

Fundamentals of Android Application Development: Introduction to Android., The Android 4.1 Jelly Bean SDK, Understanding the Android Software Stack, Installing the Android SDK, Creating Android Virtual Devices, Creating the First Android Project, Using the Text View Control, Using the Android Emulator.

Unit-3

Layouts, Menus and Graphics in Android: Menus: Options menu and app bar, Context menu and contextual action mode, Popup menu, Defining a Menu in XML, Creating an Options Menu, Changing menu items at runtime, Creating Contextual Menus, Creating Menu Groups, Adding Menu Items Based on an Intent.

Activity, Service, BroadcastReceiver and Content Provider. Building Blocks for Android Application Design, Laying Out Controls in Containers. Graphics and Animation: Drawing graphics in Android, Creating Animation with Android's Graphics API.

Unit-4:

Creating the Activity, Working with views: Exploring common views, using a list view, creating custom views, understanding layout. Using Selection Widgets and Debugging Displaying and Fetching Information Using Dialogs and Fragments. Multimedia: Playing Audio, Playing Video and Capturing Media. Advanced Android Programming: Internet, Entertainment, and Services.

Self-learning Component:

More Recent Applications: Multimedia; 2D graphics ; networking support in Android, Introduction to iOS, App. Development.

Recommended Learning Resources (Text books):

1. Bill Phillips, Chris Stewart, and Kristin Marsican, Android Programming: The Big Nerd Ranch Guide pearson technology group, 3rd Edition, 2015
2. Barry Burd, Android Application Development All-in-One For Dummies ,wiley publisher, 2nd Edition, 2012.
3. Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, Programming Android: Java Programming for the New Generation of Mobile Devices, oiley, 2nd Edition, 2012.

Recommended Learning Resources (Reference books):

1. Greg Nudelman, Android Design Patterns: Interaction Design Solutions for Developer, wiley, 2013.
2. Jason Tyler, App Inventor for Android: Build Your Own Apps No Experience Required!, wiley,2011.
3. J.F.Dimarzio, Android programming with Android studio,wrox,4th edition ,2017
4. Maurice Sharp Erica Sadun Rod Strougo, Learning iOS Development-A Hands-on Guide to the Fundamentals of iOS Programming, Addison Wesley by Pearson Education, Inc.2014.
5. Wei-Meng Lee, Beginning Swift Programming, Wiley India Pvt. Ltd.,2018

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	1	1		1	2	2	1	1
CO2	3	3	2	3	2	2		2	3	2	1	2
CO3	1	2	3	1	2	1		1	3	2	2	1
CO4	3	3	3	2	2	1		2	2	2	1	1

Where, L (Low), M (Medium) and H (High) represents strength of correlation between CO and PO.

Course Code	Course Title	Duration		L	T	P	C
M19CS1070	Advanced Database Management Systems Lab	16 Weeks	HC	4	0	0	4

Course Outcomes:

On successful completion of this course student shall be able to:

CO1: Design database schema for a given problem.

CO2: Populate the database for a specific application.

CO3: Develop the database for a real world application.

CO4: Construct database queries using SQL commands for an application

List of Programs:

Sl. No.	Program	Course Outcome	Program Outcome
1	Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, lines and words in the text entered using an alert message. Words are separated with white space and lines are separated with new line character	1, 2	a, b, e, k, l
2	Write a JavaScript program which takes user input as name, stores it in array and sort them alphabetically and displays it using alert box	1, 2, 3	a, b, d, k, n
3	Exception handling is the process of responding to exceptions when a computer program runs. An exception occurs when an unexpected event happens that requires special processing. create an html page named to demonstrate exception handling in JavaScript	2, 3	a, b, c, k, i
4	Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. (i). Create a Cookie and add these four user id's and passwords to this Cookie. (ii). Read the user id and passwords entered in the Login form (week1) and	1, 2, 3	a, b, e, k, l

	authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display “You are not an authenticated user “. Finding Related Forum Posts through Content Similarity over Intention-based Segmentation		
5	JavaScript is mainly designed to add interactivity in the HTML pages. A JavaScript can be executed when an event occurs, like when a user clicks on an HTML element. To execute code when a user clicks on an element, add JavaScript code to an HTML event attribute Simple web application such as calculator, calendar can be developed using JavaScript. Design a scientific calculator using java script	3, 4	a, b, e, k, l
6	Install a database (Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page	1, 2, 3	a, b, e, k, l
7	User authentication is very common in modern web application. It is a security mechanism that is used to restrict unauthorized access to member-only areas and tools on a site. In this context, write a program to create a simple registration and login system using the PHP and MySQL and validate the user’s authenticity	2, 3	a, b, e, k, l
8	Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP	3, 4	a, b, e, k, l

9	The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same WEB TECHNOLOGIES LAB MANUAL jdirectory jkmaterialz jkd thing at a time (i.e., from different systems in the LAN using the IP-address instead of local host). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated, modify your catalogue and cart	1, 2, 3	a, b, e, k, l
	PHP pages to achieve the above mentioned functionality using sessions		
10	Create appropriate web page for the following self-descriptive user friendly services. E-Visa Processing & Follow Up System	2, 3, 4	a, b, e, k, l

Mapping COs with POs (Program outcomes)

Course Outcomes	Program outcomes											
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01									3	2		2
C02		3	2		2					3	3	
C03		2	3							2	2	
C04		2										1

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO, PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS1080	Advanced Web Technologies Lab	16 Weeks	H C	4	0	0	4

Course Outcomes:

On successful completion of this course; the student will be able to:

C01. Summarize the fundamentals and advanced concepts in the area of web services.

C02. Design and Develop JavaScript based web based applications.

C03. Develop PHP based web based applications in real world applications

C04. Make use of the web applications and mechanisms to make it more secure.

List of Programs:

Sl. No.	Program	Course Outcome	Program Outcome
1	Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, lines and words in the text entered using an alert message. Words are separated with white space and lines are separated with new line character	1, 2	a, b, e, k, l
2	Write a JavaScript program which takes user input as name, stores it in array and sort them alphabetically and displays it using alert box	1, 2, 3	a, b, d, k, n
3	Exception handling is the process of responding to exceptions when a computer program runs. An exception occurs when an unexpected event happens that requires special processing. create an html page named to demonstrate exception handling in JavaScript	2, 3	a, b, c, k, i
4	Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. (i). Create a Cookie and add these four user id's and passwords to this Cookie. (ii). Read the user id and passwords entered in the Login form (week1) and	1, 2, 3	a, b, e, k, l

	authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ". Finding Related Forum Posts through Content Similarity over Intention-based Segmentation		
5	JavaScript is mainly designed to add interactivity in the HTML pages. A JavaScript can be executed when an event occurs, like when a user clicks on an HTML element. To execute code when a user clicks on an element, add JavaScript code to an HTML event attribute Simple web application such as calculator, calendar can be developed using JavaScript. Design a scientific calculator using java script	3, 4	a, b, e, k, l
6	Install a database (Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page	1, 2, 3	a, b, e, k, l
7	User authentication is very common in modern web application. It is a security mechanism that is used to restrict unauthorized access to member-only areas and tools on a site. In this context, write a program to create a simple registration and login system using the PHP and MySQL and validate the user's authenticity	2, 3	a, b, e, k, l
8	Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP	3, 4	a, b, e, k, l
9	The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same WEB TECHNOLOGIES LAB MANUAL jdirectory jkmaterialz jkd thing at a time (i.e., from different systems in the LAN using the IP-address instead of local host). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get	1, 2, 3	a, b, e, k, l

	invalidated, modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions		
10	Create appropriate web page for the following self-descriptive user friendly services. E-Visa Processing & Follow Up System	2, 3, 4	a, b, e, k, l

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01									3	2		2
C02		3	2		2					3	3	
C03		2	3							2	2	
C04		2										L

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO, PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2010	Cloud Computing	16 Weeks	H C	4	0	0	4

Prerequisites:

Computer Networks

Course Description:

This course begins by first establishing the definition of cloud computing, then describing the various service delivery models of a cloud computing architecture, and the ways in which cloud can be deployed as public, private, hybrid, and community clouds, followed by a much deeper review of the security and privacy issues related to cloud computing environments.

The objective of this course is to:

Discuss basic concepts related to cloud computing technologies

Describe different layers of cloud computing viz. Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS)

Illustrate the use of various cloud computing mechanisms

Explain cloud security concepts and secure computation in the cloud.

Course Outcomes:

CO1. Outline the concepts related to cloud computing technologies

CO2. Compare and contrast different layers of cloud computing viz. Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS)

CO3. Develop applications to make use of Cloud management mechanisms

CO4. Apply cloud security schemes to achieve secure computation in the cloud.

Course Contents:**Unit-1**

Introduction to Cloud Computing: Origins and Influences; Basic Concepts and Terminology; Goals and Benefits; Risks and Challenges.

Fundamental Concepts and Models: Roles and Boundaries; Cloud Characteristics; Cloud Delivery Models; Cloud Deployment Models.

Unit-2

Cloud Enabling Technologies: Broadband Networks and Internet Architecture; Data Center Technology; Virtualization Technology; Web Technology; Multitenant Technology; Service Technology.

Cloud Infrastructure Mechanisms: Logical Network Perimeter; Virtual Server; Cloud Storage Device; Cloud Usage Monitor; Resource Replication; Ready-made environment.

Unit-3

Specialized Cloud Mechanisms: Automated Scaling Listener; Load Balancer; SLA Monitor;

Pay-per-use Monitor; Audit Monitor; Failover System; Hypervisor; Resource cluster; Multi-device Broker; State Management Database

Cloud Management Mechanisms: Remote Administration System; Resource Management System; SLA Management System; Billing Management System.

Unit-4

Cloud Security: Basic Terms and Concepts; Threat Agents; Cloud Security Threats; Additional Considerations.

Cloud Security Mechanisms: Encryption; Hashing; Digital Signature; Public Key Infrastructure; Identity and Access Management; Single-Sign-on; Cloud-based Security Groups; Hardened Virtual Server Images.

Self-learning Component:

Hypervisor Clustering Architecture, Load Balanced Virtual Server Instances Architecture, Non-Disruptive Service Relocation Architecture, Zero Downtime Architecture, Cloud Balancing Architecture, Resource Reservation Architecture in cloud computing.

Recommended Learning Resources (Text books):

Thomas Erl , Ricardo Puttini , Zaigham Mahmood, "Cloud Computing: Concepts, Technology & Architecture", PHI, 2013.

Kai Hwang, Geoffrey C. Fox, Jack J Dongarra, "Distributed and Cloud Computing", MK, 2012.

Recommended Learning Resources (Reference books):

1. Raj Kumar Buyya, Christian Vecchiola, "Mastering Cloud Computing", Kindle edition, 2018.
2. Dharani P. Janakiram, Grid and Cloud Computing, McGraw-Hill 2016.
3. Transactions on Cloud Computing, IEEE.
4. Journal of Cloud Computing -Advances, Systems and Applications, Springer Open.
5. International Journal of Cloud Computing, INDERSCIENCE Publishers.

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01									3	2		2
C02		3	2		3					3	3	
C03		2	3		2					2	2	
C04		2	3		2						2	

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO, PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2020	Big Data And Analytics	16 Weeks	HC	4	0	0	4

Prerequisites:

Programming with Python, Programming with Java

Course description:

This course is to familiarize the students with most important information technologies used in manipulating, storing, and analyzing big data. The basic tools for statistical analysis, R and Python, and several machine learning algorithms are introduced. The emphasis of the course will be on mastering Spark 2.0 which emerged as the most important big data processing framework. Spark ML (Machine Learning) API and Spark Streaming which allows analysis of data in flight, i.e. in near real time. We will learn about so-called NoSQL storage solutions exemplified by Cassandra for their critical features: speed of reads and writes, and ability to scale to extreme volumes. We will learn about memory resident databases (VoltDB, SciDB) and graph databases (Ne4J). Students will gain the ability to initiate and design highly scalable systems that can accept, store, and analyze large volumes of unstructured data in batch mode and/or real time. Most lectures will be presented using Python examples. Some lectures will use Java and R.

Course Objectives:

The objective of this course is to:

Discuss the fundamentals of Hadoop distributed file system and Big Data Analytics.

Demonstrate Big Data Processing with MapReduce and Batch Analytics with Apache Spark.

Describe the implementation of Real-Time Analytics with Apache spark in real world Applications.

Illustrate the working of Stream Processing and also discuss the fundamentals of Cloud Computing

Course Outcomes:

On successful completion of this course, the student is expected to be able to:

CO 1: Summarize the fundamentals of Hadoop distributed file system and Big Data Analytics

CO 2: Apply Big Data Processing with MapReduce and Batch Analytics with Apache Spark to simple real world

problems.

CO 3: Implement Real-Time Analytics with Apache spark in real world Applications.

CO 4: Develop data models for real world stream processing Applications.

Course Contents:

Unit-1

Introduction to Hadoop: Hadoop distributed file system: High availability, Intra-Data Node balancer, EC, Port mapping; MapReduce: Task Level optimization; YARN: Opportunistic Containers, Timeline service v.2; Overview of Big data Analytics: Introduction to data analytics, Introduction to big data, distributed computing using Apache Hadoop, MapReduce framework.

Unit-2

Big Data Processing with MapReduce: The MapReduce framework, MapReduce job types: Single mapper jobs, Single mapper reducer jobs, Multiple mappers reducer jobs; MapReduce patterns: Aggregation patterns, Filtering patterns, Join patterns.

Batch Analytics with Apache Spark: SparkSQL and Data Frames, Data Frames and the SQL API, Data Frame schema, Datasets and encoders, loading and saving data, Aggregations and Joins.

Unit-3

Real-Time Analytics with Apache Spark: A short introduction to streaming: At-least-once processing, At-most-once processing, Exactly-once Processing; Spark Streaming: Streaming context, creating streaming context, Starting and Stopping Streaming Context; Discretized Streams, Stateful and stateless transformations, CheckPointing.

Batch Analytics with Apache Flink: Introduction to Apache Flink.

Unit-4

Stream Processing with Apache Flink : Data processing using the DataStream API transformations, Aggregations ,Window , Physical partitioning , Rescaling , Data sinks , Event time and watermarks.

Introduction to Cloud Computing: Cloud computing basics, Concepts and terminology, Goals and benefits, Risks and challenges, Roles and boundaries, Cloud characteristics, Cloud delivery models, Cloud deployment models.

Self-learning Component:

Concept of AWS and its Services.

Recommended Learning Resources (Text books):

1. Sridhar Alla, Big Data Analytics with Hadoop 3, published by Packt Publishing Ltd, May 2018
2. Seema Acharya, Subhashini Chellappan, Big Data and Analytics, published by wiley india pvt ltd, April 2015.

Recommended Learning Resources (Reference books):

1. Deka, Ganesh Chandra_ Mazumder, Sourav_ Singh Bhadoria, Robin - Distributed Computing in Big Data Analytics - Concepts, Technologies and Applications (Springer International Publishing AG 2017)
2. Arthur Zhang - Data Analytics_ Practical Guide to Leveraging the Power of Algorithms, Data Science, Data Mining, Statistics, Big Data, and Predictive Analysis to Improve Business, Work, and Life.
3. ACM Transactions on Knowledge Discovery in Data (TKDD).
4. SIGKDD Explorations, a magazine of the SIGKDD, the data miners professional group.
5. Data Mining and Knowledge Discovery journal (now published by Springer).

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01									3			3
C02	2			1	3				2			2
C03		3										
C04		3		2					3			

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO, PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2030	Agile Software Development	16 Weeks	HC	3	0	1	4

Prerequisites:

Basic knowledge of software development process and software development methodologies.

Course Description:

The objective of the course will help you gain knowledge on what is agile? Why agile is better suited for the situations and to cover some of the most common agile frameworks like scrum and XP in depth. The course also examines Agile Development concepts, its evolution from the Waterfall Lifecycle, various agile methods and best practices and knowledge on how to apply Agile to your software projects.

Course Objectives:

The objective of this course is to:

Explain the basics of Agile Software Development and Software Development Rhythms.

Demonstrate the unique features related to traditional agile software practices.

Describe the core principles of a DevOps implementation and culture.

Discuss the enormous benefits of DevOps practices and culture.

Course Outcomes:

On successful completion of this course, the student is expected to be able to:

CO1: Develop applications using traditional Agile Software practices

CO2: Outline the fundamental principles and practices of Agile Software in real world problem

CO3: Analyze the agile principles and values to a given situation.

CO4: Make use of Building Blocks of DevOps methods in real world problems.

Course Contents:

Unit-1

Introduction: Iterative Development, Risk-Driven and Client-Driven Iterative Planning, Time boxed Iterative Development, Evolutionary and Adaptive Development, Evolutionary Requirements Analysis, Early “Top Ten” High-Level Requirements and Skillful Analysis, Evolutionary and Adaptive Planning. Incremental Delivery, Evolutionary Delivery.

Unit-2

Agile: Agile Development, Classification of Methods, The Agile Manifesto and Principles, Agile Project Management, Embrace Communication and Feedback, Programming as If People Mattered, Simple Practices and Project Tools, Empirical vs. Defined & Prescriptive Process, Principle-Based versus Rule-Based. Sustainable Discipline: The Human Touch, Team as a Complex Adaptive System, Agile Hype? Specific Agile Methods.

Unit-3

Motivation: The Facts of Change on Software Projects, Key Motivations for Iterative Development, Meeting the Requirements Challenge Iteratively, Problems with the Waterfall.

Evidence: Research Evidence, Early Historical Project Evidence, Standards-Body Evidence, Expert and Thought Leader Evidence, Business Case for Iterative Development.

Unit 4

Fundamentals: Beginning DevOps for Developers, Introducing DevOps, Building Blocks of DevOps.

Metrics and Measurement View: Quality and Testing, Process view.

Technical View: Automatic Releasing, Infrastructure as Code, Specification by Example

Self-learning Component:

A Qualitative Study of DevOps Usage in Practices, A Case Study of DevOps at Netflix.

Recommended Learning Resources (Text books):

1. Craig Larman; Agile and Iterative Development: A Manager's Guide. Pearson Education; 2006.
2. Jim Highsmith; Agile Project Management: Creating Innovative Products (Agile Software Development) : Addison Wesley; 2009.
3. Robert Cecil Martin; Agile Software Development: Principles, Patterns, and Practices; Prentice Hall PTR, Upper Saddle River, NJ, USA; 2009.

4. Michael Huttermann; DevOps for Developers, Integrate Development and Operations, the Agile Way, Apress Publications. (<https://books.google.co.in/>).

Recommended Learning Resources (Reference books):

1. Jeff Sutherland: Scrum: A revolutionary approach to building teams, beating deadlines, and boosting productivity; Random House Business Books; 2014.
2. Mitch Lacey; The Scrum Field Guide: Agile Advice for Your First Year; Addison Wesley; 2012.
3. Martin C. Robert, Martin Micah: Agile Principles, Patterns, and Practices in C#: Prentice Hall, 2006.
4. IEEE transactions on Agile Software Development Using Scrum.
5. ACM Transactions on DevOps.

Mapping COs with POs (Program outcomes)

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	CO1	3	2	2	2	2						
CO2	3	2	2	2	3							
CO3	3		2	2	1							1
CO4	3	2	2	2	2					1		

Where, L (Low), M (Medium) and H (High) represents strength of correlation between CO and PO.

List of Experiments:

Sl No.	Programs	Course Outcome	Program Outcome
1	JIRA is a project management tool used for issues and bugs tracking system. Show that how the users can utilize this tool to track and report bugs in different applications.	1,2	a,b

2	Chef is a configuration management technology developed by Opscode to manage infrastructure on physical or virtual machines. It is an open source developed using Ruby, which helps in managing complex infrastructure on the fly. Design an application of managing an infrastructure using Chef.	1,2	a,b
3	Mantis is a Bug Reporting tool, widely used as an issue tracking tool for all types of testing. Design an application to show the usage of Mantis and also show that how to utilize the tool in reporting and maintain an issue.	2,3	b,c
4	SaltStack is an open-source configuration management and remote execution engine. Write a code in any language to show that how a SaltStack is accessed remotely and executes commands across all machines.	2,3	c,d
5	Design an application using ansible: It is simple open source ITengine which automates application deployment, intra service orchestration, cloud provisioning and many other IT tools.	3,4	c,d
6	Design an application on how to drive a scrum project, prioritize and organize the backlog prints, run scrum ceremonies and more, all within Jira Software.	4	c,d

Course Code	Course Title	Duration		L	T	P	C
M19CS2041	Python for Data Analysis	16 Weeks	SC	4	0	0	4

Prerequisites:

Object Oriented Programming principles, Programming languages(C, C++, etc.), Database Management Systems Lab (B18CS4060)

Course Description:

Python has become the language of choice for data analytics. One of the major reasons for this is the availability of some easy and fun to work with libraries in python which make it interesting to work and analyze large data sets. Python is really emerging as the leader in Data Science. There's battle out there happening in the minds of aspiring data scientists to choose the best data science tool. Though there are quite a number of data science tools that provide the much-needed option, the close combat narrows down between two popular languages – Python and R.

Course Objectives:

The objectives of this course are to:

1. Explain the concepts of data and descriptive statistics;
2. Demonstrate the knowledge on python programming and data analysis techniques;
3. Illustrate the use of concepts of Regression, Classification and Clustering;
4. Discuss the NLP and Deep Learning concepts;

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1:Understand the concepts of Python, data structures, functions;

CO2:Make use of inbuilt packages like numPy and pandas to perform operations on dataset

CO3:Experiment with various pre processing techniques for data analysis .

CO4:Apply data wrangling and to plot and visualize data.

Course Contents:

Unit 1

Data Definition: Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Introduction to statistical learning and Python Programming.

Descriptive Statistics: Measures of central tendency, Measures of location of dispersions, Practice and analysis with Python

Unit- 2

Python Programming Module: Introduction, Data structures in python, Functions and modules, OOP concepts, regular expressions, File Operations, Data Analytics Module

Basic Analysis Techniques: Basic analysis techniques, Statistical hypothesis generation and testing, Chi- Square test, t-Test, Analysis of variance Correlation analysis, Maximum likelihood test, Practice and analysis with Python

Unit- 3

Regression Algorithms: Ordinary Least Squares, Lasso, Ridge, Bayesian

Classification Algorithms: Logistic, Decision Tree, kNN, Naive bayes, SVM, Random Forest, Ensemble models – Bagging and Boosting

Clustering Algorithms: K-means, DBSCAN, Hierarchical, Agglomerative, Spatial

Unit- 4

Natural Language Processing: Bag-of-words model and algorithms for NLP. Machine Learning with stats models and scikit-learn, Deep learning with TensorFlow.

Artificial Neural Networks, Convolutional Neural Networks, Dimensionality Reduction using PCA, LDA, Kernel PCA.

Recommended Learning Resources (Text Books)

1. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny, O'Reilly Media, 2012. ISBN 978-1-4493-1979-3

2. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 978-1111822705.

Recommended Learning Resources (Reference Books)

1. Inderscience Journal of Data Mining , Modelling and Management

2. ACM Transactions on Knowledge Discovery from Data (TKDD)

3. ACM Transactions on data Science (TDS)

4. IEEE Transactions on Knowledge and Data Engineering

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes												
	a	b	c	d	e	f	g	i	j	k	l	m	n
CO1										3	2		
CO2			3		2					3	2		1
CO3				3	1						3	2	2
CO4		3	1								3		

Where, 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO ,PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2042	Parallel Computing and Programming	16 Weeks	SC	4	0	0	4

Prerequisites:

Data Structures (BTCS15F3200), Operating Systems (BTCS15F5100) and C/ C++ programming (BTCS15F5200) language.

Course Description:

Paradigms for the development of sequential algorithms, such as divide-and-conquer and the greedy method, are well known. Paradigms for the development of parallel algorithms, especially algorithms for non-shared memory MIMD machines, are not well known. These paradigms are important, not only as tools for the development of new algorithms, but also because algorithms using the same paradigm often have common properties that can be exploited by operations such as contraction.

Course Objectives:

The objectives of this course are to:

The objectives of the course are to:

Explain the basic theory underlying parallel computing.

Demonstrate the use of One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reductions in developing parallel programming.

Illustrate the use of Open MPI operations in developing Parallel programs.

Discuss the concepts of POSIX threads.

Course Outcomes (Cos):

On successful completion of this course, the student shall be able to:

CO1: Identify the type of parallelism required for solving the given problem

CO2: Apply basic communication operations for solving the given real world problem.

CO3: Develop parallel programs using message passing technique to solve the real world problems.

CO4: Build the programs using shared memory inter process communication for solving real world problems

Course Contents:

Unit-1

Introduction to parallel computing: Motivating Parallelism, Scope of parallel computing, Parallel Programming Platforms: Implicit parallelism, Limitations of Memory systems performance, Physical organization of parallel platforms, Communications costs in parallel Machines, Routing Mechanisms for interconnection networks, impact of process-processor Mapping and Mapping Techniques.

Unit-2

Principles parallel algorithm design: Preliminaries, decomposition techniques characteristics of tasks and interactions, mapping techniques load balancing, parallel algorithm models,

Basic Communication Operations: One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reduction

Unit-3

Analytical modelling of parallel programs: sources of overhead in parallel programs, performance Matrix for parallel system, the effect of granularity on performance,

Programming using message passing paradigm: Principles of Messaging- Passing Programming, The Building blocks: Send and Receive Operations, MPL, Topologies and Embedding, Overlapping communication with Computation.

Unit-4

Programming shared address space platforms: Thread basics, why thread, the POSIX thread API, thread creation and termination, synchronization primitives in Pthreads, controlling threads and synchronization attributes, thread cancellation, composite synchronization constructs, openMP.

Self-learning Component

Shared Memory, Messaging passing, OpenMP, CUDA.

Recommended Learning Resources(Text Books):

1. Ananth Grama, George Karypis, Vipin Kumar, and Anshul Gupta : Introduction to Parallel Computing, Pearson , Second Edition, 2016

2. Michael J. Quinn. , Parallel programming in C with MPI and OPENMP by, McGraw Hill Education.

Recommended Learning Resources (Reference books):

1. Peter S. Pacheco , An Introduction to Parallel Programming by., Morgan Kaufmann Publishers(MK).

2. Parallel Computing – Elsevier

3. International Journal of Parallel Programming – Springer

4. International Journal of Parallel Programming - ACM Digital Library.

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	1	1		3			1
CO2	3	1	2	1	2				2			1
CO3	3	2	2	1	2	1	1		3			
CO4	3	2	2	1	2				3			3

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2043	Open Source Cloud Computing Tools	16 Weeks	SC	4	0	0	4

Prerequisites:

Cloud Computing, Network Basics

Course Description:

This course in open source cloud computing tools provides an insight in to designing and creating an architecture for first nontrivial OpenStack cloud. Illustrates how to organize computer, networking, and storage resources and the associated software packages. Perform the day-to-day tasks required to administer a cloud.

Course Objectives:

The main objectives of this course are:

1. Discuss the basics of OpenStack Networking
2. Explain the OpenStack architecture
3. Demonstrate the design of a network.
4. Illustrate User-Facing Operations suitable to use-cases of OpenStack

Course Outcomes:

On successful completion of this course; the student will be able to:

- CO1: Experiment with operations of the OpenStack Networking.
- CO2: Analyze the working of OpenStack architecture.
- CO3: Design a network for a real world problem.
- CO4: Create OpenStack for user-enabling processes to manage users

Course Contents:

Unit- 1

OpenStack Networking: Overview; Detailed Description; Example Component Configuration; Provisioning and Deployment: Automated Deployment; Disk Partitioning and RAID; Network Configuration; Automated

Configuration; Remote Management; Designing for Cloud Controllers and Cloud Management: Hardware Considerations; Separation of Services; Database; Message Queue; Conductor Services; Application Programming Interface (API); Extensions; Scheduling; Images; Dashboard; Authentication and Authorization; Network Considerations

Unit -2

Compute Nodes: Choosing a CPU; Choosing a Hypervisor; Instance Storage Solutions; Off Compute Node Storage—Shared File System; On Compute Node Storage—Shared File System; On Compute Node Storage—Nonshared File System; Issues with Live Migration; Choice of File System; Overcommitting; Logging; Networking; Scaling: The Starting Point; Adding Cloud Controller Nodes; Segregating Your Cloud; Cells and Regions; Availability Zones and Host Aggregates; Scalable Hardware; Hardware Procurement; Capacity Planning; Burn-in Testing; Storage Decisions: Ephemeral Storage; Persistent Storage; Object Storage; Block Storage; OpenStack Storage Concepts; Choosing Storage Backends; Commodity Storage Backend Technologies

Unit- 3

Network Design: Management Network; Public Addressing Options; IP Address Planning; Network Topology; Services for Networking; Operations: Using the OpenStack Dashboard for Administration; Command-Line Tools; Network Inspection; Users and Projects; Running Instances; Managing Projects and Users: Projects or Tenants; Managing Projects; Quotas; User Management; Associating Users with Projects

Unit- 4

User-Facing Operations: Images; Adding Images; Sharing Images Between Projects; Deleting Images; Other CLI Options; The Image Service and the Database; Example Image Service Database Queries; Flavors; Private Flavors; How Do I Modify an Existing Flavor; Security Groups; General Security Groups Configuration; End-User Configuration of Security Groups; Block Storage; Block Storage Creation Failures; Instances; Starting Instances; Instance Boot Failures; Using Instance-Specific Data; Associating Security Groups; Floating IPs; Attaching Block Storage; Taking Snapshots; Live Snapshots; Instances in the Database;

Self-learning Component:

Maintenance, Failures, and Debugging; Network Troubleshooting; Logging and Monitoring; Backup and Recovery; Customization; Upstream OpenStack; Advanced Configuration.

Recommended Learning Resources (Text books):

1. Tom Fifield, Diane Fleming, Anne Gentle, Lorin Hochstein, Jonathan Proulx, Everett Toews, and Joe Topjian, OpenStack Operations Guide, O'Reilly Media, Inc, 2014.

Recommended Learning Resources (Reference books):

1. Kevin Jackson, Cody Bunch, OpenStack Cloud Computing Cookbook, Second Edition, Packt Publishing, 2013.
2. Dan Radez, OpenStack Essentials, Packt Publishing, 2015.
3. www.openstack.org
4. www.redhat.com/Private_Cloud/OpenStack

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes													
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
C01	3							3						
C02			2	2								2		
C03			3			3			3		3			
C04			3	3										

Where, 1 (Low),2(Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2051	Unix Operating System & Internals	16 Weeks	SC	4	0	0	4

Prerequisites:

Program for problem solving, Operating Systems (BTCSF5100)

Course Description:

This course gives introduction of hierarchical structure, principles, algorithms, application, development and management of UNIX operating system multi-dimensionally, systematically and from the elementary to profound. It gives a deeper understanding of how UNIX operating system functions.

Course Objectives:

The objectives of this course are to:

Explain the history, basics and structure of UNIX Operating System

Demonstrate the different states of UNIX process and scheduling techniques

Discuss UNIX memory management techniques

Describe UNIX kernel, data structures and internal representation of files in UNIX operating system

Course Outcomes:

On successful completion of this course, student shall be able to:

CO1: Summarize the history, basics and structure of UNIX operating systems.

CO2: Make use of various UNIX process management and scheduling schemes

CO3: Design applications using memory management techniques

CO4: Explore the internals of UNIX operating system

Course Contents:

Unit-1

Background of UNIX Operating System: Introduction of Operating System, Types of UNIX, History of UNIX, UNIX Software Architecture: System Call Interface, Standard Libraries and Language Libraries, UNIX Shell, Applications, UNIX Environment, Character User Interface Versus Graphical User Interface, UNIX Command Lines.

Unit-2

UNIX Process Management: Multiple Processes Running Concurrently: Fundamental Concept for Scheduler and Scheduling Algorithm, UNIX Scheduling Algorithm and Context Switch, Process States, Process Image and Attributes, Process Control: Running Command in Foreground or in Background, More Concepts about Process Concurrently, Execution in UNIX, UNIX Inter-Process Communication, UNIX Signals, Termination of Processes, Daemons UNIX Background "Guardian Spirits", UNIX System Boot and Init Process.

Unit-3

UNIX Memory Management: Outline of Memory Management: Memory Allocation Algorithms in Swapping, Page Replacement Algorithms in Demand Paging, **Process Swapping in UNIX: Swapped Content, Timing of Swapping**, Allocation Algorithm, Selection Principle of Swapped Processes, Swapper, Swapping Effect, Demand Paging in UNIX: Demand Paging, Page Replacement.

Unit-4

UNIX File System: UNIX File System Structure: File System Organization, Home and Working Directories, Absolute and Relative Pathnames, UNIX Inodes and Data Structures for File System, UNIX File Concept and Types of Files, Managing Files and Directories : Displaying Pathname for Home Directory and Changing Directories, Viewing Directories and File Attributes, Creating Directories and Files, Displaying Type of a File, File and Directory Wildcards, UNIX File Storage and File System Implementation.

Self-Learning Component:

The text editor - vi editor with modes and gedit, UNIX shell introduction, UNIX I/O system, I/O redirection and piping, Programming using Bourne shell.

Recommended Learning Resources (Text books)

Yukun Liu, Yong Yue, Liwei Guo ; UNIX Operating System: The Development Tutorial via UNIX Kernel Services ; Springer, Higher Education Press, 2011.

Maurice J. Bach ; The Design of the UNIX Operating System; Pearson Education; Prentice Hall of India, 2004.

Recommended Learning Resources (Reference books)

1. William Stallings, Operating Systems: Internals and Design Principles, Prentice Hall of India, seventh edition 2011.
2. D. M. Dhamdhere; Operating Systems: A Concept-Based Approach; Tata McGraw-Hill, 2002.
3. Gary J. Nutt; Operating Systems: A Modern Perspective; Addison-Wesley, 2011.
4. Springer Transaction for advance in Distributed computing and middleware.
5. IEEE Transaction for Real time operating system.
6. ACM Transaction for embedded operating system.

Mapping COs with POs (Program outcomes):

Course Outcomes	Program Outcomes(USP)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	2	3	3	2	0	0	0	0	0	0	0
CO 2	2	3	3	3	2	0	0	0	0	0	0	0
CO 3	2	3	3	3	2	0	0	0	0	0	0	0
CO 4	2	3	3	3	2	0	0	0	0	0	0	0

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO, PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2052	Program Analysis	16 Weeks	SC	4	0	0	4

Prerequisites:

Data Structures Using C, Analysis and Design of Algorithms

Course Description:

Data flow analysis in a program is used to discover information for a wide variety of useful applications, ranging from compiler optimizations to software engineering and verification. Modern compilers apply it to produce performance-maximizing code, and software engineers use it to re-engineer or reverse engineer programs and verify the integrity of their programs. The course will mainly cover topics: Introduction, compiler architecture, intermediate representations, Dataflow analysis, Control flow analysis, control-flow graphs, basic blocks, Pointer and alias analysis, Interprocedural analysis, Advanced Topics: Program Synthesis, Program Testing, & Types and Programming.

Course Objectives:

The objective of this course is to:

- 1.Explain the basic concepts of data flow analysis through a contemporary optimization.
- 2.Describe common properties of program analysis at an abstract level.
3. Discuss the Complexity of Iterative Data Flow Analysis.
4. Illustrate the Data Flow Analysis in GCC

Course Outcomes:

On successful completion of this course, student shall be able to:

- CO1: Summarize the basic concepts of data flow analysis and common properties of variables and expressions.
- CO2: Apply graph properties to data flow analysis, framework, assignments, functions and equations.
- CO3: Design data flow analysis algorithm in round robin and iterative methods.
- CO4: Develop various data flow analysis algorithms using the concept of GCC.

Unit-1

An Introduction to Data Flow Analysis : A Motivating Example, Program Analysis: The Larger Perspective, Characteristics of Data Flow Analysis, Classical Bit Vector Data Flow Analysis: Basic Concepts and Notations, Discovering Local Data Flow Information, Discovering Global Properties of Variables, Discovering Global Properties of Expressions.

Unit-2

Theoretical Abstractions in Data Flow Analysis: Graph Properties Relevant to Data Flow Analysis, Data Flow Framework, Data Flow Assignments, Computing Data Flow Assignments, General Data Flow Frameworks: Non-Separable Flow Functions, Discovering Properties of Variables.

Unit-3

Complexity of Iterative Data Flow Analysis: Generic Flow Functions and Data Flow Equations, Generic Round-Robin Iterative Algorithm, Complexity of Round-Robin Iterative Algorithm

Unit 4

An Introduction to GCC: About GCC, Building GCC, Implementing Data Flow Analysis in GCC : Specifying a Data Flow Analysis, An Example of Data Flow Analysis

Self-learning Component:

Discovering Properties of Pointers, Liveness Analysis of Heap Data, Implementing the Generic Data Flow Analyzer gdfa.

Recommended Learning Resources (Text books):

1. Uday P. Khedker, Amitabha Sanyal, and Bageshri Karkare. Data Flow Analysis: Theory and Practice. CRC Press, USA (2009).

Recommended Learning Resources (Reference books):

1. M. S. Hecht. Flow Analysis of Computer Programs. ElsevierNorth-Holland Inc. 1977.
2. F. Nielson, H. R. Nielson, and C. Hankin. Principles of Program Analysis Springer-Verlag. 1998.

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	1	1	1	3	2	3	3	1	1	3
C02	3	3	2	1	3	3	2	3	3	1	2	3
C03	3	3	3	3	3	3	3	1	3	2	3	3
C04	3	3	3	3	3	3	3	1	3	2	3	3

Where, 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2053	User Interface (UI)/ User Experience (UX) Design	16 Weeks	SC	4	0	0	4

Prerequisites:

Data Structures Using C, Analysis and Design of Algorithms

Course description:

This course aims at providing knowledge of basic concepts of UI and UX. UX design refers to user experience design, while UI design stands for user interface design. Both of these are crucial to an IT product and need to work closely together. Despite being very integral to each other, the roles themselves are quite different, involving distinct processes.

Course Objectives:

The objectives of this course are to:

1. Explain the new technologies that provide interactive devices and interfaces.
2. Illustrate the UI/UX design process.
3. Describe various Interaction styles including Direct Manipulation and Virtual Environment
4. Discuss the command, natural languages and issues in design for maintaining QoS.

Course Outcomes:

On successful completion of this course; the student will be able to:

C01: Understand the new technologies that provide interactive devices and interfaces in real world applications

C02: Implement the UI/UX design process and evaluate UID.

C03: Develop applications using various Interaction styles including Direct Manipulation and Virtual Environment..

CO4:Elaborate the command, natural languages and issues in design for maintaining QoS.

Course Contents:

Unit- 1

Introduction: Usability of Interactive Systems: Introduction, Usability Goals and Measures, Usability Motivation, Universal Usability, Goals for our profession. Guideline, principles, and theories: Introduction, Guidelines, principles, Theories.

Unit -2

Development Process: Managing Design Processes- Introduction, Organizational Design to support Usability, The Four Pillars of Design, and Development methodologies: Ethnographic Observation, Participatory Design, Scenario Development, and Social Impact statement for Early Design Review, Legal Issues.

Evaluating Interface Design- Introduction, Expert Reviews, Usability Testing and Laboratories, Survey Instruments, Acceptance tests, Evaluation during Active Use, Controlled Psychologically Oriented Experiments

Unit- 3

Interaction Styles: Direct Manipulation and Virtual Environments- Introduction, Examples of Direct Manipulation, Discussion of direct manipulation, 3D Interfaces, Tele-operation, Virtual and Augmented Reality.

Menu Selection, Form Filling and Dialog Boxes- Introduction, Task-Related Menu Organization, Single Menus, Combination of Multiple Menus, Content Organization, Fast Movement Through Menus, Data Entry With Menus, Form Filling, Dialog Boxes and Alternatives, Audio Menus and Menus for Small Displays.

Command and Natural Languages- Introduction, Command-organization functionality strategies and structure, Naming and Abbreviations, Natural Language in computing.

Interaction Devices- Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory interfaces, Displays-Small and Large

Unit- 4

Design Issues: Quality of Service- Introduction, Models of Response-Time Impacts, Expectations and Attitudes, User Productivity, Variability in Response time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display design, web page design, Window Design, Colour User Documentation and Online Help- Introduction, Online versus paper documentation, Reading from paper versus Displays, Shaping the content of the Manuals, Accessing the Documentation, Online Tutorials and animated demonstrations, Online Communities for User Assistance, The Development Process.

Self-Learning Component:

Information Search and Visualization- Introduction, Search in Textual Documents and Database Querying, Multimedia document searches, Advanced filtering and Search Interfaces, Information Visualization: Introduction, Data type by task taxonomy, Challenges for information visualization.

Recommended Learning Resources (Text Books):

1. Ben Shneiderman, Plaisant, Cohen, Jacobs: Designing the User Interface, 5th Edition, Pearson ,Education, 2010.
2. Alan Dix, Janet Finalay, Gregory D AbiwdmRusselBealel: Human-Computer Interaction, III Edition, Pearson , Education, 2008.

Recommended Learning Resources (Reference Books):

1. Eberts: User Interface Design, Prentice Hall, 19944.
2. Wilber O Galitz: The Essential Guide to User Interface Design- An Introduction to GUI Design,
3. Principles and Techniques, Wiley-Dreamtech India Pvt Ltd, 20115

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	2	1	1					2
CO2	3	2	2	2	1							1
CO3	3	2	2	2	1							2
CO4	3	3	2	2	1							2

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2061	Robotic Process Automation	16 Weeks	SC	4	0	0	4

Prerequisites:

Basic Programming skills in .Net, VB, C#, JavaScript, HTML, SQL queries, Knowledge of key terminologies (OCR, Process flow, Exception handling, Bots, algorithms)

Course Description:

Robotic Process Automation (RPA) offers many challenges for software developers and scientists. This course introduces the UiPath Robotic Process Automation concepts through UiPath Studio and UiPath Orchestrator where a student gains knowledge of how to build a bot to automate required tasks.

Course Objectives:

The objectives of this course are to:

1. Discuss the concepts of Robotics Process automation
2. Describe the sequence, flowchart and control flow in automation tool
3. Demonstrate the data manipulation techniques
4. Demonstrate the usage of UI Explorer and Screen scraping.

Course Outcomes (CO's):

CO1: Make use of recording features in UiPath Studio to automate the repetitive tasks.

CO2: Apply appropriate Workflow Activities in UiPath Studio to automate the complex tasks using Flowchart and Sequence.

CO3: Build data table and data manipulation techniques in UiPath Studio to automate CSV / Excel workbook applications

CO4: Design and Develop bot process using UI Explorer and Automate using Screen Scraping for applications in UiPath Studio.

Course Contents:

UNIT-1

What Is Robotic Process Automation: Scope and techniques of automation, Robotic process automation, About UiPath, Future of Automation. Record and Play: UiPath stack, Downloading and installing UiPath Studio, Learning UiPath Studio, Task recorder, Step-by-step examples using the recorder.

UNIT-2

Sequence. Flowchart and Control Flow: Sequencing the Workflow, Activities, Control Flow, various types of loops, and decision making, Step-by-step example using Sequence and Flowchart, Step-by-step example using Sequence and Control Flow

UNIT-3

Data Manipulation: Variables and Scope, Collections, Arguments-Purpose and use, Data table usage and examples, Clipboard management, File operation with step-by-step example, CSV/Excel to data table and vice versa with a step-by-step example

UNIT-4

Taking Control of the Controls: Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls-mouse and keyboard activities, Working with UI Explorer, Handling events, Screen Scraping, When to use OCR, Types of OCR available, How to use OCR.

Self-learning components

Handling User Events and Assistant Bots

Recommended Reference Books (Text books):

1. Learning Robotic Process Automation Alok mani Tripathi Kindle Edition, Published rch by Packt Publishing, 2018.
- 2.E. Turban, R. Sharda, D. Delen, David King, Business Intelligence, 2nd ed. Pearson India, 2010.

Recommended Reference Books (Reference books):

1. Marlon Dumas et. al., Fundamentals of Business Process Management, Springer, ebook, 2012.
2. Van der Aalst, Process Mining: Discovery, Conformance and Enhancement of Business Processes, Third

edition, 2011.

Mapping Cos with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01	3	3	3	2	2					2		
C02	3	3	3	3	3					2		
C03	3	3	3	3	3					2		
C04	3	3	3	3	3					2		

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2062	Block Chain Technology	16 Weeks	SC	4	0	0	4

Prerequisites:

Cryptography concepts

Course description:

This course introduces the concept of digital crypto currencies using Blockchain, which is fundamentally a public digital ledger to share information in a trustworthy and secure way. The course also discuss the concept and applications of Blockchain that have now spread from crypto currencies to various other domains, including business process management, smart contracts, IoT and so on. This includes the fundamental design and architectural primitives of Blockchain, the system and the security aspects, along with various use cases from

different application domains.

Course Objectives:

The objective of the course is to:

- 1.Explain the underlying technology of transactions, blocks, proof-of-work, and consensus building
- 2.Discuss Hyperledger to build applications on blockchain
- 3.Describe the architecture of bit coins and to give the working of the bit coin
- 4.Illustrate the design and implementation of new ways of using blockchain technology

Course Outcomes:

On successful completion of this course; the student will be able to:

- CO1: Explain the basic architecture and design of a blockchain
- CO2: Discuss various aspects of permissioned blockchain - Hyper ledger
- CO3: Analyse various use cases of blockchain implementation
- CO4: Develop new use cases for blockchain implementation

Course Contents:

Unit-1

Introduction to Blockchain: History: Digital Money to Distributed Ledgers; Design Primitives: Protocols, Security, Consensus, Permissions, Privacy; Blockchain Architecture and Design: Basic crypto primitives: Hash, Signature; Hashchain to Blockchain; Basic consensus mechanisms; Consensus: Requirements for the consensus protocols, Proof of Work (PoW), Scalability aspects of Blockchain Consensus, consensus protocols.

Unit-2

Permissioned Blockchains: Design goals, Consensus protocols for Permissioned Blockchains Hyperledger Fabric I: Decomposing the consensus process, Hyperledger fabric components, Chaincode Design and Implementation; Hyperledger Fabric II: Beyond Chaincode: Fabric SDK and Front End Hyperledger composer tool.

Unit-3

Use case I: Blockchain in Financial Software and Systems (FSS): Settlements, KYC, Capital markets, Insurance;

Use case II: Blockchain in trade supply chain: Provenance of goods, visibility, trade supply chain finance, invoice management discounting, etc

Use case III: Blockchain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system, social welfare systems.

Unit-4

Blockchain Cryptography, Privacy and Security on Blockchain; Research aspects I: Scalability of Blockchain consensus protocols, Case Study of various recent works on scalability;

Research aspects II: Secure cryptographic protocols on Blockchain; Case Study of Secured Multi-party Computation,

Blockchain for science: making better use of the data-mining network; Case Studies: Comparing Ecosystems - Bitcoin, Hyperledger, Ethereum and more.

Self-learning Component:

Explore the architecture and design of Ethereum,

Recommended Learning Resources (Text books):

1. Bitcoin and Cryptocurrency Technologies by Arvind Narayanan, Joseph Bonneau, Edward Felten,
2. Andrew Miller, and Steven Goldfeder, Princeton University Press,2016

3. Mastering Bitcoin by Andreas Antonopoulos

4. <https://github.com/bitcoinbook/bitcoinbook>

Recommended Learning Resources (Reference books):

1. Hyperledger Fabric - <https://www.hyperledger.org/projects/fabric>

2. Zero to Blockchain - An IBM Redbooks course, by Bob Dill, David Smits

3. <https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html>

4. <http://cs251crypto.stanford.edu/18au-cs251/syllabus.html>

Mapping COs with POs (Program outcomes):

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
C01	3	L	L	L	3	-	-	-	-	-	-	-
C02	2	2	2	2	3	-	-	-	-	-	-	-
C03	3	3	2	2	3	-	-	-	-	-	-	-
C04	3	3	3	3	3	-	-	-	-	-	-	-

Where, 1 (Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2063	Deep Learning	16 Weeks	SC	4	0	0	4

Prerequisites:

Machine Learning for Data Analytics (B18CS6010)

Course Description:

This course introduces to deep learning, a branch of machine learning concerned with the development and application of modern neural networks. Deep learning algorithms extract layered high-level representations of data in a way that maximizes performance on a given task. Deep learning is behind many recent advances in AI, including Siri's speech recognition, Facebook's tag suggestions and self-driving cars.

Course Objectives:

On successful completion of this course; the student will be able to:

The objectives of this course are to:

1. Apply a Mathematical model for a real world application.
2. Explain suitable learning algorithm for a real world application.
3. Design a deep learning neural network for a real world application.
4. Demonstrate the deep learning techniques in neural networks and natural language processing.

Course Outcomes:

On successful completion of this course, the student is expected to be able to:

- CO1. Apply the basic concepts of mathematics to solve problems based on deep learning concepts.
- CO2. Make use of suitable machine learning algorithms on real world problems (classification, clustering).
- CO3. Utilize deep learning neural network model on real time applications like(face recognition, speech recognition)
- CO4. Adapting CNN concepts on NLP and Recommender systems applications.

Course Contents:

Unit 1

Introduction: Applied math and Machine Learning Basics: Linear Algebra-Scalars, Vectors, Matrices and Tensors, Eigen Decomposition, SVD, PCA Probability and Information Theory-Probability Distribution, Conditional Probability, Chain Rule of Conditional Probability, Bayes' Rule.

Unit- 2

Numerical Computation: Overflow, Underflow, Gradient Based Optimization, Constrained Optimization, Linear Least Squares, Machine Learning Basics- Learning Algorithms, Overfitting and Underfitting, Maximum Likelihood Estimation, Supervised and Unsupervised Learning Algorithms, Building Machine Learning Algorithm, Challenges Motivating Deep Learning

Unit -3

Deep Networks: Modern Practices-Example: Learning XOR, Gradient-Based Learning, Hidden Units, Architectural Design, Back-Propagation Algorithm.

Unit- 4

Convolutional Networks: Recurrent Neural Networks, Applications- Natural Language Processing, Recommender Systems.

Self-Learning Component:

Linear factor Models, Structured probabilistic Models, Monte-Carlo Methods, Deep generative Models.

Recommended Learning Resources (Text Books)

1. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning." First edition, An MIT Press book in preparation. (2015).
2. Duda, R.O., Hart, P.E., and Stork, D.G. Pattern Classification. Wiley-Interscience. 2nd Edition. 2001.

Recommended Learning Resources (Reference Books Books)

1. Theodoridis, S. and Koutroumbas, K. Pattern Recognition. Edition 4. Academic Press, 2008.
2. Russell, S. and Norvig, N. Artificial Intelligence: A Modern Approach. Prentice Hall Series in Artificial Intelligence. 2003.
3. Springer Journal of Machine Learning.

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	2	2	1	2					2	2	1	2
C02	2		1	2	1			1	2		1	2
C03	1		1	2	2			1	1		1	2
C04	1	1		2	1				1	1		2

Where, L (Low), M (Medium) and H (High) represents strength of correlation between CO and PO

Course Code	Course Title	Duration		L	T	P	C
M19CS2070	Big Data & Analytics Lab	16 Weeks	HC	0	0	2	2

Course Outcomes (Cos):

On successful completion of this course; the student will be able to:

CO1.Summarize the fundamentals of Hadoop distributed file system and Big Data Analytics.

CO2.Apply and compare basic applications of Big Data Processing with MapReduce and Batch Analytics with Apache Spark.

CO3.Design and Implement Real-Time Analytics Applications.

CO4.Perform analytics and build models for real world stream processing problems.

List of Programs

Sl. No.	Program	Course Outcome	Program Outcome
1	Installing Hadoop 3, Hive, Derby, R, Anaconda, Python, Apache Spark, Apache Flink, Tableau	1, 2	a, b, e, k, l
2	Download any data sets from UCI Machine Learning Repositories or Kaggle. Perform Exploratory data analytics that include: Study of data through pairplots, heatmaps, histograms, finding correlations amongst data, and so on	2, 3	a, b, e, k, l
3	Install R on a shared server and connect to Hadoop. Demonstrate execution of R programming constructs inside MapReduce using RMR2. Hence, develop any application using R and Hadoop Streaming by choosing data sets from Internet-bound big data repositories	1, 2, 3	a, b, e, k, l
4	Perform Machine Learning Clustering Task using SparkML in Python by choosing public datasets that are openly available for the task identified. Then, perform experiments and interpret the results obtained	3, 4	a, b, e, k, l
5	Use Map Reduce framework to perform big data analytics on distributed clusters. by choosing public datasets that are	1, 3, 4	a, b, e, k, l

	openly available for the task identified. Then, perform experiments and interpret the results obtained.		
6	Use Spark framework to perform big data analytics on distributed clusters. by choosing public datasets that are openly available for the task identified. Then, perform experiments and interpret the results obtained.	1, 2, 3	a, b, e, k, l
7	Perform big stream data analytics on using spark framework using SparkML in Python by choosing public datasets that are openly available for the task identified. Then, perform experiments and interpret the results obtained.	3, 4	a, b, e, k, l
8	Perform big stream data analytics on using Flink framework using SparkML in Python by choosing public datasets that are openly available for the task identified. Then, perform experiments and interpret the results obtained.	1, 3, 4	a, b, e, k, l
9	<p>Hadoop requires external memory for processing big data applications, whereas, it suffers from its poor processing time due to this limitation. Apache Spark is found to overcome the limitations of Hadoop by performing in-memory data processing.</p> <p>Develop</p> <p>Batch Analytics application using Apache Spark.</p> <p>Real time-Analytics application using Apache Spark.</p> <p>(Note: choose data sets from Internet-bound big data repositories)</p>	2, 3, 4	a, b, e, k, l
10	Develop any Batch-Analytics application using Apache Flink.	3, 4	a, b, e, k, l

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01									3			3
C02	2			L	3				2			2
C03		3										
C04		3		2					3			

Where, 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO ,PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS2080	Cyber Security Lab	16 Weeks	SC	0	0	2	2

Course Outcomes:

On successful completion of this course; the student will be able to:

CO1: Implement the cipher techniques

CO2: Develop the various security algorithms

CO3: Design different open source tools for network security and analysis

CO4: Demonstrate intrusion detection system using various open tools

List of Programs

Sl. No.	Program	Course Outcome	Program Outcome
1	Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts: a) Caesar Cipher b) Playfair Cipher c) Hill Cipher d) Vigenere Cipher e) Rail fence – row & Column Transformation	1, 2	a, b, e, k, l
2	Implement the following algorithms a) DES b) RSA Algorithm c) Diffiee-Hellman d) MD5 e) SHA-1	1, 2	a, c, e, k, i
3	Implement the Signature Scheme - Digital Signature Standard	2, 3	a, b, c, k, l

4	Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG)	3, 4	a, d, e, i, k
5	Setup a honey pot and monitor the honeypot on network (KF Sensor)	1, 2, 3	a, b, d, k, l
6	Installation of rootkits and study about the variety of options	1, 3, 4	a, b, e, k, l
7	Perform wireless audit on an access point or a router and decrypt WEP and WPA. (Net Stumbler)	2, 3, 4	a, c, e, k, m
8	Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)	1, 2, 3	a, d, e, i, j

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	2			2						2		
C02	2				2				2			
C03			2	2						2		
C04	3			2	2					2	2	

Where, L (Low), M (Medium) and H (High) represents strength of correlation between CO and PO

Course Code	Course Title	Duration		L	T	P	C
M19CS3011	Virtual and Augmented Reality	16 Weeks	SC	4	0	0	4

Prerequisites:

Problem Solving with Programming (C/C++), Data Structures, Computer Graphics and Animation.

Course Description:

This Course provides the knowledge on Virtual reality concepts, multiple modal interaction, visual-auditory-haptic, interaction immersion and imagination, visual computation and environmental modeling; geometric behavior and physically based simulation; management of large scale environment, VR development tools, augmented reality, mixed reality, digital entertainment

Course Objectives:

- 1.Explain the principles and multidisciplinary features of virtual reality.
- 2.Illustrate the technology for multimodal user interaction and perception in VR, in particular the visual, audial and haptic interface and behavior.
- 3.Describe the objects using technology for managing large scale VR environment in real time.
- 4.Demonstrate the design of the solutions using VR system framework and development tools.

Course Outcomes:

On successful completion of this course; the student shall be able to:

CO1 Summarize the fundamentals of Augmented Reality and Virtual Reality.

CO2 Apply multimodal user interaction and perception techniques involved in Virtual Reality.

CO3: Design different objects using Simulation and Interactive techniques for real world applications.

CO4: Develop innovative Virtual Reality solutions for industrial and Social relevant applications..

Course Contents:

UNIT- 1

Introduction to Virtual Reality (VR): Fundamental Concept and Components of VR, Primary Features and Present Development on VR.

Multiple Modals of Input and Output Interface in VR: Input – Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus and 3D Scanner. Output – Visual, Auditory, Haptic Devices.

UNIT -2

Visual Computation in VR: Fundamentals of Computer Graphics; Real time rendering technology; Principles of Stereoscopic Display; Software and Hardware Technology on Stereoscopic Display.

Environment Modeling in VR: Geometric Modeling, Behavior Simulation, Physically Based Simulation

UNIT- 3.

Haptic & Force Interaction in Virtual Reality: Concept of haptic interaction; Principles of touch feedback and force feedback; typical structure and principles of touch/force feedback facilities in applications. Interactive Techniques in VR: Body Track, Hand Gesture, 3D Manus, Object Grasp.

Development Tools and Frameworks in VR: Frameworks of Software Development Tools in VR, X3D Standard, Vega, MultiGen, Virtools, Unity.

UNIT- 4

Augmented Reality: System Structure of Augmented Reality; Key Technology in AR; General solution for calculating geometric & illumination consistency in the augmented environment.

Application of VR in Digital Entertainment: VR Technology in Film and TV Production, VR Technology in Physical Exercises and Games, Demonstration of Digital Entertainment by VR.

Self-learning Component:

Unity 3D, Manus VR

Recommended Learning Resources (Text books):

Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.

Recommended Learning Resources (Reference books):

1. Sherman, William R. and Alan B. Craig, Understanding Virtual Reality – Interface, Application, and Design, Morgan Kaufmann, 2002.

2. Fei GAO, Design and Development of Virtual Reality Application System, Tsinghua Press, March 2012.
3. Guanran LIU, Virtual Reality Technology, Tsinghua Press, Jan. 2011.
4. International Journal of Virtual and Augmented Reality (IJVAR).
5. Springer, Virtual Reality.

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	2	2	2	3	2	3	3	2	2	3
C02	3	3	2	2	3	3	2	3	3	2	2	3
C03	3	3	3	3	3	3	3	2	3	2	3	3
C04	3	3	3	3	3	3	3	2	3	2	3	3

Where, 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO ,PO and PSO.

Course Code	Course Title	Duration		L	T	P	C
M19CS3012	Computer Vision	16 Weeks	SC	4	0	0	4

Prerequisites:

Probability and Statistics, Programming Language (C/C++/Java), Database Management Systems and Introduction to Data mining.

Course description:

The course, introduces a number of fundamental concepts in computer vision, expose students to a number of real-world applications that are important to our daily lives. More importantly, students will be guided through a series of well-designed projects such that they will get to implement using few interesting and cutting-edge computer vision algorithms. The course benefit is to apply computer vision algorithms to solve real world problems Computer Vision is one of the fastest growing and most exciting AI disciplines in today's academia and industry. This course is designed to open the doors for students who are interested in learning about the fundamental principles and important applications of computer vision.

Course Objectives:

The objectives of this course are to:

1. Explain the fundamentals of Computer vision
2. Describe different segmentation techniques
3. Illustrate registration and classification of images.
4. Discuss the concepts of object detection in real world problem

Course Outcomes :

On successful completion of this course; the student will be able to:

- CO1. Utilize linear filters to enhance the quality of images.
- CO2. Develop Segmentation technique to solve real world problems.

CO3. Design and Develop program for registration and classification of images.

CO4. Apply object detection and recognition techniques to solve real world problems.

Course Contents:

UNIT-1

Introduction and overview to computer vision: Introduction :What is computer vision? A brief history ,Image formation: Geometric primitives and transformations, Geometric primitives, 2D transformations ,3D transformations, 3D rotations, 3D to 2D projections, Lens distortions, Photometric image formation, Lighting, Reflectance and shading, The digital camera, Sampling and aliasing, Color, Compression,

UNIT-2

Image processing, Point operators, Linear filtering, More neighborhood operators, Fourier transforms, Pyramids and wavelets, Geometric transformations, Global optimization

Feature detection and matching , Points and patches, Feature detectors , Feature descriptors, Feature matching, Feature tracking, Edges, Edge detection, Edge linking, Application: Edge editing and enhancement, Lines, Successive approximation, Vanishing points, Hough transforms, Application: Rectangle detection

UNIT-3

Segmentation : Active contours, Snakes, Dynamic snakes and CONDENSATION, Scissors, Level Sets, Application: Contour tracking and rotoscoping, Split and merge, Watershed, Region splitting (divisive clustering), Region merging (agglomerative clustering) , Graph-based segmentation, Probabilistic aggregation, Mean shift and mode finding, Normalized cuts Graph cuts and energy-based methods .

UNIT-4

HIGH-LEVEL VISION

Registration: Registering Rigid Objects, Model-based Vision: Registering Rigid Objects, Registering Deformable Objects .Learning to Classify: Classification, Error, and Loss, Major Classification Strategies, Practical Methods for Building Classifiers, Classifying Images: Building Good Image Features, Classifying Images of Single, Image Classification in Practice

Detecting Objects in Images: The Sliding Window Method, Detecting Deformable Objects, The State of the Art of Object Detection Topics in Object Recognition: What Should Object Recognition Do?

Self-Learning Component:

Implementation of segmentation using different techniques and evaluation of performance between the methods. Implementation of Registration of non rigid objects , Classification using ensemble methods, object detection in images, localization of images, image captioning

Recommended Learning Resources (Text books):

1. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach", 2nd Edition, University of Illinois at Urbana-Champaign Jean Ponce, Ecole Normale Supérieure, Paris©2012, Pearson
2. Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer
3. David Marr, Tomaso A. Poggio, Shimon Ullman "A Computational Investigation into the Human Representation and Processing of Visual Information", , eBook - Amazon.com

Recommended Learning Resources (Reference books):

1. Gary Bradski, Adrian Kaehler, " Learning OpenCV: Computer Vision with the OpenCV Library" Amazon
2. International Journal of Computer Vision, Springer
3. Image and Vision Computing, Elsevier
4. Computer Vision and Image Understanding, Elsevier
5. IEEE Transactions on Image Processing.

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	2	3	3	-	-	-	-	-	-	-
C02	3	2	2	2	3	-	-	-	-	-	-	-
C03	3	2	3	3	3	-	-	-	-	-	-	-
C04	3	2	3	3	3	-	-	-	-	-	-	-

where, 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS3013	Data Privacy	16 Weeks	SC	4	0	0	4

Prerequisites:

Cryptography concepts

Course Description:

This course intend to provide students with an understanding of personal data and information, the background and principles of data protection, the consequences of not adhering to applicable laws and regulations, and responsibilities with respect to data protection. The Data Privacy course is available in multiple versions adapted for various industries, regional laws and jurisdictions.

Course Objectives:

The objective of the course is to

1. Discuss the basic concepts of Data Encryption.
2. Explain the underlying technology for Substitution Ciphers and stream ciphers to build applications for data privacy
3. Demonstrate the use of Data hiding techniques in text and images
4. Describe the different essential resource for data privacy

Course Outcomes:

The objective of the course is to

- CO1: Summarize the basic concepts of Data Encryption.
- CO2. Make use of the underlying technology for Substitution Ciphers and stream ciphers to build applications for data privacy.
- CO3. Design the techniques for Data hiding in text and images.

Unit-1

Data Encryption: Monoalphabetic Substitution Ciphers: Letter Distributions, Breaking a Monoalphabetic Cipher, The Pigpen Cipher, Polybius's Monoalphabetic Cipher, Extended Monoalphabetic Ciphers, The Play fair Cipher, and Homophonic Substitution Ciphers. Transposition Ciphers: Simple Examples, Cyclic Notation and

Keys, Transposition by Turning Template, Columnar Transposition Cipher, Double Transposition, A 2-Step ADFGVX Cipher,

Unit-2

Polyalphabetic Substitution Ciphers and Stream Ciphers: Self-Reciprocal Ciphers, The Porta Polyalphabetic Cipher, The Beaufort Cipher, The Trithemius Cipher, The Vigen`ere Cipher, Breaking the Vigen`ere Cipher, Long Keys, A Variation on Vigen`ere, The Gronsfeld Cipher, Generating Permutations, The Eyraud Cipher, The Hill Cipher, Symmetric Key and Public Key, Stream Ciphers, Linear Shift Registers, Cellular Automata, Nonlinear Shift Registers, Dynamic Substitution, SEAL Stream Cipher, RC4 Stream Cipher Index of Coincidence.

Unit-3

Data Hiding: Data Hiding in Text, Basic Features, Applications of Data Hiding, Watermarking, Intuitive Methods, Simple Digital Methods, Data Hiding in Text, Innocuous Text, Mimic Functions. Data Hiding in Images; LSB Encoding, BPCS Steganography, Lossless Data Hiding, Spread Spectrum Steganography, Data Hiding by Quantization, Patchwork, Signature Casting in Images, Transform Domain Methods, Robust Data Hiding in JPEG Images, Robust Frequency Domain Watermarking, Detecting Malicious Tampering.

Unit-4

Essential Resources: Convolution, One-Dimensional Convolution, Two-Dimensional Convolution, Hashing, Hash Tables, Hash Functions, Collision Handling, Secure Hash Functions, Cyclic Redundancy Codes, Galois Fields, Field Definitions and Operations, GF(256) and Rijndael, Polynomial Arithmetic.

Self-learning Component:

Explore Block Ciphers, Data Hiding in MPEG-2 Video and Stenographic File System

Recommended Learning Resources (Text books):

1. Data Security and privacy by Saloman D, Springer 2013, XIV, 465P, 45illus, ISBN: 978-0-387-00311-

Recommended Learning Resources (Reference books):

1. New Jersey Law against Discrimination. <https://ods.rutgers.edu..>
2. Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>.

Mapping COs with POs (Program outcomes):

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	2	3	2							
CO 2	3	3	3	3	3							
CO 3	3	3	2	2	2							
CO 4	3	3	2	3	3							

where, L (Low), M (Medium) and H (High) represents strength of correlation between CO and PO.

Course Code	Course Title	Duration		L	T	P	C
M19CS3020	Introduction to Machine Learning	16 Weeks	OE	4	0	0	4

Prerequisites:

Data Structure, Algorithms and Mathematics (Linear Algebra and statistics)

Course Description:

The course introduces machine learning, with various aspects involved in machine learning, types of learning like supervised, unsupervised and reinforcement learning. It also introduces various methods of dimensionality reduction, reasons for dimensionality reduction, concepts of neural networks, different aspects involved in neural networks, their activation function, back propagation algorithm etc

Course objectives:

The objectives of this course are to:

1. Discuss the basic concepts underlying machine learning.
2. Illustrate the applications of machine learning algorithms to solve problems of moderate complexity for data analysis.
3. Explain the Neural Network a biologically-inspired programming paradigm which enables a computer to learn from observational data.
4. Demonstrate the knowledge of deep learning, a powerful set of techniques for learning in Neural Networks.

On successful completion of this course, the student is expected to be able to:

- CO1: Identify the areas for designing a learning system.
- CO2: Apply machine learning techniques for solving real world problems.
- CO3: Utilize machine learning techniques for solving real world problems.
- CO4: Analyse different feature reduction and representation techniques

Course Contents:

Unit-1

Introduction: Well-Posed Learning Problems, Designing a Learning System, Perspectives and Issues in Machine Learning Examples of Machine Learning Applications, Learning Associations, Classification, Regression, Unsupervised Learning, and Reinforcement Learning. Supervised Learning. Concept Learning and the General-to-Specific Ordering.

Unit-2

Dimensionality Reduction: Subset Selection, Principal Components Analysis, Factor Analysis, Multidimensional Scaling, Linear Discriminant Analysis. Clustering: Mixture Densities, k-Means Clustering, Expectation-Maximization Algorithm, Mixtures of Latent Variable Models, Supervised Learning after Clustering, Hierarchical Clustering, Choosing the Number of Clusters. Decision Tree Learning,

Unit-3

Characteristics of Neural Networks, Historical Development of Neural Networks Principles, Artificial Neural Networks: Terminology, Models of Neuron, Topology, Basic Learning Laws, Pattern Recognition Problem, Basic Functional Units, Pattern Recognition Tasks by the Functional Units. Feedforward Neural Networks: Introduction, Analysis of pattern Association Networks, Analysis of Pattern Classification Networks,

Unit-4

Deep Feed forward Networks: Example learning XOR, Gradient based learning, Hidden units, Architectural design, Back propagation and other differential algorithms

Self-learning Component

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

Recommended Learning Resources (Text Books):

1. Machine Learning Tom Mitchell: McGraw-Hill, McGraw-Hill Education (India) Private Limited, 2013.
2. Introduction to Machine Learning Ethem Alpaydin: Second edition MIT press, 2016
3. Deep Learning -Ian Good fellow, Yoshua Bengio and Aaron Courville.An MIT Press book, 2013

Recommended Learning Resources (Reference Books):

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.

2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001

3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

Mapping COs with POs (Program outcomes)

Course Outcomes	Program Outcomes												
	P01	P02	P03	P04	P05	P06	P07	P08	P08	P09	P10	P11	P12
CO1	3	3	2	2	2								
CO2	2	3	3	3	3								
CO3	2	3	3	3	3								
CO4	L	L	2	L	2								

Where, 1(Low), 2 (Medium) and 3 (High) represents strength of correlation between CO , PO and PSO

Course Code	Course Title	Duration		L	T	P	C
M19CS3030	Project Work Phase - I	16 Weeks	HC	0	0	4	4

Project survey has to be completed and problem identification for the project must be done. Students must meet the guide and discuss with due PPT presentations at least two hours per Wk. and do the necessary ground work for Phase II devoting at least 6 hours per week.

Course Code	Course Title	Duration	Course	L	T	P	C	Hrs/
M19CS3040	Internship	16	HC	0	0	4	4	4

Experience is becoming a crucial factor for employers when deciding who gets their foot in the door. It's strongly advised that students and graduates take the opportunity to complete a period of work experience to ensure they have a competitive advantage over their peers; and that's where an internship can make all the difference.

An internship is a period of work experience offered by an employer to give students and graduates exposure to the working environment, often within a specific industry, which relates to their field of study. Internships can be as short as a week or as long as 12 months. They can be paid or voluntary; however, before you start an internship it's important to know your rights with regards to getting paid.

Internships can be done in a range of sectors, including sales, marketing, engineering, graphic design, management, I.T. and many, many more. Throughout an internship you will develop a variety of soft skills, including communication skills, personal effectiveness, presentation skills, creative problem solving and influencing skills.

'On-the-job' experience can be as valuable as anything learned in your studies. After all, you cannot really understand what a job is all about until you have worked in that environment. Internships are great opportunities to speak directly to people who have experience in the role you aspire to; and their knowledge of the job and working environment will give you a greater understanding of what it's all about and what you need to do to progress.

Course Code	Course Title	Duration	Course	L	T	P	C	Hrs/
M19CS3050	Global Certification	16	HC	0	0	4	4	4

Information technology is a highly dynamic and ever-changing field. As the industry evolves, new types or sets of certifications continue to crop up. Getting certified is a surefire way to advance your career in the IT industry. Whether you work for an enterprise, a small business, government, healthcare or any other place that employs IT professionals, your best bet for career advancement is to validate your skills and knowledge through a carefully chosen combination of certifications.

Certification training can help you cover new areas while also reinforcing the skills you already have. Think of it as a refresher course that can help you identify and overcome your problem areas. Certifications do more than just validate your skills and experience. It also shows potential employers that you are committed to the IT field by spending the money and time to obtain your certifications. IT certifications also make career advancement more likely. The plain truth is that, in general, IT certifications can help you get a pay raise or a promotion.

Course Code	Course Title	Durati on	Course	L	T	P	C	Hrs/
S20CS3060	MOOC	16	HC	0	0	4	4	4

A MOOC is a model of educational delivery that is, to varying degrees, massive, open, online, and a course. Most MOOCs are structured similar to traditional online higher education courses in which students watch lectures, read assigned material, participate in online discussions and forums, and complete quizzes and tests on the course material.

MOOCs are typically provided by higher education institutions, often in partnership with “organizers” such as Coursera, edX, and Udacity, though some MOOCs are being offered directly by a college or university.

MOOCs arise from the confluence of several important trends, and they raise important questions and spark essential conversations about curriculum design, accreditation, what constitutes a valid learning experience, and who has access to higher education.

The global certifications / MOOCs chosen by the students for their final semester should be considered with the following aspects in mind by the guide.

The certification must be provided from an online source which offers the complete technical course required for the students such as Udacity, Udemy, Coursera, NPTEL, EDX or training provided by Harvard or MIT Online Courses.

The guides must make sure that the certification chosen is technical in nature and is useful for the student in gaining further career opportunities.

The guides must make sure that the certification courses must be of a minimum time per course of 30 hours which makes it equivalent to a subject chosen.

The guides must ensure to inform the students that the certification will be followed by a mini project session where the student must perform a mini-project based on the technical concept learnt (Such as python or data science or Android development).

Provision of the completion certificate is compulsory with the proof of grading, hours of content and the online certificate verification link to verify that the student has not forged the same.

Two internal tests (Assessment in terms of presentation + live demo of technical content learned) must be conducted for the dates further specified.

The guides must make sure that the certifications must be done between January and April 2019. The certifications done before January 10 will not be considered for the same.

Course Code	Course Title	Durati on	Course	L	T	P	C	Hrs/
M19DS3070	Sports, Yoga, Music, Dance, Theatre	16	RULO	0	0	2	2	4

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any ONE of these courses.

YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

To prepare the students for the integration of their physical, mental and spiritual faculties;

To enable the students to maintain good health;

To practice mental hygiene and to attain higher level of consciousness;

To possess emotional stability, self-control and concentration; and

To inculcate among students self-discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

Practice yoga for strength, flexibility, and relaxation.

Learn techniques for increasing concentration and decreasing anxiety.

Become self-disciplined and self-controlled

Improve physical fitness and perform better in studies

Gain self-confidence to face the challenges in the society with commitment to serve the society

Course Contents:

Unit-I:

Yoga: Introduction , Surya Namaskara:- 12 counts.

Unit-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana. Asanas: Standing- Tadasana, Trikonasana, Parshwa konasana, Veerabhadrasana.

Unit-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana.

Asanas: Supine Position- Sarvangasana, Halasana. Mudras- Dhyana mudra, , Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:- Anuloma – Viloma, Basthrika, Bhramari.

Dhyana & its types: Competition format, Rules and their interpretations

B. VOLLEYBALL

Course Objectives:

To learn the rules, fundamental skills, and strategies of volleyball

To develop skills in passing, setting, serving, spiking, and blocking.

To learn basic offensive and defensive patterns of play.

To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

Learn basic skills and knowledge associated with volleyball.

Apply these skills while playing volleyball and exhibit improved performance

Improve physical fitness and practice positive personal and lifestyle.

Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:

Unit-I

Introduction about Volleyball

Players Stance, Receiving and passing

The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

Unit-II

Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)

Setting the ball- Set for attack, Back set, Jump set

Unit-III

Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash

Block- Single block, Double block, Three-man block

Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

Unit-IV

Attack Combination, Defense Systems, Libero play

Court marking, Rules and their interpretations and Duties of officials

C. BASKETBALL

Course Objectives:

The objectives of this course are to:

To learn the rules, fundamental skills, and strategies of Basketball

To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.

To learn basic offensive and defensive strategies of play.

To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.

To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

Learn basic skills and knowledge associated with basketball.

Apply these skills while playing basketball and exhibit improved performance

Improve physical fitness and practice positive personal and lifestyle.

Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:

Unit-I

Basketball: Introduction

Grip; Player stance- Triple threat stance and Ball handling exercises.

Passing (Two hand/one hand)- Chest pass, Bounce Pass, Overhead pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.

Receiving-Two Hand receiving, one hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

Unit-II

Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations

Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.

Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

Unit-III

Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.

Individual Defensive- Guarding the man with the ball and without the ball.

Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

Unit-IV

Court marking, Rules and their interpretations

D.FOOTBALL

Course Objectives:

The objectives of this course are to:

To learn the rules, fundamental skills, and strategies of football.

To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.

To learn basic offensive and defensive patterns of play

To use different parts of the body in utilizing the above skills while playing football

To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

CO1.Learn basic skills and knowledge associated with football.

CO2.Apply these skills while playing football and exhibit improved performance

CO3.Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.

CO4.Improve physical fitness and practice positive personal and lifestyle.

CO5.Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:

Unit-I

Football: Introduction

Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley

Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

Unit-II

Dribbling- With instep and outer instep of the foot.

Heading- From standing, running and jumping.

Feinting- With the lower limb and upper part of the body.

Unit-III

Tackling- Simple tackling, Slide tackling.

Throw-in- Standing and Sliding

Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

Unit-IV

Ground marking, Rules and their interpretations.

E. ATHLETICS (TRACK AND FIELD)

Course Objectives:

The objectives of this course are to:

To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.

To develop competence among students in demonstrating all the techniques covered in the course.

To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.

To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.

To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course learners will be able to:

Display competencies in executing basic techniques and skills associated with select track and field events.

Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.

Learn regular practice of select track and field events and improve physical fitness

Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Contents:

Unit-I

Athletics: Introduction

Track Events - Steeple Chase, Race Walking, Middle and Long distance races

Race walking - Technique, Faults and Officiating.

Middle and Long distance races – Technique and Training

Unit-II

Jumping Events - High Jump and Triple Jump: Basic Skills and techniques

High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing

Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques

Discus Throw - Standing and Rotatory techniques, Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)

Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Recommended Learning Resources (Text books):

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). "Track and field coaching Manual", Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
10. Jarver, Jesse (1987). "The Jumps", Track and Field Coaching Manual Australia.

F. DRAMATICS

Pre-requisites:

Students with background in Theatre Arts/ Keen interest in Dramatics.

Course Objectives:

The objectives of this course are to:

To imbibe the acting skills.

To understand the broader applications of theatre studies in allied arts forms.

To be able to use body language for better communication.

Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

Freely express improvisation in non-verbal communication.

Shall hone good acting skills and be able to emote better.

Be able to put up a theatre act and play a key role.

Be able to differentiate good acting and understand the importance of good lyrics, stage crafting, music, dance, costume and lighting.

Course Contents:

UNIT - 1

Working on Body:Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT - 2

Sound and Movement:Awareness of creating sound patterns, voice modulations, rhythm in speech and dialogues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT - 3

Characterization and Improvisation:Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT - 4

Group work and Production:Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Recommended Learning Resources (Text books):

All about Theatre – Off stage – Chris Hogget.

Rangadalli Anataranga – K V Subbanna

The Indian Theatre – Hemendranath Das Gupta.

A Practical handbook for an Actor – Milisa Bruder, ee Milchel Cohn, Madeleine Oliek et al, Zigler Publisher.

G.INDIAN CLASSICAL DANCE FORMS (Bharatanatyam, Kuchipudi ,Mohiniyattam)

Prerequisites:

Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join.

Course Objectives:

The objectives of this course are to:

To develop an understanding about the Indian classical dance forms and its universal application.

To be able to understand the fine nuances of Classical dance.

To understand the importance of health through Indian classical dance, strengthen the body capacity.

To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.

Course Outcomes:

On successful completion of this course; the student will be able to:

To be able to identify and appreciate the classical dance forms.

To be able to execute basics of Adavus with finesse.

To be able to express through abhinaya.

To be able to perform to perform the fundamentals in the chosen dance form.

Course Contents:

Unit 1

An introduction to Indian classical dance forms Bharatanatyam, Kuchipudi, Mohiniyattam

Unit 2

Learning of Fundamentals Exercises and Adavus- I (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 3

Adavus –II (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 4

Learn a basic composition in the chosen dance form.

Recommended Learning Resources (Text books):

Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi

Classical Dances –Sonal Mansingh, Avinash Parischa

Kuchipudi – Sunil Kothari

Bharatanatyam An in depth study- Saroja vydyanathan

Mohiniyattam – Bharathi Shivaji

H.PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Prerequisites:

Basics in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Course Objectives:

The objectives of this course are to:

To understand the Rhythmology.

To understand the importance of Laya, Taala.

To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

To be able to set instrument to Sruthi.

To be able to play the fundamentals on instrument.

To be able to learn and perform a particular taala.

Course Contents:

UNIT- 1

Introduction to Musical Instruments

Percussion Instruments

Mridangam and its History

UNIT - 2

Introduction to Tala System

Definitions of 5 jaathis and their recitation

Adi Talam and its various forms

Definitions and recitation of different gathis

UNIT- 3

1. Tisra Jaathi, 2. Khanda Jaathi, 3. Misra jaathi, 4. Sankeerna Jaathi

UNIT - 4

1. Learning of Jathi Formation, 2. Basic jathis, 3. Jathis for Dance forms

4. Some Basic Definitions of Korvai, Teermanam etc.,

Recommended Learning Resources (Text books):

1. Mridangam- An Indian Classical Percussion Drum – Shreejayanthi Gopal
2. Theory and practice of Tabala – Sadanand Naimpally.
3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – Srdjan Beronja.
5. Indian Tabala – Srdjan Beronja.

Course Title	Project Work Phase – I				Course Type	Practice	
Course Code	M20TC0303	Credits	4		Class	III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	4	4	4	Practice	CIE	SEE
	-	0	-	-			
	Total	4	4	4			

COURSE OVERVIEW

The major project is a two semester-long practical project with the main objective that students show their ability to apply theoretical concepts learned in lectures to solve (complex) practical problems. The results are to be presented in a project report and as an oral presentation.

COURSE OBJECTIVE (S):

1. To allow students to demonstrate a wide range of the skills learned during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation.
2. To encourage multidisciplinary research through the integration learned in a number of courses.
3. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
4. To encourage teamwork.
5. To improve students' communication skills by asking them to produce both a professional report and to give an oral presentation

COURSE OUTCOMES (CO'S):

On successful completion of this course, the student shall be able to:

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3

C05	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3
C06	Apply project results for sustainable development of the society.	6	1,2,3
C07	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
C08	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
C09	Function effectively as individual and a member in the project team.	9	1,2,3
C010	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
C011	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
C01		√				
C02			√			
C03						√
C04				√		
C05			√			
C06			√			
C07		√				
C08		√				
C09	√			√		
C010			√			√
C011		√		√		

COURSE ARTICULATION MATRIX

CO# / POs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PS01	PS02	PS03

C01	3										3	3	3
C02		3									3	3	3
C03			3								3	3	3
C04				3							3	3	3
C05					3						3	3	3
C06						3					3	3	3
C07							3				3	3	3
C08								3			3	3	3
C09									3		3	3	3
C010										3	3	3	3
C011											3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Capstone-Project Phase-1:

- Student should carry out project work in V semester. Student must select a faculty member from department of CSE as an internal project guide based on research domain and expertise. Student may optionally also select external guide bearing domain expertise from different departments within University and Industry to carry out multidisciplinary project.
- Student must propose a project title, after consultation with guides and after carrying out a literature survey. The proposed title must be submitted in form a document (synopsis) that contains the proposed title of the project, an abstract, Introduction, Survey, Feasibility, and cost estimation to carry out the project.
- Further with the help of respective guide, each student have to the literature review based on the literature survey, identify the research gaps in the selected research/project domain, and then finalize the problem statement and objectives for the project.
- Each student shall be reviewed and evaluated in two reviews through the semester.
- Review 1 shall be on the presentation of the synopsis and justification of the title and feasibility of the project
- Review 2 shall be on the presentation on the literature survey carried out.

Finally, the Capstone-Project Phase-1 shall conclude with each project apply for idea patent or copyright and publish a survey paper in SCOPUS indexed journals, write research proposals for fundings from various governmental organizations or indus

Course Title	Internship/Global Certification				Course Type	Practice	
Course Code	M20TC0304	Credits	4		Class	III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	4	0	0	Practice	CIE	SEE
	-	0	-	-			
	Total	4	4	4			

Internship

COURSE OVERVIEW

An internship can present students with new skills and opportunities. Interns not only gain technical knowledge within the industry of their choice, but they also learn how to interact with professionals in a workplace setting, and develop essential soft skills like time management, organization, adaptability, problem-solving and teamwork.

COURSE OBJECTIVE (S):

1. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
2. To encourage teamwork.
3. To help students to gain exposure into industries.
4. To improve students' communication skills by asking them to produce both a professional report and to give an oral presentation

COURSE OUTCOMES (CO'S):

On successful completion of this course, the student shall be able to:

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3

CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3						√
CO4				√		
CO5			√			
CO6			√			
CO7		√				
CO8		√				
CO9	√			√		
CO10			√			√
CO11		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PS01	PS02	PS03
CO1	3											3	3	3

C02		3									3	3	3
C03			3								3	3	3
C04				3							3	3	3
C05					3						3	3	3
C06						3					3	3	3
C07							3				3	3	3
C08								3			3	3	3
C09									3		3	3	3
C010										3	3	3	3
C011										3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Internship:

- The internship should be paid internship in IT industry.
- The internship should be for minimum of three months.
- The project title must be submitted in form a document (synopsis) that contains the proposed title of the project, an abstract, Introduction and their roles and responsibilities in company.
- Each student shall be reviewed and evaluated in two reviews through the semester.
- Review 1 shall be on the presentation of the synopsis.
- Review 2 shall be on the presentation on the roles and responsibilities carried out with module completion results(as applicable).

Global Certification
COURSE OVERVIEW

The Global Certification is a one semester intensive project based learning approach to cater with the Industry requirement. It prepares the students to up skill their knowledge base to compete in terms of latest technology and become competent enough to the industry requirement. In this, students will be able to solve complex real world problems pertaining to the domain chosen and gain confidence. It is an individual course and students have to earn the certificate based on their performances in terms of project assignment and aptitude. Student have to choose two Global certification courses.

COURSE OBJECTIVE (S):

1. To allow students to learn skills of their choice required in the current Industry perspective.
2. To encourage building multidisciplinary skill set through the integration of courses learned.

3. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
4. To prepare them to face the interview as professionals by improving communication skills.

COURSE OUTCOMES (CO'S):

On successful completion of this course, the student shall be able to:

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3
CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			

C03						√
C04					√	
C05				√		
C06				√		
C07			√			
C08			√			
C09	√				√	
C010				√		√
C011			√		√	

COURSE ARTICULATION MATRIX

CO#/ POs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PS01	PS02	PS03
C01	3											3	3	3
C02		3										3	3	3
C03			3									3	3	3
C04				3								3	3	3
C05					3							3	3	3
C06						3						3	3	3
C07							3					3	3	3
C08								3				3	3	3
C09									3			3	3	3
C010										3		3	3	3
C011											3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Global Certification

- Student should choose two Global certifications among the available Industry ready courses to cope up with the vast changing software world.

- Student should register for the course having minimum of 39 hours of teaching and should have 100 percent attendance for all the sessions.
- Each student shall be reviewed and evaluated in two reviews through the semester.
- Review 1 shall be on the presentation of the course, assignment completed followed by viva.
- Review 2 shall be on the presentation of their overall skills learned in the course followed by their certificate verification.

IV Semester Syllabus

Course Title	Project Work Phase – 2 and Dissertation				Course Type	Practice	
Course Code	M20TC0401	Credits	12		Class	IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	12	12	12	Practice	CIE	SEE
	-	0	-	-			
	Total	12	12	12			

COURSE OVERVIEW

Project Phase-2 is continuation of Project Phase-1 from semester III.

COURSE OBJECTIVE (S):

1. To allow students to demonstrate a wide range of the skills learned during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation.
2. To encourage multidisciplinary research through the integration learned in a number of courses.
3. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
4. To encourage teamwork.
5. To improve students' communication skills by asking them to produce both a professional report and to give an oral presentation

COURSE OUTCOMES (CO'S):

On successful completion of this course, the student shall be able to:

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3
CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				

C02			√			
C03						√
C04				√		
C05			√			
C06			√			
C07		√				
C08		√				
C09	√			√		
C010			√			√
C011		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PS01	PS02	PS03
C01	3											3	3	3
C02		3										3	3	3
C03			3									3	3	3
C04				3								3	3	3
C05					3							3	3	3
C06						3						3	3	3
C07							3					3	3	3
C08								3				3	3	3
C09									3			3	3	3
C010										3		3	3	3
C011											3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Project Phase-2:

- Each student shall conduct the required experiment to implement the proposed project with the consultation of respective guides.
- Each student shall be reviewed and evaluated in two reviews through the semester and finally each student shall demonstrate the completed project to a team of examiners.
- Review 1 shall be on the presentation of the methodology employed and model created.
- Review 2 shall be on the presentation on the functional project.
- Finally, the Project Phase-2 shall conclude with each project apply for patent or copyright and publish a paper in SCOPUS indexed journals.
- In Semester end examination, each student shall be evaluated, based on the course outcomes.

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

WILLINGNESS TO LEARN

SELF MOTIVATION

TEAM WORK

COMMUNICATION SKILLS AND APPLICATION OF THESE SKILLS TO REAL SCENARIOS

REQUIREMENT OF GATHERING, DESIGN AND ANALYSIS, DEVELOPMENT AND TESTING SKILLS

ANALYTICAL AND TECHNICAL SKILLS

COMPUTER SKILLS

INTERNET SEARCHING SKILLS

INFORMATION CONSOLIDATION AND PRESENTATION SKILLS

ROLE PLAY

GROUP DISCUSSION, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Commerce is efficient leaders of repute, who can deal the real time problems with a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, leadership, and strategic management and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career.

The University has recognized skill development and industry relationship as its very important activities. Therefore, the University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director has been established to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under PradhanMantriKaushalVikasYojana.

The various skill/certification programs identified are as follows:

Big-data and Cloud Computing, Internet of Things (IOT), ORACLE, MYSQL, Advanced Java and Internals of LINUX/UNIX

Red-hat certified programs on LINUX,

Management related programs like SAP, ERP and Business Analytics

Open Source software/hardware, Software Testing

Advanced networking based CISCO / Microsoft technology.

Web designing, System administration

IBM certified programs.

The University has signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

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School of Management Studies

B.B.A (Industry Integrated)

HAND BOOK

2019

**Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bangalore - 560 064
Phone No: +91- 90211 90211 /080-46966966, Fax: 080-28478539**

Rukmini Educational
Charitable Trust

www.reva.edu.in

Chancellor's Message

"Education is the most powerful weapon which you can use to change the world."

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when 'intellectual gratification' has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime.

The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of 'Knowledge is Power', we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence. For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I'm always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said 'A University should be a place of light, of liberty and of learning'. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.



Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our

students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise. With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

Director's Message

Today, as you prepare to join our campus and start the next chapter of your lives, in what can only be described as an increasingly divided and fast-shifting world, I want to offer some thoughts specific to the challenging times in which we find ourselves. Your responsibilities as Management student to lead businesses are more important today than ever. You will be graduating into a world in which trust and faith in business has declined significantly, and you have to develop the personality reflecting honesty and Ethics.

As Business Student- leaders, part of your responsibility is to rebuild this trust between business and society. My hope is that the many discussions you will have, in courses as varied as Leadership and Corporate Accountability and Finance, Ethical Management, Governance, HRM, HR, have given you tools and perspectives that will serve as a guide to you in the future. I hope you will develop, and will continue to develop, both the competence and character of true leadership. You will need both to fulfill your responsibility to rebuild trust. The way you can do so is by creating shared prosperity; in essence, by ensuring that you create value for others before you claim value for yourself.

You can exercise your responsibility to help rebuild trust not only by the big decisions you make while leading organizations, but also by the smaller interactions you have every day. Business Leaders—rightly—are scrutinized more carefully than others, so even small signs of arrogance, excessive pride, or self-interest will be magnified. Hold yourself to a higher standard.

Many of our alumni currently lead some of the most admired and most valuable companies on the planet. They have been crucial to the creation and evolution of entire industries, including management consulting, mutual funds, private equity, venture capital, and social entrepreneurship, HR, Marketing, Entrepreneurship, and the like.

If you want your lives to have that kind of impact, you must REACH, that is stretch for things in life that seem just a bit outside your grasp, just a bit audacious. When we reach, we take a risk that has the potential to fundamentally shift the trajectory of our lives and our organizations. We develop three types of behaviour in this school: 1. Modesty; 2. Honesty; and 3. Winning Attitude, focusing on knowledge, skills, and competency.

Often our biggest sense of accomplishment comes not when we reach for ourselves, but when we reach out on behalf of others. I experience this most often when I deal with our distinguished alumni who give back to so many causes. Today you join a group of alumni who are distinguished not only as leaders, but as philanthropists and energetic civic participants—people who lead and fund countless non-profits and

philanthropies. It's a privilege for me to spend time with these people, and we ask that you RESPECT the people who are most important in your lives, and everyone with whom you interact along your road to leadership. Remember that nothing can be accomplished without the help of everyone in REVA University.

The Curriculum caters to and has relevance to local, regional, national, and global development needs. A maximum number of courses are integrated with cross-cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

Lastly, show respect on a daily basis to everyone you interact with: your co-students. As students, you will often get more credit than you deserve; be sure to share this credit by giving respect to all who contribute to any success. Let me in that spirit take a moment to thanks your parents, guardian who have collectively helped to educate you and bring you to this wonderful moment of Management World.

As you begin this exciting journey, I wish you all the best.

Prof. Shubha A
Director
School of Commerce & Management Studies

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognised by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 27 Post Graduate Degree programs, 29 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 19 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries,

business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas

Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher–scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is '**Life Time Achievement Award**' to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the "**Founders' Day Celebration**" of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "REVA Life Time Achievement Award" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced "**REVA Award of Excellence**" in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is

REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes' everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Within short span of time, REVA University has been recognized as a fast growing university imparting quality higher education to the youth of the country and received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia's Greatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by ASSOCHAM India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

ABOUT SCHOOL OF MANAGEMENT STUDIES

The School of Management Studies offers Industry Integrated Programs that reduce the widening gap between Industries – Academia. BBA - a degree in Management Studies (Industry Integrated) provides adequate scope to enter wide range of business spheres, which is depicted in various core subjects offered within the program. This course enriches the students to enable them to work in different national and multinational organizations and face the global challenges arising there from. It not only aims at imparting knowledge and skills in different areas of management and accounting, but also provides inputs necessary for the overall development of the personality of the students. It also enables the students right from the inception to get equipped with required skills through continuous efforts by adopting various methods like case studies, group discussions / analysis, simulation, games, debates, seminars, quiz and the like. The students are groomed with the right exposure to the practical events in the global market milieu.

The Masters degree in Management Studies not only induces research culture and Entrepreneurship but also provides practical exposure and much needed soft skills. During 2014-15 the School of Management Studies is offering one full time Graduate and Post Graduate programs.

The programs offered by REVA University are well planned and designed after detailed study with emphasis on knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities, institutions, experts from industries and business sectors have contributed in preparing schemes of instruction and curriculum for these programs.

VISION

1. "To produce world class Management experts through the excellent teaching and research so as to offer professional services at National and International levels"

MISSION

- To provide high-standard, forward-looking, morally, socially and ethically responsive, coherent, interdisciplinary and career-oriented programs in a dynamic global education environment.
- To contribute to the enrichment and dissemination of knowledge through theoretical, applied and problem-oriented research for the benefit of students, faculty, and society in general;
- To serve the community by undertaking customer-oriented research, providing training and professional consultation for business, industry and government and pursue research in partnership with business and governmental organizations.

VALUES

- 1 Excellence in all our academic and research endeavors
- 2 Dedication and service to our stakeholders
- 3 Leadership through innovation
- 4 Accountability and transparency
- 5 Creating conducive academic environment with service motto
- 6 Integrity and intellectual honesty
- 7 Ethical and moral behavior
- 8 Freedom of thought and expression
- 9 Adaptability to the change
- 10 Team-work

Advisory Board

1. **Belverd E. Needles, Jr.**
Ernst & Young Distinguished Professor of Accounting, EY Distinguished
Professor of Accountancy Editor, Accounting Instructors' Report (AIR) School of Accountancy & MIS,
DePaul University, Chicago USA.
2. **Shri. Ananthakrishna**
Executive Chairman, Karnataka Bank Ltd, Mahaveer Circle,
Kankanady Mangalore - 575002
3. **Rajendra P. Srivastava**
Ernst & Young Distinguished Professor and Director
Ernst & Young Center for Auditing Research and Advanced Technology
School of Business, The University of Kansas Lawrence, Kansas 66045
4. **Prof. Shahzad Uddin,**
Director, Essex Accounting Centre, Essex Business School, University Of Essex Colchester, UK.
5. **Prof. Jacques Richard,**
Profess of Accounting, University of Dauphine, Paris, France.
6. **Dr. Teerooven Soobaroyen**
Reader in Accounting, Centre for Research in Accounting
, Accountability and Governance, School of Management, Faculty of Business and Law
University of Southampton, Highfield, Southampton, SO17, UK
7. **Dr Collins Ntim** - BSc, MSc, MRes, PhD, PGCTHE, FHEA.
Professor of Accounting & Finance, Department of Accountancy
University of Huddersfield,UK
8. **Prof. P. Murali**
Former Vice –Chancellor, Sri Venkateswara University, Tirupati-AP.
9. **Prof. Sridhar Seshadri**
Senior Associate Dean, Faculty and Research, Indian School of Business,
Gachibowli, Hyderabad - 500032
10. **Dr. M. Thiripalraju**
Director, Indian Institute of Capital Markets
Sakal Bhavan Marg, CBD Belapur, Navi Mumbai - 400 614.
11. **Prof. K.V Rao**
Vice-Chancellor. Acharaya Nagarjuna University, Guntur - AP
12. **Dr. Shanthi S K**
Chair Professor-Union Bank Center for Banking Excellence, Greta Lakes University, Chennai--
6303102
13. **Mr. Nagaraj Kulkarni**
Director, Compence Bangalore
14. **Reshma Srinivasan,**
Founder and Managing Director, WeCare Learning Private Limited, # 901, Senswe Block, Elan Homes,
Sarjapur Road, Bangalore – 560 035.

B B A (Industry Integrated) Program

Programme Overview:

Bachelor of Business Administration (B.B.A) degree programme is designed to create motivated, energetic, creative and thinking graduates to fill the roles as entry level executives in business organisations. With the sound and continuing economic growth of India in the last two decade, need for candidates with adequate managerial and business knowledge has gone up. Organisations require candidates with sound business knowledge in business administration who can act as executives to assist senior managers to manage marketing, sales, finance and accounts, operations, public relations, logistics, supply chain management activities. These candidates would later be groomed into senior management roles.

Realising this vital need for adequate trained business management personnel **REVA UNIVERSITY, BENGALURU, is offering BBA (Industry Integrated)** degree programme to meet the human resources requirement in business sector. BBA programme addresses the core functions of business such as marketing, finance, strategy, decision making, with latest additions in entrepreneurship development and Business Analytics skills etc. The degree also focuses on managerial skills, team skills and communication skills. Some of the courses taught in BBA programme are marketing and sales, organization behaviour, basic management skills, business strategy, market trends and competition, financial accounting, legal regulatory framework, entrepreneurship development, Business Analytics, financial management, E-commerce, communication, etc.

The curriculum is outcome based and it comprises required theoretical concepts and practical skills in the domain. By undergoing this programme, students develop critical, analytical thinking and problem solving abilities for a smooth transition from academic to real-life work environment. Opportunities are provided for the students to do internship in business organisations and develop leadership skills.

Programme Educational Objectives (PEOs)

The aim of the programme is to produce motivated, innovative, creative graduates for business sector to fill the roles of executives to assist/ to manage marketing, sales, finance and accounts, operations, public relations, logistics, supply chain management and related management activities. With further education and earning of higher level degrees help the graduates to pursue a career in management, academics or research organisations.

The Programme Educational Objectives are to prepare the students to:

1. Manage business activities like marketing, sales, finance and accounts, operations, public relations, logistics, supply chain management etc.,
2. Pursue for higher degrees to work in colleges, universities as professors or as scientists in research establishments
3. Act as administrators in public, private and government organisations with further training
4. Be conversant with environmental, legal, cultural, social, ethical, public safety issues
5. Work as a member of a team as well as lead a team
6. Communicate effectively across team members and work under constraints
7. Set his/her own enterprise with further training
8. Adopt lifelong learning philosophy for continuous improvement

Programme Outcomes (POs)

After undergoing this programme, a student depending on subject specialization will be able to:

1. Perform management activities like marketing, sales,
2. Accounting and financial planning,
3. Human resources sourcing and development,
4. Public relations,
5. Manage operations
6. Perform project management activity
7. Act as an effective team member to ensure that projects are completed satisfactorily, on time, and within budget
8. Conform to cultural, environmental, sustainability and ethical issues
9. Communicate across teams verbally, visually and by writing
10. Choose an appropriate online educational programmes for further learning, participate in seminars and conferences

BBA (Industry Integrated) Program

SCHEME OF INSTRUCTION-2019

(Duration: 6 Semesters - 3 Years)

Sl. No	Course Code	Title of the Course	HC/SC/SE/CC	Credit Pattern			
				L	T	P	Total
FIRST SEMESTER							
1	B19BB1010	Communicative English	CC	2	0	0	2
2	B19BB1021	Language – II: Kannada	CC	2	0	0	2
3	B19BB1022	Language – II: Hindi	CC				
4	B19BB1023	Language – II: Additional English	CC				
5	B19BB1030	Fundamentals of Accounting	HC	3	0	1	4
6	B19BB1040	Economics for Business	HC	3	1	0	4
7	B19BB1050	Introduction to Management	HC	3	1	0	4
8	B19BB1060	Indian Constitution and Human Rights	FC	2	0	0	2
9	B19BB1070	Skill Development Course	RULO	0	0	2	2
10	B19BB1080	Sports/Yoga/Dance/Music/Theatre	RULO	1	0	1	2
Total Credits				16	2	4	22
SECOND SEMESTER							
1	B19BB2010	Communicative English	CC	2	1	0	3
2	B19BB2021	Language – II: Kannada	CC	2	0	0	2
3	B19BB2022	Language – II: Hindi	CC				
4	B19BB2023	Language – II: Additional English	CC				
5	B19BB2030	Statistics for Management	HC	3	0	1	4
6	B19BB2040	Marketing Management	HC	3	1	0	4
7	B19BB2050	Organizational Behavior	HC	2	1	0	3
8	B19BB2060	Computer Applications in Business	FC	2	0	0	2
9	B19BB2070	Skill Development Course	RULO	0	0	2	2
10	B19BB2080	Self-study Component (online course)	RULO	0	0	2	2
11	B19BB2090	Summer Internship-I (Minor Project)	HC	0	0	4	4
Total Credits				14	3	09	26
THIRD SEMESTER							
1	B19BB3010	Cost Accounting	HC	3	0	1	4
2	B19BB3020	Service Sector Management	HC	3	0	1	4
3	B19BB3030	Innovation Management	HC	2	1	0	3
4	B19BB3040	Human Resource Management	HC	2	1	0	3
5	B19BB3050	Environmental Studies	FC	2	0	0	2
6	B19BB3060	Open Elective – Career planning and Development	OE	3	1	0	4
7	B19BB3070	Skill Development Course	RULO	0	0	2	2

8	B19BB3080	Soft Skill Training (Placement Department)	RULO	0	0	2	2
Total Credits				15	3	6	24
FOURTH SEMESTER							
1	B19BB4010	Business Law	HC	3	0	1	4
2	B19BB4020	Financial Management	HC	3	0	1	4
3	B19BB4030	Soft Skill Training (Placement Department)	RULO	2	0	0	2
4	B19BB4040	Skill Development Course	RULO	0	0	2	2
5	B19BB4050	Self-study Component (online Course)	RULO	0	0	2	2
6	B19BB4060	Summer Internship-I (Minor Project)	HC	0	0	4	4
Specializations (Soft Core Courses (SC)); * Choose any ONE of the following specializations							
I. Finance							
II. Human Resource							
III. Marketing							
IV. Tourism							
I. Finance Specialization							
7	B19BB4111	Corporate Financial Policy	SC	2	1	0	3
	B19BB4112	International Finance	SC	2	1	0	3
II. Human Resource Specialization							
8	B19BB4211	Strategic Human Resource Management	SC	2	1	0	3
	B19BB4212	Compensation Management	SC	2	1	0	3
III. Marketing Specialization							
9	B19BB4311	Retail Management	SC	2	1	0	3
	B19BB4312	Consumer behaviour	SC	2	1	0	3
IV. Tourism Specialization.							
10	B19BB4411	Introduction to tourism	SC	2	1	0	3
	B19BB4412	Tourism Geography	SC	2	1	0	3
Total Credits				12	2	10	24
FIFTH SEMESTER							
1	B19BB5010	Income Tax	HC	3	0	1	4
2	B19BB5020	Management Accounting	HC	3	0	1	4
3	B19BB5030	Business Research Methodology	HC	3	1	0	4
4	B19BB5040	Production and Operations Management	HC	2	0	1	3
5	B19BB5050	Soft Skill Training (Placement Department)	RULO	2	0	0	2

6	B19BB5060	Skill Development Course	RULO	0	0	2	2
Specializations (Soft Core Courses(SC)); Choose any ONE of the following specialization							
I. Finance Specialization							
6	B19BB5111	Financial Markets and Services	SC	2	1	0	3
	B19BB5112	Security Analysis and Portfolio Management	SC	2	1	0	3
II. Human Resource Specialization							
7	B19BB5211	Employee welfare & social security	SC	2	1	0	3
	B19BB5212	Organisational change & Development	SC	2	1	0	3
III. Marketing Specialization							
8	B19BB5311	International Marketing	SC	2	1	0	3
	B19BB5312	Advertising	SC	2	1	0	3
IV. Tourism Specialization							
9	B19BB5411	Travel agency and Tour operations	SC	2	1	0	3
	B19BB5412	Leisure and Recreation Tourism	SC	2	1	0	3
Total Credits				17	3	5	25
SIXTH SEMESTER							
1	B19BB6010	Goods and Service Tax	HC	3	1	0	4
2	B19BB6020	Entrepreneur Development Programme	HC	3	1	0	4
3	B19BB6030	Business Policy and Strategic Management	HC	3	1	0	4
4	B19BB6040	Project Management	HC	2	1	0	3
5	B19BB6050	Skill Development Course	RULO	0	0	2	2
6	B19BB6060	Major Project (Based on Specialization)	HC	1	0	5	6
Total Credits				12	4	7	23
Total Credits of all Semesters							144

Semester-wise Summary of Credit Distribution

Semester	L	T	p	Total
I	16	2	4	22
II	14	3	09	26
III	15	3	6	24
IV	12	2	10	24
V	17	3	5	25
VI	12	4	7	23
Total	82	15	47	144

Distribution of Credits Based on Type of Courses

Semester	HC	SC	OE	RULO	FC	CC	TOTAL
I	12	-	-	4	2	4	22
II	15	-	-	4	2	5	26
III	14	-	4	4	2	-	24
IV	12	6	-	6	-	-	24
V	15	6	-	4	-	-	25
VI	21	-	-	2	-	-	23
Total	89	12	4	24	6	9	144

BBA (Industry Integrated) Program

DETAILED SYLLABUS

FIRST SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB1010	Communicative English	CC	2	0	0	2	2

Course Objectives:

1. To attune young minds to concerns and issues which have a broad and wide scope of use and application to life.
2. To acquire a functional use of language in context.
3. To equip students to deliver formal and informal oral presentations to a variety of audiences in multiple contexts
4. To enable students to construct effective written message in various formats and styles.
5. To inculcate the habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

On completion of the course, learners will be able to:

1. Demonstrate ethical and political responsibilities in taking cognizance of issues relating to society, environment and media.
2. Develop a process oriented approach to writing.
3. Make use of grammatical skills developed during the course aptly.
4. Utilize the target language effectively to focus on interpersonal skills and develop a good command over the language.

Course Content:

Unit-1

Functional English

Remedial Grammar: Past Simple; Past Continuous; Irregular Verbs

Writing Skills: Paragraph Writing

Activities: Conversations; Leaving Phone Messages

Literature: Chief Seattle – The End of Leaving and Beginning of Survival

Unit-2

Interpersonal Skills

Remedial Grammar: Present Simple & Present Continuous; Activity & State Verbs

Writing Skills: Official Letters

Activities: Making Apologies; Invitations & Making Arrangements

Literature: Ruskin Bond – Tiger in the Tunnel

Unit-3**Multitasking Skills**

Remedial Grammar: Present Perfect; For, Since & How Long; -ed & -ing adjectives; Prefix & Opposites of Adjectives

Writing Skills: Note Making

Activities: Agreeing & Disagreeing with Opinions

Literature: Jesse Owens - My Greatest Olympic Prize

Unit-4**Communication Skills**

Remedial Grammar: Collocations; Prepositions

Writing Skills: Precis Writing

Activities: Offers, Suggestions & Requests

Literature: Avijit Pathak – Onscreen Magic

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB1021	Kannada	CC	2	0	0	2	2

Course Outline:

ಭಾಷೆಯನ್ನು ಮಾತನಾಡುವ ಬರೆಯುವ ಕೌಶಲ್ಯ, ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸ್ಥೂಲವಾಗಿ ಪರಿಚಯಿಸುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸ ಹಾಗೂ ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು, ಪ್ರಸ್ತುತ ಸಂದರ್ಭಕ್ಕೆ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಸಜ್ಜುಗೊಳಿಸಲು ಪಠ್ಯವನ್ನು ರೂಪಿಸಲಾಗಿದೆ. ಕಲೆ ಮತ್ತು ವಿಜ್ಞಾನದ ವಿಚಾರಗಳಿಗೆ ಒತ್ತನ್ನು ನೀಡಲಾಗಿದೆ. ಇದು ಮೂರು ಕ್ರೆಡಿಟ್ ಹೊಂದಿದೆ.

Course Objectives:

ಎರಡು ಸೆಮಿಸ್ಟರ್‌ಗಳಲ್ಲಿ ಸಮಗ್ರ ಕನ್ನಡ ಸಾಹಿತ್ಯವನ್ನು ಪರಿಚಯಿಸುವ ಉದ್ದೇಶವನ್ನು ಹೊಂದಿದೆ. ಅದರಂತೆ ಮೊದಲನೆಯ ಸೆಮಿಸ್ಟರ್‌ನಲ್ಲಿ ಜನಪದ, ಪ್ರಾಚೀನ, ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ಸಣ್ಣಕಥೆಗಳು ಹಾಗೂ ನಾಟಕ ಸಾಹಿತ್ಯವನ್ನು ಪಠ್ಯವನ್ನಾಗಿ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡು, ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸದಭಿರುಚಿಯನ್ನು ಮೂಡಿಸಲಾಗುತ್ತದೆ. ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯ ಜೊತೆಗೆ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸದ ಕಡೆಗೆ ಗಮನ ನೀಡಲಾಗುತ್ತದೆ.

1. ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಇತಿಹಾಸ ಮತ್ತು ಸಂಸ್ಕೃತಿಗಳನ್ನು ಕನ್ನಡ, ಕರ್ನಾಟಕಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಪರಿಚಯಿಸಲಾಗುತ್ತದೆ.
2. ವಿದ್ಯಾರ್ಥಿಗಳ ಸರ್ವತೋಮುಖ ಬೆಳವಣಿಗೆಗೆ ಅನುವಾಗುವಂತೆ ಹಾಗೂ ಅವರಲ್ಲಿ ಮಾನವ ಸಂಬಂಧಗಳ ಬಗ್ಗೆ ಗೌರವ, ಸಮಾನತೆ ಮೂಡಿಸಿ, ಬೆಳೆಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಪಠ್ಯಗಳ ಆಯ್ಕೆಯಾಗಿದೆ.
3. ಅವರಲ್ಲಿ ಸೃಜನಶೀಲತೆ, ಶುದ್ಧ ಭಾಷೆ, ಉತ್ತಮ ವಿಮರ್ಶಾ ಗುಣ, ನಿರರ್ಗಳ ಸಂಭಾಷಣೆ, ಭಾಷಣ ಕಲೆ ಹಾಗೂ ಬರಹ ಕೌಶಲ್ಯಗಳನ್ನು ಬೆಳೆಸುವುದು ಗುರಿಯಾಗಿದೆ.
4. ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಿಗೆ ಅನುಕೂಲವಾಗುವಂತಹ ವಿಷಯಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ಸೂಕ್ತ ಪಠ್ಯಗಳನ್ನು ಆಯ್ಕೆ ಮಾಡಿಕೊಳ್ಳಲಾಗಿದೆ.

Course Outcomes:

ಜನಪದ, ಪ್ರಾಚೀನ, ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ಸಣ್ಣಕಥೆಗಳು ಹಾಗೂ ನಾಟಕ ಸಾಹಿತ್ಯ ಕಲಿಕೆಯ ಮೂಲಕ ಕಾಲದ ಸ್ಥಿತ್ಯಂತರಗಳನ್ನು ಅದರ ಒಳನೋಟಗಳನ್ನು ಬೆಳೆಸುತ್ತದೆ.

- ಸಾಮಾಜಿಕ, ರಾಜಕೀಯ, ಧಾರ್ಮಿಕ, ಸಾಂಸ್ಕೃತಿಕ ಹಾಗೂ ಲಿಂಗಸಂಬಂಧಿ ವಿಚಾರಗಳೆಡೆ ಗಮನ ಹರಿಸುವುದರೊಂದಿಗೆ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಚರ್ಚಾ ಮನೋಭಾವವನ್ನು ಬೆಳೆಯುತ್ತದೆ.
- ಜೀವನದಲ್ಲಿ ಬರುವ ಅಭಿಪ್ರಾಯ ಬೇಧಗಳು, ಸಮಸ್ಯೆಗಳನ್ನು ಆಧುನಿಕ ಸಂದರ್ಭದಲ್ಲಿ ಮಾನವೀಯತೆಯೊಂದಿಗೆ ನಿರ್ವಹಿಸುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತದೆ.
- ಉತ್ತಮ ಸಂವಹನ ಕಲೆಯನ್ನು ಬೆಳೆಸುವ ಉದ್ದೇಶವನ್ನು ಈಡೇರಿಸುತ್ತದೆ.

Course Content:

Unit	Description	Topics	
I	ಜನಪದ/ಪ್ರಾಚೀನ/ವ ಏಧ್ಯಕಾಲೀನ ಕಾವ್ಯ	1. ಉತ್ತರದೇವಿ 2. ಸೂಳ್ವಡೆಯಲಪ್ಪುದು ಕಾಣಾ ಮಹಾಜಿರಂಗದೊಳ್? 3. ವಚನಗಳು 4. ಕೋಳೂರು ಕೊಡಗೂಸು	ಜನಪದ ಗೀತೆ ಪಂಪ ಅಲ್ಲಮ ಪ್ರಭು ಹರಿಹರ
II	ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯ	5. ಉತ್ತರಕುಮಾರ ಪ್ರಸಂಗ 6. ತ್ರಿಪದಿಗಳು 7. ಸೋರಿದುದು ನೃಪಾಲನ ಗರ್ವಭಂಗ 8. ಗಿಳಿಯು ಪಂಜರದೊಳಿಲ್ಲ	ಕುಮಾರವ್ಯಾಸ ಸರ್ವಜ್ಞ ರತ್ನಾಕರವರ್ಣಿ ಪುರಂದರದಾಸರು
III	ಸಣ್ಣ ಕಥೆಗಳು	9. ಗಂಭೀರೆಯೆಂಬ ಬರ್ದಿಯ ಕಥೆ 10. ಕಮಲಾಪುರದ ಹೋಟೆನಲ್ಲಿ 11. ನರಬಲಿ 12. ಅಮಾಸ	ಶಿವಕೋಟ್ಯಾಚಾರ್ಯ ಪಂಜೆ ಮಂಗೇಶರಾಯ ತ್ರಿವೇಣಿ ದೇವನೂರು ಮಹಾದೇವ
IV	ನಾಟಕ	13. ಶೂದ್ರ ತಪಸ್ವಿ	ಕುವೆಂಪು

ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು:

1. ಮುಗಳಿ ರಂ.ಶ್ರೀ., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 2014
2. ಸಂಗ್ರಹ. ನಾಗೇಗೌಡ ಎಚ್.ಎಲ್., ಚಾರಿತ್ರಿಕ ಜನಪದ ಕಥನ ಕಾವ್ಯಗಳು, ಪ್ರಕಾಶಕರು ಕರ್ನಾಟಕ ಜಾನಪದ ಪರಿಷತ್ತು, ಬೆಂಗಳೂರು. 2008
3. ಸೀಮಾತೀತ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ ಸಂಪುಟ 1,2,3,4,5 ಮತ್ತು 6, ಕುವೆಂಪು ಕನ್ನಡ ಅಧ್ಯಯನ ಸಂಸ್ಥೆ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು. 2014
4. ಸಂಗ್ರಹ. ನಾಗೇಗೌಡ ಎಚ್.ಎಲ್., ಕನ್ನಡ ಜನಪದ ಕಥನ ಕಾವ್ಯಗಳು, ಪ್ರಕಾಶಕರು ಕರ್ನಾಟಕ ಜಾನಪದ ಪರಿಷತ್ತು, ಬೆಂಗಳೂರು. 2007
5. ಹಂಪ ನಾಗರಾಜಯ್ಯ, ಸಾಂಗತ್ಯ ಕವಿಗಳು, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
6. ನಾರಾಯಣ ಪಿ.ವಿ, ಚಂಪೂ ಕವಿಗಳು, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
7. ಕಾಳೇಗೌಡ ನಾಗವಾರ, ತ್ರಿಪದಿ, ರಗಳೆ ಮತ್ತು ಜಾನಪದ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
8. ಸಂ. ಬೆನಗಲ್ ರಾಮ ರಾವ್ ಮತ್ತು ಪಾನ್ಯಂ ಸುಂದರ ಶಾಸ್ತ್ರೀ, ಪುರಾಣ ನಾಮ ಚೂಡಾಮಣಿ, ಪ್ರಕಾಶಕರು ಪ್ರಸಾರಾಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ. 2010
9. ಡಾ. ಚಿದಾನಂದ ಮೂರ್ತಿ, ವಚನ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013
10. ಸಂ. ಬಸವರಾಜು ಎಲ್. ಸರ್ವಜ್ಞನ ವಚನಗಳು, ಪ್ರಕಾಶಕರು ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 2012
11. ಸಂ ಮರುಳಸಿದ್ದಪ್ಪ ಕೆ, ನಾಗರಾಜ ಕಿ.ರಂ. ವಚನ ಕಮ್ಮಟ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2016
12. ಮರುಳಸಿದ್ದಪ್ಪ ಕೆ, ಷಟ್ಪದಿ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
13. ನರಸಿಂಹಾಚಾರ್. ಡಿ.ಎಲ್., ಪಂಪ ಭಾರತ ದೀಪಿಕೆ, ಪ್ರಕಾಶಕರು ಡಿ.ವಿ.ಕೆ ಮೂರ್ತಿ ಪ್ರಕಾಶನ, ಮೈಸೂರು. 2012
14. ಸಂ. ಜಿ.ಎಸ್.ಭಟ್., ಕುಮಾರವ್ಯಾಸನ ಕರ್ಣಾಟ ಭಾರತ ಕಥಾಮಂಜರಿ ಪ್ರವೇಶ, ಪ್ರಕಾಶಕರು ಅಕ್ಷರ ಪ್ರಕಾಶನ, ಹೆಗ್ಗೋಡು, ಸಾಗರ. 2006
15. ರಂಜಾನ್ ದರ್ಗಾ, ಶರಣರ ಸಮಗ್ರ ಕ್ರಾಂತಿ, ಪ್ರಕಾಶಕರು. ಲೋಹಿಯಾ ಪ್ರಕಾಶನ, ಬಳ್ಳಾರಿ. 2015
16. ವಸಿಷ್ಠ, ರತ್ನಾಕರವರ್ಣಿಯ ಭರತೇಶ ವೈಭವ, ಪ್ರಕಾಶಕರು ಚೇತನ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 1999
17. ಶಾಮರಾಯ ತ.ಸು., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ತಳುಕಿನ ವೆಂಕಣ್ಣಯ್ಯ ಸ್ಮಾರಕ ಗ್ರಂಥಮಾಲೆ, ಮೈಸೂರು -2014
18. ಶಿವರುದ್ರಪ್ಪ ಜಿ.ಎಸ್. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಮೀಕ್ಷೆ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB1012	Hindi	CC	2	0	0	2	2

पाठ्यक्रम रूपरेखा :

यह पाठ्यक्रम नौसिखिया, अपनी भाषा की क्षमता का विकास करने हेतु तथा विभिन्न साहित्यिक प्रक्रियाओं द्वारा समाज, संस्कृति एवं जीवन के मूल्यों को समझने हेतु अभिकल्पित है।

पाठ्यक्रम उद्देश्य :

- संदर्भानुसार उचित भाषा का प्रयोग करने की दक्षता को छात्रों में उत्पन्न करना।
- साहित्य के माध्यम से समाज एवं मानवीय मूल्यों को समझाकर, उन मूल्यों की रक्षा हेतु प्रेरित करना।
- छात्रों में पुस्तक पठन एवं लेखन की अकृतिम प्रवृत्ति स्थापित करना।
- अध्येताओं में साहित्य के माध्यम से प्रभावी एवं कुशल संचार का विकास करना।

अधिगम परिणाम :

अध्ययन की समाप्ति पर अध्येता –

- सामाजिक मूल्य एवं नैतिक जवाबदेही को स्वीकार कर सकता है।
- साहित्य की प्रासंगिकता को जीवन में समझने की दक्षता रखता है।
- समाज में अंतर्निहित पद्धतियाँ एवं विचारधाराओं का व्याख्यान करने में सक्षम बन सकता है।

अध्ययन विषय सूची / पाठ्यक्रम

इकाई – 1: कहानी, व्यंग्य रचना

अध्यापन अवधियाँ : 12 hrs.

1. कहानी - नमक का दारोगा – प्रेमचंद
2. उसकी रोटी – मोहन राकेश
3. व्यंग्य रचना – वैष्णव की फिसलन – हरिशंकर परसाई

इकाई – 2: कहानी, निबंध

अध्यापन अवधियाँ : 12 hrs.

4. कहानी – परदा – यशपाल
5. कहानी – मेरी माँ कहाँ – कृष्णा सोबती
6. निबंध – अच्छी हिन्दी – रविन्द्रनाथ त्यागी

इकाई – 3: कहानी

अध्यापन अवधियाँ : 12 hrs.

7. कहानी – गुंडा - जयशंकर प्रसाद
8. कहानी – जल्लाद – पांडेय बेचन शर्मा 'उग्र'

इकाई – 4: अनुवाद, पत्र-लेखन

अध्यापन अवधियाँ : 12 hrs.

पत्रलेखन- : बैंक संबंधी पत्र, बीमा पत्र और आवेदन पत्र |

सन्दर्भ ग्रन्थ :

- पाठ्य पुस्तक – रेवा विश्वविद्यालय
- सुबोध व्यवहारिक हिन्दी – डॉ. कुलदीप गुप्त
- अभिनव व्यवहारिक हिन्दी – डॉ. परमानन्द गुप्त
- हिन्दी साहित्य का इतिहास - डॉ. नागेन्द्र
- आधुनिक हिन्दी साहित्य का इतिहास - डॉ. बच्चन सिंह
- हिन्दी साहित्य का नवीन इतिहास - डॉ. लाल साहब सिंह
- शुद्ध हिन्दी कैसे बोले कैसे लिखे- पृथ्वीनाथ पाण्डे
- कार्यालय अनुवाद निदेशिका

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB1013	Additional English	CC	2	0	0	2	2

Course Objectives:

1. To equip students with the ability to acquire the functional use of language in context.
2. To motivate the students to explore and critique issues related to society and Ethics.
3. To develop in the students a genuine habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

1. On completion of the course, learners will be able to:
2. Demonstrate ethical responsibilities in taking cognizance of issues relating to society and values.
3. Develop an understanding of literature in context.
4. Interpret and paraphrase their ideas logically and cohesively.
5. Illustrate the systems and ideologies inherent in the society.

Course Content:

Unit-I: Values and Ethics

12 Hrs

Literature:

Rabindranath Tagore - Where the Mind is Without Fear, William Wordsworth – Three Years She Grew in Sun and Shower, Saki – The Lumber-room, William Shakespeare – Extract from *Julius Caesar* (Mark Antony's Speech) Language: Vocabulary Building

Unit-II: Natural & Super Natural

12 Hrs

Literature: John Keats – La Belle Dame Sans Merci, Charles Dickens – The Signal Man
Hans Christian Anderson - The Fir Tree, William Shakespeare – An Excerpt from *The Tempest*
Language: Collective Nouns

Unit-III: Travel and Adventure

12 Hrs

Literature: R.L. Stevenson – Travel, Elizabeth Bishop - The Question of Travel, H.G. Wells – The Magic Shop, Jonathan Swift – Excerpt from *Gulliver's Travels Book – I*
Writing Skills: Travelogue

Unit-IV: Success Stories**12 Hrs**

Literature:Emily Dickinson – Success is Counted SweetestRupert Brooke – Success

Dr. Martin Luther King - I Have a DreamHelen Keller – Excerpt from *The Story of My Life*

Writing Skills:Brochure &Leaflet

Reference Books:

1. Tagore, Rabindranath. *Gitanjali*. Rupa Publications, 2002.
2. Wordsworth, William. *The Complete Works of William Wordsworth*. Andesite Press, 2017.
3. Munro, Hector Hugh. *The Complete Works of Saki*. Rupa Publications, 2000.
4. Shakespeare, William. *The Complete Works of William Shakespeare*. Sagwan Press, 2015.
5. Chindhade, Shirish. *Five Indian English Poets: Nissim Ezekiel, A.K. Ramanujan, ArunKolatkhar, DilipChitre, R. Parthasarathy*. Atlantic Publications, 2011.
6. Dickens, Charles. *The Signalman and Other Horrors: The Best Victorian Ghost Stories of Charles Dickens: Volume 2*. Createspace Independent Publications, 2015.
7. Anderson, Hans Christian. *The Fir Tree*. Dreamland Publications, 2011.
8. Colvin, Sidney (ed). *The Works of R. L. Stevenson. (Edinburgh Edition)*. British Library, Historical Prints Edition, 2011.
9. Bishop, Elizabeth. *Poems*. Farrar, Straus and Giroux, 2011.
10. Swift, Jonathan. *Gulliver's Travels*. Penguin, 2003.
11. Dickinson, Emily. *The Complete Poems of Emily Dickinson*. Createspace Independent Publications, 2016.
12. Brooke, Rupert. *The Complete Poems of Rupert Brooke*. Andesite Press, 2017.
13. King, Martin Luther Jr. &James M. Washington. *I Have a Dream: Writings And Speeches That Changed The World*. Harper Collins, 1992.
14. Keller, Helen. *The Story of My Life*. Fingerprint Publishing, 2016.
15. Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
16. Thorpe, Edgar and Showick Thorpe. *Basic Vocabulary*. Pearson Education India, 2012.
17. Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.
18. Murphy, Raymond. *Murphy's English Grammar with CD*. Cambridge University Press, 2004

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB1030	Fundamentals of Accounting	HC	3	0	1	4	4

Course Objectives:

The Objectives of this course are to:

1. To introduce students to Accounting, stressing its importance in today's business world.
2. Explain fundamental concepts and principles, as well as to develop the capability to perform the basic accounting functions.
3. Prepare original books of accounts.
4. To be able to prepare financial statements.
5. To introduce students to the legal aspects of company and issue of shares to public.

Course Outcomes:

1. Understand the basic principles of accounting.
2. Journalize the business transactions and post them to respective ledger accounts. 3. Prepare the various subsidiary books.
4. Prepare the financial statements of sole proprietorship.
5. Understand the concept of partnership.
6. Prepare the profit and loss appropriation account.
7. Understand the legal aspects of company.
8. Prepare the journal entries for issue of shares, forfeiture and reissue of shares.

Course Content:

UNIT-1: FUNDAMENTAL OF ACCOUNTS:

Meaning and scope of accounting – Users of accounting information—Accounting concepts and conventions-principles of accounting - Double entry system (Meaning) – Journal entries-Ledger posting (Theory and Problems)-Accounting standards (Theory in brief)

UNIT-2: SUBSIDIARY BOOKS:

Meaning- Purchase book- Sales book- Purchase returns book- Sales returns book,-Receivable & Payable books. Trail balance (Theory and Problems) - Cash Book- Petty Cash Book- Three column cash book (Theory and Problems) - Journal proper (Theory) Depreciation (Theory and Problems) and provisions- (Theory only)

UNIT-3: FINAL ACCOUNTS OF SOLE PROPRIETORSHIP & PARTNERSHIP ACCOUNTS:-

Preparation of final accounts of sole proprietor (Trading account– Profit and Loss account -Balance sheet) with adjustments (Theory and Vertical format Problems)- Meaning and definition of partnership – Features– Partnership Deed (meaning) – Contents of partnership deed- Legal provisions in the absence of the partnership Deed-Final Accounts of partnership (Including Profit and Loss appropriation account)- Fixed and fluctuating capital methods – (Theory and Vertical Problems)

UNIT-4: SHARES AND DEBENTURES:

Meaning and characteristics of company - Different types of shares – Difference between Shares and Debentures Journal entries for Issue of shares and Debentures at par- premium and discount- forfeiture- Reissue (Theory and Problems)

Skill Development Activities:

1. Visit any sole proprietorship or partnership business concern and understand practical procedure of recording of business transactions.
2. Collect the financial statements of a sole proprietorship or partnership business concern.
3. Collect the information regarding types of shares issued by any four joint stock companies.

Reference Books:

1. Battacharya S.K., John Dearden, Accounting for Management; Vikas PublishingHouse Ltd., New Delhi.
2. Jain and Narang; Advanced Accountancy, Kalyani Publishers, New Delhi.

3. Maheswari S.N, Financial Accounting, Vikas Publishing House, New Delhi.

4. Maheswari S.N., Corporate Financial Accounting. Vikas Publishing House, New Delhi.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB1040	Economics for Business	HC	3	0	1	4	4

Course Objectives:

1. To familiarize the students with the concepts related to Business Economics;
2. To assist the students to develop a sound understanding on the Behavior of consumers and the market structure.
3. To enable the students to make decisions based on the varying consumer preferences
4. To make the students understand the different kinds of competitions
5. To enable the students to understand the concepts related to production and cost

Course Outcomes:

At the end of the course, the students will be able to:

1. Define the basic concepts of Economics;
2. List out the types of economies;
3. Develop a sound understanding on the consumer behavior issues;
4. Classify the various market structures based on competition.
5. To analyze the concepts related to production function
6. To comprehend and thereby devise the different strategies to suit the type of competitions
7. To understand the price determinants

Course Content:

UNIT-1: INTRODUCTION TO ECONOMICS:

Nature and Scope of Economics: Micro and Macro Economics – Types of Economies-Basic problems of an Indian economy. –Business Economics-Scope-Goals of Business economics-Difference between economics and business economics

UNIT-2: THEORIES OF DEMAND AND ANALYSIS:

Demand –Demand determinants –Law of demand-Elasticity of demand-Price elasticity-Types-Determining factors-Change in demand and elasticity of demand-Business applications of price elasticity-Concepts of income and cross elasticity of demand-Price elasticity of demand measurement by total outlay method

UNIT-3: CONSUMER BEHAVIOUR:

Consumer sovereignty-Limitations-Approaches to the study of consumer behavior- Cordial approach- The law of Equi-Marginal utility- Ordinal approach – Indifference curve analysis – Properties – Consumer surplus – Meaning- Analysis – Limitations.

UNIT-4: MARKET STRUCTURE:

- (a) Perfect Competition: Features- Equilibrium of the firm and industry in the short run and long run
- (b) Imperfect Competition: Difference between perfect competitions and imperfect competition;

- Monopolistic Competition: Assumption; Short-run Equilibrium.
 (c) Monopoly: Features short run and long-run equilibrium of monopoly firm
 (d) Oligopoly: Features short run and long-run equilibrium of monopoly firm.

Reference Books:

1. Pindyck, R.S., D.L. Rubinfeld and P. L. Mehta; *Microeconomics*, Pearson Education.
2. N. Gregory Mankiw, *Principles of Micro Economics*, Cengage Learning
3. Gould, J.P. and E.P. Lazear; *Microeconomic Theory*, All India Traveler Bookseller, New Delhi.
4. Lipsey, R.G and K.A. crystal; *Economics*, Oxford University Press.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB1050	Introduction to Management	HC	3	0	1	4	4

Course Objectives:

The overall objective of the Course is as follows:

1. To make the students understand fundamental concepts and management principles.
2. To familiarize the students with the basic theories of Management.
3. To understand and apply the functions of management in daily life.
4. To design management practices and update themselves related to the recent trends in management philosophy.
5. To distinguish the different types of organizations and organization structures.

Course Outcomes:

By the end of the course, the students shall be able to:

1. Describe the concepts of management and its functions.
2. Explain and apply the various management principles.
3. Distinguish between the different types of plans and explain the planning process.
4. Understand and apply the process of decision making in all activities.
5. Illustrate and understanding of the principles of organizing in various activities.
6. Classify the various types of organization structures.
7. Identify the various types of staffing practices.
8. Recognizing the influencing factors of effective controlling.

Course Content:

UNIT-1: CONCEPT OF MANAGEMENT:-

Meaning - nature - Scope and importance of management - Management as Profession, Science or an Art- MBO - MBE-Theories of management. Approaches to management: Behavioural, Systems and Contingency approach: Trends and Challenges of Management in Global Scenario, Emerging issues in management.

UNIT-2: PLANNING AND DECISION MAKING:-

Meaning and significance –Types of plans–Different approaches to plans strategies - Objectives and policies.
Decision making: decision making process, type of decisions, techniques in decision making.

UNIT-3: ORGANIZING & STAFFING:-

Organizing: Organization structure, formal and informal organizations, principles of organizations- chain of command, span of control, delegation, decentralization, and empowerment. Functional, divisional, geographical, customer based and matrix organization, team based structures, virtual organisations, boundary less organizations. Meaning - Principles of organizing staffing - Types of organization-Formal and informal Concept of staffing - Recruitment and Selection; Orientation; Training and Development; Career Development; Performance Appraisal.

UNIT-4: DIRECTING AND CONTROLLING:

Definition – Importance - Principles of direction - Co-ordination as essence of management. Leadership – types of leadership- principles - contemporary leadership styles.Functions of a manager,

Managerial Control: - Meaning - Need for control - features of effective controlling System-.Importance of controlling, controlling process, type of control, factors influencing control effectiveness.

Reference Books:

1. Parasad L.M, Principles & practice of management, Sultan Chand & Sons, New Delhi.
2. Gupta CB, Principles of management, Sultan Chand & Sons, New Delhi.
3. ChandanJ. S, Management: Concept and Strategies,Vikas Publishing.
4. Sherleker, Principles of Management, Himalaya Publishing House, New Delhi.
5. RamanaAT,Knowledge Management, Tata McGraw Hill,New Delhi.
6. Horold Koontz and ItainzWeibrich, Essential of Management,
7. AswathapaK, Essential of Business Administration, Himalaya Publishing House

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB1060	Indian Constitution and Human Rights	FC	2	0	2	2	4

Course Objectives:

The objective of this course is to provide a comprehensive view of Indian Constitution and Human Rights.

Course Content:

Unit-1: Indian Constitutional Philosophy

1. Features of the Constitution and Preamble
2. Fundamental Rights and Fundamental Duties
3. Directive Principles of State Policy

Unit-2: Union and State Executive, Legislature and Judiciary

1. Union Parliament and State Legislature: Powers and Functions
2. President, Prime Minister and Council of Ministers
3. State Governor, Chief Minister and Council of Ministers
4. The Supreme Court and High Court: Powers and Functions

Unit-3: Concept and Development of Human Rights

1. Meaning Scope and Development of Human Rights
2. United Nations and Human Rights- UNHCR
3. UDHR 1948, ICCR 1996 and ICESCR 1966

Unit-4: Human Rights in India

1. Protection of Human Rights Act, 1993 (NHRC & SHRC)
2. First, Second and Third Generations- Human Rights
3. Judicial Activities and Human Rights

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB1070	Skill Development Course	RULO	0	0	2	2	4

Note: The students will have to undergo Skill Development course being conducted by Training and Placement cell of the University.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB1080	Sports / Yoga / Dance / Music / Theatre	RULO	1	0	1	4	4

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

- To prepare the students for the integration of their physical, mental and spiritual faculties;
- To enable the students to maintain good health;
- To practice mental hygiene and to attain higher level of consciousness;
- To possess emotional stability, self control and concentration; and
- To inculcate among students self discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

- Practice yoga for strength, flexibility, and relaxation.
- Learn techniques for increasing concentration and decreasing anxiety
- Become self disciplined and self-controlled
- Improve physical fitness and perform better in studies
- Gain self confidence to face the challenges in the society with commitment to serve the society

Course Content:

Unit-I: Yoga: Introduction, Surya Namaskara:- 12 counts

Unit-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana.

Asanas: Standing- Tadasana, Trikonasana, Parshwa konasana, Veerabhadrasana.

Unit-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana.

Asanas: Supine Position- Sarvangasana, Halasana.

Mudras- Dhyana mudra, , Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:- Anuloma – Viloma, Basthrika, Bhramari.

Dhyana & its types: Competition format, Rules and their interpretations

B. VOLLEYBALL

Course Objectives:

To learn the rules, fundamental skills, and strategies of volleyball

1. To develop skills in passing, setting, serving, spiking, and blocking.
2. To learn basic offensive and defensive patterns of play.
3. To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with volleyball.
2. Apply these skills while playing volleyball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.

4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Introduction about Volleyball
- Players Stance, Receiving and passing
- The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

Unit-II

- Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)
- Setting the ball- Set for attack, Back set, Jump set

Unit-III

- Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash
- Block- Single block, Double block, Three-man block
- Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

Unit-IV

- Attack Combination, Defense Systems, Libero play
- Court marking, Rules and their interpretations and Duties of officials

C. BASKETBALL

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of Basketball
2. To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.
3. To learn basic offensive and defensive strategies of play.
4. To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
5. To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with basketball.
2. Apply these skills while playing basketball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Basketball: Introduction

- Grip; Player stance- Triple threat stance and Ball handling exercises
- Passing (Two hand/one hand)- Chest pass, Bounce Pass, Over head pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
- Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

Unit-II

- Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
- Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
- Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

Unit-III

- Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
- Individual Defensive- Guarding the man with the ball and without the ball.
- Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

Unit-IV

- Court marking, Rules and their interpretations

D. FOOTBALL

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of football.
2. To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.
3. To learn basic offensive and defensive patterns of play
4. To use different parts of the body in utilizing the above skills while playing football
5. To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with football.
2. Apply these skills while playing football and exhibit improved performance
3. Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
4. Improve physical fitness and practice positive personal and lifestyle.
5. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

1. **Football: Introduction**

- Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
- Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

Unit-II

- Dribbling- With instep and outer instep of the foot.
- Heading- From standing, running and jumping.
- Feinting- With the lower limb and upper part of the body.

Unit-III

- Tackling- Simple tackling, Slide tackling.
- Throw-in- Standing and Sliding
- Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

Unit-IV

- Ground marking, Rules and their interpretations

E. ATHLETICS (TRACK AND FIELD)

Course Objectives:

1. To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
2. To develop competence among students in demonstrating all the techniques covered in the course.
3. To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
4. To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.
5. To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course learners will be able to:

1. Display competencies in executing basic techniques and skills associated with select track and field events.
2. Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.
3. Learn regular practice of select track and field events and improve physical fitness
4. Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Content:

Unit-I

- Athletics: Introduction
- Track Events - Steeple Chase, Race Walking, Middle and Long distance races
- Race walking - Technique, Faults and Officiating.
- Middle and Long distance races – Technique and Training

Unit-II

- Jumping Events - High Jump and Triple Jump: Basic Skills and techniques
- High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing
- Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

- Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
- Discus Throw - Standing and Rotatory techniques, Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
- Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

- Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference Books

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). “Track and field coaching Manual”, Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. Carr, Gerry (1999). “Fundamentals of Track and Field. Track Athletics Title G.V. 1060 5.e. 368.
10. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
11. Jarver, Jesse (1987). “The Jumps”, Track and Field Coaching Manual Australia.

F. DRAMATICS

Pre-requisites: Students with background in Theatre Arts/ Keen interest in Dramatics.

Course Objectives:

- To imbibe the acting skills.
- To understand the broader applications of theatre studies in allied arts forms.

- To be able to use body language for better communication.
- Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

- Freely express improvisation in non-verbal communication.
- Shall hone good acting skills and be able to emote better.
- Be able to put up a theatre act and play a key role.
- Be able to differentiate good acting and understand the importance of good lyrics, stage crafting, music, dance, costume and lighting.

Course Content:

UNIT – 1

Working on Body:

Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT – 2

Sound and Movement:

Awareness of creating sound patterns, voice modulations, rhythm in speech and dialogues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT – 3

Characterization and Improvisation:

Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT – 4

Group work and Production:

Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Reference Books:

1. All about Theatre – Off stage – Chris Hogget.
2. Rangadalli Anataranga – K V Subbanna
3. The Indian Theatre – Hemendranath Das Gupta.
4. A Practical handbook for an Actor – Milisa Bruder, ee Milchel Cohn, Madeleine Oliek et al, Zigler Publisher.

G. INDIAN CLASSICAL DANCE FORMS (Bharatanatyam, Kuchipudi ,Mohiniyattam)

Prerequisites: Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join.

Course Objectives:

- To develop an understanding about the Indian classical dance forms and its universal application.
- To be able to understand the fine nuances of Classical dance.
- To understand the importance of health through Indian classical dance, strengthen the body capacity.
- To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.

Course Outcomes:

- To be able to identify and appreciate the classical dance forms.
- To be able to execute basics of Adavus with finesse.
- To be able to express through abhinaya.
- To be able to perform to perform the fundamentals in the chosen dance form.

Course Content:**Unit 1**

An introduction to Indian classical dance forms
Bharatanatyam, Kuchipudi, Mohiniyattam

Unit 2

Learning of Fundamentals
Exercises and Adavus- I (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 3

Adavus –II (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 4

Learn a basic composition in the chosen dance form.

Reference Books

1. *Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi*
2. *Classical Dances –Sonal Mansingh, Avinash Parischa*
3. *Kuchipudi – Sunil Kothari*
4. *Bharatanatyam An in depth study- Saroja vydyanathan*
5. *Mohiniyattam – Bharathi Shivaji*

H. PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Pre-requisites: Students with background in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Course Objectives:

- To understand the Rhythmology.

- To understand the importance of Laya, Taala.
- To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

- To be able to set instrument to Sruthi.
- To be able to play the fundamentals on instrument.
- To be able to learn and perform a particular taala.

Course Content:

UNIT 1

1. Introduction to Musical Instruments
2. Percussion Instruments
3. Mridangam and its History

UNIT 2

1. Introduction to Tala System
2. Definitions of 5 jaathis and their recitation
3. Adi Talam and its various forms
4. Definitions and recitation of different gathis

UNIT 3

1. Tisra Jaathi
2. Khanda Jaathi
3. Misra jaathi
4. Sankeerna Jaathi

UNIT 4

1. Learning of Jathi Formation
2. Basic jathis
3. Jathis for Dance forms
4. Some Basic Definitions of Korvai, Teermanam etc.,

Reference Books:

1. Mridangam- An Indian Classical Percussion Drum – Shreejyanthi Gopal
2. Theory and practice of Tabala – Sadanand Nainpally.
3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – Srdjan Beronja.

SECOND SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
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B19BB2010	Communication English	CC	2	1	0	3	4
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Course Objectives:

1. To make students on basics and importance of communication and etiquettes in trade and commerce.
2. It explains the basic skills necessary to write various types of commercial or business letters.

Course Outcomes:

Students will be able to identify, explain and analyze the psychological, social, cultural and linguistic factors which affect the interpersonal communication of humans.

Level of knowledge: Comprehensive

Course Content:

Unit-1

Introduction to Communication

Communication – Meaning and definition – objectives of business communication – Types– 7 C’s of Communication, – Barriers and its effects. Media’s of verbal and non verbal communication. Effective presentation skills

Business etiquettes: Meaning, importance and need of Business etiquettes, body language in communication, types of etiquettes.

Unit-2

Letter writing

Lay-out and components of business letters-Qualities of a good business letter. Application for situations, writing Bio-data – Interview call letter – Appointment letter

Unit-3

Business Letters

Trade enquiries and replier – Offers and quotations, Terms used in offer and quotation-Orders and their executions –Complaints and adjustments – Business circular letters.

Unit-4

Credit Letters

Requisition for credit sales – Requisition for bank credit – Trade and bank references – Status enquiry and reply – Granting or refusal of credit

Invitation for share application – Letter of allotment – Letter of regret – Notice for company meeting – Agenda for company meetings – Minutes writing.

Reference Books:

1. Rajendra Pal & J.S. Korlahalli - Essentials of Business Communication.
2. Revathi&Vanitha - Effective English in Business Correspondence.
3. Mehta, P.P. &Saroj P. Karuik – Business Communication.
4. Pillai, R.S.N. &Bhagavathi - Commercial Correspondence and OfficeManagement.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2021	Language – II: Kannada	CC	2	0	0	2	2

Course Outline:

ಭಾಷೆಯನ್ನು ಮಾತನಾಡುವ ಬರೆಯುವ ಕೌಶಲ್ಯ, ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸ್ಥೂಲವಾಗಿ ಪರಿಚಯಿಸುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸ ಹಾಗೂ ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು, ಪ್ರಸ್ತುತ ಸಂದರ್ಭಕ್ಕೆ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಸಜ್ಜುಗೊಳಿಸಲು ಪಠ್ಯವನ್ನು ರೂಪಿಸಲಾಗಿದೆ. ಕಲೆ ಮತ್ತು ವಿಜ್ಞಾನದ ವಿಚಾರಗಳಿಗೆ ಒತ್ತನ್ನು ನೀಡಲಾಗಿದೆ. ಇದು ಮೂರು ಕ್ರೆಡಿಟ್ ಹೊಂದಿದೆ.

Course Objectives:

ಎರಡು ಸೆಮಿಸ್ಟರ್‌ಗಳಲ್ಲಿ ಸಮಗ್ರ ಕನ್ನಡ ಸಾಹಿತ್ಯವನ್ನು ಪರಿಚಯಿಸುವ ಉದ್ದೇಶವನ್ನು ಹೊಂದಿದೆ. ಅದರಂತೆ ಎರಡನೆಯ ಸೆಮಿಸ್ಟರ್‌ನಲ್ಲಿ ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಪ್ರಕಾರಗಳಾದ ನವೋದಯ-ನವ್ಯ-ನವ್ಯೋತ್ತರ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಲೇಖನಗಳು, ವ್ಯವಹಾರ ಪತ್ರಲೇಖನ ಹಾಗೂ ಕಿರು ಕಾದಂಬರಿಯನ್ನು ಪಠ್ಯವನ್ನಾಗಿ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡು, ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸದಭಿರುಚಿಯನ್ನು ಮೂಡಿಸಲಾಗುತ್ತದೆ. ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯ ಜೊತೆಗೆ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸನದ ಕಡೆಗೆ ಗಮನ ನೀಡಲಾಗುತ್ತದೆ.

1. ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಇತಿಹಾಸ ಮತ್ತು ಸಂಸ್ಕೃತಿಗಳನ್ನು ಕನ್ನಡ, ಕರ್ನಾಟಕಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಪರಿಚಯಿಸಲಾಗುತ್ತದೆ.
2. ವಿದ್ಯಾರ್ಥಿಗಳ ಸರ್ವತೋಮುಖ ಬೆಳವಣಿಗೆಗೆ ಅನುವಾಗುವಂತೆ ಹಾಗೂ ಅವರಲ್ಲಿ ಮಾನವ ಸಂಬಂಧಗಳ ಬಗ್ಗೆ ಗೌರವ, ಸಮಾನತೆ ಮೂಡಿಸಿ, ಬೆಳೆಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಪಠ್ಯಗಳ ಆಯ್ಕೆಯಾಗಿದೆ.
3. ಅವರಲ್ಲಿ ಸೃಜನಶೀಲತೆ, ಶುದ್ಧ ಭಾಷೆ, ಉತ್ತಮ ವಿಮರ್ಶಾ ಗುಣ, ನಿರರ್ಗಳ ಸಂಭಾಷಣೆ, ಭಾಷಣ ಕಲೆ ಹಾಗೂ ಬರಹ ಕೌಶಲ್ಯಗಳನ್ನು ಬೆಳೆಸುವುದು ಗುರಿಯಾಗಿದೆ.
4. ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಿಗೆ ಅನುಕೂಲವಾಗುವಂತಹ ವಿಷಯಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ಸೂಕ್ತ ಪಠ್ಯಗಳನ್ನು ಆಯ್ಕೆ ಮಾಡಿಕೊಳ್ಳಲಾಗಿದೆ.

Course Outcomes:

ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಪ್ರಕಾರಗಳಾದ ನವೋದಯ-ನವ್ಯ-ನವ್ಯೋತ್ತರ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಲೇಖನಗಳು, ವ್ಯವಹಾರ ಪತ್ರಲೇಖನ ಹಾಗೂ ಕಿರು ಕಾದಂಬರಿ ಸಾಹಿತ್ಯ ಕಲಿಕೆಯ ಮೂಲಕ ಕಾಲದ ಸ್ಥಿತ್ಯಂತರಗಳನ್ನು ಅದರ ಒಳನೋಟಗಳನ್ನು ಬೆಳೆಸುತ್ತದೆ.

- ಸಾಮಾಜಿಕ, ರಾಜಕೀಯ, ಧಾರ್ಮಿಕ, ಸಾಂಸ್ಕೃತಿಕ ಹಾಗೂ ಲಿಂಗಸಂಬಂಧಿ ವಿಚಾರಗಳೆಡೆ ಗಮನಹರಿಸುವುದರೊಂದಿಗೆ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಚರ್ಚಾ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ.
- ಜೀವನದಲ್ಲಿ ಬರುವ ಅಭಿಪ್ರಾಯ ಬೇಧಗಳು, ಸಮಸ್ಯೆಗಳನ್ನು ಆಧುನಿಕ ಸಂದರ್ಭದಲ್ಲಿ ಮಾನವೀಯತೆಯೊಂದಿಗೆ ನಿರ್ವಹಿಸುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತದೆ.
- ಉತ್ತಮ ಸಂವಹನ ಕಲೆಯನ್ನು ಬೆಳೆಸುವ ಉದ್ದೇಶವನ್ನು ಈಡೇರಿಸುತ್ತದೆ.

Course Content:

Unit	Description	Topics
I	ಒಳನೋಟ- ಒಳನೋಟದ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ.	1. ಪಾತ್ರವರ್ಗ 2. ಒಳನೋಟದ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ 3. ದೃಶ್ಯವಿನ್ಯಾಸ 4. ಕಥನವಿನ್ಯಾಸ
II	ಒಳನೋಟ- ಒಳನೋಟದ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ.	5. ಒಳನೋಟದ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ 6. ಒಳನೋಟದ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ

	PÀ«vÉUÀ¼ÀÄ	7. ÉÉÆǺqÀ`ÁgÀzÀÄ aǺ®zÉÆ¼ÀUÀÉÀÄ 8. zÁAǺvÀǺ	«ÉÉzÉÄ» ǺÀæw`sÁ ÉÀAzÀPÀÄ«AiÁgĩ
III	ÉÄRÈAUÀ¼ÀÄ	9. ǺÀ²Ñ«ÀÄ WÀIOUÀ¼À ǺvÀÉÀ 10. «ÉÁPÁ`ÉAiÀÄ «ÀÄPÀl¼ÀÄ 11. «ÀǺ«À°ÁgÀ ǺvÀæUÀ¼À ,ÀégÀÆǺÀ «ÀÄvÀÄÜ «zsÀUÀ¼ÀÄ 12. rfi`AiÀÄÄUÀzÀ°è PÀÉÀßqÀ dUÀvÀÄÜ	ÉÁUÉÄ±i°ÉUÀqÉ r.Dgi. ÉÁUÀgÁei «ÁtÁdâ ǺvÀæUÀ¼ÀÄ «. ZÀAzÀæ±ÉÄRgÀ ÉÁAUÀ°
IV	PÁzÀASj	13. ZÀAzÀæVjAiÀÄ wǺgÀzÀ°è	,Á gÁ CŞÆŞPÀlgi

ǺgÁ«ÀÄ±ÀðÉÀ UÀæAxÀUÀ¼ÀÄ:

1. «ÀÄÄUÀ¼ gÀA.²æÄ., PÀÉÀßqÀ ,Á»vÀǺ ZÀjvÉæ, ǺæPÁ±ÀPÀgÀÄ VǺvÁ ŞÄPi°E,j, «ÉÄÉ,ÀÆgÀÄ. 2014
2. 'Ǻ«AiÁwǺvÀ PÀÉÀßqÀ ,Á»vÀǺ ZÀjvÉæ ,AǺÄl 1,2,3,4,5 «ÀÄvÀÄÜ 6, PÀÄ«ÉAǺÄ PÀÉÀßqÀ CzsÀâAiÀÄÉÀ ,AA,ÉÜ, «ÉÄÉ,ÀÆgÀÄ «±Àé«zÁâ®AiÀÄ, «ÉÄÉ,ÀÆgÀÄ. 2014
3. CgÀ«AzÀ «AiÁ°UÀwÜ, ,Á»vÀǺ ,AA,Àløw «ÀÄvÀÄÜ zÀ°vÀ ǺææÉÖ, ǺæPÁ±ÀPÀgÀÄ PÀÉÀßqÀ ,Á»vÀǺ ǺjµvÀÄÜ, "ÉAUÀ¼ÀÆgÀÄ. 2014
4. qÁ. F.J.i. D«ÀÄÆgÀ, PÀÉÀßqÀ PÀxÀÉÀ ,Á»vÀǺ : PÁzÀASj, ǺæPÁ±ÀPÀgÀÄ ,ÀéǺß ŞÄPi°E,j, "ÉAUÀ¼ÀÆgÀÄ. 2016
5. zÉÄ±ÀǺÁAqÉ J,j.Ĵ.Ĵ. "ÉÄAzÉæ ±ÀjǺǺsÁgÀ PÁ«ÀâAiÀiÁÉÀ, ǺæPÁ±ÀPÀgÀÄ zÉÄ' ǺÄ,ÀÜPÀ, "ÉAUÀ¼ÀÆgÀÄ. 2013
6. QǺvÀðÉAxÀ PÀÄvÀðPÉÄn, PÀÉÀßqÀ ,Á»vÀǺ ,AUÁw, ǺæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉÄn «ÉÄ«ÉÄǺjAiÀÄ`læ,jÖ, zsÁgÀ«ÁqÀ. 2009
7. ,AA. ©.J.j. PÉÄ±À«ÀgÁ«i. PÉÉ`Á,AA PÀÉÀßqÀ ÉÁIPÀUÀ¼ÀÄ, ǺæPÁ±ÀPÀgÀÄ CAQvÀ ǺÄ,ÀÜPÀ, "ÉAUÀ¼ÀÆgÀÄ. 2005
8. ±Á«ÀÄgÁAiÀÄ vÀ.,ÀÄ., PÀÉÀßqÀ ,Á»vÀǺ ZÀjvÉæ, ǺæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQÉÀ «ÉAPÀtÚAiÀÄâ ,ÁägÀPÀ UÀæAxÀ«AiÁ`É, «ÉÄÉ,ÀÆgÀÄ -2014
9. DzsÀÄPÀ PÀÉÀßqÀ PÁ«Àâ `sÁUÀ-2, PÀÄ«ÉAǺÄ PÀÉÀßqÀ CzsÀâAiÀÄÉÀ ,AA,ÉÜ, «ÉÄÉ,ÀÆgÀÄ «±Àé«zÁâ®AiÀÄ, «ÉÄÉ,ÀÆgÀÄ. 2004
10. ²«ÀgÀÄzÀæǺÀ f.J.i. PÀÉÀßqÀ ,Á»vÀǺ ,ÀÄÄPÉè, ǺæPÁ±ÀPÀgÀÄ ,ÀéǺß ŞÄPi°E,j, "ÉAUÀ¼ÀÆgÀÄ. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2022	Language – II: Hindi	CC	2	0	0	2	2

अध्ययन विषय सूची / पाठ्यक्रम

इकाई – 1: प्राचीन कविता, आधुनिक कविता

अध्यापन अवधियाँ : 12 hrs.

1. कबीर के दोहे – कबीरदास
2. कविता – पाषाणी – नागार्जुन
3. कविता – वीरों का कैसा हो वसंत - सुभद्राकुमारी चौहान

इकाई – 2: मध्यकालीन कविता, आधुनिक कविता

अध्यापन अवधियाँ : 12 hrs.

4. रहीम के दोहे – रहीम

5. कविता – किसको नमन करूँ मैं? - रामधारी सिंह दिनकर

6. कविता – कर्मवीर – अयोध्यासिंह उपाध्याय “हरिऔध”

इकाई – 3: मध्यकालीन कविता, आधुनिक कविता

अध्यापन अवधियाँ : 12 hrs.

7. मीरा के पद – मीराबाई

8. कविता – ऊँचाई - अटल बिहारी वाजपाई

9. कविता – माँ – नरेश मेहता

इकाई – 4: अनुवाद, संक्षेपण

अध्यापन अवधियाँ : 12 hrs.

अनुवाद : हिन्दी – अंग्रेजी

अनुवाद : अंग्रेजी – हिन्दी (शब्द एवं अनुच्छेद)

संक्षेपण : परिच्छेद का एक तिहाई भाग में |

सन्दर्भ ग्रन्थ :

- पाठ्य पुस्तक – रेवा विश्वविद्यालय
- सुबोध व्यवहारिक हिन्दी – डॉ. कुलदीप गुप्त .
- अभिनव व्यवहारिक हिन्दी – डॉ. परमानन्द गुप्त
- हिन्दी साहित्य का इतिहास - डॉ. नागेन्द्र
- आधुनिक हिन्दी साहित्य का इतिहास - डॉ. बच्चन सिंह
- हिन्दी साहित्य का नवीन इतिहास - डॉ. लाल साहब सिंह
- शुद्ध हिन्दी कैसे बोले कैसे लिखे- पृथ्वीनाथ पाण्डे
- कार्यालय अनुवाद निदेशिका
- संक्षेपण और पल्लवन - के.सी.भाटिया&तुमन सिंग

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2023	Language – II: Additional English	CC	2	0	0	2	2

Course Objectives:

1. To help the student understand the multiple values of the society.
2. To develop a cultural understanding in the student to sharpen his/her social skills.
3. To ensure a gradual development of literary interest in the student.

Course Outcomes:

1. On completion of the course, learners will be able to:
2. Demonstrate a deep understanding of the society and its values.
3. Develop a constructive understanding of the cultural dimensions of the human world.
4. Make use of his understanding to become a responsible global citizen of tomorrow.

Course Content:

Unit-I: Ecology & Environment

12 hrs

Literature: Toru Dutt - Casuarina Tree, Robert Frost – Stopping by Woods on a Snowy Evening
Tomas Rivera–The Harvest, C.V. Raman – Water – The Elixir of Life, Language:
Degrees of Comparison

Unit-II: Voices from the Margin

12 hrs

Literature: Tadeusz Rozewicz – Pigtail Jyoti Lanjewar – Mother Sowvendra Shekhar Hansda – The Adivasi
Will Not Dance, Harriet Jacobs – Excerpt from *Incidents in the Life of a Slave Girl*
Language: Prefix and Suffix

Unit-III: Women & Society

12 hrs

Literature: Kamala Das – An Introduction, Usha Navrathnaram – To Mother ,Rabindranath Tagore – The
Exercise Book, Jamaica Kincaid – Girl, Writing Skills: Dialogue Writing

Unit-IV: Popular Culture

12 hrs

Literature: Rudyard Kipling – The Absent-minded Beggar, Sir Arthur Conan Doyle – The Hound of the
Baskervilles, Aldous Huxley – The Beauty Industry, Writing Skills: Story Writing

Reference Books:

1. Agrawal, K.A. *Toru Dutt the Pioneer Spirit of Indian English Poetry - A Critical Study*. Atlantic Publications, 2009.
2. Latham, Edward Connery (ed). *The Poetry of Robert Frost*. Holt Paperbacks, 2002.
3. Gale, Cengage Learning. *A Study Guide for Tomas Rivera's The Harvest*. Gale, Study Guides, 2017.
4. Basu, Tejan Kumar. *The Life and Times of C.V. Raman*. PrabhatPrakashan, 2016.
5. Rozewicz, Tadeusz. *New Poems*. Archipelago, 2007.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2030	Statistics for Management	HC	3	0	1	4	4

Course Objectives:

1. The central objective of the undergraduate major in statistics is to equip students with consequently requisite quantitative skills that they can employ and build on in flexible ways.
2. To have conceptual overview of statistics
3. To apply analyze various simple and advance statistical tools.
4. To interpret data through statistical tools

5. To perform statistical analyses.

Course Outcomes:

After completion of this course the students will be able to:

- 1) Elucidate the concept of variation and identify and pose statistical questions requiring investigation.
- 2) Interpret statistical analysis and draw conclusion in context and in the presents of uncertainty.
- 3) Able to calculate sample means variances, covariance and correlation using a hand calculator & association.
- 4) Able interpret measures of central tendency, depression.
- 5) Demonstrate knowledge and understating of index numbers theory and methods and be able to provide practical solutions to general aggregation problems.
- 6) Demonstrate knowledge and understating of the competing merits of different approached to index number problems and methods for dealing with quality change and be able to choose appropriate methods for use in constructing an index number.
- 7) An understating of the limits of their knowledge and how it influences analyses and interpretations based on that knowledge.

Course Content:

UNIT-1: INTRODUCTION TO STATISTICS AND MEASURE OF CENTRAL TENDENCY

Meaning and Definition – Function – Scope – Limitations-Classification and Tabulation of Data-Diagrams and graphs– Arithmetic Mean (Simple and Weighted)-Median – Mode (Including missing frequency problems) & Graphical representation of Median through Ogive curves.

UNIT-2: MEASURES OF DISPERSION AND SKEWNESS:

Measures of dispersion- Meaning and Definition –Calculation of absolute and relative measures of dispersion-Range – Standard deviation - Mean Deviation – Quartile Deviation – and Co-efficient of Variation. Skewness:- Meaning – Measures of skewness-Absolute and relative measure of skewness- Karl Pearson’s co-efficient of skewness - Bowley’s co-efficient of skewness (Problems)

UNIT - 3: INDEX NUMBERS:

Meaning and Definition – uses and methods of constructing Index numbers- Simple aggregative method – Simple Average of Price Relative method – Weighted Index Method- Fishers Ideal method (including TRT and FRT) – Consumer Price Index (Problems on CPI)

UNIT- 4: INTERPOLATION AND EXTRAPOLATION

Binomial expansion method of interpolation and extrapolation- conditions, formula and problems (one and two missing values – one within and one outside the range).
Newton’s method of interpolation and extrapolation, conditions, formula and problems (one and two missing value-within or outside the range)

Skill Development Activities:

1. Collect marks scored by 50 students in an examination and prepare frequency distribution table.
2. Collect data relating to prices of shares of two companies for ten days and ascertain Which companies

- share price is more stable.
3. Collect the run scored by the two batsmen in ten one day international cricket Matches, find who better run getter is and who is more consistent.
 4. Using imaginary figures construct the cost of living index of your own place

Reference Books:

1. Vohra, N.D., Business Statistics, McGraw Hill Publishing Co.
2. Sharma, J.K., Business Statistics, Pearson Education, New Delhi.
3. Levine Krehbeil, Berenson and Viswanathan, Business Statistics: A first course, Prentice –Hall of India, New Delhi.
4. Thukral, J.K., Mathematics for Business Studies, Mayur Publications.
5. Gupta S.P., Statistical Methods. Sultan Chand & Sons, New Delhi.
6. Elhance D.N, Fundamentals of Statistics.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB2040	Marketing Management	HC	3	1	0	4	4

Course Objectives:

1. To provide knowledge of basic concepts of Marketing
2. To understand the functions, tools and techniques of marketing.
3. To gain knowledge about Rural marketing and positioning of the products.
4. To identify the factors influencing Consumer Buying Behaviour
5. To understand the concept of Pricing and Sales promotion
6. To gain knowledge about recent Trends in Marketing

Course Outcomes:

After completion of this course the students will be able to:

- 1) Explain the concept and functions of Marketing
- 2) Identify the factors influencing consumer buying process
- 3) Interpret the diversification of product
- 4) Identify product segments
- 5) Identification and application of product life cycle
- 6) Identification and distribution different distribution channels
- 7) Categorize the Market into various segments
- 8) Identify the Marketing strategy adopted by Companies

Course Content:

Unit-1: INTRODUCTION TO MARKETING

Meaning, Evolution of marketing concepts, functions, marketing mix: Marketing environment- Micro and Macro environmental factors, Consumer Behavior –Consumer buying process, Factors influencing consumer buying decisions.

Unit-2: SEGMENTATION TARGETING POSITIONING

Market segmentation – concept, importance and bases, Target market selection: Positioning concept, importance and bases: Product differentiations.

Unit-3: MARKETING MIX

Product: Meaning and importance, Product classifications, Concept of product mix, Product life-cycle, new product development.

Pricing: Factors affecting price of product, pricing methods.

Promotion: Nature and importance of promotion: Promotion tools: advertising, personal selling, public relations: sale promotion and publicity. Promotion mix: Factors affecting promotion mix decisions.

Place: Channels of distribution - Meaning and importance: Types of distribution channels: Wholesaling and retailing: Factors affecting choice of distribution channel.

Unit-4: DEVELOPMENTS & ISSUES IN MARKETING

Rural marketing, Social marketing, Global marketing, E- marketing, Green marketing, CRM, marketing ethics.

Reference Books:

1. Kotler, Philip; Keller, Kevin Lane; Koshy, Abraham, and MithileshwarJha, Marketing Management: A South Asian Perspective, Pearson Publishing House, New Delhi.
2. Dr. K. Karunakaran, Marketing management, HPH.
3. Palmer, Adrian, Introduction to Marketing, Oxford University Press, UK.
4. Lamb, Charles W. Hair, Joseph F., and Carl McDaniel, Principles of Marketing, South Western Publishing, Ohio.
5. Armstrong & Kotler, Marketing : An Introduction, Pearson Publishing House, New Delhi
6. Ramaswamy, V.S.: and Namakumari: Marketing Management – Planning implementation and control, Mc Millan India Ltd., New Delhi.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB2050	Organizational Behavior	HC	2	1	0	3	4

Course Objectives:

1. To acquaint the students with the fundamentals of Management and Organization Behaviour.
2. To help students interpret and summarize the Determinants and Theories of Personality.
3. To help students acquaint and demonstrate the concepts of Learning and Learning Theories.
4. To help students identify and express the difference between Values, Attitude and Beliefs.
5. To illustrate and paraphrase the concept of Perception and Interpersonal Skills.
6. To judge and exhibit the fundamentals of Group Dynamics.

Course Outcomes:

After completion of this course the students will be able to:

1. Apply the concept of Organization and Organization Behaviour to the Modern day Management
2. Develop the prospects and implications of Management to Organization.
3. Demonstrate the practical applications of determinants of Personality.
4. Analyse and Classify the difference between Values, Attitude and Behaviour
5. Interpret and Establish the factors affecting Perception and Perceptual Consistency.
6. Correlate and Categorize Group Size and Group Behaviour.
7. Administer and Record the factors affecting Group Dynamics, Group Behaviour and Group Cohesiveness

Course Content:

UNIT- 1: INTRODUCTION

Meaning - need and importance of organization – classification of organization - prospectus of formal organization - Organizational Behaviour – Nature and Scope – contribution from other discipline.

UNIT -2: PERSONALITY & LEARNING

Definition - Determinants of personality - Theories of personality – Erickson’s personality - Freudian theory and Trait theory - Meaning of learning – Learning process – Learning theory of Organizational Behaviour – Classical - Operant conditioning- Cognitive- Observation Theory

UNIT -3: ATTITUDE & PERCEPTION

Meaning – Characteristics - Components and Formation of attitudes - Change in attitude - Barriers to change- How to minimize the barriers.

Perception:- Meaning and definition – Need - Factors influencing perception - perceptual consistency - Context and definition - Interpersonal perception.

UNIT-4: GROUP BEHAVIOR AND GROUP DYNAMICS

Meaning – Types – Groups in the organization – Group size and status – Influences –Roles and relationship and group behavior – Characteristics – Behavior problem - Group norms – Cohesiveness - feature Effects – Group thinking – Symptoms - Influence and Remedy – Group decision making techniques.

Reference Books:

1. Essential Reading Singh, K. (2012). Organizational Behaviour: Text and Case. New Dehli: Pearson Education.
2. Aswathappa, K. (2010). Organizational Behaviour(Text, Cases and Games). Bangalore: Himalaya Publication.
3. Greenberg, J., & Baron, R. A. (2008). Behaviour in Organizations. Pearson Prentice Hall. Nelson, D. L., & Quik, J. C. (2008).
4. Organization Behaviour. Thomson South Western. Robbins, S. P., Judge, T. A., & Vohra, N. (2011).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2060	Computer Applications in Business	FC	2	0	0	2	4

Course Objectives:

1. Gain familiarity with the concepts and terminology used in the development, implementation and operation of business computer applications.
2. Explore various methods where Information Technology can be used to support existing businesses and strategies.
3. Achieve hands-on experience with productivity/application software to enhance business activities.
4. Accomplish projects utilizing business theories, teamwork, Internet resources and computer technology.
5. To introduce the students about basics of MS-Office and to provide practical knowledge exposure to MS- office

Course Outcomes:

After completion of this course the students will be able to:

1. Apply computer resources for use in business and academics.
2. Construct business and academic documents using Microsoft Word.
3. To Create spreadsheets with formulas and graphs using Microsoft Excel.
4. Develop presentations containing animation and graphics using Microsoft PowerPoint.
5. Integrate Microsoft Office applications for use in business.
6. Work with simple design and development tasks for the main types of business systems.
7. Investigate emerging technology in shaping new processes, strategies and business models.

Course Content:

Unit- 1: Introduction to Computers

General features of a computer – Generations of computers - Personal computer – Workstation– Mainframe computer and super computers. Computer applications – Data processing – Information processing – Commercial – Office automation – Industry and engineering – Healthcare – Education – Graphics and multimedia.

UNIT 2: Computer Organization

Central processing unit – Computer memory – Primary memory – Secondary memory – Secondary storage devices – Magnetic and optical media – Input and output units – OMR – OCR – MICR – Scanner – Mouse - Modem.

UNIT -3: Computer Hardware and Software

Machine language and high level language – Application software – Computer program – Operating system – Computer virus -Antivirus and computer security – Elements of MS DOS and Windows OS – Computer arithmetic – Binary - Octal and Hexadecimal number systems – Algorithm and flowcharts – Illustrations – Elements of database and its applications.

UNIT -4: Microsoft Office

Word Processing and electronic spread sheet – An overview of MS WORD - MS EXCEL and MS POWERPOINT – Elements of BASIC programming – Simple illustrations. **Computer Networks:** Types of networks – LAN - Intranet and Internet – Internet applications – World Wide Web – E-mail - Browsing and Searching – Search engines – Multimedia applications.

Reference Books:

1. Alexis Leon and Mathews Leon (1999), Fundamentals of Information Technology, Leon Tech world Pub.
2. Jain. S.K. (1999), Information Technology “O” level made simple, BPB Publications.
3. Jain. V.K. (2000), “O” Level Personal Computer Software, BPB Publications.
4. Sharma Dhiraj, Information Technology for Business, Himalaya Publishing House, New Delhi
5. Archanakumar, Computer Basics with Office automation I.K. International
6. Sinha, Computer Fundamentals, BPB Publications.
7. Saha&Saha, Computer Fundamentals

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2070	Skill Development Course	RULO	0	0	2	2	2

Note: The students will have to undergo Skill Development course being conducted by **Training and Placement Cell** of the University

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2080	Online Courses (MOOC / SWAYAM etc.,)	RULO	0	0	2	2	2

MOOC/ SWAYAM:

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering OOC courses.

A student shall register and successfully complete any of the courses available on SWAYAM. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

Internship:

The students shall have to undergo internship of the minimum duration fixed by the university and as per the guidelines of the University either in industry or in a business sector, R&D organization, including educational institutes with excellent research culture. The students are expected to submit a formal report at the end of the internship programme. The marks for internship shall be awarded based on the (a) presentation and (b) comprehensive viva, by the panel of examiners constituted by the School.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB2090	Summer Internship – 1 (Minor Project)	HC	0	0	4	4	4

Course Objective:

To carry out the research under the guidance of supervisor and in the process learn the techniques of research.

Course Outcomes:

On successful completion of the project the students shall be able to:

1. Familiarize with literature search
2. Conduct research and collect data from various sources.
3. Consolidate, analyse and Interpret the data.
4. Write report and defend the research findings.

Project:

The students will choose the topic of research and work under the guidance of allocated faculty member. The project shall preferably be application oriented or need based and useful to the society. In case of industry need based project the students may opt co-supervisor from the concerned industry. The project work floated should be completed and submitted within the stipulated date by the University. The students have to meet the concerned supervisor(s) frequently to seek guidance and also to produce the progress of the work being carried out. The students should also submit progress report during mid of the semester and final draft report with findings to the supervisor (s) before submission of the project report. After the completion of the project the student shall submit project report in the form of dissertation on a specified date by the School.

THIRD SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB3010	Cost Accounting	HC	3	0	1	4	5

Course Objectives:-

1. To acquaint students with basic concepts of cost accounting, application of cost accounting process.
2. To enable students to understand various methods of cost ascertainment and cost accounting.
3. To give an understanding about Material and Inventory control system.
4. To give knowledge about Labour Cost and calculation of various incentive plans.
5. To throw light on allocation and apportionment of Overheads.

Course Outcomes:

After completing this course, the student will be able to:

1. Understand the important dimensions of costs involved in an organization
2. Learn the methods of reducing various elements of cost.
3. Calculate labour hours and various incentive plans.
4. Understand the Procedure for accounting and control of overheads.
5. To be able to analyze and evaluate information for cost ascertainment, planning, control and decision making

Course Content:

UNIT 1: INTRODUCTION TO COST ACCOUNTING

Introduction –Meaning & Definition of Cost - Costing and Cost Accounting – Objectives of Costing- Comparison between Financial Accounting and Cost Accounting- Application of Cost Accounting - Designing and Installing a Cost Accounting System- Cost Concepts –Classification of Costs- Cost Unit- Cost Center – Elements of Cost – Preparation of - Tenders and Quotations. **(Problems on Cost sheet,tender, quotation)**

UNIT 2: MATERIAL COST

Meaning – Types – Direct material – Indirect Material- Material Control – Purchasing Procedure- Store keeping – Techniques of Inventory Control – Setting of Stock Levels- EOQ- ABC Analysis – Methods of Pricing - Material Issues- FIFO- LIFO- Weighted Average Price Method and Simple Average Price Method. **(Problems on different stock level, Methods of Pricing)**

UNIT 3: LABOR COST

Meaning – Types – Direct Labor- Timekeeping- Time booking- Idle Time- Overtime-Labor Turnover - Methods of Labor Remuneration- Time Rate System- Piece Rate System-Incentive Systems- Halsey plan- Rowan Plan- Taylor's Differential Piece Rate System and Merrick's Differential Piece Rate System- **(Problems on Remuneration method)**

UNIT 4: OVERHEAD COST

Meaning and Definition- Classification of Overheads- Procedure for Accounting and Control of Overheads- Allocation of overheads – Apportionment of overheads- Primary overhead Distribution summary- Secondary overhead Distribution Summary- Repeated Distribution Method and Simultaneous Equations Method- Absorption of Factory Overheads – Methods of Absorption – Machine Hour Rate (**Problems on Overheads**)

Reference Books:

1. Principles & Practices of Cost Accounting, S P Jain, K L Narang and Simmi Agarwal, Kalyani Publishers, 2016
2. Cost Accounting: Principles & Practice, M N Arora, 12th Edition, Vikas Publishing House, 2012
3. Cost Accounting, Jawaharlal Lal and Seema Srivastava 5e, McGraw Hill Education, 2013
4. Principles & Practices of Cost Accounting, Bhattacharya, A.K. 3rd edition PHI
5. Cost Accounting – Theory and Practice, Bhabatosh Banerjee, 13th Edition, PHI Learning Private Limited.
6. Cost Accounting, M Y Khan and P K Jain, Second Edition, McGraw Hill Education, 2017
7. Fundamentals of Cost Accounting: Theory, Problems and Solutions, Atlantic, 2011

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BB3020	Service Sector Management	HC	3	0	1	4	5

Course Objectives:

1. To acquaint the students with nature of Services, Service design and Automation
2. To understand the impact of tourism and Hospitality on service industry
3. To gain knowledge about banking and insurance services.
4. To understand the Nature of health care facilities and services in India

Course Outcomes:

After completing this course, the student will be able to:

- 1) Understand the service concept and service management process.
- 2) Gain insight of tourism and hospitality services.
- 3) Understand the trends and services in banking and insurance sector.
- 4) Establish priorities of a health-care organization in line with the needs.

Course Content:

UNIT 1: INTRODUCTION TO SERVICES MANAGEMENT

Meaning of Services – Concepts - Characteristics of Services – Classification of Services – Growth of Service Sector. Meaning of marketing – Differences between Products and Services – Importance of Services Marketing – Marketing Mix for Services – 7 Ps (in detail) Role of Customer in Service delivery process- Quality issues in Services – GAP Model – Designing the Service process – Service Blue print – Back office and Front office process- Technology and Automation in Services.

UNIT 2: TOURISM AND HOSPITALITY SERVICES

Introduction – Evolution of Tourism Industry – Concept and Nature of Tourism – Significance of Tourism Industry- Market segmentation in tourism- Marketing mix of Tourism - Recent Trends in Tourism.
Hospitality Services: Introduction to hotels, classification of hotels–Types of facilities and hospitality, Marketing Mix of Hospitality Industry.

UNIT 3: BANKING AND INSURANCE SERVICES

Banking - Introduction – Banking concepts-Types of Banking services -Traditional and Modern banking Services – Recent Trends in Banking Services-universal banking-e- banking- retail banking-issues in banking.

Insurance - Introduction – Meaning and Definition of Insurance – Types of Insurance – Life Insurance and General Insurance: Marine, Fire, Personal accident and health insurance policies, Insurance Agents and insurance business in India – IRDA – major private and public sector organizations.

UNIT 4: HEALTHCARE AND INFORMATION TECHNOLOGY ENABLED SERVICES (ITES)

Hospitals – Introduction-Evolution of Hospital Industry – Nature of Service – classification of hospitals.Hospital service management-facilities; personnel; administration; hospital service extensions, marketing the medical transcription services. ITES: Introduction – Growth of ITES- Types, Job opportunities in ITES.

Reference Books :

- 1.Christopher Lovelock, J. J. (2010). *Services Marketing*. New Delhi: Pearson Education.
2. Chatterjee, J. (2010). *Services Management*. New Delhi: Pearson Education.
3. Valarie A. Zeithaml, M. J. (2010). *Services Marketing*. New Delhi: Tata McGraw Hill.
4. Service Management – Operations, Strategy, Information Technology, 7e, James A Fitzsimmons and Mona J Fitzsimmons, McGraw Hill Education, 2017
5. Service Management: Strategy and leadership in service business , 3rd Edition , Richard Norman , Wiley

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB3030	Innovation Management	HC	2	1	0	3	4

Course Objectives:

1. To understand the concepts of innovation and innovation management process
2. To provide insights into innovations within organizations and enablers of innovations in organizations
3. To understand the economic aspects of innovation and financing innovations
4. To understand the strategic and intellectual property issues in innovations

Course Outcomes

1. To be able to use the concepts of innovation in managing innovations in their organizations
2. Recognize the diversity of types of innovations
3. Able to integrate IT systems in innovations
4. Critically assess and explain key strategic issues in innovations-

Course Content:

Unit 1 Concept of innovation, Approaches to innovation, innovation process- Types of innovations, Innovation a Management process; Assumptions and barriers to innovations- Successful & Un-Successful innovations

Unit 2 Managing Innovation within Organizations and Innovation, Organizational Characteristics that Facilitate Innovation, Organizational Structures and innovation, Role of Individual in Innovation, IT Systems and their Impact on Innovation

Unit 3 Organizational aspects of innovation, Methods and techniques of innovation management, Creative approaches; Systemic and analytical methods and techniques of innovation management, Economic aspects of innovations encompassing sources of innovation financing

Unit 4 Strategic considerations on innovations, innovation platforms that incorporate new product development, process innovations, service innovation, service design innovation, multiple product options, portfolios and standards- Intellectual property of innovations, legal aspects of innovations

Reference Books:

1. Peter F. Drucker, Innovation and Entrepreneurship, Harper Collins, 1999
2. CK Prahalad and MK Krishnan : The new age of innovation, McGraw Hill
3. Paul Traut: Innovation Management and New product Development ,Pearson
4. Mauborgne, René, Blue Ocean Strategy, Boston, Harvard Business School Press, 2005.
5. Snyder, Duarte, Unleashing Innovation, How Whirlpool Transformed an Industry, JosseyBass, 2008
6. Mass, Harvard Business School Press, 2006
7. Fraser, Heather, Design Works; Toronto: University of Toronto Press, 2012
8. Govindarajan, Vijay & Trimble, Chris, 10 Rules for Strategic Innovators; Boston: Harvard Business School Press, 2005
9. Govindarajan, Vijay & Trimble, Chris, Reverse Innovation; Boston: Harvard Business School Press, 2012
10. Hamel, Gary, The Future of Management; Boston: Harvard Business School Press, 2007
- 11.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BB3040	Human Resource Management	HC	2	1	0	3	4

Course Objectives:

The objectives of the course are to:

1. Explain the importance of human resources and their effective management in organisation.
2. To acquaint the students with the various functions of a HR Manager.
3. To make the students understand the different processes related to recruitment and selection
4. To make the students aware of the importance of the Human Resource in the organization

Course Outcomes:

After completing the course, the student shall be able to:

1. Understand the nature and concept of Human Resource Management

2. Categorize the major functions of HR
3. Illustrate the concepts of HRM.
4. Gain insight about Contemporary issues in HRM.

Course Content:

UNIT 1 – INTRODUCTION TO HRM

Introduction: Evolution, meaning, significance, scope, objectives, nature, principles of HRM Functions: operative, managerial and advisory; an overview of Strategic Human resource Management-Human capital and importance to an organization- Internal structure of an HR department- External factors impacting HRM- Aligning HRM and Organizational strategy –Ethical issues in HR: Definition and importance.

Career Opportunities in HRM: Professional Associations in HRM, HR Managers (duties and responsibilities)-Recent Trends in HRM

UNIT 2 – STAFFING IN ORGANIZATIONS

Hiring and Staffing: How HR Managers recruit and hire employees? -Recruitment: meaning, significance, objectives, sources & methods- Selection: meaning, importance, steps/process, selection Techniques, Selection tests, Interview: Definition, types, pros and cons– Absenteeism and Turnover in work place- Types of Termination: Attrition, Layoffs, Resignation, Retirement

UNIT 3 – DEVELOPMENT & COMPENSATION

Development: Meaning, importance, benefits, methods of learning, identification of learning needs & measuring its effectiveness;

Compensation: meaning, significance, executive compensation Programmes, employee benefits & services- Performance Appraisal: meaning, objectives, methods (including 720degree method of performance appraisal), uses & limitations.

UNIT 4 – INTEGRATION & MAINTENANCE OF HRM

Integration of HRM: Types and forms of participative management, quality circles, employee empowerment, collective bargaining, quality of work life

Maintenance of HRM: Job Satisfaction, Discipline and employee rights, employee counseling, grievances settlement Contemporary issues in HRM, knowledge management

Reference Books:

1. Human resource Management by Garry Dessler (15th edition)-Pearson publishing co.
2. Human Resource Management: theory and practice by R.C.Sharma and nipunsharma, sage publishing co.
3. DeCenzo, D.A.& Robbins: Fundamentals of Human Resource Management, New York: John Wiley & Sons.
4. Rao, V.S.P: Human Resource Management, Text and Cases, Excel Books
5. SubbaRao, Personnel and HRM – PHP
6. Aswathappa, Human Resource and Personnel Management - Tata McGraw Hill Publishing Company
7. Renuka Murthy, Santosh B.R., Bhargavi V.R. – HPH
8. Reddy & Appanniah – Human Resource Management - HPH

Course Code	Duration	Course Title	L	T	P	C
B19BB3060	16 weeks	CAREER PLANNING AND DEVELOPMENT	3	1	0	4

Objectives:

- The students will develop an operational understanding of the components involved in career development programs. The students will develop and understanding of the major career development theories and decision- making models. The students will become acquainted with the major career assessment instruments and techniques.

Course content:-

UNIT-1: INTRODUCTION

Career – Meaning – Definition - Why career development? -Forces that enable and lead to career development -Major stages of career development - Novation’s’ Model- Individual’s perspective to career development. -Schein’s Model – stages of career development.

UNIT-2:- CAREER ANCHORS AND VALUES

Career Movement - Factors that affect career choices - Holland’s theory of vocational personalities in Work environments.

UNIT-3:- CAREER APPRAISAL

Instruments used - MBTI etc. - Career coaching and career centers - Career counseling - Career counseling competencies.

UNIT-4:- PROFESSIONAL CAREER DEVELOPMENT

Planning process- steps - Modern Challenges in careers - plateau employees etc.

Job Enrichment: Responsibilities of Organizations and employees in career planning.

Corporate Offerings: Individual and Team Motivation - Confidence Building - public speaking skills - Leadership skills Development - Effective Communication - Time Management - Building Presentation Skills.

Reference Books:

1. Business Communication – From Process to product, Boxman joel& Barachaw, Dryden Press, Chicago.
2. Effective Business Communications, Murphy Herta A & Peck, Tata McGraw- Business Communication- Principles & Application.
3. P. Subba Rao, Personnel & Human Resource Management.
4. Successful Business Communication, Treece Malra, Allyn and Bacon, Boston
5. V.S.P Rao, Human Resource Management, Excel Books

FOURTH SEMESTER

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB4010	Business Law	HC	3	0	1	4	5

Course Objectives:

1. To introduce the students to various regulations affecting business and
2. To familiarize the students with such regulations.

Course Outcomes:

By the end of the course, the student shall be able to

1. Understand the various laws existed and explore more on contractual laws and its framework.
2. Gain enough knowledge on contractual agreements under patents and its procedures.
3. Explore on the environmental protection acts and its importance in managing business activities ethically.
4. Understand the consumer laws under the sale of goods and regulations to overcome the conflicts.

Course Content:

UNIT 1: INTRODUCTION TO BUSINESS LAWS

Introduction - Nature of Law - Meaning and Definition of Business Laws - Scope and Sources of Business Law - Fundamental Rights and Directive Principle of State Policies - Principles having economic significance - Overview of Business Laws in India.

UNIT 2: CONTRACT LAWS -INDIAN CONTRACT ACT, 1972:

Definition of Contract - essentials of a valid contract (all essentials need to be explained in great detail) - classification of contracts - breach of contract and remedies for breach of contract. **Indian Sale of Goods Act, 1930:** Definition of contract of sale - essentials of contract of sale- conditions and warranties - rights and duties of buyer - rights of an unpaid seller.

UNIT 3: INFORMATION LAWS AND ENVIRONMENT PROTECTION ACT, 1986

Right to Information Act, 2005: Objectives of the RTI Act – Scope - Method of seeking information - Eligibility to obtain information - Authorities under the Act. **Environment Protection Act, 1986:** Objects of the Act - definitions of important terms – environment, environment pollutant, environment pollution, hazardous substance and occupier - types of pollution - global warming - causes for ozone layer depletion – carbon trade - rules and powers of central government to protect environment in India.

UNIT 4: COMPETITION AND CONSUMER LAWS

The Competition Act, 2002: Objectives of Competition Act - the features of Competition Act - components of Competition Act - CCI, CAT, offences and penalties under the Act.

Consumer Protection Act, 1986: Definition of the terms consumer - consumer dispute, defect, deficiency, unfair trade practices and services. -Consumer Protection Act - Consumer Redressal Agencies – District Forum - State Commission - National Commission - any two landmark judgments of the Supreme Court.

Reference Books:

1. Avtar, S. (2011). Principles of Mercantile Law (9th Edition), Eastern Book Company, New Delhi.
2. Kapoor, N.D (2012.). Elements of Mercantile Law, Sultan Chand & Sons, NewDelhi.
3. Maheshwari, S N &Maheshwari, S K, A MAnnual of Business Laws - 2011, 4 Revised Ed – HPH PUBLICATIONS
4. Chopra, K.C., Business laws, 2011, 5th Edition – HPH PUBLICATION
5. Taxmann Publications Corporate Laws Vol II : 2019, 39
6. Singh Avatar , Law of Sale of Goods, 2019, 8 – Eastern Book Company
7. Singh Avatar & Kaur Harpreet , Introduction to The Torts and Consumer Protection : 2015, 3 – Lexis Nexis
8. Ahuja, V K , Law Relating to Intellectual Property Rights: 2019, 3 – Lexis Nexis
9. Bhandari, M K , Law Relating to Intellectual Property Rights, 2019, 5 – Central Law Publications

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB4020	Financial Management	HC	3	0	1	4	5

Course Objectives:

1. To familiarize the students to gain knowledge about the various finance functions
2. To enable the students to understand the key concepts related to financial management
3. To impart knowledge related to those finance concepts which makes an organisation successful financially

Course Outcomes:

1. Assess the importance of finance functions
2. Explain essential principles of FM
3. Forecast firm's financial needs and design optimum capital structure for business undertakings
4. Estimate optimum working capital
5. Evaluate alternate investment proposals by applying techniques of capital budgeting and select the most profitable proposal
6. Apply effective investment and financing decision to maximise shareholder's wealth

Course Content:

UNIT 1: INTRODUCTION TO FINANCIAL MANAGEMENT

Introduction – Meaning of Finance – Business Finance – Finance Function – Objectives of Finance Function – Organization structure of finance - Financial Management – Goals of Financial Management – Financial Decisions – Role of a Financial Manager – Financial Planning – Steps in Financial Planning – Principles of a Sound Financial Planning.

UNIT 2: FINANCING DECISION AND INVESTMENT DECISION

Financing Decisions: Introduction – Meaning of Capital Structure – Factors influencing Capital Structure – Optimum Capital Structure – EBIT – EBT – EPS Analysis – Leverages – Types of Leverages – Simple Problems.

UNIT 3: INVESTMENT DECISIONS:

Introduction – Meaning and Definition of Capital Budgeting – Features –Significance – Process – Techniques – Payback Period – Accounting Rate of Return – Net Present Value – Internal Rate of Return – Profitability Index - Simple Problems Dividend Decision Introduction – Meaning and Definition – Determinants of Dividend Policy – Types of Dividends .

UNIT 4: WORKING CAPITAL MANAGEMENT

Introduction – Concept of Working Capital – Significance of Adequate Working Capital – Evils of Excess or Inadequate Working Capital – Determinants of Working Capital – Sources of Working Capital – Cash Management.

Reference Books:

1. Prasanna Chandra: Financial Management 2011-Tata McGraw-Hill publishing company
2. M.Y. Khan &P.K Jain: Financial Management 2012-Tata McGraw-Hill publishing company
3. James C.Van Horne: Fundamentals of Financial Management2001, Prentice- Hall India
4. Ravi.M.Kishore: Financial Management2011-Taxman Publication

SOFT CORE COURSES

Finance Specialisation

CORPORATE FINANCIAL POLICY

Course Code	Course Name	Course Type		L	T	P	C	Hrs./Wk
B19BB4111	Corporate Financial Policy	SC		2	1	0	3	4

Course Objectives:

1. Introduce the students to different types of investment decision.
2. Impart knowledge regarding the evaluation of investment opportunities
3. Introduce students to different sources of financing new ventures
4. Introduce students to different kinds of managing sickness

Course Outcomes:

1. Able to comprehend the differences between a viable project from financing point of view and a non viable project.
2. Able to possess good knowledge in techniques for making strategic investment decision and tackling financial distress
3. Able to identify the sources of financing ventures
4. Able to understand the possible reasons for undertaking strategic decisions like mergers and acquisitions.
5. Able to identify the different ways in which one could rehabilitate the financially sick unit

Course Content:

UNIT - I:

INVESTMENT DECISIONS - Project Investment Management Vs Project Management – Introduction to profitable projects – evaluation of Investment opportunities – Investment decisions under conditions of uncertainty – Risk analysis in Investment decision – Types of investments and disinvestments.

UNIT - II:

FINANCING OF VENTURES - Different stages of financing – Seed, Expansion and Mezzanine – Sources of finance – Equity, Bootstrapping, Debentures, Angel funding, Venture capital and Lease financing, Bank loans – different types of fund-based and non fund-based facilities – Financial institutions funding, Financial assistance to women entrepreneurs, Financial incentives and facilities available to entrepreneurs.

UNIT - III:

STRATEGIC ANALYSIS OF SELECTED INVESTMENT DECISIONS –Lease financing – Lease Vs Buy decision – Hire Purchase and installment decision – Hire Purchase Vs Lease Decision – Mergers and acquisition – Cash Vs Equityfor mergers.

UNIT - IV:

MANAGING GROWTH AND FINANCIAL SICKNESS - Venture lifecycle, Growth sources, Growth strategies and their funding – Franchising, Licensing, Exporting, Joint Ventures, Mergers and Acquisitions, Leveraged Buyouts - Business Valuation – need and approaches, Going public through IPO, Steps involved in issuing IPO, Rating of IPOs, Symptoms and causes of sickness, Rehabilitation measures and Turnaround strategies.

Reference Books:

1. Prasanna Chandra, Financial Management, 9th Edition, Tata McGraw Hill,2012.
2. Prasanna Chandra, Projects : planning, Analysis, Financing implementation and review,TMH, New Delhi,2011.
3. Bodie, Kane, Marcus: Investment, Tata McGraw Hill, New Delhi2010.
4. Brigham E. F & Houston J.F. Financial Management, Thomson Publications, 9th edition,2010.
5. I. M. Pandey, Financial Management, Vikas Publishing House, 10th edition,2010.
6. M. Y. Khan and P. K. Jain, Financial Management Text and Problems, Tata McGraw Hill Publishing Co,2011.

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB4112	International Finance	SC	2	1	0	3	5

Course Objectives:

1. To enable the students to understand the actual concept of Indian Financial System.
2. Provide students with a basic knowledge of how international financial markets work.
3. Provide students with an understanding of exchange rates and why currency values fluctuate.

Course Outcomes:

- Understand the foreign financial markets and its exchange rates are influenced in the convertibility of a rupee
- Examine the regulations of international financial markets and its governing bodies globally
- Recognize the methods used to manage risk in the global markets.
- Gain an in-depth understanding of the process of international investment decisions.

Course Content:

UNIT – 1:

INTERNATIONAL FINANCE: Introduction - Meaning of International Finance - Issues involved in International business Finance - Currency to be used - Credit worthiness - Methods of Payment - Foreign Exchange Markets. Meaning of International Financial Management - Scope and significance of International financial management in International markets.

UNIT – 2:

INTERNATIONAL FLOW OF FUNDS AND INTERNATIONAL MONETARY SYSTEM:-

International Flow of Funds: Balance of Payments (BoP), Fundamentals of BoP, Accounting components of BOP, Factors affecting International Trade and capital flows, Agencies that facilitate International flows. BOP, Equilibrium & Disequilibrium. Trade deficits.

International Monetary System: Evolution, Gold Standard, Bretton Woods system, the flexible exchange rate regime, the current exchange rate arrangements, the Economic and Monetary Union (EMU).

UNIT – 3:

INTERNATIONAL FINANCIAL MARKETS AND INSTRUMENTS: Foreign Institutional Investors – Regulations governing Foreign Institutional Investors India; International Bond & Equity market. GDR, ADR, Cross listing of shares Global registered shares. International Financial Instruments: Foreign Bonds & Eurobonds, Global Bonds. Foreign Direct Investment (FDI) – growth FDI; Advantages and Disadvantages of FDI to Host country and home country.

International Banking services –Correspondent Bank, Representative offices, Foreign Branches. Forward Rate Agreements

UNIT –4:

INTERNATIONAL RISK MANAGEMENT: Types of Risk – Political – commercial - exchange control restrictions and remittance differing tax system - sources of funds - exchange rate fluctuations - different stages and rates of inflation - risks of non-payment - Managing Risk - Internal and external technologies.

Reference Books:

1. Avadhani: International Financial Management
2. Mittal, International Rate Foreign Exchange Tariff policy
3. Venkataraman K.V, Finance of Foreign Trade and Foreign Exchange
4. Genaro C da Costa; International Trade and Payments

HR SPECIALIZATION

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB4211	Strateic Human Resource Management	SC	2	1	0	4	4

Course Objectives:

1. To familiarize the students with the concepts of SHRM
2. To acquaint the students with difference between HRM and SHRM
3. To familiarize the students with the basic concepts of Labour Laws

Course Outcomes:

1. Comprehend the different aspects of managing people in the organization.
2. Understand the various functions of a HR Manager.
3. To acquaint the students with difference between HRM and SHRM
4. Illustrate the concepts of SHRM

Course Content:

Unit 1:

INTRODUCTION HRM AND ACQUISITION OF HUMAN RESOURCE

Human Resource Management: Concept and Functions, Role, Status and competencies of HR Manager, HR Policies, Evolution of HRM, HRM vs HRD.

Human Resource Planning: Quantitative and Qualitative dimensions; job analysis – job description and job specification; Recruitment – Concept and sources; Selection – Concept and process; test and interview; placement and induction

Unit 2:

TRAINING AND DEVELOPMENT

Concept and Importance: Identifying Training and Development Needs; Designing Training Programmes; Role-Specific and Competency-Based Training; Evaluating Training, Effectiveness; Training Process Outsourcing; Management Development

Unit 3:

PERFORMANCE APPRAISAL

Performance Appraisal: Nature, objectives and importance; Modern techniques of performance appraisal; potential appraisal and employee counseling; job changes - transfers and promotions.

Unit 4:

INDUSTRIAL RELATIONS

Industrial Relations: Introduction to Industrial Relations,

Trade Union: Trade unions role, types, functions, problems, industrial dispute- concept, causes & machinery for settlement of disputes- grievance, concepts, causes & grievance redressal machinery, discipline concept, aspect of discipline & disciplinary procedure.

Reference Books:

1. Gary Dessler. A Framework for Human Resource Management. (7th Edition) Pearson Education.
2. Strategic Human Resource Management: An Indian Perspective (2006 Edition) Sage Publications
3. Wreather and Davis. Human Resource Management. Pearson Education.
4. Robert L. Mathis and John H. Jackson. Human Resource Management. Cengage Learning.
5. TN Chhabra, Human Resource Management, Dhanpat Rai & Co., Delhi
6. Biswajeet Pattanayak, Human Resource Management, PHI Learning.

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB4212	Compensation Management	SC	2	1	0	3	4

Course Objectives:

1. To familiarize the students on various components of compensation.
2. To make the students acquaint with the reward system existing in India.

Course Outcomes:

1. Inferring nature and concept of Compensation Management
2. Illustrate the concepts and implications of role of Compensation Management in Business.
3. Illustrate the Models of Compensation Management.

Course Content:**UNIT 1: INTRODUCTION**

Compensation: Concept, factors, Base and Supplementary Compensation, Wage and Salary,

Wage Components: minimum wage, Fair wage, living wage, Wage Policy in India, Wage differentials, Wage

Theories: Market Theories, Human Capital Theories, Bargaining Theories – Social Theories, Economic and Behavioural theories.

UNIT 2: JOB EVALUATION

Job Evaluation: nature and importance- methods, Computer aided job evaluation, Internal and external equity- Pay surveys. Compensation management in public, private and emerging sectors

UNIT 3: PAY STRUCTURE

Pay structure: Types, Broad Banding, Performance Linked Compensation - Types of Incentives: Bonus, Profit sharing ,Gain Sharing , stock options, Benefits and allowances-types, Executive and shop floor level rewards,Compensating Expatriates and knowledge workers.

UNIT 4: WAGE ADMINISTRATION

Legal Framework: Legal framework of Wage determination Welfare Legislations, Tax Planning, Downsizing, VRS, gratuity, commutation, pension plans, Machinery for wage fixation: Wage Boards – Pay Commissions –Statutory Wage Fixation. Emerging Issues: Compensation management-Future trends.

Reference Books:

1. Bhattacharya, *Compensation Management*, (2014 Edition) Oxford Press

2. Michael A. Armstrong and Helen Murlis, *Reward Management: A Handbook of Remuneration Strategy and Practice*, (2nd Edition) London Kogan Page.
3. B D Singh, *Compensation and Reward Management* Excel Books. New Delhi.
4. Milkowich, Newman, *Compensation*, Tata Mcgraw Hill, New Delhi.

MARKETING SPECIALIZATION

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB4311	Retail Management	SC	2	1	0	3	4

Course Objectives:

1. To provide the knowledge of basic concepts of retail management.
2. To understand the various dimensions related to retail operations.
3. To gain knowledge about the retail marketing mix and various decision parameters related to retail mix.
4. To understand the use of various IT tools in retail business.

Course Outcomes:

After the completion of the course the students will be able to:

- 1) Explain the concept, importance and functions of retail business.
- 2) Elaborate and analyze the concepts of retail operations.
- 3) Explain the retail marketing mix and decisions related to these elements.
- 4) Elaborate on the various ways IT has impacted retail

Course Content:

UNIT 1: INTRODUCTION TO RETAILING.

Definition – functions of retailing - types of retailing – forms of retailing based on ownership - Retail theories – Wheel of Retailing – Retail life cycle - Retailing in India – Influencing factors – present Indian retail scenario - Retailing from the International perspective

UNIT 2: RETAIL OPERATIONS.

Choice of Store location – Influencing Factors, Market area analysis – Trade area analysis – Rating Plan method - Site evaluation - Retail Operations - Store Layout and visual merchandising – Store designing – Space planning, Retail Operations - Inventory management – Merchandise Management – Category Management.

UNIT 3: RETAIL MARKETING MIX.

Retail marketing mix – Introduction. **Product** – Decisions related to selection of goods (Merchandise Management revisited) –Decisions related to delivery of service. **Pricing** – Influencing factors – approaches to pricing – price sensitivity - Value pricing – Markdown pricing. **Place** – Supply channel – SCM principles – Retail logistics – computerized replenishment system – corporate replenishment policies.

Promotion – Setting objectives – communication effects - promotional mix.

UNIT 4: IMPACT OF IT IN RETAILING.

Non store retailing (E tailing) The impact of Information Technology in retailing - Integrated systems and networking – EDI – Bar coding – Electronic article surveillance – Electronic shelf labels – customer database management system - Legal aspects in retailing - Social issues in retailing - Ethical issues in retailing. Introduction to Retail Research and shopping mall management.

Reference Books:

1. Barry Bermans and Joel Evans, "Retail Management – A Strategic Approach", 9th edition, PHI Private Limited, New Delhi, 2013.
2. Swapna Pradhan, Retailing Management, 3/e, 2011 Tata McGraw-Hill Education
3. A.J. Lamba, "The Art of Retailing", 2/e edition, Tata Mc GrawHill, New Delhi, 2003.
4. Suja Nair: Retail Management, 2011, Himalaya Publishing House .
5. Rosemary Varley, Mohammed Rafiq, Retail Management, 2/e, 2006 Palgrave Macmillan
6. Siva Kumar; Retail Marketing, Excel Books.
7. James R. Ogden & Denise T. Ogden, Integrated Retail Management 2007, Biztantra Cengage Learning
8. Levy & Weitz, Retail Management, TMH 6th Edition 2009

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB4312	Consumer Behaviour	SC	2	1	0	3	4

Course Objectives:

1. To provide knowledge of basic concepts of Consumer Behaviour to apply in market.
2. To understand the various Individual and group determinants of Consumer Behaviour.
3. To gain knowledge about the consumer decision making process and theories involved.
4. To understand the concept of Consumer satisfaction & consumerism

Course Outcomes:

- 1) Explain the concept and importance of consumer behaviour in day to day function.
- 2) Identify the factors influencing consumer buying process and its application.
- 3) Determine the factors influencing consumer behaviour
- 4) Discuss the concept of consumerism in today's competitive world.

Course Content:

UNIT 1: INTRODUCTION TO CONSUMER BEHAVIOUR

Introduction to Consumer Behaviour Need to study Consumer Behaviour - Applications of consumer behaviour knowledge - current trends in Consumer Behaviour

UNIT 2: INDIVIDUAL AND ENVIRONMENTAL DETERMINANTS

Consumer needs & motivation - personality and self-concept - consumer perception - learning & memory - nature of consumer attitudes - consumer attitude formation and change. Family influences - Influence of

culture - subculture & cross cultural influences - group dynamics and consumer reference groups - social class & consumer behaviour.

UNIT 3: CONSUMER'S DECISION MAKING PROCESS

Problem recognition - Search & Evaluation - Purchase processes - Post-purchase behaviour - personal influence & opinion leadership process - Diffusion of innovations - Models of Consumer Behaviour - Researching Consumer behaviour - Consumer research process.

UNIT 4: CONSUMER SATISFACTION & CONSUMERISM

Concept of Consumer Satisfaction - Working towards enhancing consumer satisfaction - sources of consumer dissatisfaction - dealing with consumer complaint. Concept of consumerism - consumerism in India - The Indian consumer - Reasons for growth of consumerism in India

Reference Books:

1. Leon. G. Schiffman & Leslve Lazer Kanuk; Consumer behaviour; 7th Edition; PHI, New Delhi, 2010.
2. Suja.R.Nair, Consumer behaviour in Indian perspective, First Edition, Himalaya Publishing House, Mumbai, 2009.
3. Batra/Kazmi; Consumer Behaviour. 2/e, Excel Books, 2008
4. David. L. Loudon & Albert J. Bitta; Consumer Behaviour; 5th Edition, Mcgraw Hill, Inc; New Delhi, 2008.
5. Assael Henry; Consumer behaviour and marketing action; Asian Books(P) Ltd, Thomson learning, 6th Edition; 2001.
6. S.A.Chunawalla : Commentary on Consumer Behaviour, 2/e, HPH.
7. Jay D. Lindquist & M. Joseph Sirgy, Shopper, Buyer and Consumer Behaviour, 2003.
8. Blackwell; Consumer Behaviour, 2nd Edition.

FIFTH SEMESTER

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB5010	Income Tax	HC	3	0	1	4	5

Course Objectives:

1. To gain in depth knowledge about the various provision of Income Tax Act.
2. To learn filing of income tax through online.

Course Outcomes:

1. Explain the various legal framework on Income Tax Act.
2. Compute the income from various heads

3. Compute the total income of individual assessee
4. Explain the deductions under payment side

Course Content:

UNIT 1: INTRODUCTION TO INCOME TAX

Income Tax: Brief History - Legal Frame Work – Types of Taxes - Cannons of Taxation –

Important Definitions: Assessment – Assessment Year – Previous Year – Exceptions to the general rule of Previous Year - Assessee – Person – Income - Casual Income – Gross Total Income – Total Income – Agricultural Income **Residential Status:** Determination of Residential Status of an individual (simple problems) - Incidence of Tax (Simple Problems on Computation of Gross Total Income). **Exempted**

Incomes: Introduction – Exempted Incomes U/S 10 (Restricted to Individual Assessee) – Only theory

UNIT 2: INCOME FROM SALARY

Meaning & Definition – Basis of Charge – Allowances – Fully Taxable Allowances – Partly Taxable Allowances - House Rent Allowance - Entertainment Allowance – Transport Allowance - Children Education & Hostel Allowances - Fully Exempted Allowances – Perquisites – Tax Free Perquisites – Perquisites Taxable in all Cases - Rent free accommodation - Concessional accommodation - Personal obligations of the employee met by the employer – Perquisites Taxable in Specified Cases – Gardener – Sweeper – Gas – Electricity - Water and Motor car facility (when the motor car is owned or hired by the employer) – Provident Funds – Deductions from Salary U/S 16 – Problems on Income from Salary(excluding retirement benefits).

UNIT 3: INCOME FROM HOUSE PROPERTY

Basis of Charge – Exempted Incomes from House Property – Annual Value – Determination of Annual Value – Loss due to Vacancy – Deductions from Annual Value – Problems on Income from House Property(Excluding Pre -Construction interest)

UNIT 4: INCOME FROM BUSINESS AND PROFESSION AND TOTAL INCOME

Meaning and Definition of Business & Profession – Expenses & losses Expressly Allowed –

Expenses and losses Expressly Disallowed – Expenses Allowed on Payment Basis - Problems on computation of income from Business of Sole Proprietor. Income from **Capital Gains** (excluding exemptions - Theory only) - **Income from Other Sources** (Theory only) - Deductions **U/S 80 C, D & G**. Simple problems on Computation of Total income of an Individual

Reference Books:

1. Dr. Vinod K. Singhania: Direct Taxes – Law and Practice, Taxmann publication.
2. B.B. Lal: Direct Taxes, Konark Publisher (P) ltd.
3. Dr. Mehrotra and Dr. Goyal: Direct Taxes – Law and Practice, SahityaBhavan Publication.
4. DinakarPagare: Law and Practice of Income Tax, Sultan Chand and sons.
5. Gaur &Narang: Income Tax, Kalyani Publisher s/

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB5020	Management Accounting	HC	3	0	1	4	5

Course Objective:

1. To understand the financial reports of company.
2. To learn the interpretation of financial results of company

Course Outcomes:

1. Understand the relationship between various branches of accounting.
2. To analyze the financial statements
3. To learn the other financial reports of company
4. To analyze the financial performance of companies.

Course Content:

UNIT 1:

INTRODUCTION TO MANAGEMENT ACCOUNTING Meaning – Definition- objectives- Nature and scope- Role of Management Accountant Relationship between Financial Accounting and Management Accounting - Relationship between cost Accounting and Management Accounting. **ANALYSIS OF FINANCIAL STATEMENTS** :- Types of Analysis – Methods of Financial Analysis – Comparative Statements – Common Size Statements – Trend Analysis (**Problems on financial analysis**)

UNIT-2:

FUND FLOW STATEMENT Meaning and concept of Fund – Meaning and Definition of Fund Flow statement- Uses and Limitations of Fund flow Statement- Procedure of Fund Flow statement- Statement of Changes in Working Capital- Statement of Funds from operation – statement of Sources and Application of Funds (**Problems on working capital & funds flow statement with adjustment**)

UNIT -3:

CASH FLOW STATEMENT Meaning and Definition of Cash Flow Statement- Differences between cash flow Statement and Fund Flow Statement – Uses of Cash flow statement – Limitations of Cash Flow statement – Provisions of AS-3 – Procedure of Cash Flow Statement – Concept of Cash and Cash Equivalents – Cash flow from operating Activities – Cash flow from Investing Activities and Cash flow from Financing Activities – Preparation of Cash Flow Statement according To AS-3 (**Problem on indirect Method Only**)

UNIT -4:

RATIO ANALYSIS Meaning and Definition of Ratio, Classification of Ratios, Uses and Limitations – (**Problems on Ratio Analysis- Preparation of Financial statements with the help of Accounting Ratios**)

Reference Books:

1. Management Accounting : Test , Problem & cases : Khan, M.Y / Jain , P.K . 4th ed. TMH
2. Management Accounting, SN.Maheswari, Sultan Chand Co;
3. Management Accounting, Dr.SP.Gupta, SahityaBhavan,
4. Management Accounting, Sharma & Gupta; Kalyani Publishers
5. Management Accounting : Surender Singh ; PHI

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB5030	Business Research Methods	HC	3	1	0	4	5

Course Objectives:

1. To develop understanding of the basic framework of research process.
2. To identify various sources of information for data collection.
3. To develop an understanding of various research designs and technique.
4. Understand some basic concepts of research and its methodologies and research report writing.

Course Outcomes:

1. Identify the research process in detail.
2. Understand the sources of data collection
3. Understand the methods of data analysis techniques.
4. To enable the usage of statistical tools and apply the skills in report writing.

Course Content:

Unit 1: INTRODUCTION TO RESEARCH

Meaning – Objectives – Types of Research – Scope of Research – Research Approaches – Research Process – Research Design – Research Methods Vs Research Methodology – Steps in Research – Problem Formulation – Statement of Research Objective – Exploratory – Descriptive – Experimental Research.

Unit 2: METHODS OF DATA COLLECTION

Observational and Survey Methods – Field Work Plan - Administration of surveys – Training field investigators - Sampling methods - Sample size.

Unit 3: TOOLS FOR COLLECTION OF DATA

Questionnaire Design; Attitude measurement techniques – Motivational Research Techniques – Selection of Appropriate Statistical Techniques

Unit 4: STATISTICAL METHODS AND REPORT WRITING

Tabulation of data - Analysis of data – Testing of Hypothesis, Advanced techniques – ANOVA, Chi-Square - Discriminate Analysis - Factor analysis - Conjoint analysis - Multidimensional Scaling - Cluster Analysis (Concepts Only). Types of Reports - Business, Technical and Academic Report writing – Methodology Procedure – Contents – Bibliography

Reference Books:

1. O.R.Krishnaswamy; Research methodology in Social Sciences, HPH, 2008.
2. C R Kothari, Gaurav Garg; Research Methodology, NewAgeInternational., 2019.
3. J.K. Sachdeva: Business Research Methodology HPH, 2010
4. S.N. Murthy, V. Bhojanna: Business Research Methods Excel Books, 2010

PRODUCTION AND OPERATION MANAGEMENT

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB5040	Production and Operation Management	HC	2	0	1	3	5

Course objectives:

1. To give students an overview of various functions of Production management.
2. To provide insights on material management concepts applied in the business.
3. To understand techniques of production planning.
4. To understand various demand forecasting methods to tackle for effective and smooth operations.

Course Outcomes:

1. Conduct Facility planning by making location and layout decisions.
2. Plan and implement suitable materials handling principles and practices in the operations.
3. Analyze and develop a balanced line of production & scheduling and sequencing techniques in operation environments.
4. Understand Quality management practices followed by the companies

Course Content:

Unit-1: Introduction, Plant Location and Layout Historical Evolution of Production and Operations Management, Concept of Production, Production System, Classification of Production System, Objectives of Production Management, Distinction between Manufacturing Operations and Service Operations, Objectives of Operations Management, Scope of Production and Operations Management. Plant Location and Layout: Introduction and Meaning Need for Selecting a Suitable Location, Factors Influencing Plant Location/Facility Location, Plant Layout- Objectives and principles, Classification of Layout, Design of Process Layout, Service Layout, Organization of Physical Facilities.

Unit-2: Material Handling and Materials Management Introduction and Meaning, Objectives of Material Handling, Principles of Material Handling, Evaluation of Material Handling System, Guidelines for Effective Utilization of Material Handling Equipment's. Materials Management: Introduction and Meaning, Scope or Functions of Materials Management, Material Planning and Control, Purchasing, Stores Management, Inventory Control or Management, Standardization, Simplification, Just-In-Time (JIT) Manufacturing, Six Sigma concept.

Unit-3: Production Planning and Quality Control: Introduction and Meaning, Need for Production Planning and Control, Objectives of Production Planning and Control, Phases of Production Planning and

Control, Functions of Production Planning and Control, Quality Control: Introduction, Quality, Fundamental Factors Affecting Quality, Need for Controlling Quality Inspection, Types of Quality Control, Steps in Quality Control, Objectives of Quality Control, Benefits of Quality Control, Seven old and new Tools for Quality Control, Causes of Variation in Quality,

Unit-4: Demand Forecasting and Work Study (Time And Motion Study) Introduction, Methods of Demand Forecasting, Theory and Problems of Demand Forecasting, Productivity, Work Study(problems on work study), Method Study-Objectives, scope, steps, Motion study, time study, work measurement.

Reference Books:

1. S. Anil kumar and N Suresh, (2015) *Production and Operations Management*, New Age International publishers.
2. K. Aswathappa, G. Sudarsana Reddy, M Krishna Reddy, (2013) *Production and Operations Management*, Himalaya Publishers. .
3. Gaither, N & Frazier, (2002) *Production & Operations Management*, Thomson Learning Publications.
4. Stevenson WJ, (2015) *Production and Operations Management*, Irwin McGraw Hill Publications.

FINANCE SPECIALISATION

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB5111	Financial Markets and Services	SC	2	1	0	3	4

Course Objectives:

1. To enable the student to understand the different kinds of financial markets
2. To enable the students to understand the difference between banking and non banking institution
3. To identify the different methods of raising finance from the market
4. To understand the basics of stock market
5. To understand the functioning of stock market, SEBI and mutual fund operations

Course Outcomes:

1. Understand the difference between primary and secondary market
2. Identify the different intermediaries in primary market
3. Explain the technicalities of stock market
4. Analyze the difference between leasing and hire purchase
5. Assess the technicalities related to credit rating

Course Content:

UNIT 1: FINANCIAL MARKETS

Primary Market - Meaning – Features – Players of Primary Market – Instruments in Primary Market (Names) – Procedure for issuing Equity and Debentures – SEBI guidelines towards the issue of Equity Shares and Debentures – Merits and Demerits of Primary Markets Secondary Market-Meaning – Structure – Functions – Trading and Settlement System of Stock Exchange Transactions – Players in the Stock Market – Merits and Demerits of Stock Markets – Reforms in Stock Market – OTCEI and NSE – Origin – Function – Merits Demerits.

UNIT 2: Banking And Non – Banking Financial Intermediaries:

Banking financial institutions-commercial banks, functions, role in development of economy, Developmental financial institutions, and their role in economy development. Non-Banking Financial intermediaries. Investment and Finance Companies – Merchant Banks – Hire Purchase Finance – Lease Finance – Housing Finance – Venture Capital Funds and Factoring.

UNIT 3: SEBI AND MUTUAL FUNDS

Objectives of SEBI - Organization – Functions and Functioning of SEBI – Powers of SEBI – Role of SEBI in marketing of Securities and Protection of Investor Interest. Concept of Mutual Funds – Growth of Mutual Funds in India – Mutual Fund Schemes – Money Market Mutual Funds – Private Sector Mutual Funds – Evaluation of the performance of Mutual Funds – Functioning of Mutual Funds in India.

UNIT 4: Credit Rating and RECENT TRENDS IN FINANCIAL SERVICES:

Credit rating: Meaning, advantages, need; methodology of credit rating process; Personalized Banking – ATM – Tele-banking & E-banking – Credit and Debit Card – Customization of Investment Portfolio – Financial Planning: Introduction, Need, Advantages, essential elements of financial planning

Reference Books:

1. Vasant Desai: Financial Markets & Financial Services, Himalaya Publishing House, 2010
2. E Gardon& K Natarajan: Financial Markets & Services, 2016, HpH
3. Bharathi V Pathak, Indian Financial System, 2011, Pearson Education Delhi
4. M Y Khan, Indian Financial System, 2010, McGraw Hill

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB5112	Security Analysis and Portfolio Management	SC	2	1	0	3	4

Course Objectives:

1. Understand the basics of investment management
2. Understand the functions of stock market
3. Understand the manner of stock market functioning
4. Understand the difference between the operations of primary and secondary market

Course Outcomes:

1. Classify the securities
2. Identify the different types of risks that one comes across while investing
3. Identify different kinds of stocks
4. Perform the fundamental and technical analysis
5. To identify the stocks that are performing well
6. Identify the advantages of investing in global markets

Course Content:**UNIT 1: INTRODUCTON TO INVESTMENT MANAGEMENT**

Attributes, Economic vs. Financial Investment, Investment and speculation, Features of a good investment, Investment Process. Financial Instruments: Money Market Instruments, Capital Market Instruments, Derivatives. Classification of Securities — Benefits of Investments and Diversification – Investment Strategies – Types of Companies and Stocks –Investment Avenues

UNIT 2: SECURITY ANALYSIS

Introduction – Fundamental Analysis – Economic Analysis – Industry Analysis – Company Analysis, Technical Analysis – Dow Theory – Advanced Declined Theory – Chartism Assumptions of Technical Analysis.

UNIT 3: RISK AND RETURN- EQUITY, BONDS AND PREFERENCE SHARE

Concept of Risk, Types of Risk- Systematic risk, Unsystematic risk, Calculation of Risk and returns individual security, Portfolio Risk and Return (Theory & Problems). Valuation of bonds and preference share: valuation of bonds, YTM, valuation of preference share, equity valuation-dividend valuation model, CAPM approach for valuation of cost of equity

UNIT 3: MODERN PORTFOLIO THEORY AND MEASURES

Introduction – Mean – Variance Model – Markowitz Model – Sharpe single index model – Capital Market Line – Market Portfolio – Capital Asset Pricing Model – Security Market Line – Beta Factor – Alpha and Beta Coefficient – Arbitrage Pricing Model. Sharpe’s measure - Jensen’s measure, -Treynor’s measure.

Reference Books:

1. Security analysis and portfolio management- Avadhani
2. Investment Management- C.K Bhalla, S. Chand Ltd 13th edition
3. Investment analysis and portfolio management- Prasanna Chandra, tat Mc Graw- Hill, 3rd edition.
4. Investment analysis and portfolio management- Dr. R P Rustagi, Sultan Chand and sons, 4th edition.

HUMAN RESOURCE SPECIALISATION

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB5211	Employee Welfare and Social Security	SC	2	1	0	3	4

Course Objectives:

- i) To sensitize the students with the employee relations scenario in India.
- ii) To make student understand fundamental concepts of employee welfare and management.
- iii) To make student knowledgeable of historical development, theoretical aspects and practice applications of employee welfare process.
- iv) To acquaint the students with basic Acts pertaining to social security and labour welfare as applicable in India.

Course Outcomes:

1. To know the relevance and importance of employee welfare and social security
 2. To understand the different kinds of legal frameworks which are available for ensuring employee welfare
 3. To understand the concept of social security
 4. To understand the evolution of the concept of social security
- Employee Welfare & Social Security

Course Content:

UNIT- I

Evolution of labour welfare: classification of welfare work, agencies for welfare work.

Welfare activities of govt. of India: welfare work by trade unions Labour welfare work by voluntary social organizations.

Labour administration: agencies for administrating labour welfare laws in India.

Case Studies should be discussed in class.

UNIT-II

Factories Act 1948: Scope, importance, features and implications as applicable in India

Minimum Wages Act 1948: Scope, importance, features and implications as applicable in India

Payment of Bonus Act 1965: Scope, importance, features and implications as applicable in India
 Workman’s Compensation Act 1923: Scope, importance, features and implications as applicable in India
 Maternity Benefit Act 1961: Scope, importance, features and implications as applicable in India

UNIT-III

Employment State Insurance Act 1948: Scope, importance, features and implications as applicable in India
Provident Fund & Miscellaneous Provision Act 1951: Scope, importance, features and implications as applicable in India

Gratuity Act 1972: Scope, importance, features and implications as applicable in India
 I.L.O and social Security.

UNIT-IV

The concept of scope of social security. Social assistance and social insurance Evolution of Social Security.
 The concept of Labour welfare: definition, Scope and Objectives, welfare work and social work
 Payment of wages Act 1936: Scope, importance, features and implications as applicable in India

Reference Books:

1. A. M. Sharma ‘Social, Security Labour Welfare’ (12th Edition) Himalayas Publishing House
2. C B Mamoria, “Dynamics of Industrial Relations” (16th Edition) Himalaya Publishing House

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB5212	Organisational Change and Development	SC	2	1	0	3	4

Course Objective:

1. To sensitize the students with the concepts of Organizational Change and Organizational Development
2. To acquaint the students with the basics of various OD Interventions
3. To familiarize the students to develop an understanding of the practices used by organizations to change and manage its development.

Course Outcomes:

- Upon completion of the course, the student shall be able to:
1. Understand the basic concepts and the need for organisation change
 2. Analyze the importance of team work
 3. Understand the importance of organizational interventions
 4. Bring about the change process in the teams as team lead
 5. Understanding the basics of OD process

Course Content:

Unit-1: Organizational development

Organizational development: Definition, history of OD, values, assumptions and beliefs in OD; Foundations of OD: Models and Theories, systems theory participation and empowerment, teams and team work, parallel learning structures.

Unit-2: Organizational Interventions

OD Interventions: Team Interventions, Intergroup Interventions, third party peace making intervention, Comprehensive OD;

Theory and Practice on change and changing: nature of planned change.

Unit-3: Managing Organizational Development

Process Managing OD Process: Action Research as a process and approach; history and varieties of action research.

Operational Components of OD: Diagnostic, Action and Process, Maintenance components; Resistance to change.

Unit-4: Implementation and Assessment of OD

Implementation conditions for failure and success in OD efforts:

Assessment of OD and change in organizational performance:

The impact of OD Structure interventions and applicability of OD: training experiences, T-groups behavioural modelling, life and career planning, coaching and mentoring, instrumental training

Reference Books:

1. Wendell L. French, Robert A. Zawacki, Cecil H. Bell, "Organization Development and Transformation: Managing Effective Change" (2004 Edition) Mc-graw Hill
2. Kavita Singh, "Organization Change and Development", (1st Edition), Excel
3. Organization Development, Daniel Robey & Steven Actman, Macmillan.
4. Organization Development and Change, Cummins & Worley, Thomson, Cengage.
5. Organisation Development Interventions & Strategies, S. Ramnarayan, T.V Rao & Kuldeepsingh,

MARKETING SPECIALISATION

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB5311	International Marketing	SC	2	1	0	3	4

Course Objectives:

1. To understand the International marketing conditions
2. To study the benefits of International marketing
3. To understand the International marketing environment
4. Analyze the International market entry strategies

Course Outcomes:

1. Apply the porter's diamond model
2. Analyze the factors affecting International market conditions
3. Understand the International market entry strategies
4. Understand the internal marketing mix

Course Content:

Unit 1: Introduction to International Marketing

Introduction, Meaning of International Marketing, Domestic Marketing vs. International Marketing, Benefits of International Marketing, Barriers.

Trade Theories: Comparative and Absolute Advantage Theory Mercantilism, Porter's diamond model.

Unit 2: International Marketing Environment

Economic condition and indicators, Economic systems, Balance of payments, Policies and reforms, International Economic environment and trends

Meaning and Characteristics of Culture, Implication of culture, Culture as barrier.

Political environment, Legal environment, Political risk, Implication of political and legal environment on International marketing

Unit 3 Market Entry Strategies

Market Entry strategies, Foreign Direct Investment, Exporting and Importing, Licensing, Joint Venture, Mergers, Acquisitions, Strategic Alliances, Turnkey operations, Franchising

Unit 4: International Marketing Mix

Product Development, Product diversification, Product customization, Branding decisions.

Channel development, Channel decisions, Physical Distribution, Modes of Transportation, Clearing and Forwarding Price standardization, Pricing decision, Alternative pricing strategies, Dumping, Price Distortion, Inflationary impact, Transfer pricing, Price quotation and Terms of sale, Means of payment, International Promotion Mix

Reference Books:

1. International Marketing Management, Varshney and Bhattacharya, Sultan Chand & sons (2012)
2. Export Marketing, Michael Vaz, Manan Publication 2013
3. Export Marketing, Francis Cherunilam, Himalaya publishing house 2015

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB5312	Advertising	SC	2	1	0	3	4

Course Objectives:

1. To provide knowledge of basic concepts of advertising management
2. To understand the various determinants of media and the creative process
3. To gain knowledge about the measurement techniques of advertising effectiveness
4. To understand the concept of advertising agency

Course Outcomes:

After the completion of the course the students will be able to:

- 1) Explain the concept, importance and types of advertising
- 2) Identify the factors influencing creative and media decisions
- 3) Explain the pretesting and post testing process

4) Elaborate on the importance and structure of advertising agency

Course Content:

UNIT-1: INTRODUCTION TO ADVERTISING

Advertising meaning - nature and importance of advertising - types and objectives - Audience selection - Setting of advertising budget - determinants and major methods - Communication process - basic and elements - Marketing Communication - response hierarchy - models and alternatives

UNIT -2: MESSAGE DECISIONS AND DEVELOPMENT

Major media types – their merits and demerits - Advertising through internet and interactive media - issue and considerations - Factors influencing media choice - media selection - media scheduling. Advertising creativity - Advertising appeals - Advertising copy and elements of print advertisement creativity

UNIT III: MEASURING ADVERTISING EFFECTIVENESS

Arguments for and against measuring effectiveness - Advertising testing process - Evaluating communication and sales effects - Pre-and Post-testing techniques.

UNIT IV: ORGANISATIONAL ARRANGEMENT

- a) Advertising Agency – Role - types and selection of advertising agency - Reasons for evaluating advertising agencies.
- b) Social ethical and legal aspects of advertising in India - Recent developments and issues in advertising.

Reference Books:

1. Belch and Belch, Advertising and Promotion, Tata McGraw Hill Co 11th Edition
2. Sharma, Kavita, Advertising: Planning and Decision Making, Taxmann Publication Pvt. Ltd.
3. Mahajan, J.P., and Ramki, Advertising and Brand Management, Ane Books Pvt Ltd, New Delhi.
4. Burnett, Wells, and Moriatty, Advertising: Principles and Practice, Pearson Education
5. Terence A. Shimp, Advertising and Promotion: An IMC Approach, South Western, Cengage Learning.
6. O'Guinn, Advertising and Promotion: An Integrated Brand Approach, Cengage Learning.

SIXTH SEMESTER

Course Code	Course Name	Course Type	L	T	P	C	Hrs./Wk
B19BB6010	Goods and Services Tax	HC	3	1	0	4	5

Course Objective:

To provide an in depth study on the various provisions of GST law and their implications on various business decision making.

Course Outcome:

1. Understand the basic concepts related to GST
2. Compute the assessable value of various transactions and levy on collection of indirect taxes
3. Identify and analyses the different times of supply.
4. Compute the assessable value of ITC and learn the claim of ITC.

Course Content:

Unit-1: Introduction, Overview of GST- Key concepts of GST Act-Features of GST- Need for GST in India- Pros & Cons of GST implementation in India-Objectives- taxes subsumed in GST- Dual GST Model- Structure of GST (SGST,CGST,IGST, UTGST)- Powers and Functions. GST ACT 2019: Overview of GST Act 2019- Salient features of CGST Act, SGST Act (Karnataka State), IGST Act. Important Definitions under GST Act- Actionable claim, Address of Delivery, Aggregate Turnover, Agriculturist, Associated enterprises, Business, GST Council, Credit note and Debit note, Deemed Exports, Draw-back, Electronic Credit Ledger, Exempt supplies, Input, Input service, ISD, Input tax, Input Tax Credit, Job work, Intra-state supply of goods, Reverse charge, Invoice, Composition scheme, Person, Turnover in state.

Unit-2: Levy and collection of tax Introduction-Supply: meaning and Scope of Supply, types of supply, treatment of mixed & composite Supply, Liability of tax payable person, Rate and value of tax, transactions without considerations, List of transactions for supply of goods & services and list of transactions for non supply of goods & services- Reverse charge Mechanism. **(problems on mixed and composite supply)**

Unit-3: Time of supply, GST network and technology Introduction- time of supply-forward charge, Reverse charge, residuary, special charges Time of supply of service- forward charge, reverse charge, Vouchers, Residuary, Special charges. Problems on determination of time of supply. GST NETWORK: Structure, Vision and Mission, Powers and Functions, Goods & Service Tax Suvidha Providers (GSP): Concepts, Framework and Guidelines and architecture to integrate with GST system- GSP Eco system. **(problems on time of supply)**

Unit-4: Input Tax and Credit, Assessment and Returns Input Tax : Meaning, conditions for taking credit, ineligible input tax credit, availability of credit in special circumstances, Input tax credit and change in constitution of registered person, Taking input tax credit in respect of inputs and capital goods sent for job work, Manner of Distribution of Credit by Input Service Distributor (ISD). Overview of Assessment, returns-

Types Furnishing details of outward supplies and Inward supplies, Claim on ITC, Matching reversal and reclaim of ITC, Steps for Filing forms, Levy of late fee. **(Problems on Assessment of tax and tax liability)**

Reference Books:

1. Datey V.S.: GST Ready Reckoner, Taxman Publication, New Delhi Koolwal,
2. Ashish &Ritu: Goods and Services Tax (2017) Commercial Law Publisher (India) Pvt. Ltd.
3. GST : Dr. H.C. Mehrotra and Prof. V.P. Agarwal ,SahityaBhawan Publications (2019)
4. GST Law &Practice : C A NiteshParashar , Anuj Harshwardhan Sharma Bharat Law House 2nd edition (2019)
5. GST : Dr. Thomas Joseph Thoomkuzhy , Dr. Jaya Jacob , Ms. Chinnu Mariam Chacko , Himalaya Publication House , 2nd edition (2019)

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB6020	Entrepreneur Development Programme	HC	3	1	0	4	5

Course Objectives:

The course enables the students to:

1. To enable students to understand the basic concepts of entrepreneurship
2. To mold them to prepare a business plan to start a small industry.
3. To give them an enough knowledge on basic requirements for a business plan.

Course Outcomes:

After the completion of the course the students will be able to

1. To gain the knowledge on the various steps to complete the formation of an industry
2. Explore in preparing a business plan

Course Content:

Unit 1: ENTREPRENEURSHIP

Introduction – Meaning& Definition of Entrepreneurship, Entrepreneur & Enterprise –Functions of Entrepreneur - Factors influencing Entrepreneurship - Pros and Cons of being an Entrepreneur – Qualities of an Entrepreneur – Types of Entrepreneur

Unit 2: SMALL SCALE INDUSTRIES

Meaning &Definition – Product Range - Capital Investment - Ownership Patterns – Meaning and importance of Tiny Industries - Ancillary Industries - Cottage Industries. Role played by SSI in the development of Indian Economy - Problems faced by SSIs and the steps taken to solve the problems - Policies Governing SSIs.

Unit 3: FORMATION OF SMALL SCALE INDUSTRY

Business opportunity - scanning the environment for opportunities - evaluation of alternatives and selection based on personal competencies - Steps involved in the formation of a small business venture – location -

clearances and permits required – formalities - licensing and registration procedure - Assessment of the market for the proposed project – Financial – Technical - Market and Social feasibility study.

UNIT 4: BUSINESS PLAN (BP) AND PROJECT ASSISTANCE

Meaning – importance – preparation –BP format: Financial aspects of the BP Marketing aspects of the BP - Human Resource aspects of the BP - Technical aspects of the BP - Social aspects of the BP - Common pitfalls to be avoided in preparation of a BP. Financial assistance through SFCs – SIDBI - Commercial Banks - IFCI - Non-financial assistance from DIC – SISI – AWAKE - KVIC - Financial incentives for SSIs and Tax Concessions - Assistance for obtaining Raw Material – Machinery - Land and Building and Technical Assistance - Industrial Estates - Role and Types.

Reference Books:

1. Narayana Reddy p. Entrepreneurship Text and Cases, Cengage learning, new Delhi.
1. Vasanth Desai, Management of Small Scale Industry, HPH
2. Mark. J. Dollinger, Entrepreneurship – Strategies and Resources, Pearson Edition.
3. Dr. Venkataramana ; Entrepreneurial Development, SHB Publications
4. Udai Pareek and T.V. Rao, Developing Entrepreneurship
5. Rekha & Vibha – Entrepreneurship Development, VBH
6. S.V.S. Sharma, Developing Entrepreneurship, Issues and Problems
7. B. Janakiraman, Rizwana M: Entrepreneurship Development, Excel Books
8. Srivastava, A Practical Guide to Industrial Entrepreneurs
9. Anil Kumar: Small Business and Entrepreneurship I.K. International Publishers

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB6030	Business Policy and Strategic Management	HC	3	1	0	4	5

Course Objective:

1. Understand the strategies that the organisations adopt for longevity success
2. Understand the external environment of the organisation
3. Understand the factors that ensure organizational success
4. Understand the SWOC related to the company

Course Outcomes:

1. Perform Industry analysis
2. Perform SWOC of the company
3. Apply Porters five analysis on companies
4. Understand the life cycle stage the company is in
5. Understand the factors responsible for success and sustainability for long term growth

Course Content:

Unit-1: BUSINESS POLICY AND STRATEGIC MANAGEMENT Introduction to business policy: Evolution of Business Policy as a Discipline, Nature, Importance, Purpose and Importance of business Policy An Overview of Strategic management: Understanding Strategy, defining and explaining strategy,

Levels at which strategy operates, strategic decision making, Schools of thought on strategic formation, the process of strategic management, Strategists and their role in strategic management.

Unit-2: UNIT 2: STRATEGY FORMULATION AND ANALYSIS

Organizational Direction: Mission and Objectives, Environmental Scanning, diagnosing corporate capabilities, SWOT analysis, stability strategies, growth strategies and Retrenchment Corporate level strategies generic strategies, offensive & defensive strategies, Functional strategies, Internal factor Evaluation(IFE) Matrix, External factor Evaluation(EFE) Matrix, TOWS, BCG Matrix and Nine Cell Matrix

Unit-3: STRATEGY IMPLEMENTATION

Strategy Implementation: Organisational Structure – Analyzing, managing strategic change, issues in strategy implementation, organization structure, Matching structure and strategy, Assessment of organizational structure and perspectives on the methods of organizing Strategy Implementation: Behavioural Issues - Leadership, Corporate culture, values, power and social responsibilities, Ethics, organization change and Development Strategy Implementation: Functional Issues – Operational/Production Policies, marketing policies, financial policies and human resource policies.

Unit-4: STRATEGY EVOLUTION AND CONTROL

Designing Strategic Control System, Challenges to change, Control systems at Operational levels, Strategic control and Environmental factors, Information for strategic control, Techniques of strategic Evaluation and control, implementing strategic control and successful maintenance of strategic control, key success factors ,monitoring success and evaluating Deviations, operational control of systems.

Reference Books:

1. Business policy and Strategic management by P. Subba Rao, Himalaya publishing House, 2011
2. Business policy and Strategic management by Sukul Lomash and P K Mishra, Vikas Publishing House Pvt Ltd, 2003
3. Business Policy and Strategic Management, 15e By Azhar Kozami, Tata McGraw-Hill Publishing company Limited, 2006
4. Thomas L. wheelen and Hunger J. David Concepts in Strategic Management and Business Policy, Pearson Education Asia, New Delhi, 2012

Course Code	Course Name	Course Type	L	T	P	C	Hrs./ Wk
B19BB6040	Project Management	HC	3	1	0	4	4

Course Objectives:

1. To develop the students ability to understand the techniques and process of project appraisal.
2. To enable the students ability to estimate project cost.
3. To enable the students to understand the environmental impact on infrastructure projects.

4. To develop the students ability to understand project implementation and monitoring process.

Course Outcomes:

At the end of the course the students able to:

1. Understand the techniques and process of project appraisal.
2. Able to estimate the various costs required for the execution of the project.
3. Understand the environmental impact on infrastructure projects.
4. Analyse the environmental issues which have an impact on the execution of Project Management.

Course Content:

Unit 1: Generation and screening of Project Ideas: Project Development, Political, Economic, Social, Technological (PEST) factors, Preliminary Screening, Feasibility Study – Steps in Feasibility analysis,

Unit 2: Project Management: Project Identification, Project Formulation, Project Selection, Project Planning, Project Appraisal, Project Implementation and Integrated Project Management,

Unit 3: Monitoring & Controlling the Project: Human aspects of project management –Project Monitoring and Control, Project Evaluation, Prerequisites for successful project implementation, Project Success and Failure, Project Auditing and Project Termination, E- Tendering

Unit-4: Project Leadership, Audit and Closure Project Leadership: Managing vs leading a project, Managing project stake holders, Qualities of an effective project manager, Managing project teams, Issues arising out of globalization, Communication, Conflict management. Project Audit and Closure: Audit process, project closure, project documentation, evaluation of project manager, team and members.

Reference Books:

1. Vasant Desai, Project Management, Himalaya Publishing House, 2011.
2. Prasanna Chandra, Project, Planning and Analysis, Financing, Implementation, TMH, New Delhi 7/e, 2009.
3. Narendra Singh, “Project Management and Control”, Himalaya Publishing House, 2009.
4. SitangshuKhatua, “Project Management and Appraisal” Oxford Higher education, 2012.

Course Code	Course Name	Course Type	L	T	P	C	Hrs. /Wk
B19BB6050	Skill Development Course	RULO	0	0	2	2	4

Note: This Course is offered by the School in Association with UIIC.

Course Code	Course Name	Course Type	L	T	P	C	Hrs. /Wk
B19BB6060	Major Project (Based on Specialization)	RULO	1	0	5	6	12

Note: Guidelines for Major Project are provided at Annexure- I

ANNEXURE-I
Major Project
RESEARCH PROJECT GUIDELINES

Sl.No	TABLE OF CONTENTS	Page No
	Introduction	
	Course Objectives	
	Mentorship	
	Weekly reports	
	Course Credits	
	Evaluation of Project Report (Dissertation) - Important dates	
	Ethics in Research	
	What constitutes plagiarism?	
	Publication	
	Copies of Project Report / Dissertation	
	Size & Quality of Paper	
	Chapter Scheme: - Executive Summary - Chapter I: Introduction - Chapter 2: Industry and Company Profile - Chapter 3: Research Methodology - Chapter 4: Data Analysis and Interpretation - Chapter 5: Summary of Findings, Recommendations and Conclusion Appendices and Annexures Bibliography	
	Submission Guidelines	
	Order of Content	
	Annexure 1- Format to submit Organization and topic	
	Annexure 2- Weekly Report Format	
	Project Front pages:	
	Synopsis Format	

Introduction to Major Project/Dissertation:

All the Sixth semester B.Com Honors students of REVA University are required to undergo a 16 weeks internship program at an organization of their choice. The nature of internship must be based on their area of specialization and future employability, since a good internship could lead to a pre-placement offer.

A Major Project period of five to six months in a real life situation helps the graduates to achieve hands on training on execution and delivery of expected results. The constant interaction with the mentors from the organization and in-house faculty leads to a healthy synthesis of practical experience and the theoretical inputs.

The method ensures a continuous evaluation of the student interns through a comprehensive grade sheet of many of the latent talents like professional judgment, data handling and analysis, decision making abilities, initiative, leadership and team building etc. that may not be entirely visible during the classroom simulations. The industry has the benefit of direct access to the trainees who can be monitored and evaluated

over a period of six months. There is value addition as projects relevant to the industry are executed with the help of trained graduates without additional cost to the company.

Course Objectives

- Develop problem solving, decision making, interpersonal skills by contributing to the organizations' day to day activities and performing the role assigned.
- Develop work ethics, values and exhibit professionalism.
- Improve researching, reporting and presentation skills.
- Add value to the organization through his/her contributions.

Mentorship

Students will be guided by a corporate mentor and a faculty mentor. The faculty mentor will be allotted to you by the School at the end of third semester. However, it is the responsibility of the student after consulting with the company executives to identify the corporate mentor. All the evaluation formats, project reports and attendance shall be signed by both corporate and faculty mentors.

Weekly reports

Every student shall submit the weekly report by mail (scanned) to the respective faculty guide at the end of each week. The format is given in Annexure 2.

Course Credits

A project work carrying FOUR or SIX credits is called Minor Project work / Dissertation. A project work of EIGHT, TEN, TWELVE or SIXTEEN credits is called Major Project work / Dissertation.

Programme	Title and Course Code	Credits
BBA Industry Integrated	Major Project- B19BB6060	06

Evaluation of Project Report (Dissertation)

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the mentors. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

For Undergraduates Projects

IA1	January 1 st Week	Topic Finalization and First Chapter
IA2	March 1 st Week	Second and Third Chapter
IA3	April 1 st week	Fourth and Fifth chapter -Draft Report
SEE	April 3 rd week	Final Evaluation and Viva-Voce. Synopsis of the project along with project has to be submitted.

Important dates:

For Undergraduates Projects

- Last date to submit the name of the company and topic of internship:
- IA1: 1st Report submission: Topic Finalization and First Chapter (Identification of the problem, research methodology):
- IA2: 2nd Report submission: Second and Third Chapter:
- IA3: 3rd Report submission: Fourth and Fifth chapter - Draft Report:
- SEE: Final report submission:
- Project Viva Voce Starts from.

All interns must report on a weekly basis on the given format.

Ethics in Research

There are many ethical dilemmas associated with the practice of social Science research. There are six key principles of ethical social science research:

- Research should be designed, reviewed and undertaken to ensure integrity and quality;
- Research staff and subjects must be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved;
- The confidentiality of information supplied by research subjects and the anonymity of respondents must be respected;
- Research participants must participate in a voluntary way, free from any coercion;
- Harm to research participants must be avoided;
- The independence of research must be clear, and any conflicts of interest or partiality must be explicit;

What constitutes plagiarism?

A major ethical standard in research focuses on appropriately recognizing and crediting the work of others who have contributed to the body of knowledge in a given area. Plagiarism is simply using someone else's ideas or wording without giving due credit. When you present an idea in your thesis project that originated from another source (written or spoken), even if you modified the wording or parts of the idea, credit to the original source should be given. The thesis is a scholarly work, and as such, extensive citation from the literature is expected. As you make notes from a source, indicate clearly whether your notes are a direct quote or a paraphrased interpretation. If direct quotes are used, the page number is required for a complete citation. Plagiarism software is widely available and routinely used by professors and journal editors.

Note: *The project report has to be tested for plagiarism, and passed the plagiarism test with the similarity score less than 25% and it satisfies the academic requirements in respect of Project work prescribed for the Post Graduate Students Degree.*

Publication

Publishing one research article from project is compulsory for the Postgraduate Students. If any candidate is not published research article out of the study which they carried out are not eligible to submit the Major Project/ Dissertation. For Under Graduate Students, it publication is not compulsory but they are also encouraged to do the same.

Copies of Project Report / Dissertation

Three bound copies of the Project Report / Dissertation must be submitted to the University (the Director of respective School through the / her Project Guide). The candidate is advised to keep a copy of the same for personal use. Along with **TWO** bound copies of the Project Report / Dissertation the electronic version of the same is to be submitted in CD in pdf format and a copy of the same is to be retained by the candidate.

Size & Quality of Paper

Good quality paper must be used printing the report. The main copy of the Project Report / Dissertation should be original. Preferably other two copies shall also be print ones. In case of photocopy, such copies shall be such that they ensure consistent quality without gray or dark casts to the background. All copies shall be on white A4 paper and printed on one side of a paper.

Chapter Scheme:

Following chapter scheme shall be used while writing the report.

Executive Summary (2-3 Pages)

A brief summary for the project in 2-3 pages. Executive summary must include a brief introduction to the study, statement of the problem, major objectives of the study, research methodology, data collection plan, data analysis and major suggestions and conclusion.

Chapter I: Introduction (8-10 Pages)

This chapter includes the introduction to the study, industry profile and theoretical background of the study.

1.1 Introduction to the study

1.2 Industry-Brief History, Industry analysis (Porter's Model), Growth and Prospects

1.3 Area of Study - Definition of the terms used, Important and other relevant aspects of the subject in line with the topic of the study.

Chapter 2: Industry and Company Profile (15-20 Pages)

2.1 Inception and History, Type, Nature, Board of Directors, Organization chart, Business operations.

2.2 Product/service profile, Market share, Competitors, Functional chart

2.3 GDP contribution

2.4 Growth and development of company and industry.

2.5 CSR of Companies

2.6 SWOT Analysis, Future prospects/growth

Chapter 3: Research Methodology (15-20 Pages)

3.0: Literature Review

Here relevant theoretical background in brief may be given by referring to some standard text books, journals, newspapers etc. Students should endeavor to collect, compile and concisely cover latest information

and data by scanning latest articles published in periodicals, journal etc. Please note that the latest authentic data adds to the quality of the project report and gives a good impression to the viva-committee as well as organizations where in students are placed for summer training. Data collected from others source should be duly acknowledged and cited. (Refer <http://www.waikato.ac.nz/library/study/referencing/styles/apa> for more details.)

3.1 Statement of the problem

3.2 Title of the study

3.3 Objectives of the study

3.4 Hypothesis if any

3.5 Research Design and Sampling

3.6 Research instruments (e.g., questionnaire)

3.7 Definitions of the terms used

3.8 Scope and Limitations of the study

3.9 Chapter scheme

Chapter 4: Data Analysis and Interpretation (25-30 Pages)

The primary and/or secondary data collected must be analyzed to standard formats such as tables /graphs /diagrams and so on and is to be presented in this chapter. This chapter shall include hypothesis testing using appropriate statistical tools. Use of advanced statistical tools to analyze your data is encouraged. Proper titles, legends, scales, source (s) etc. must be mentioned along with each diagram/table.

Data Interpretation is the most important part of the study. Students are required to apply established theoretical concepts/tools/techniques to the data presented and draw inferences. Students are required to discuss rationally for drawing inferences. For each inference, proper linkages are to be established either with the data analyzed in with the calculation (s) to be included in this chapter. Wherever, calculations are to be carried out, it must be provided before drawing any inference. The inferences are to be presented in narrative form from each data set along with limitation (s) due to data insufficiency, if any.

Each table must have

- Title of the table
- Data table (in tabular and/or visual form)
- Analysis of the table
- Inference of the table
- Source

Hypothesis testing using appropriate statistical tools also to be described here along with interpretation of results. Use excel, SPSS or R for analysis of data.

Chapter 5: Summary of Findings, Recommendations and Conclusion (4-5 Pages)

The chapter begins with objectives and scope of the study to ease the understanding of the reader. The findings should be summarized and presented in a paragraph form, numbering each of the finding. The conclusion of the project should be given so as to justify the objectives of the study.

Recommendations and Conclusion (2-3 Pages)

- Drawn with direct reference to objectives of the study.
- Find specific recommendation/suggestions to each of the objective of the study.

- These recommendations should be specific, acceptable/practical and clear.

Appendices and Annexures

- The copy of the questionnaire and any useful material collected from the organization may be annexed.
- In case of finance topics, the copies of the attested financial statements of three to five years are to be annexed.

Bibliography

- The references made from the text books, articles, journals & magazines and website must be cited both.
- Follow APA style referencing. A few citations are given below.
- India today, “The Melt down: End of good times”, Oct 27, 2008.
- James M, Kaplan; and et.al. “Managing it in a Down Turn: Beyond Cost Cutting”, Indian Management, vol.47 issue 11, Nov 08.
- <http://www.ibm.com/in> (Accessed on(mention the date)

Submission Guidelines

- The report should be printed on A4 size Executive Bond sheet.
- The font used should be Times New Roman and font size should be 12. For Heading; Times New Roman 14 in Bold and for sub heading; Times New Roman 12 in Bold.
- The top, bottom and right margins should be 1” each. The left margin should be set at 2”.
- The line spacing should be fixed at 1.5 lines.
- Table line spacing shall be single line spacing.
- Page numbers should be placed at bottom middle position.
- Chapters should be numbered as 1, 2, 3, etc. The tables and charts should be in the format of 1.1, 1.2, etc. i.e. 1.1 indicates that it is the first table in Chapter 1; 2.1 Indicates first table in Chapter 2. Similarly chart no. 1.1 indicates first chart in Chapter 1.
- The project report should be a minimum of 60 pages and should not exceed 75 pages.
- Students should submit 3 hard copies duly signed by the faculty guide and the Director and soft copy in pdf format.
- The hard copy should be in soft binding format with white thick cover as the cover page.
- Title of the study, objectives, analysis, findings and suggestions should tally.

Order of Content

- Cover Page
- Title page
- Candidate’s Declaration page - containing the signature of the candidate, guide, co-guide if any, and Director of the School.
- Certificate by the Guide and the Co-Guide if any, and the Director of the School concerned for

having completed the project and prepared the report as per the requirements of the University.

- Certificate that the Project Report / Dissertation has been revised and resubmitted based on suggestions by examiners, if applicable, signed by the candidate, guide, co-guide, if any, and Director of the School.
- Preface and/or Acknowledgement
- Table of contents with page references
- List of tables with titles and page references
- List of illustrations / Screen Shots if any, with titles and page references.
- List of Symbols, Abbreviation of Nomenclature
- Abstract
- Text
- References,
- Bibliography, if any
- Appendices, if any
- Copies of articles/ Conference papers published

Format to submit Organization and topic

B19BC6060– Organization and Topic	
Name of the student	
SRN	
Name of the company	
Address of the company	
Name of the corporate mentor	
Designation	
Mobile number of the corporate mentor	
E-Mail id of the corporate mentor	
Topic of study	

Weekly Report Format

B19CH6060 – Weekly Report	
Month: Dates (From- to):	Week : I / II / III / IV
Details of work done in the Week: Job Description: 1. 2. 3.	

Achieved Outcome:

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Signature and Name of the Reporting Manager :

Signature and Name of the Student :

Date:

Project Front pages:

Specimen of Cover Page

3.012 "

REVA
UNIVERSITY
Bengaluru, India

0.839 "

Font : Roboto Slab, Bold, 17pt

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

A PROJECT REPORT *Font : Roboto Slab, Normal, 12pt*

ON

Font : Roboto Slab, Bold, 14pt

"AN AUTOMATED ACCIDENT DETECTION SYSTEM"

submitted in partial fulfilment of the requirement for the award of the degree of

Font : Roboto Slab, Normal, 10pt

MASTER OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

Font : Roboto Slab, Bold, 16pt

Submitted by

(Name of the candidate)

(SRN)

Font : Georgia Normal, 12pt

Under the guidance of

(Name of the Guide)

2016 *Font : Roboto Slab, Bold, 15pt*

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Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru - 560 064

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Sample Title Page for Project Report / Dissertation

SCHOOL



OF.....

A Project Report

On

< Title of the project / Dissertation >

Submitted in fulfillment of the requirements for the award of the Degree of

Bachelor of

Submitted by

(Name of the Candidate)

(SRN)

Under the guidance of

(Name of the Guide)

(Name of the Co Guide) (if any)

May 2019

Rukmini Knowledge park , Kattigenahalli, Yelahanka, Bengaluru-560064

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Sample Candidate's Declaration Page for Project Report / Dissertation

DECLARATION

I, Mr. / Ms. <name of candidate> student of B.Com (Industry Integrated) belong in to School of Commerce, REVA University, declare that this Project Report / Dissertationentitled “ < title of the project >”is the result the of project / dissertation workdone by me under the supervision of Dr / Prof. <name of Guide with affiliation .

I am submitting this Project Report / Dissertationin partial fulfillment of the requirements for the award of the degree of Bachelor of Commerce in Commerce by the REVA University, Bangalore during the academic year 2019-19.

I further declare that this project / dissertation report or any part of it has not been submitted for award of any other Degree/ Diploma of this University or any other University/ Institution.

(Signature of the candidate)

Signed by me on < date, month and year >

Certified that this project work submitted by < name of the candidate > has been carried out under my / our guidance and the declaration made by the candidate is true to the best of my knowledge.

Signature of Guide Signature of Co-Guide, (if any)

Date :Date :

Signature of Director of School

Date :

Official Seal of the School

Sample Certificate Page by the Guide for Project Report / Dissertation



SCHOOL

OF.....

CERTIFICATE

Certified that the project work entitled < **TITLE** >carried out under my / our guidance by <**Candidate Name**>, < **SRN** >, a bonafide student of REVA University during the academic year 2015-16, is submitting the project report in partial fulfillment for the award of **Bachelor of**in <Program Name> during the academic year **2019–20**. The project report has been tested for plagiarism, and has passed the plagiarism test with the similarity score less than 25%. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Signature with date

Signature with date

Signature with date

**<Guide name>
Guide**

**<Co Guide name>
Co Guide**

**< Name of the Director >
Director**

External Examiner

Name of the Examiner with affiliation Signature with Date

- 1.
- 2.

ACKNOWLEDGEMENT

This is a matter of pleasure for me to acknowledge my deep sense of gratitude to REVA UNIVERSITY and my college, School of Commerce for giving me an opportunity to explore my abilities via this internship program.

I would like to express my sincere gratitude to our internship guide<Name> for his valuable guidance and advice in completing this organisation study.

Let me take this opportunity to thank School Director, **Prof. Shubha A** for the whole hearted support extended to me throughout the conduct of the study. Madam gave me lot of inputs and suggestions to bring out the best in me. The encouraging words that have been extended were great boost for the completion of this work.

I would like to record my sincere appreciation and gratitude towards all the officials and employees of < Company Name>, without whose kind assistance, my internship program would not have succeeded.

I am also very thankful and grateful towards my seniors, colleagues and authorities of School of Commerce, REVA UNIVERSITY for their support, encouragement, and valuable suggestions for the completion of this organisation study.

Last but not the least, I would like to express my sincere thanks to my family members, friends for their immense support and best wishes through-out the internship duration and the preparation of this report.

(Student Name)

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	Certificate from the Company	
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II	Industry and Company Profile	
III	Research Methodology	
IV	Data Analysis and Interpretation	
V	Summary of Findings, Recommendations and Conclusion	
	Bibliography	
	Questionnaire	

LIST OF TABLES

Table No.	Title	Page No.

LIST OF GRAPHS

Graph No.	Title	Page No.

Synopsis Model Format



CUSTOMERS' RESPONSE

PORTABILITY

TO MOBILE NUMBER

-A STUDY WITH SPECIAL REFERENCE TO VODAFONE SUBSCRIBERS IN BANGALORE

(The title should be clear and specific in term of topic and area of study)

Submitted in Partial Fulfilment of the Requirement for the award of the degree

In

COMMERCE

By

Student Name

SRN:XXXXX

Under The Guidance Of

(GUIDE NAME)

School of Commerce

REVA UNIVERSITY

Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru – 560 064

Year of submission

Introduction *(Heading font size 14 and body text 12)*

Mobile number portability (MNP) enables mobile telephone users to retain their mobile telephone numbers when changing from one mobile network operator to another. MNP (Mobile number portability) is implemented in different ways across the globe. In India the Telecom Regulatory Authority of India (TRAI) implemented the MNP facility firstly in Haryana in November 2010 and then extended to all parts of the country in January 2011. The facility is available for both pre-paid and post-paid customers across mobile operators with in the same telecom circle. *(In this paragraph introduce about your topic)*

Vodafone India, formerly Vodafone Essar and Hutchison Essar, is the second largest mobile network operator in India after Airtel. It is based in Mumbai, Maharashtra and which operates nationally. It has approximately 146.84 million customers as of November 2011. In terms of active subscriber base in Karnataka Vodafone is the second largest player with a market share of 19.8%. Karnataka is one of slowest growing market with high proportion of MNP requests. By March 2012, Karnataka registered 2,066,487 Mobile Number Portability (MNP) requests, resulting into churn rate of 6.08% which is one of the highest in India. *(Here introduce about your special reference product or organization)*

This study is an attempt to understand the customers' response towards MNP facility with special reference to Vodafone customers in Bangalore. Bangalore is one of best city in India with respect to development and generating income. *(Here introduce about what you are going to do with this project)*

Significance of the study *(State why your study is relevant and how it will useful to various interested groups)*

Active wireless subscriber base in Karnataka is 72.67% resulting in 24.72 million active mobile users. Vodafone is the second largest mobile operator in terms of active subscriber base and fastest growing wireless operator in Karnataka. By March 2012, Karnataka registered 2,066,487 Mobile Number Portability (MNP) requests, resulting into churn rate of 6.08% which is one of the highest in India. Vodafone is one of the companies which benefitted from the MNP service. So this study highly relevant and will be useful to mobile operators as well as to mobile subscribers for making informed decision regarding porting from one operator to other.

Statement of the Problem (*State your hypothesis here. Hypothesis is your assumption that you are going to prove through this study*)

Mobile Number Portability is a powerful tool in the hands of customers to bargain from their existing mobile operators for better quality in services and fare tariff for services. Under MNP, if the subscribers are not satisfied with the services of their service provider, they can change their service provider while retaining the existing phone number. But in India this facility has got poor response comparing to other countries because of very little pent up demand for it when compared to other countries. So this study will reveal awareness level, opinion and use of MNP facility among Vodafone subscribers in Bangalore.

Objectives of the study (*Write two or three specific objectives of the study*)

- To know the awareness level of MNP facility among Vodafone subscribers
- To examine the factors influencing the porting decision of mobile users
- To analyse customers satisfaction after availing MNP facility

Methodology and Data Collection

a. Scope of the study (*Scope means the area of coverage. Is the geographical area where you are conducting your study*)

This study will be conducted among Vodafone customers in Bangalore, Karnataka.

b. Sampling Plan (*Mention about the number of samples and methods of sampling*)

30 Vodafone customers will be randomly chosen for the purpose of study. The data will be collected through structured questionnaire.

c. Methodology (*Here mention about the sources of data and methods of collecting data*)

This study will be based on both primary and secondary data. The primary data will be collected through questionnaire specially designed for this survey. And secondary data will be gathered from the relevant journals, web sites and other sources.

Chapterisation (*The chapter in your project along with brief explanation about every chapter*)

The study will be presented through the following chapter schemes

1. Introduction
2. Review of Literature
3. Analysis and Interpretations
4. Finding, Suggestions and Conclusions

Limitations of the study (*Mention two or three factors that will limit the quality of your study*)

1. The shortage of time and money will limit the number of samples in to minimum
2. The advanced statistical tools not used for analysis

Finding and Suggestion

A brief Finding and suggestion of the of the study has to be presented here.

References *(All the sources of the data used for the study has to be cited as per the API rules)*

- The references made from the text books, articles, journals & magazines and website must be cited both
- Follow APA style referencing. A few citations are given below.
- India today, “The Melt down: End of good times”, Oct 27, 2008.
- Bartov, E. & Mohanram, P. (2004). Private information, earnings manipulations, and executive stock-option exercises. *The Accounting Review*, 79(4), 889-1010.
<http://www.ibm.com/in> (Accessed on(mention the date))

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of commerce is knowledge not only in the subject, but also the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career. The School

of Applied sciences also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

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School of Management Studies

B B A (Honors)

HAND BOOK

2019

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bangalore - 560 064
Phone No: +91-080-66226622, Fax: 080-28478539

Chancellor's Message

"Education is the most powerful weapon which you can use to change the world."

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when 'intellectual gratification' has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it.

Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of 'Knowledge is Power', we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I'm always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said 'A University should be a place of light, of liberty and of learning'. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.



Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards interdisciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our

students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

Director's Message

Today, as you prepare to join our campus and start the next chapter of your lives, in what can only be described as an increasingly divided and fast-shifting world, I want to offer some thoughts specific to the challenging times in which we find ourselves. Your responsibilities as Management student to lead businesses are more important today than ever. You will be graduating into a world in which trust and faith in business has declined significantly, and you have to develop the personality reflecting honesty and Ethics.

As Business Student- leaders, part of your responsibility is to rebuild this trust between business and society. My hope is that the many discussions you will have, in courses as varied as Leadership and Corporate Accountability and Finance, Ethical Management, Governance, HRM, HR, have given you tools and perspectives that will serve as a guide to you in the future. I hope you will develop, and will continue to develop, both the competence and character of true leadership. You will need both to fulfill your responsibility to rebuild trust. The way that you can do so is by creating shared prosperity; in essence, by ensuring that you create value for others before you claim value for yourself.

You can exercise your responsibility to help rebuild trust not only by the big decisions you make while leading organizations, but also by the smaller interactions you have every day. Business Leaders—rightly—are scrutinized more carefully than others, so even small signs of arrogance, excessive pride, or self-interest will be magnified. Hold yourself to a higher standard.

Many of our alumni currently lead some of the most admired and most valuable companies on the planet. They have been crucial to the creation and evolution of entire industries, including management consulting, mutual funds, private equity, venture capital, and social entrepreneurship, HR, Marketing, Entrepreneurship, and the like.

If you want your lives to have that kind of impact, you must REACH, that is stretch for things in life that seem just a bit outside your grasp, just a bit audacious. When we reach, we take a risk that has the potential to fundamentally shift the trajectory of our lives and our organizations. We develop three types of behaviour in this school: 1. Modesty; 2. Honesty; and 3. Winning Attitude, focusing on knowledge, skills, and competency.

Often our biggest sense of accomplishment comes not when we reach for ourselves, but when we reach out on behalf of others. I experience this most often when I deal with our distinguished alumni who give back to so many causes. Today you join a group of alumni who are distinguished not only as leaders, but as philanthropists and energetic civic participants—people who lead and fund countless non-profits and philanthropies. It's a privilege for me to spend time with these people, and we ask that you RESPECT the people who are most important in your lives, and everyone with whom you interact along your road to leadership. Remember that nothing can be accomplished without the help of everyone in REVA University.

The Curriculum caters to and has relevance to local, regional, national, and global development needs. A maximum number of courses are integrated with cross-cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

Lastly, show respect on a daily basis to everyone you interact with: your co-students. As students, you will often get more credit than you deserve; be sure to share this credit by giving respect to all who contribute to any success. Let me in that spirit take a moment to thanks your parents, guardian who have collectively helped to educate you and bring you to this wonderful moment of Management World.

As you begin this exciting journey, I wish you all the best.

Prof. Shubha A
Director
School of Management Studies

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental

Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognised by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 27 Post Graduate Degree programs, 29 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 19 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has

also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher-scholar

exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director IISc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is '**Life Time Achievement Award**' to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the "**Founders' Day Celebration**" of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "REVA Life Time Achievement Award" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced "**REVA Award of Excellence**" in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other

Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vaidya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga class's everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Within short span of time, REVA University has been recognized as a fast growing university imparting quality higher education to the youth of the country and received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia's Greatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by ASSOCHAM India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

ABOUT SCHOOL OF MANAGEMENT STUDIES

The School of Management Studies offers Industry Integrated Programs that reduce the widening gap between Industries – Academia. BBA - a degree in Management Studies (Industry Integrated) provides adequate scope to enter wide range of business spheres, which is depicted in various core subjects offered within the program. This course enriches the students to enable them to work in different national and multinational organizations and face the global challenges arising there from. It not only aims at imparting knowledge and skills in different areas of management and accounting, but also provides inputs necessary for the overall development of the personality of the students. It also enables the students right from the inception to get equipped with required skills through continuous efforts by adopting various methods like case studies, group discussions / analysis, simulation, games, debates, seminars, quiz and the like. The students are groomed with the right exposure to the practical events in the global market milieu.

The Masters degree in Management Studies not only induces research culture and Entrepreneurship but also provides practical exposure and much needed soft skills. During 2014-15 the School of Management Studies is offering one full time Graduate and Post Graduate programs.

The programs offered by REVA University are well planned and designed after detailed study with emphasis on knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities, institutions, experts from industries and business sectors have contributed in preparing schemes of instruction and curriculum for these programs.

VISION

1. "To produce world class Management experts through the excellent teaching and research so as to offer professional services at National and International levels"

MISSION

- To provide high-standard, forward-looking, morally, socially and ethically responsive, coherent, interdisciplinary and career-oriented programs in a dynamic global education environment.
- To contribute to the enrichment and dissemination of knowledge through theoretical, applied and problem-oriented research for the benefit of students, faculty, and society in general;
- To serve the community by undertaking customer-oriented research, providing training and professional consultation for business, industry and government and pursue research in partnership with business and governmental organizations.

VALUES

- 1 Excellence in all our academic and research endeavors
- 2 Dedication and service to our stakeholders
- 3 Leadership through innovation
- 4 Accountability and transparency
- 5 Creating conducive academic environment with service motto
- 6 Integrity and intellectual honesty
- 7 Ethical and moral behavior
- 8 Freedom of thought and expression
- 9 Adaptability to the change
- 10 Team-work

Advisory Board

1. **Belverd E. Needles, Jr.**
Ernst & Young Distinguished Professor of Accounting, EY Distinguished
Professor of Accountancy Editor, Accounting Instructors' Report (AIR) School of Accountancy & MIS, DePaul
University, Chicago USA.
2. **Shri. Ananthakrishna**
Executive Chairman, Karnataka Bank Ltd, Mahaveer Circle,
Kankanady Mangalore - 575002
3. **Rajendra P. Srivastava**
Ernst & Young Distinguished Professor and Director
Ernst & Young Center for Auditing Research and Advanced Technology School of
Business, The University of Kansas Lawrence, Kansas 66045
4. **Prof. Shahzad Uddin,**
Director, Essex Accounting Centre, Essex Business School, University Of Essex Colchester, UK.
5. **Prof. Jacques Richard,**
Profess of Accounting, University of Dauphine, Paris, France.
6. **Dr. Teerooven Soobaroyen**
Reader in Accounting, Centre for Research in Accounting
,Accountability and Governance, School of Management, Faculty of Business and Law
University of Southampton, Highfield, Southampton, SO17, UK
7. **Dr Collins Ntim** - BSc, MSc, MRes, PhD, PGCTHE, FHEA.
Professor of Accounting & Finance, Department of Accountancy
University of Huddersfield,UK
8. **Prof. P. Murali**
Former Vice –Chancellor, Sri Venkateswara University, Tirupati-AP.
9. **Prof. Sridhar Seshadri**
Senior Associate Dean, Faculty and Research, Indian School of Business,
Gachibowli, Hyderabad - 500032
10. **Dr. M. Thiripalraju**
Director, Indian Institute of Capital Markets
Sakal Bhavan Marg, CBD Belapur, Navi Mumbai - 400 614.
11. **Prof. K.V Rao**
Vice-Chancellor. Acharaya Nagarjuna University, Guntur - AP
12. **Dr. Shanthi S K**
Chair Professor-Union Bank Center for Banking Excellence, Greta Lakes University, Chennai--6303102
13. **Mr. Nagaraj Kulkarni**
Director, Compgece Bangalore
14. **Reshma Srinivasan,**
Founder and Managing Director, WeCare Learning Private Limited, # 901, Senswe Block, Elan Homes, Sarjapur Road,
Bangalore – 560 035.

B. B. A. (Honors)

Programme Overview:

Bachelor of Business Administration (B.B.A) is an undergraduate degree programme designed to create motivated, energetic, creative and thinking graduates to fill the roles as entry level executives in business organisations.

With the sound and continuing economic growth of India in the last two decade, need for candidates with adequate managerial and business knowledge has gone up. Organisations require candidates with sound business knowledge in business administration who can act as executives to assist senior managers to manage marketing, sales, finance and accounts, operations, public relations, logistics, supply chain management activities. These candidates would later be groomed into senior management roles.

Realising this vital need for adequate trained business management personnel the **School of Commerce at the REVA UNIVERSITY, BENGALURU, is offering BBA** - an undergraduate degree programme to meet the human resources requirement in business sector.

BBA programme addresses the core functions of business such as marketing, finance, strategy, decision making, with latest additions in entrepreneurship development and Business Analytics skills etc. The degree also focuses on managerial skills, team skills and communication skills. Some of the courses taught in BBA programme are marketing and sales, organization behaviour, basic management skills, business strategy, market trends and competition, financial accounting, legal regulatory framework, entrepreneurship development, Business Analytics, financial management, E-commerce, communication, etc.

The curriculum is outcome based and it comprises required theoretical concepts and practical skills in the domain. By undergoing this programme, students develop critical, analytical thinking and problem solving abilities for a smooth transition from academic to real-life work environment. Opportunities are provided for the students to do internship in business organisations and develop leadership skills.

Programme Educational Objectives (PEOs)

The aim of the programme is to produce motivated, innovative, creative graduates for business sector to fill the roles of executives to assist/ to manage marketing, sales, finance and accounts, operations, public relations, logistics, supply chain management and related management activities. With further education and earning of higher level degrees help the graduates to pursue a career in management, academics or research organisations.

The Programme Educational Objectives are to prepare the students to:

1. manage business activities like marketing, sales, finance and accounts, operations, public relations, logistics, supply chain management etc.,
2. pursue for higher degrees to work in colleges, universities as professors or as scientists in research establishments
3. act as administrators in public, private and government organisations with further training
4. be conversant with environmental, legal, cultural, social, ethical, public safety issues
5. work as a member of a team as well as lead a team
6. communicate effectively across team members and work under constraints
7. set his/her own enterprise with further training
8. adopt lifelong learning philosophy for continuous improvement

Programme Outcomes (POs)

After undergoing these programme students depending on subject specialization will be able to:

1. Perform management activities like marketing, sales,
2. Accounting and financial planning,
3. Human resources sourcing and development,
4. Public relations,
5. Manage operations
6. Perform project management activity
7. Act as an effective team member to ensure that projects are completed satisfactorily, on time, and within budget
8. Conform to cultural, environmental, sustainability and ethical issues
9. Communicate across teams verbally, visually and by writing
10. Choose an appropriate online educational programmes for further learning, participate in seminars and conferences

B.B.A. (Honors) PROGRAM
SCHEME OF INSTRUCTION-2019
(Duration: 6 Semesters – 3 Years)

Sl. No	Course Code	Title of the Course	HC/SC / SE/CC	Credit Pattern				
				L	T	P	Total	Total Hours
FIRST SEMESTER								
1	B19BH1010	Communicative English	CC	1	0	1	2	3
2	B19BH1021 / B19BH1022/ B19BH1023	Language – II K / H / AE	CC	2	0	0	2	2
3	B19BH1030	Fundamentals of Accounting	HC	3	0	1	4	5
4	B19BH1040	Business Economics	HC	3	1	0	4	5
5	B19BH1050	Management Principles and Application	HC	3	1	0	4	5
6	B19BH1060	Indian Constitution and Human Rights	FC	2	0	0	2	2
7	B19BH1070	Skill Development Course	RULO	0	0	2	2	4
8	B19BH1080	Sports / Yoga / Dance / Music / Theatre	RULO	0	0	2	2	4
Total Credits				14	02	06	22	28
SECOND SEMESTER								
1	B19BH2010	Communicative English	CC	2	0	0	2	2
2	B19BH2021/ B19BH2022/ B19BH2023	Language – IIK / H / AE	CC	2	0	0	2	2
3	B19BH2030	Business Statistics	HC	3	0	1	4	5
4	B19BH2040	Principles of Marketing	HC	3	1	0	4	5
5	B19BH2050	Accounting for Business	HC	3	1	0	4	5
6	B19BH2060	Computer Applications in Business	FC	1	0	1	2	3
7	B19BH2070	Self-Study Component (MOOC/SWAYAM/Online Course)	RULO	0	0	2	2	4
8	B19BH2080	Skill Development Course	RULO	0	0	2	2	4
9	B19BH2090	Summer Internship – 1 (Minor Project)	HC	0	0	4	4	8
Total Credits				14	02	10	26	38
THIRD SEMESTER								

1	B19BH3010	Organizational Psychology	HC	3	0	1	4	5
2	B19BH3020	Production and Operation Management	HC	3	1	0	4	5
3	B19BH3030	Fundamentals of Financial Management	HC	2	0	1	3	4
4	B19BH3040	International Business	HC	2	1	0	3	4
5	B19BH3050	Human Resource Management	HC	2	1	0	3	4
6	B19BH3060	Environmental Studies	FC	2	0	0	2	2
7	B19BH3070	Ethical Values For Business(Offered by School of Management to other schools)	OE	3	1	0	4	5
8	B19BH3080	Skill Development Course	RULO	0	0	2	2	4
9	B19BH3090	Soft Skill Training (Placement Department)	RULO	0	0	2	2	4
Total Credits				17	04	6	27	37
FOURTH SEMESTER								
1	B19BH4010	Cost Accounting	HC	3	0	1	4	5
2	B19BH4020	Business Research Methodology	HC	3	1	0	4	5
3	B19BH4030	Business Law	HC	2	1	0	3	4
4	B19BH4040	Soft Skill Training (Placement Department)	RULO	2	0	0	2	2
5	B19BH4050	Self-Study Component (Online Course)	RULO	0	0	2	2	4
6	B19BH4060	Skill Development Course	RULO	0	0	2	2	4
7	B19BH4070	Summer Internship Project – 2	HC	0	0	4	4	8
Specializations (Soft Core Courses (SC)); Students shall choose any ONE of the following specializations.								
I. Finance								
II. Human Resource								
III. Marketing								
IV. International Business								
I. Finance								
1	B19BH4111	Advanced Financial Management	SC	2	1	0	3	4
2	B19BH4112	Financial Markets & Services	SC	2	1	0	3	4
II. Human Resource								
1	B19BH4211	International Human Resource Management	SC	2	1	0	3	4

2	B19BH4212	Performance Management and Competency Mapping	SC	2	1	0	3	4
III. Marketing								
1	B19BH4311	Retail Management	SC	2	1	0	3	4
2	B19BH4312	Brand Management	SC	2	1	0	3	4
IV. International Business								
1	B19BH4411	Foreign Exchange Operations	SC	2	1	0	3	4
2	B19BH4412	International Business in Service Sector	SC	2	1	0	3	4
Total Credits				14	04	09	27	40
FIFTH SEMESTER								
1	B19BH5010	Direct Taxes	HC	3	0	1	4	5
2	B19BH5020	Business Policy and Strategy	HC	3	1	0	4	5
3	B19BH5030	Project Management	HC	3	1	0	4	5
4	B19BH5040	Management Accounting	SC	2	1	0	3	4
5	B19BH5050	Soft Skill Training (Placement Department)	RULO	2	0	0	2	2
6	B19BH5060	Skill Development Course	RULO	0	0	2	2	4
Specializations (Soft Core Courses(SC)); Choose any ONE of the following specialization								
I. Finance								
3	B19BH5111	Stock and Commodity Market	SC	2	1	0	3	4
4	B19BH5112	International Financial Management	SC	2	1	0	3	4
II. Human Resource								
3	B19BH5211	Talent Management	SC	2	1	0	3	4
4	B19BH5212	Organizational Change and Development	SC	2	1	0	3	4
III. Marketing								
3	B19BH5311	Advertising	SC	2	1	0	3	4
4	B19BH5312	Consumer Behavior	SC	2	1	0	3	4
IV. International Business								
3	B19BH5411	International Marketing	SC	2	1	0	3	4
4	B19BH5412	Forex Management	SC	2	1	0	3	4
Total Credits				17	05	03	25	31
SIXTH SEMESTER								
1	B19BH6010	Good and Services Tax (GST)	HC	3	0	1	4	5
2	B19BH6020	Operational Research for Managerial Decision	HC	3	1	0	4	5

3	B19BH6030	Marketing Metrics	HC	3	1	0	4	5
4	B19BH6040	New Venture Creation	HC	2	1	0	3	4
5	B19BH6050	Skill Development Course	RULO	0	0	2	2	4
6	B19BH6060	Major Project (Based on Specialization)	HC	1	0	5	6	11
		Total Credits		12	03	08	23	34
		Total Credits of all Semesters						

Semester-wise Summary of Credit Distribution

Semesters	CC	HC	FC	SC	RULO	OE	Total
I	4	12	2	-	4	-	22
II	4	16	2	-	4	-	26
III	-	17	2	-	4	4	27
IV	-	15	-	6	6	-	27
V	-	15	-	6	4	-	25
VI	-	21	-	-	2	-	23
Total Credits	8	96	6	12	24	4	150

Semester-wise Summary of Credit Distribution

Semesters	L	T	P	Total	Total Hours
I	14	02	06	22	28
II	14	02	10	26	38
III	17	04	6	27	37
IV	14	04	09	27	40
V	17	05	03	25	31
VI	12	03	08	23	34
Total	88	20	42	150	208

BBA-HONORS
DETAILED SYLLABUS

FIRST SEMESTER

Course Code	Duration	Course Title	L	T	P	C
B19BH1010	16 weeks	Communicative English	1	0	1	2

Course Objectives:

1. To attune young minds to concerns and issues which have a broad and wide scope of use and application to life.
2. To acquire a functional use of language in context.
3. To equip students to deliver formal and informal oral presentations to a variety of audiences in multiple contexts
4. To enable students to construct effective written message in various formats and styles.
5. To inculcate the habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

On completion of the course, learners will be able to:

1. Demonstrate ethical and political responsibilities in taking cognizance of issues relating to society, environment and media.
2. Develop a process-oriented approach to writing.
3. Make use of grammatical skills developed during the course aptly.
4. Utilize the target language effectively to focus on interpersonal skills and develop a good command over the language.

Course Content:

Unit-1

Functional English

Remedial Grammar: Past Simple; Past Continuous; Irregular Verbs

Writing Skills: Paragraph Writing

Activities: Conversations; Leaving Phone Messages

Literature: Chief Seattle – The End of Leaving and Beginning of Survival

Unit-2

Interpersonal Skills

Remedial Grammar: Present Simple & Present Continuous; Activity & State Verbs Writing
Skills: Official Letters

Activities: Making Apologies; Invitations & Making Arrangements

Literature: Ruskin Bond – Tiger in the Tunnel

Unit-3

Multitasking Skills

Remedial Grammar: Present Perfect; For, Since & How Long; -ed& -ing adjectives; Prefix & Opposites of Adjectives

Writing Skills: Note Making

Activities: Agreeing & Disagreeing with Opinions

Literature: Jesse Owens - My Greatest Olympic Prize

Unit-4**Communication Skills****Remedial Grammar:** Collocations; Prepositions**Writing Skills:** Precis Writing**Activities:** Offers, Suggestions & Requests**Literature:** Avijit Pathak – Onscreen Magic

Course Code	Duration	Course Title	L	T	P	C
B19BH1021	16 Weeks	Language – II: Kannada				

Course Outline:

ಭಾಷೆಯನ್ನು ಮಾತನಾಡುವ ಬರೆಯುವ ಕೌಶಲ್ಯ, ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸ್ಥೂಲವಾಗಿ ಪರಿಚಯಿಸುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸ ಹಾಗೂ ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು, ಪ್ರಸ್ತುತ ಸಂದರ್ಭಕ್ಕೆ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಸಜ್ಜುಗೊಳಿಸಲು ಪಠ್ಯವನ್ನು ರೂಪಿಸಲಾಗಿದೆ. ಕಲೆ ಮತ್ತು ವಿಜ್ಞಾನದ ವಿಚಾರಗಳಿಗೆ ಒತ್ತನ್ನು ನೀಡಲಾಗಿದೆ. ಇದು ಮೂರು ಕ್ರೆಡಿಟ್ ಹೊಂದಿದೆ.

Course Objectives:

ಎರಡು ಸೆಮಿಸ್ಟರ್‌ಗಳಲ್ಲಿ ಸಮಗ್ರ ಕನ್ನಡ ಸಾಹಿತ್ಯವನ್ನು ಪರಿಚಯಿಸುವ ಉದ್ದೇಶವನ್ನು ಹೊಂದಿದೆ. ಅದರಂತೆ ಮೊದಲನೆಯ ಸೆಮಿಸ್ಟರ್‌ನಲ್ಲಿ ಜನಪದ, ಪ್ರಾಚೀನ, ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ಸಣ್ಣಕಥೆಗಳು ಹಾಗೂ ನಾಟಕ ಸಾಹಿತ್ಯವನ್ನು ಪಠ್ಯವನ್ನಾಗಿ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡು, ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸದಭಿರುಚಿಯನ್ನು ಮೂಡಿಸಲಾಗುತ್ತದೆ. ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯ ಜೊತೆಗೆ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸದ ಕಡೆಗೆ ಗಮನ ನೀಡಲಾಗುತ್ತದೆ.

- ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಇತಿಹಾಸ ಮತ್ತು ಸಂಸ್ಕೃತಿಗಳನ್ನು ಕನ್ನಡ, ಕರ್ನಾಟಕಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಪರಿಚಯಿಸಲಾಗುತ್ತದೆ.
- ವಿದ್ಯಾರ್ಥಿಗಳ ಸರ್ವತೋಮುಖ ಬೆಳವಣಿಗೆಗೆ ಅನುವಾಗುವಂತೆ ಹಾಗೂ ಅವರಲ್ಲಿ ಮಾನವ ಸಂಬಂಧಗಳ ಬಗ್ಗೆ ಗೌರವ, ಸಮಾನತೆ ಮೂಡಿಸಿ, ಬೆಳೆಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಪಠ್ಯಗಳ ಆಯ್ಕೆಯಾಗಿದೆ.
- ಅವರಲ್ಲಿ ಸೃಜನಶೀಲತೆ, ಶುದ್ಧ ಭಾಷೆ, ಉತ್ತಮ ವಿಮರ್ಶಾ ಗುಣ, ನಿರರ್ಗಳ ಸಂಭಾಷಣೆ, ಭಾಷಣ ಕಲೆ ಹಾಗೂ ಬರಹ ಕೌಶಲ್ಯಗಳನ್ನು ಬೆಳೆಸುವುದು ಗುರಿಯಾಗಿದೆ
- ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಿಗೆ ಅನುಕೂಲವಾಗುವಂತಹ ವಿಷಯಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ಸೂಕ್ತ ಪಠ್ಯಗಳನ್ನು ಆಯ್ಕೆ ಮಾಡಿಕೊಳ್ಳಲಾಗಿದೆ.

Course Outcomes:

ಜನಪದ, ಪ್ರಾಚೀನ, ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ಸಣ್ಣಕಥೆಗಳು ಹಾಗೂ ನಾಟಕ ಸಾಹಿತ್ಯ ಕಲಿಕೆಯ ಮೂಲಕ ಕಾಲದ ಸ್ಥಿತ್ಯಂತರಗಳನ್ನು ಅದರ ಒಳನೋಟಗಳನ್ನು ಬೆಳೆಸುತ್ತದೆ.

- ಸಾಮಾಜಿಕ, ರಾಜಕೀಯ, ಧಾರ್ಮಿಕ, ಸಾಂಸ್ಕೃತಿಕ ಹಾಗೂ ಲಿಂಗಸಂಬಂಧಿ ವಿಚಾರಗಳೆಡೆ ಗಮನ ಹರಿಸುವುದರೊಂದಿಗೆ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಚರ್ಚಾ ಮನೋಭಾವವನ್ನು ಬೆಳೆಯುತ್ತದೆ.
- ಜೀವನದಲ್ಲಿ ಬರುವ ಅಭಿಪ್ರಾಯ ಬೇಧಗಳು, ಸಮಸ್ಯೆಗಳನ್ನು ಆಧುನಿಕ ಸಂದರ್ಭದಲ್ಲಿ ಮಾನವೀಯತೆಯೊಂದಿಗೆ ನಿರ್ವಹಿಸುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತದೆ.
- ಉತ್ತಮ ಸಂವಹನ ಕಲೆಯನ್ನು ಬೆಳೆಸುವ ಉದ್ದೇಶವನ್ನು ಈಡೇರಿಸುತ್ತದೆ.

Course Content:

Unit	Description	Topics	
I	ಜನಪದ/ಪ್ರಾಚೀನ/ ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯ	1. ಉತ್ತರದೇವಿ 2. ಸೂಳೆಯಲಪ್ಪುದು ಕಾಣಾ ಮಹಾಜಿರಂಗದೊಳ್? 3. ವಚನಗಳು 4. ಕೋಳೂರು ಕೊಡಗೂಸು	ಜನಪದ ಗೀತೆ ಪಂಪ ಅಲ್ಲಮ ಪ್ರಭು ಹರಿಹರ
II	ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯ	5. ಉತ್ತರಕುಮಾರ ಪ್ರಸಂಗ 6. ತ್ರಿಪದಿಗಳು 7. ಸೋರಿದುದು ನೃಪಾಲನ ಗರ್ವಭಂಗ 8. ಗಿಳಿಯು ಪಂಜರದೊಳಿಲ್ಲ	ಕುಮಾರವ್ಯಾಸ ಸರ್ವಜ್ಞ ರತ್ನಾಕರವರ್ಣಿ ಪುರಂದರದಾಸರು
III	ಸಣ್ಣ ಕಥೆಗಳು	9. ಗಂಭೀರೆಯೆಂಬ ಬಿದಿಯ ಕಥೆ 10. ಕಮಲಾಪುರದ ಹೋಟ್ಟಿನಲ್ಲಿ 11. ನರಬಲಿ 12. ಅಮಾಸ	ಶಿವಕೋಟ್ಯಾಚಾರ್ಯ ಪಂಜೆ ಮಂಗೇಶರಾಯ ತ್ರಿವೇಣಿ ದೇವನೂರು ಮಹಾದೇವ
IV	ನಾಟಕ	13. ಶೂದ್ರ ತಪಸ್ವಿ	ಕುವೆಂಪು

ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು :

1. ಮುಗಳಿ ರಂ.ಶ್ರೀ., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 2014
2. ಸಂಗ್ರಹ. ನಾಗೇಗೌಡ ಎಚ್.ಎಲ್., ಚಾರಿತ್ರಿಕ ಜನಪದ ಕಥನ ಕಾವ್ಯಗಳು, ಪ್ರಕಾಶಕರು ಕರ್ನಾಟಕ ಜಾನಪದ ಪರಿಷತ್ತು, ಬೆಂಗಳೂರು. 2008
3. ಸೀಮಾತೀತ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ ಸಂಪುಟ 1,2,3,4,5 ಮತ್ತು 6, ಕುವೆಂಪು ಕನ್ನಡ ಅಧ್ಯಯನ ಸಂಸ್ಥೆ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು. 2014
4. ಸಂಗ್ರಹ. ನಾಗೇಗೌಡ ಎಚ್.ಎಲ್., ಕನ್ನಡ ಜನಪದ ಕಥನ ಕಾವ್ಯಗಳು, ಪ್ರಕಾಶಕರು ಕರ್ನಾಟಕ ಜಾನಪದ ಪರಿಷತ್ತು, ಬೆಂಗಳೂರು. 2007
5. ಹಂಪ ನಾಗರಾಜಯ್ಯ, ಸಾಂಗತ್ಯ ಕವಿಗಳು, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
6. ನಾರಾಯಣ ಪಿ.ವಿ, ಚಂಪೂ ಕವಿಗಳು, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
7. ಕಾಳೇಗೌಡ ನಾಗವಾರ, ತ್ರಿಪದಿ, ರಗಳೆ ಮತ್ತು ಜಾನಪದ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
8. ಸಂ. ಬೆನಗಲ್ ರಾಮ ರಾವ್ ಮತ್ತು ಪಾನ್ಯಂ ಸುಂದರ ಶಾಸ್ತ್ರಿ, ಪುರಾಣ ನಾಮ ಚೂಡಾಮಣಿ, ಪ್ರಕಾಶಕರು ಪ್ರಸಾರಾಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ. 2010
9. ಡಾ. ಚಿದಾನಂದ ಮೂರ್ತಿ, ವಚನ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013
10. ಸಂ. ಬಸವರಾಜು ಎಲ್. ಸರ್ವಜ್ಞನ ವಚನಗಳು, ಪ್ರಕಾಶಕರು ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 2012
11. ಸಂ ಮರುಳಸಿದ್ದಪ್ಪ ಕೆ, ನಾಗರಾಜ ಕಿ.ರಂ. ವಚನ ಕಮ್ಮಟ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2016
12. ಮರುಳಸಿದ್ದಪ್ಪ ಕೆ, ಷಟ್ಪದಿ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
13. ನರಸಿಂಹಾಚಾರ್. ಡಿ.ಎಲ್., ಪಂಪ ಭಾರತ ದೀಪಿಕೆ, ಪ್ರಕಾಶಕರು ಡಿ.ವಿ.ಕೆ ಮೂರ್ತಿ ಪ್ರಕಾಶನ, ಮೈಸೂರು. 2012
14. ಸಂ. ಜಿ.ಎಸ್.ಭಟ್., ಕುಮಾರವ್ಯಾಸನ ಕರ್ನಾಟಕ ಭಾರತ ಕಥಾಮಂಜರಿ ಪ್ರವೇಶ, ಪ್ರಕಾಶಕರು ಅಕ್ಷರ ಪ್ರಕಾಶನ, ಹೆಗ್ಗೋಡು, ಸಾಗರ. 2006
15. ರಂಜಾನ್ ದರ್ಗಾ, ಶರಣರ ಸಮಗ್ರ ಕ್ರಾಂತಿ, ಪ್ರಕಾಶಕರು. ಲೋಹಿಯಾ ಪ್ರಕಾಶನ, ಬಳ್ಳಾರಿ. 2015
16. ವಸಿಷ್ಠ, ರತ್ನಾಕರವರ್ಣಿಯ ಭರತೇಶ ವೈಭವ, ಪ್ರಕಾಶಕರು ಚೇತನ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 1999
17. ಶಾಮರಾಯ ತ.ಸು., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ತಳುಕಿನ ವೆಂಕಣ್ಣಯ್ಯ ಸ್ಮಾರಕ ಗ್ರಂಥಮಾಲೆ, ಮೈಸೂರು -2014
18. ಶಿವರುದ್ರಪ್ಪ ಜಿ.ಎಸ್. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಮೀಕ್ಷೆ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013

Course Code	Duration	Course Title	L	T	P	C
B19BH1022	16 Weeks	Language – II: Hindi				

पाठ्यक्रम रूपरेखा :

यह पाठ्यक्रम नौसिखिया, अपनी भाषा की क्षमता का विकास करने हेतु तथा विभिन्न साहित्यिक प्रक्रियाओं द्वारा समाज, संस्कृति एवं जीवन के मूल्यों को समझने हेतु अभिकल्पित है।

पाठ्यक्रम उद्देश्य :

- संदर्भानुसार उचित भाषा का प्रयोग करने की दक्षता को छात्रों में उत्पन्न करना।
- साहित्य के माध्यम से समाज एवं मानवीय मूल्यों को समझाकर, उन मूल्यों की रक्षा हेतु प्रेरित करना।
- छात्रों में पुस्तक पठन एवं लेखन की अकृतिम प्रवृत्ति स्थापित करना।
- अध्येताओं में साहित्य के माध्यम से प्रभावी एवं कुशल संचार का विकास करना।

अधिगम परिणाम :

अध्ययन की समाप्ति पर अध्येता –

- सामाजिक मूल्य एवं नैतिक जवाबदेही को स्वीकार कर सकता है।
- साहित्य की प्रासंगिकता को जीवन में समझने की दक्षता रखता है।
- समाज में अंतर्निहित पद्धतियाँ एवं विचारधाराओं का व्याख्यान करने में सक्षम बन सकता है।

अध्ययन विषय सूची / पाठ्यक्रम

इकाई –1: कहानी, व्यंग्य रचना

अध्यापन अवधियाँ : 12 hrs.

1. कहानी - नमक का दारोगा – प्रेमचंद
2. उसकी रोटी – मोहन राकेश
3. व्यंग्य रचना – वैष्णव की फिसलन – हरिशंकर परसाई

इकाई –2: कहानी, निबंध अध्यापन अवधियाँ : 12 hrs.

4. कहानी – परदा – यशपाल
5. कहानी – मेरी माँ कहाँ – कृष्णा सोबती
6. निबंध – अच्छी हिन्दी – रविन्द्रनाथ त्यागी

इकाई –3: कहानी अध्यापन अवधियाँ : 12 hrs.

7. कहानी – गुंडा - जयशंकर प्रसाद

8.कहानी – जल्लाद – पांडेय बेचन शर्मा 'उग्र'

इकाई -4: अनुवाद, पत्र-लेखन

अध्यापन अवधियाँ : 12 hrs.

पत्रलेखन- : बैंक संबंधी पत्र, बीमा पत्र और आवेदन पत्र |

सन्दर्भ ग्रन्थ :

- पाठ्य पुस्तक – रेवा विश्वविद्यालय
- सुबोध व्यवहारिक हिन्दी – डॉ. कुलदीप गुप्त
- अभिनव व्यवहारिक हिन्दी – डॉ.परमानन्द गुप्त
- हिन्दी साहित्य का इतिहास - डॉ. नागेन्द्र
- आधुनिक हिन्दी साहित्य का इतिहास - डॉ. बच्चन सिंह
- हिन्दी साहित्य का नवीन इतिहास - डॉ. लाल साहब सिंह
- शुद्ध हिन्दी कैसे बोले कैसे लिखे- पृथ्वीनाथ पाण्डे
- कार्यालय अनुवाद निदेशिका

Course Code	Duration	Course Title	L	T	P	C
B19BH1023	16 weeks	Language – II: Additional English	2	0	0	2

Course Objectives:

1. To equip students with the ability to acquire the functional use of language in context.
2. To motivate the students to explore and critique issues related to society and Ethics.
3. To develop in the students a genuine habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

1. On completion of the course, learners will be able to:
2. Demonstrate ethical responsibilities in taking cognizance of issues relating to society and values.
3. Develop an understanding of literature in context.
4. Interpret and paraphrase their ideas logically and cohesively.
5. Illustrate the systems and ideologies inherent in the society.

Course Content:

Unit-I: Values and Ethics

12 Hrs

Literature:

Rabindranath Tagore - Where the Mind is Without Fear, William Wordsworth – Three Years She Grew in Sun and Shower, Saki – The Lumber-room, William Shakespeare – Extract from *Julius Caesar* (Mark Antony's Speech) Language: Vocabulary Building

Unit-II: Natural & Super Natural**12 Hrs**

Literature: John Keats – La Belle Dame Sans Merci Charles Dickens – The Signal Man
 Hans Christian Anderson - The Fir Tree William Shakespeare – An Excerpt from *The Tempest*
 Language: Collective Nouns

Unit-III: Travel and Adventure**12 Hrs**

Literature: R.L. Stevenson – Travel, Elizabeth Bishop - The Question of Travel, H.G. Wells – The Magic Shop, Jonathan Swift – Excerpt from *Gulliver’s Travels Book – I*
 Writing Skills: Travelogue

Unit-IV: Success Stories**12 Hrs**

Literature: Emily Dickinson – Success is Counted Sweetest Rupert Brooke – Success
 Dr. Martin Luther King - I Have a Dream Helen Keller – Excerpt from *The Story of My Life*
 Writing Skills: Brochure & Leaflet

Reference Books:

1. Tagore, Rabindranath. *Gitanjali*. Rupa Publications, 2002.
2. Wordsworth, William. *The Complete Works of William Wordsworth*. Andesite Press, 2017.
3. Munro, Hector Hugh. *The Complete Works of Saki*. Rupa Publications, 2000.
4. Shakespeare, William. *The Complete Works of William Shakespeare*. Sagwan Press, 2015.
5. Chindhade, Shirish. *Five Indian English Poets: Nissim Ezekiel, A.K. Ramanujan, ArunKolatkar, DilipChitre, R. Parthasarathy*. Atlantic Publications, 2011.
6. Dickens, Charles. *The Signalman and Other Horrors: The Best Victorian Ghost Stories of Charles Dickens: Volume 2*. Createspace Independent Publications, 2015.
7. Anderson, Hans Christian. *The Fir Tree*. Dreamland Publications, 2011.
8. Colvin, Sidney (ed). *The Works of R. L. Stevenson. (Edinburgh Edition)*. British Library, Historical Prints Edition, 2011.
9. Bishop, Elizabeth. *Poems*. Farrar, Straus and Giroux, 2011.
10. Swift, Jonathan. *Gulliver’s Travels*. Penguin, 2003.
11. Dickinson, Emily. *The Complete Poems of Emily Dickinson*. Createspace Independent Publications, 2016.
12. Brooke, Rupert. *The Complete Poems of Rupert Brooke*. Andesite Press, 2017.
13. King, Martin Luther Jr. & James M. Washington. *I Have a Dream: Writings And Speeches That Changed The World*. Harper Collins, 1992.
14. Keller, Helen. *The Story of My Life*. Fingerprint Publishing, 2016.
15. Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
16. Thorpe, Edgar and Showick Thorpe. *Basic Vocabulary*. Pearson Education India, 2012.
17. Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.
18. Murphy, Raymond. *Murphy’s English Grammar with CD*. Cambridge University Press, 2004

Course Code	Duration	Course Title	L	T	P	C

B19BH1030	16 weeks	Fundamentals of Accounting	3	0	1	4
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Course Objectives:

1. To educate students about the accounting principles and practices
2. To know the accounting cycle and steps involved in preparation of financial statements.
3. To get detailed knowledge of the practice of accounting in different forms of business
4. To gain the ability of using accounting information as a tool in applying solutions for managerial problems, evaluating the financial performance, and interpreting the financial structure.

Course Outcomes:

After completion of the course students shall be able to:

1. Explain the nature and purpose of financial statements in relationship to decision making.
2. Develop the ability to use the fundamental accounting equation to analyze the effect of business transactions on an organization's accounting records and financial statements.
3. Use a basic accounting system to create (record, classify, and summarize) the data needed to solve a variety of business problems.
4. Practically apply the skills of accounting concepts, principle and frameworks to analyze and effectively communication information to variety of audiences.

Course Content:

Unit-1: Introduction to Accounting

16 hours

Meaning, Nature, Need for accounting, Internal and External users of accounting information, limitations of accounting, accounting Concepts and Conventions, Accounting Practices, Generally Accepted Accounting Principles (GAAP), IFRS and proposed changes in Indian Accounting Standards

Accounting systems & process

Accounting equation - Systems of Accounting, Process of Accounting transactions, types of Accounts, Rules of Accounting. Journal - Meaning, features, simple and compound entries, Capital and revenue expenditures, Capital and revenue receipts, Contingent assets and contingent liabilities, Preparation of ledgers and Trial balance.

Unit-2: Subsidiary Books

16 hours

Subsidiary books – material evidences – Proforma invoice, debit and credit note, types of subsidiary books - Sales book, Sales return book, Purchases book, Purchase returns book, receivable book, payable book, Cash Book- (Single column, double column, and three columnar cash book, petty cash book) and journal proper. Reconciliation Statement – Preparation of Bank Reconciliation Statement.

Unit-3: Final Accounts

16 hours

Preparation of Trading and Profit and Loss account and Balance Sheet of sole trading concerns and partnership firms including all adjustments (vertical form).

Unit-4: Single entry System

16 hours

Meaning – Features – Merits – Demerits – Differences between single entry and double entry systems – Preparation of Opening Statement of Affairs, Closing Statement of Affairs, Computation of Profit/Loss and

Revised Statement of Affairs. Conversion of single entry to double entry system.

Suggested Readings:

1. Jain S.P., &Narang K L. (2013). *Basic Financial Accounting*, I, Kalyani publishers, New Delhi
2. Maheshwari, S.N., &Maheshwari, S.K. (2012). *Advanced Accountancy*, 1, JainBookAgency, NewDelhi.
3. Shukla, M. (2013). *Advanced Accounts*, SChand Publishers, New Delhi
4. Tulsian, P.C. (2011), *Financial Accounting*, S Chand Publishers, New Delhi.

Course Code	Course Title	Course Type	L	T	P	C
B19BH1040	Business Economics	HC	3	0	1	4

Course Objectives:

1. To provide knowledge about economic situation of the country.
2. To provide knowledge about the factors that influence the buying behavior of consumers and producers
3. To impart knowledge about those factors which influence the business economics
4. To enable the students to understand and identify demand and supply patterns in the growing economy
5. To enable the students to gain knowledge about the kinds of competitions in the market

Course Outcomes:

After completion of the course students shall be able to:

1. Analyze the basic problems related with Economics
2. Describe the concepts of Micro and Macro economics
3. Explain the demand determinants which influence the decisions of producers.
4. Comprehend the concepts related to demand and supply elasticity
5. Identify the approaches to the study of Consumer behaviour
6. To differentiate between the perfect and imperfect competition

Course Content:

16 hours

Unit-1: Introduction

Business Economics, Meaning, Scope, Importance, Basic terminologies of Economics, Problems of Economics, Micro and Macro Economics: Meaning & Differences with examples. Goals of a business firm, Application of Economics in business decisions.

Unit-2: Consumer Theory

16 hours

Ordinal utility theory: (Indifference curve approach): Consumer's preferences; Budget line; Consumer's equilibrium; Effects on Consumer Equilibrium; Reveled preference theory.

Demand and supply: Meaning, Determinants of demand, movements vs. shift in demand curve, Law of demand Criticisms of the law of demand, Determinants of supply, movement along a supply curve vs. shift in supply curve; - Market equilibrium, Elasticity of demand and supply, backward bending supply curve for labor concepts

Unit-3: Production and Cost

16 hours

Production: Firm as an agent of production. Concepts of Production function. Law of variable proportions; Iso-

quants; Return to scale; Economies and Diseconomies of scale. Costs: Costs in the short run, Costs in the long run, Profit maximization and cost minimization, Equilibrium of the firm, Technological change.

Unit-4: Market Structure

16 hours

- a) Perfect Competition: Assumption; Theory of a firm under perfect competition; Demand and Revenue; Equilibrium of the firm in the short run and long run, The long run industry supply curve; Increasing, decreasing and constant cost industry. Allocation efficiency under perfect competition.
- b) Monopoly: Meaning, Reasons for existence of Monopoly, Short-run and long-run equilibrium of monopoly firm; Price discrimination.
- c) Imperfect Competition: Difference between perfect competitions, monopoly and imperfect competition;
 - i. Monopolistic Competition: Features; Short-run Equilibrium; Long-run Equilibrium; Concepts of excess capacity; Empirical relevance.
 - ii. Oligopoly: Causes for the existence of oligopolistic firms in the market rather than perfect competition; Cooperative vs. Non cooperative Behavior and dilemma of oligopolistic firms.

Suggested Readings:

- 1) Salvatore, D. Schaum’S. Outline of Theory and Problems of Microeconomic Theory, New Delhi: McGraw-Hill, International Edition.
- 2) Ahuja, H.L. Business Economics, S. Chand & Co Publishers, New Delhi.
- 3) Pindyck, R.S., and Rubinfeld, D.L. Microeconomics. Prentice-Hall of India Pvt. Ltd.
- 4) Deepashree, Business Economics, New Delhi: Ane Books Pvt. Ltd.
- 5) Varian, H.R. Intermediate Microeconomics: A Modern Approach, Affiliated East-West Press, New Delhi.

Course Code	Duration	Course Title	L	T	P	C
B19BH1050	16 weeks	Management Principles and Application	3	1	0	4

Course Objectives:

- 1. To provide an understanding of basic management concepts, principles and practices.
- 2. To develop the skills of effective planning and decision making in the learner
- 3. To make the student aware of the importance of staffing and organizing
- 4. To equip the student with the skills and techniques of proper directing, leading and Controlling

Course Outcomes:

After completion of the course the students shall be able to:

- 1. Discuss and apply the concepts of management, function and its importance.
- 2. Describe and analyze the various management theories and principles.
- 3. Explain elaborately the concepts of staffing and motivation
- 4. Analyze and apply the leadership theories and concept of communication in effective management.

Course Content:

Unit -1:

16 hours

Introduction to management Concept, salient features, objectives of management, Managerial functions – An

overview. Evolution of Management Thought: Classical approach – Taylor, Fayol, Neo classical and Human relations approach – Hawthorne experiments, Behavioral approach, Systems approach, Contingency approach- Lawrence & Lorsch, MBO, Business Process Re-engineering, Senge’s Concept of Learning Organization, Fortune at the Bottom of Pyramid. Trends and Challenges of Management in Global Scenario, Emerging issues in management. Cases on Management concepts.

Unit-2:

16 hours

Planning- Types of Plan – An overview. Strategic, tactical, operational, characteristics, importance. Strategic planning – Concept, process, Importance and limitations. Environmental analysis and diagnosis (Internal and external environment) – Definition, Importance and Techniques (SWOT/TOWS/WOTS-UP, BCG Matrix), Business environment - Concept and components. Decision-making – Concept, importance, group decision making, Individual versus group decision making, Decision making process, perfect rationality and bounded rationality, Decision making techniques (qualitative and quantitative). Case study on Planning & decision making.

Unit-3:

16 hours

Organizing and staffing- Concept, Process of organizing – An overview, span of management, different types of authority (line, staff and functional), decentralization, delegation. Formal and informal organization. Principles of organizing. Types of organization structure, Network Organization Structure, Staffing, Directing and Control Concept of staffing - Recruitment and Selection; Orientation; Training and Development; Career Development; Performance Appraisal. Case study on organizing & staffing. Coordination – Essence of management.

Unit-4:

16 hours

Motivation – Concept, importance, intrinsic and extrinsic motivation; Major motivation theories - Maslow’s need hierarchy theory, Herzberg’s two factor theory, McGregor’s Theory X and Theory Y, Ouchi’s Theory Z. Leadership – Concept, importance; Major theories of leadership (Likert’s scale theory, Blake and Mouton’s Grid theory, House’s path goal theory, Fred Fielder’s situational leadership), Transactional leadership, Transformational leadership, Communication – Concept, purpose, process; Oral and written communication; Formal and informal communication networks; Barriers to communication, overcoming barriers to communication. Control: Concept, Stages of Control, Limitations, Types; Principles of Effective Control, Techniques of Control (traditional vs. modern) - Ratio Analysis, ROI, Budgetary Control, EVA, PERT/CPM.

Suggested Readings:

1. Koontz, H. and Weihrich, H., Essentials of Management, Pearson Education. 10 Ed.
2. Robbins, S. and Coulter, M. Management, Pearson Education 13 Ed.
3. Robbins, S. P. Decenzo, D.A., Bhattacharya, S. and Agrawal, M.M., Fundamentals of Management: Essentials, Concepts and Applications, Pearson Education. 10 Ed.
4. Drucker P. F., Practice of Management, Mercury Books, London, 2010.
5. Singh, B.P. and Singh, A.K., Essentials of Management, Excel Books, 2006
6. Chhabra, T.N., Essentials of Management, Sun India.
7. Griffin, R.W., Management Principles and Application, Cengage Learning 2nd Ed.
8. Luthans, F., Introduction to Management, McGraw Hill. 2006

Course Code	Duration	Course Title	L	T	P	C
B19BH1060	16 weeks	Indian Constitution and Human Rights	2	0	0	2

Course Objective:

The objective of this course is to provide a comprehensive view of Indian Constitution and Human Rights.

Course Outcome:

The student would have the knowledge of the constitution, fundamental rights, duties and human rights.

Course Content:**Unit-1: Indian Constitutional Philosophy****8 hours**

- a. Features of the Constitution and Preamble
- b. Fundamental Rights and Fundamental Duties
- c. Directive Principles of State Policy

Unit-2: Union and State Executive, Legislature and Judiciary**8 hours**

- a. Union Parliament and State Legislature: Powers and Functions
- b. President, Prime Minister and Council of Ministers
- c. State Governor, Chief Minister and Council of Ministers
- d. The Supreme Court and High Court: Powers and Functions

Unit-3: Concept and Development of Human Rights**8 hours**

- a. Meaning Scope and Development of Human Rights
- b. United Nations and Human Rights-UNHCR
- c. UDHR 1948, ICCR 1996 and ICESCR1966

Unit-4: Human Rights in India**8 hours**

- a. Protection of Human Rights Act, 1993 (NHRC&SHRC)
- b. First, Second and Third Generations- Human Rights
- c. Judicial Activities and Human Rights

Course Code	Duration	Course Title	L	T	P	C
B19BH1070	16 weeks	Skill Development Course	0	0	2	2

Note: This Course is offered by the School in Association with UIIC.

Course Code	Duration	Course Title	L	T	P	C
B19BH1080	16 weeks	Sports / Yoga / Dance / Music / Theatre (RULO)	0	0	2	2

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and

Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

1. To prepare the students for the integration of their physical, mental and spiritual faculties;
2. To enable the students to maintain good health;
3. To practice mental hygiene and to attain higher level of consciousness;
4. To possess emotional stability, self-control and concentration; and
5. To inculcate among students self-discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

1. Practice yoga for strength, flexibility, and relaxation.
2. Learn techniques for increasing concentration and decreasing anxiety
3. Become self-disciplined and self-controlled
4. Improve physical fitness and perform better in studies
5. Gain self-confidence to face the challenges in the society with commitment to serve the society

Course Content:

Unit-I:

Yoga: Introduction, **Surya Namaskara:-** 12 counts

Unit-II:

Asanas: Sitting-Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana.

Asanas: Standing-Tadasana, Trikonasana, Parshwakonasana, Veerabhadrasana.

Unit-III:

Asanas: Prone Position-Bhujangasana, Dhanurasana.

Asanas: Supine Position-Sarvangasana, Halasana.

Mudras- Dhyana mudra, , Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:-Anuloma – Viloma, Basthrika, Bhramari.

Dhyana & its types: Competition format, Rules and their interpretations

B. VOLLEYBALL

Course Objectives:

To learn the rules, fundamental skills, and strategies of volleyball

1. To develop skills in passing, setting, serving, spiking, and blocking.
2. To learn basic offensive and defensive patterns of play.
3. To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with volleyball.
2. Apply these skills while playing volleyball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Introduction about Volleyball
- Players Stance, Receiving and passing
- The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

Unit-II

- Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)
- Setting the ball- Set for attack, Back set, Jump set

Unit-III

- Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash
- Block- Single block, Double block, Three-man block
- Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

Unit-IV

- Attack Combination, Defense Systems, Libero play
- Court marking, Rules and their interpretations and Duties of officials

C. BASKETBALL

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of Basketball
2. To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.
3. To learn basic offensive and defensive strategies of play.
4. To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
5. To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with basketball.
2. Apply these skills while playing basketball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Basketball: Introduction
- Grip; Player stance- Triple threat stance and Ball handling exercises
- Passing (Two hand/one hand)- Chest pass, Bounce Pass, Over head pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
- Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

Unit-II

- Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
- Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
- Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

Unit-III

- Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
- Individual Defensive- Guarding the man with the ball and without the ball.
- Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

Unit-IV

- Court marking, Rules and their interpretations

D. FOOTBALL

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of football.
2. To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.
3. To learn basic offensive and defensive patterns of play
4. To use different parts of the body in utilizing the above skills while playing football
5. To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with football.
2. Apply these skills while playing football and exhibit improved performance
3. Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
4. Improve physical fitness and practice positive personal and lifestyle.
5. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

1. **Football: Introduction**

- Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
- Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

Unit-II

- Dribbling- With instep and outer instep of the foot.
- Heading- From standing, running and jumping.
- Feinting- With the lower limb and upper part of the body.

Unit-III

- Tackling- Simple tackling, Slide tackling.
- Throw-in- Standing and Sliding
- Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

Unit-IV

- Ground marking, Rules and their interpretations

E. ATHLETICS (TRACK AND FIELD)

Course Objectives:

1. To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
2. To develop competence among students in demonstrating all the techniques covered in the course.
3. To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
4. To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.
5. To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course students shall be able to:

1. Display competencies in executing basic techniques and skills associated with select track and field events.
2. Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.
3. Learn regular practice of select track and field events and improve physical fitness
4. Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Content:

Unit-I

- Athletics: Introduction
- Track Events - Steeple Chase, Race Walking, Middle and Long distance races
- Race walking - Technique, Faults and Officiating.

- Middle and Long distance races – Technique and Training

Unit-II

- Jumping Events - High Jump and Triple Jump: Basic Skills and techniques
- High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing
- Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

- Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
- Discus Throw -Standing and Rotatory techniques, Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
- Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

- Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference Books

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). “Track and field coaching Manual”, Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. Carr, Gerry (1999). “Fundamentals of Track and Field. Track Athletics Title G.V. 1060 5.e. 368.
10. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
11. Jarver, Jesse (1987). “The Jumps”, Track and Field Coaching Manual Australia.

F. DRAMATICS

Pre-requisites: Students with background in Theatre Arts/ Keen interest in Dramatics.

Course Objectives:

- To imbibe the acting skills.
- To understand the broader applications of theatre studies in allied arts forms.
- To be able to use body language for better communication.
- Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

- Freely express improvisation in non-verbal communication.
- Shall hone good acting skills and be able to emote better.
- Be able to put up a theatre act and play a key role.
- Be able to differentiate good acting and understand the importance of good lyrics, stage crafting, music, dance, costume and lighting.

Course Content:**UNIT – 1***Working on Body:*

Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT – 2*Sound and Movement:*

Awareness of creating sound patterns, voice modulations, rhythm in speech and dialogues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT – 3*Characterization and Improvisation:*

Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT – 4*Group work and Production:*

Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Reference Books:

1. All about Theatre – Off stage – Chris Hogget.
2. RangadalliAnataranga – K V Subbanna
3. The Indian Theatre – Hemendranath Das Gupta.
4. A Practical handbook for an Actor – MilisaBruder, eeMilchel Cohn, Madeleine Oliek et al, Zigler Publisher.

G. INDIAN CLASSICAL DANCE FORMS (Bharatanatyam, Kuchipudi ,Mohiniyattam)

Prerequisites: Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join.

Course Objectives:

- To develop an understanding about the Indian classical dance forms and its universal application.
- To be able to understand the fine nuances of Classical dance.
- To understand the importance of health through Indian classical dance, strengthen the body capacity.
- To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.

Course Outcomes:

- To be able to identify and appreciate the classical dance forms.
- To be able to execute basics of Adavus with finesse.
- To be able to express through abhinaya.
- To be able to perform to perform the fundamentals in the chosen dance form.

Course Content:**Unit 1**

An introduction to Indian classical dance forms

Bharatanatyam, Kuchipudi, Mohiniyattam

Unit 2

Learning of Fundamentals

Exercises and Adavus- I (Bharathanatyam ,Kuchipudi, Mohiniyattam)

Unit 3

Adavus –II (Bharathanatyam ,Kuchipudi, Mohiniyattam)

Unit 4

Learn a basic composition in the chosen dance form.

Reference Books

1. *Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi*
2. *Classical Dances –SonalMansingh, AvinashParischa*
3. *Kuchipudi – Sunil Kothari*
4. *Bharatanatyam An in depth study- Saroja vydyanathan*
5. *Mohiniyattam – Bharathi Shivaji*

H. PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Pre-requisites: Students with background in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Course Objectives:

- To understand the Rhythmology.
- To understand the importance of Laya, Taala.
- To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

- To be able to set instrument to Sruthi.
- To be able to play the fundamentals on instrument.
- To be able to learn and perform a particular taala.

Course Content:

UNIT 1

1. Introduction to Musical Instruments
2. Percussion Instruments
3. Mridangam and its History

UNIT 2

1. Introduction to Tala System
2. Definitions of 5 jaathis and their recitation
3. Adi Talam and its various forms
4. Definitions and recitation of different gathis

UNIT 3

1. TisraJaathi
2. Khanda Jaathi
3. Misrajaathi
4. SankeernaJaathi

UNIT 4

1. Learning of Jathi Formation
2. Basic jathis
3. Jathis for Dance forms
4. Some Basic Definitions of Korvai, Teermanam etc.,

Reference Books:

1. Mridangam- An Indian Classical Percussion Drum – Shreejayanthi Gopal
2. Theory and practice of Tabala – SadanandNaimpally.
3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – SrdjanBeronja.

SECOND SEMESTER

Course Code	Duration	Course Title	L	T	P	C
B19BH2010	16 weeks	Communicative English	2	0	0	2

Course Objectives:

1. To prepare the students to become successful professionals by enhancing their communicative skills.
2. To develop the grammatical base of the students which would serve them in the long run.
3. To equip the students to form a strong command over vocabulary.

Course Outcomes:

After completion of the course students will be able to:

1. Develop professional communicative skills.
2. Apply their acquired grammatical knowledge in broader spheres of linguistic usage.
3. Utilize their communicative skills in multiple arenas of practical existence.

Course Content:

Unit-1

Language Acquisition

Remedial Grammar: Questions & Negatives; Questions Tags

Writing Skills: Email Writing

Activities: Group Discussions

Literature: Alphonse Daudet - The Last Lesson

Unit-2

Persuasive Skills

Remedial Grammar: Past Simple & Past Perfect

Writing Skills: Report Writing

Activities: Book & Movie Reviews

Literature: Lord Alfred Tennyson – Ulysses

Unit-3

Cognitive Skills

Remedial Grammar: Present & Past Passive; Conditionals

Writing Skills: Creative Writing

Activities: Role Plays

Literature: O. Henry – The Gift of the Magi

Unit-4

Employability Skills

Remedial Grammar: Reported Speech; Idioms

Writing Skills: Cover Letter & CV

Activities: Exchanging Information

Literature :Saki – The Open Window

Reference Books:

1. Bansal, R.K. and J.B. Harrison. Spoken English. Orient Blackswan, 2013.
2. Raman, Meenakshi and Sangeeta Sharma. Technical Communication. Oxford University Press, 2015.
3. Thorpe, Edgar and Showick Thorpe. Objective English. Pearson Education, 2013.
4. Dixon, Robert J. Everyday Dialogues in English. Prentice Hall India Pvt Ltd., 1988.
5. Turton, Nigel D. ABC of Common Errors. Mac Millan Publishers, 1995.
6. Samson, T. (ed.) Innovate with English. Cambridge University Press, 2010.
7. Kumar, E Suresh, J. Savitri and P Sreehari (ed). Effective English. Pearson Education, 2009.
8. Goodale, Malcolm. Professional Presentation. Cambridge University Press, 2013.

Course Code	Duration	Course Title	L	T	P	C
B19BH2021	16 weeks	Language – II: Kannada	2	0	0	2

Course Outline:

ಭಾಷೆಯನ್ನು ಮಾತನಾಡುವ ಬರೆಯುವ ಕೌಶಲ್ಯ, ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸ್ಥೂಲವಾಗಿ ಪರಿಚಯಿಸುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸ ಹಾಗೂ ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು, ಪ್ರಸ್ತುತ ಸಂದರ್ಭಕ್ಕೆ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಸಜ್ಜುಗೊಳಿಸಲು ಪಠ್ಯವನ್ನು ರೂಪಿಸಲಾಗಿದೆ. ಕಲೆ ಮತ್ತು ವಿಜ್ಞಾನದ ವಿಚಾರಗಳಿಗೆ ಒತ್ತನ್ನು ನೀಡಲಾಗಿದೆ. ಇದು ಮೂರು ಕ್ರೆಡಿಟ್ ಹೊಂದಿದೆ.

Course Objectives:

ಎರಡು ಸೆಮಿಸ್ಟರ್‌ಗಳಲ್ಲಿ ಸಮಗ್ರ ಕನ್ನಡ ಸಾಹಿತ್ಯವನ್ನು ಪರಿಚಯಿಸುವ ಉದ್ದೇಶವನ್ನು ಹೊಂದಿದೆ. ಅದರಂತೆ ಎರಡನೆಯ ಸೆಮಿಸ್ಟರ್‌ನಲ್ಲಿ ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಪ್ರಕಾರಗಳಾದ ನವೋದಯ-ನವ್ಯ-ನವ್ಯೋತ್ತರ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಲೇಖನಗಳು, ವ್ಯವಹಾರ ಪತ್ರಲೇಖನ ಹಾಗೂ ಕಿರು ಕಾದಂಬರಿಯನ್ನು ಪಠ್ಯವನ್ನಾಗಿ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡು, ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸದಭಿರುಚಿಯನ್ನು ಮೂಡಿಸಲಾಗುತ್ತದೆ. ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯ ಜೊತೆಗೆ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸದ ಕಡೆಗೆ ಗಮನ ನೀಡಲಾಗುತ್ತದೆ.

- ಭಾಷೆ, ಸಾಹಿತ್ಯ, ಇತಿಹಾಸ ಮತ್ತು ಸಂಸ್ಕೃತಿಗಳನ್ನು ಕನ್ನಡ, ಕರ್ನಾಟಕಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ ಪರಿಚಯಿಸಲಾಗುತ್ತದೆ.
- ವಿದ್ಯಾರ್ಥಿಗಳ ಸರ್ವತೋಮುಖ ಬೆಳವಣಿಗೆಗೆ ಅನುವಾಗುವಂತೆ ಹಾಗೂ ಅವರಲ್ಲಿ ಮಾನವ ಸಂಬಂಧಗಳ ಬಗ್ಗೆ ಗೌರವ, ಸಮಾನತೆ ಮೂಡಿಸಿ, ಬೆಳೆಸುವ ನಿಟ್ಟಿನಲ್ಲಿ ಪಠ್ಯಗಳ ಆಯ್ಕೆಯಾಗಿದೆ.
- ಅವರಲ್ಲಿ ಸೃಜನಶೀಲತೆ, ಶುದ್ಧ ಭಾಷೆ, ಉತ್ತಮ ವಿಮರ್ಶಾ ಗುಣ, ನಿರರ್ಗಳ ಸಂಭಾಷಣೆ, ಭಾಷಣ ಕಲೆ ಹಾಗೂ ಬರಹ ಕೌಶಲ್ಯಗಳನ್ನು ಬೆಳೆಸುವುದು ಗುರಿಯಾಗಿದೆ
- ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳಿಗೆ ಅನುಕೂಲವಾಗುವಂತಹ ವಿಷಯಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ಸೂಕ್ತ ಪಠ್ಯಗಳನ್ನು ಆಯ್ಕೆ ಮಾಡಿಕೊಳ್ಳಲಾಗಿದೆ.

Course Outcomes:

ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಪ್ರಕಾರಗಳಾದ ನವೋದಯ-ನವ್ಯ-ನವ್ಯೋತ್ತರ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಲೇಖನಗಳು, ವ್ಯವಹಾರ ಪತ್ರಲೇಖನ ಹಾಗೂ ಕಿರು ಕಾದಂಬರಿ ಸಾಹಿತ್ಯ ಕಲಿಕೆಯ ಮೂಲಕ ಕಾಲದ ಸ್ಥಿತ್ಯಂತರಗಳನ್ನು ಅದರ ಒಳನೋಟಗಳನ್ನು ಬೆಳೆಸುತ್ತದೆ.

- ಸಾಮಾಜಿಕ, ರಾಜಕೀಯ, ಧಾರ್ಮಿಕ, ಸಾಂಸ್ಕೃತಿಕ ಹಾಗೂ ಲಿಂಗಸಂಬಂಧಿ ವಿಚಾರಗಳೆಡೆ ಗಮನಹರಿಸುವುದರೊಂದಿಗೆ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಚರ್ಚಾ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ.
- ಜೀವನದಲ್ಲಿ ಬರುವ ಅಭಿಪ್ರಾಯ ಬೇಧಗಳು, ಸಮಸ್ಯೆಗಳನ್ನು ಆಧುನಿಕ ಸಂದರ್ಭದಲ್ಲಿ ಮಾನವೀಯತೆಯೊಂದಿಗೆ ನಿರ್ವಹಿಸುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತದೆ.

10. 23AgÄzÄæ¥À f.J.i. PÄÈÀßqÄ ,Á»vÄå ,Ä«ÄÃPÉë, ¥ÄæPÁ±ÄPÄgÄÄ ,Äé¥Àß §ÄPî 9Ë,ï, "ÉAUÀ¼ÄÆgÄÄ. 2013

Course Code	Duration	Course Title	L	T	P	C
B19BH2022	16 weeks	Language – II: Hindi	2	0	0	2

अध्ययन विषय सूची / पाठ्यक्रम

इकाई –1: प्राचीन कविता, आधुनिक कविता

अध्यापन अवधियाँ : 12 hrs.

- 1.कबीर के दोहे –कबीरदास
- 2.कविता – पाषाणी – नागार्जुन
- 3.कविता – वीरों का कैसा हो वसंत - सुभद्राकुमारीचौहान

इकाई –2: मध्यकालीन कविता, आधुनिक कविता

अध्यापन अवधियाँ : 12 hrs.

- 4.रहीम के दोहे – रहीम
- 5.कविता – किसको नमन करूँ मैं?-रामधारी सिंह दिनकर
- 6.कविता – कर्मवीर – अयोध्यासिंह उपाध्याय "हरिऔध"

इकाई –3: मध्यकालीन कविता, आधुनिक कविता

अध्यापन अवधियाँ : 12 hrs.

- 7.मीरा के पद – मीराबाई
- 8.कविता – ऊँचाई - अटल बिहारी वाजपाई
- 9.कविता – माँ – नरेश मेहता

इकाई –4: अनुवाद, संक्षेपण **अध्यापन अवधियाँ :** 12 hrs.

अनुवाद : हिन्दी-अंग्रेजी

अनुवाद : अंग्रेजी – हिन्दी(शब्द एवं अनुच्छेद)

संक्षेपण : परिच्छेद का एक तिहाई भाग में |

सन्दर्भ ग्रन्थ :

- पाठ्य पुस्तक – रेवा विश्वविद्यालय
- सुबोध व्यवहारिक हिन्दी – डॉ कुलदीप गुप्त .
- अभिनव व्यवहारिक हिन्दी – डॉ.परमानन्द गुप्त
- हिन्दी साहित्य का इतिहास - डॉ. नागेन्द्र
- आधुनिक हिन्दी साहित्य का इतिहास - डॉ. बच्चन सिंह
- हिन्दी साहित्य का नवीन इतिहास - डॉ. लाल साहब सिंह

- शुद्ध हिन्दी कैसे बोले कैसे लिखे- पृथ्वीनाथ पाण्डे
- कार्यालय अनुवाद निदेशिका
- संक्षेपण और पल्लवन - के.सी.भाटिया&तुमन सिंग

Course Code	Duration	Course Title	L	T	P	C
B19BH2023	16 weeks	Language – II: Additional English	2	0	0	2

Course Objectives:

1. To help the student understand the multiple values of the society.
2. To develop a cultural understanding in the student to sharpen his/her social skills.
3. To ensure a gradual development of literary interest in the student.

Course Outcomes:

After completion of the course students will be able to:

1. Demonstrate a deep understanding of the society and its values.
2. Develop a constructive understanding of the cultural dimensions of the human world.
3. Make use of his understanding to become a responsible global citizen of tomorrow.

Course Content:

Unit – I

12 Hrs

Literature: Toru Dutt - Casuarina Tree; Robert Frost – Stopping by Woods on a Snowy Evening; Tomas Rivera– The Harvest; C.V. Raman – Water – The Elixir of Life

Language: Degrees of Comparison

Unit – II

12 Hrs

Literature: Tadeusz Rozewicz – Pigtail; Jyoti Lanjewar – Mother; Sowvendra Shekhar Hansda – The Adivasi Will Not Dance; Harriet Jacobs – Excerpt from *Incidents in the Life of a Slave Girl*; **Language:** Prefix and Suffix

Unit – III

12 Hrs

Literature: Kamala Das – An Introduction; Usha Navrathnaram – To Mother; Rabindranath Tagore – The Exercise Book; Jamaica Kincaid – Girl; **Writing Skills:** Dialogue Writing

Unit – IV

12 Hrs

Literature: Rudyard Kipling – The Absent-minded Beggar; Sir Arthur Conan Doyle – The Hound of the Baskervilles; Aldous Huxley – The Beauty Industry; **Writing Skills:** Story Writing

Reference Books:

1. Agrawal, K.A. *Toru Dutt the Pioneer Spirit of Indian English Poetry - A Critical Study*. Atlantic Publications, 2009.
2. Latham, Edward Connery (ed). *The Poetry of Robert Frost*. Holt Paperbacks, 2002.
3. Gale, Cengage Learning. *A Study Guide for Tomas Rivera's The Harvest*. Gale, Study Guides, 2017.

4. Basu, Tejan Kumar. *The Life and Times of C.V. Raman*. PrabhatPrakashan, 2016.
5. Rozewicz, Tadeusz. *New Poems*. Archipelago, 2007.
6. Manohar, Murli. *Critical Essays on Dalit Literature*. Atlantic Publishers, 2013.
7. Hansda, SowvendraShekhar. *The Adivasi Will Not Dance: Stories*. Speaking Tiger Publishing Private Limited, 2017.
8. Jacobs, Harriet. *Incidents in the Life of a Slave Girl*. Createspace Independent Publication, 2014.
9. Das, Kamala. *Selected Poems*. Penguin Books India, 2014.
10. Tagore, Rabindranath. *Selected Short Stories of Rabindranath Tagore*. Maple Press, 2012.
11. Gale, Cengage Learning. *A Study Guide for Jamaica Kincaid's Girl*. Gale, Study Guides, 2017.
12. Kipling, Rudyard. *The Absent-Minded Beggar*. Hardpress Publishing, 2013.
13. Doyle, Arthur Conan. *The Hound of the Baskervilles*. General Press, 2017.
14. Dixon, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
15. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
16. Samson, T. (ed.) *Innovate with English*. Cambridge University Press, 2010.
17. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.

Course Code	Duration	Course Title	L	T	P	C
B19BH2030	16 weeks	Business Statistics	3	0	1	4

Course Objective:

1. To help students understand and describe data and make evidence-based decisions using descriptive and inferential statistics that are based on well-reasoned statistical arguments.
2. To understand data with descriptive statistics;
3. To perform statistical analyses of data;
4. To interpret the results of statistical analyses

Course Outcomes:

After completion of the course the students shall be able to:

1. Identify statistical tools needed to solve various business problems.
2. Compute measures of location and dispersion
3. To apply the learnt techniques in statistical testing and their applications.
4. Use regression analysis to estimate the relationship between two variables.
5. Perform test of hypothesis as well as calculate confidence interval for a population parameter for single sample.

Course Content:

Unit-1: Statistics an over view

16 hours

Growth and development of Statistics– Definition–Application of Statistics in managerial decision making; Importance and scope of Statistics – Limitations of statistics, Presentation of data to convey meaning– Tables, Graphs and Frequency Distribution. Measures of Central Tendency: Arithmetic mean – Weighted mean, – Median, – Mode, Measures of dispersion: Range, – Quartile deviation, – Mean Deviation– Standard deviation, – Coefficient of variation, Skewness, Kurtosis.

Unit-2: Correlation and Regression analysis

16 hours

Correlation: Meaning and definition – Uses – Types –Karl Pearson’s coefficient of correlation – Probable error – Spearman’s Rank Correlation Coefficient. Regression: Meaning, Uses, Regression Line, Regression Equation. Correlation Coefficient through Regression, Coefficient Relation between Correlation coefficient and Regression coefficients.

Unit-3: Statistical Inference

16 hours

Introduction to Sampling Distributions and Estimation: The need for sampling distributions, sampling distribution of the mean and the proportion, sampling techniques. Estimation: Point and Interval estimation for population parameters of large sample and small samples, determining the sample size (simple Problems on sample size).

Estimation theory and Hypothesis Testing: Sampling Theory; Formulation of Hypotheses; Application of Z-test, t-test and Chi-Square test. One way and two ways ANOVA.

Unit-4: Use of Computers in Descriptive Statistical Analysis

16 hours

Time Series Analysis and Forecasting: Importance, –Components, –Trend – Free hand method, –Method of semi averages, Method of moving averages, –Method of least squares.

Note: Introduction and overview, using statistical packages for quantitative data analysis, simple statistical analysis using EXCEL.

Suggested Readings:

1. Beri, G. C. (2011). *Business Statistics*, New Delhi: Tata McGraw Hill Educations Pvt Ltd.
2. Sharma, J. K. (2014). *Fundamentals of Business Statistics*. New Delhi: Vikas Publishers.
3. Foster, D. & Stine, E.R., (2010). *Statistics For Business: Decision Making And Analysis*, New Delhi: Pearson Publishers
4. Gupta, S. P. (2010). *Statistical Methods*. New Delhi: Sultan Chand.
5. Sharma, J. K. (2011). *Business Statistics*, New Delhi: Pearson Publishers.
6. Vishwanathan, P.K. (2007). *Business Statistics: An Applied Orientation*, New Delhi: Pearson Publishers.

Course Code	Duration	Course Title	L	T	P	C
B19BH2040	16 weeks	Principles of Marketing	3	1	0	4

Course Objectives:

The objectives of this course are:

1. To provide basic knowledge of concepts, principles, tools and techniques of marketing
2. To give detailed knowledge about marketing environment and consumer behavior
3. To create deep understanding about the marketing mix
4. To make students aware about segmentation, positioning and competitive dynamics

Course Outcomes:

At the end of the course students would be able to-

1. Describe the concepts, principles, tools and techniques of marketing
2. Analyze the marketing environment and consumer behavior dimensions
3. Apply the knowledge of marketing mix in business applications
4. Explain the concepts of segmentation, positioning and competitive dynamics

Course Content:

Unit-1: Introduction to Marketing

16 hours

Meaning & Definition – Goals – Concepts of Marketing – Approaches of Marketing – Functions of Marketing, Core Marketing Concepts, Role of Strategic Planning in Marketing, and Recent trends in Marketing.

Unit -2: Marketing Environment and Consumer Behaviour

16 hours

Components of Modern Marketing Information System: Internal Records, Marketing Intelligence System, Marketing Research process; Importance of Macro environment (trends)factors; measuring and forecasting Market Demand, Factors Influencing Consumer Behavior, Buying Decision Process, Difference between Business Market and Consumer Market.

Unit -3: Marketing Mix

16 hours

Meaning, Elements, Product, Product Mix, Product Line – (PLC) – Product Planning – New product Development, PLC: Design Marketing Strategies for each Stage of the Product Lifecycle; Branding, Packaging, Labeling, Pricing – Objectives, Factors influencing Pricing Policy and Methods of Pricing. Process of Pricing; Physical Distribution – Meaning – Types of Marketing channel, Factors affecting Channel Selection –Promotion – Meaning and Significance of Promotion Mix: Advertising, Sales Promotion, Personal Selling, Public Relations and Publicity.

Unit -4: Segmentation, Targeting, Positioning, and Competitive Dynamics

16 hours

Segment Consumer Markets based on Demographic Variables, Psychographic Variables, Behavioral Variables; Segmenting Business Markets, Effective segmentation criteria and Targeting Strategies; Examine Competitive Strategies for Market Leaders, Examine Competitive Strategies for Market Challengers and Followers, Develop and Establish an Effective Positioning Strategy.

Suggested Readings:

1. Philip Kotler, (2011) 14th edition, *Marketing Management*, Prentice Hall.
2. Kuranakaran, (2010) *Marketing Management*, Himalaya Publishers.
3. Ramesh & Jayanti Prasad (2012), 1st edition, *Marketing Management*, I.K. International
4. Michael J. Etzel, Bruce J. Walker, and William J Stanton, (2019) Tata Mc Graw Hill, Publishing Co Ltd
5. Kotable and Helsen, *Global Marketing Management*, 7th edition, John Wiley
6. William J. Stanton, Michael J.Etzel, Bruce J Walker, *Fundamentals of Marketing*, McGraw Hill Education.

Course Code	Duration	Course Title	L	T	P	C
B19BH2050	16 weeks	Accounting for Business	3	1	0	4

Course Objectives:

1. To explore in the area of underwriting of shares & its share value.
2. To initiate the concept of goodwill and valuation methods

3. To elaborate on the transactions within the company and different companies.
4. To enable the students analyze the rationale behind conversion of partnership into a limited company.

Course Outcomes:

After completion of the course the students shall be able to:

1. Understand the valuation of shares and goodwill and prepare financial statements accordingly.
2. Prepare the balance sheets and books of accounts
3. Understand the rationale behind conversion of partnership into a limited company.

Course Content:

Unit-1: Underwriting of shares

16 hours

Meaning - Terms used Underwriting-Underwriter-Marked applications-Unmarked Applications - Partial underwriting- Complete underwriting-Pure underwriting-Firm Underwriting- Underwriting Commission-Determination of Net Liability and Total Liability.

Unit-2: Valuation of Goodwill and Shares

16 hours

Goodwill Meaning- circumstance of valuation of Goodwill- Factors influencing the value of Goodwill-Methods of Valuation of Goodwill- Average Profit method- Super profit Method- Capitalization of Super profit method- Annuity Method- Capitalization of Profit Method problems. Shares meaning – need for valuation – factors affecting valuation- Methods of Valuation: intrinsic value method, yield method, Earning capacity method, Fair value method problems

Unit- 3: Holding Company

16 hours

Introduction- types of control –legal definition-preparation of accounts- financial year of Holding company and its subsidiary- Rules of preparation of Consolidated Balance sheet – investments in the subsidiary Company- minority interest –cost of control –goodwill or capital Reserve- Capital Profits – Revenue Profits – Intercompany transactions –goods sold on credit – Debtors – Bills Receivable – Creditors- Bills payable- Contingent liabilities – intercompany unrealized profits – Revaluation of Assets and Liabilities – dividends – Bonus issue.

Unit- 4: Conversion of Partnership firm into a limited company

16 hours

Introduction- need for conversion –Meaning of Purchase Consideration – Mode of Discharge of Purchase Consideration –Methods of Calculation of Purchase Consideration – Net payment Method – Net assets Method – Passing of Journal Entries and Preparation of Ledger accounts in the books of Vendor- Treatment of certain items- Dissolution Expenses – Unrecorded Assets and Liabilities- Assets and Liabilities not taken over by the Purchasing Company- Contingent liabilities – Non- assumption of trade liabilities – In the books of Company

Suggested Readings

1. Paul S.K, Advanced Financial Accounting, New central Agency Book Private limited, 2008
2. Anil Kumar, Advance Financial Accounting, HPS,2013
3. Hanif, Mohammed and Mukarjee, Amitabha , Advanced accounting- for CAIPCC examination 2009
4. Maheswari, S N & Maheshwari, S K, Corporate Accounting, 2016, 5TH Edition
5. Jain S. P. & Narang K. L., Corporate Accounting, 2013
6. Bhattacharya, Asish K, Financial Accounting for Business Managers, 2012, 4TH Edition

Course Code	Duration	Course Title	L	T	P	C
B19BH2060	16 weeks	Computer Applications in Business	1	0	1	2

Course Objectives:

1. To provide basic knowledge of computer and its usage.
2. To make the student skilled to work on the computer using various computer applications

Course Outcomes:

At the end of the course, student shall be able -

1. To explain the details of computer and its usage.
2. To apply the skills to work on the computer using various computer applications

Course Content:

Unit-1: Introduction to Computers

General features of a computer – Generations of computers - Personal computer – Workstation– Mainframe computer and super computers. Computer applications – Data processing – Information processing – Commercial – Office automation – Industry and engineering – Healthcare – Education – Graphics and multimedia.

Unit-2: Computer Organization

Central processing unit – Computer memory – Primary memory – Secondary memory – Secondary storage devices – Magnetic and optical media – Input and output units – OMR – OCR – MICR – Scanner – Mouse - Modem.

Unit-3: Computer Hardware and Software

Machine language and high level language – Application software – Computer program – Operating system – Computer virus -Antivirus and computer security – Elements of MS DOS and Windows OS – Computer arithmetic – Binary - Octal and Hexadecimal number systems – Algorithm and flowcharts – Illustrations – Elements of database and its applications.

Unit-4: Microsoft Office

Word Processing and electronic spread sheet – An overview of MS WORD - MS EXCEL and MS POWERPOINT – Elements of BASIC programming – Simple illustrations. Computer Networks: Types of networks – LAN - Intranet and Internet – Internet applications – World Wide Web – E-mail - Browsing and Searching – Search engines – Multimedia applications.

Suggested Readings

1. Alexis Leon and Mathews Leon (1999), Fundamentals of Information Technology, Leon Tech worldPub.
2. Jain. S.K. (1999), Information Technology “O” level made simple, BPBPublications.
3. Jain. V.K. (2000), “O” Level Personal Computer Software, BPBPublications.
4. Sharma Dhiraj, Information Technology for Business, Himalaya Publishing House, NewDelhi
5. Archanakumar, Computer Basics with Office automation I.K.International
6. Sinha, Computer Fundamentals, BPBPublications.

Course Code	Duration	Course Title	L	T	P	C
B19BH2070	16 weeks	Self-Study Component(Online course)	0	0	2	2

Course Code	Duration	Course Title	L	T	P	C
B19BH2080	16 weeks	Skill Development Course	0	0	2	2

Course Code	Duration	Course Title	L	T	P	C
B19BH2090	16 weeks	Summer Internship – 1 (Minor Project)	0	0	4	4

THIRD SEMESTER

Course Code	Duration	Course Title	L	T	P	C
B19BH3010	16 weeks	Organizational Psychology	3	0	1	4

Course Objective:

1. To acquaint the students with the fundamentals of individual behavior required for managing business
2. To know in-depth about the concepts and significance of personality, perception, attitude and emotions at workplace.
3. To understand individual and group behavior at work place so as to improve the effectiveness of an organization.
4. To be able to apply the techniques of group decision making in the organization.

Course Outcomes:

After completion of the course the students shall be able to:

1. Develop a deep understanding of the various dimensions of individual behavior
2. Describe and analyze the theories of personality, attitude, leadership and group behavior
3. Design ways to improve behavior, personality, attitude and leadership styles.
4. Analyze group behavior and adopt specific decision-making techniques

Unit-1: Introduction

16 hours

Concepts of OB; Management functions, Roles, Skills and activities; Disciplines that contribute to OB; Scope of OB; Types of Organizational Design; Challenges facing management; Emerging organizations. Emotions - Introduction, Basic Emotions, Sources, Theories, Emotional Intelligence, Applications of Emotions and Moods in organizations and decision making.

Unit-2: Personality, Values and Learning

16 hours

Personality: Introduction, Determinants of personality, Theories – Psychoanalytical, Socio-psychological, Trait theories, Erikson’s Theory, Myers-Briggs Type Indicator, Big Five Personality, Other personality traits.
 Values: Introduction, Types, Terminal versus Instrumental, Generational, International, how to develop ethical values? Case studies on personality.
 Learning: Concept of Learning, Principles of learning, Process, Theories of Learning- Cognitive, Behavioral, Social learning theory.

Unit-3: Perception, Attitude, and Leading Teams

16 hours

Perception: Introduction, Factors influencing perception, Process, Attribution theory, Halo effect, Contrast effect, Stereotyping, Selective perception, Barriers to perception.
 Attitude: Characteristics, Components, Functions, Attitude formation, Attitude measurement.
 Cross cultural teams, Cross functional teams, Leadership, Leading teams, Project teams, Self-managed teams; Teams; Team work; working with virtual teams.

Unit-4: Group Dynamics and Decision Making

16 hours

Groups: Characteristics, Why groups in organizations, Types, Stages, Group development process, Group properties – roles, norms, status, size cohesiveness & diversity, Groupthink and group shift.

Bounded rationality perspective; Business ethics; Cognitive psychology; Decision making; Decision making techniques - Divergent and convergent decision-making techniques, Decision making tools; Group decision making; Intuitive decision making.

Suggested Readings:

1. Fred, L. (2011). *Organizational behavior : an evidence-based approach* (12 ed.). NewYork: McGraw-Hill/Irwin.
2. Don, H., & Slocum, J. W. (2004). *Organizational behavior* (10 ed.). Mason, Ohio Thomson/South-Western.
3. Dwivedi. (2008). *Human Relations and Organisational Behaviour* (5 ed.). Laxmi Publications.
4. Jerald, G. (2010). *Behaviour in Organizations* (10 ed.). Pearson.
5. Stephen, P. R., & Timothy, A. J. (2015). *Organizational Behavior* (15 ed.). pearson education.

Course Code	Course Title	Course Type	L	T	P	C
B19BH3020	Production and Operation Management	HC	3	0	1	4

Course Objectives:

1. To give students an overview of various functions of Production management.
2. To provide insights on material management concepts applied in the business.
3. To understand techniques of production planning.
4. To help budding entrepreneurs in the field of manufacturing by highlighting various issues they have to tackle for effective and smooth operations.

Course Outcomes:

At the end of the course, student shall be able to-

1. Conduct Facility planning by making location and layout decisions.
2. Plan and implement suitable materials handling principles and practices in the operations.
3. Analyze and develop a balanced line of production & scheduling and sequencing techniques in operation environments.
4. Understand Quality management practices followed by the companies

Course Content:

Unit-1: Introduction, Plant Location and Layout

16 hours

Historical Evolution of Production and Operations Management, Concept of Production, Production System, Classification of Production System, Objectives of Production Management, Distinction between Manufacturing Operations and Service Operations, A Framework for Managing Operations, Objectives of Operations Management, Managing Global Operations, Scope of Production and Operations Management.

Plant Location and Layout: Introduction and Meaning- Need for Selecting a Suitable Location, Factors Influencing Plant Location/Facility Location, Plant Layout- Objectives and principles, Classification of Layout, Design of Product Layout, Design of Process Layout, Service Layout, Organization of Physical Facilities.

Unit-2: Material Handling and Materials Management

16 hours

Introduction and Meaning, Objectives of Material Handling, Principles of Material Handling, Selection of Material

Handling Equipment's, Evaluation of Material Handling System, Guidelines for Effective Utilization of Material Handling Equipment.

Materials Management: Introduction and Meaning, Scope or Functions of Materials Management, Material Planning and Control, Purchasing, Stores Management, Inventory Control or Management, Standardization, Simplification, Just-In-Time (JIT) Manufacturing, Six Sigma concept.

Unit-3: Production Planning

16 hours

Introduction and Meaning, Need for Production Planning and Control, Objectives of Production Planning and Control, Phases of Production Planning and Control, Functions of Production Planning and Control, Operations Planning and Scheduling Systems, Aggregate Planning, Master Production Schedule (MPS), Material Requirement Planning (MRP), Capacity Planning, Routing, Scheduling.

Unit-4: Quality Control, Demand Forecasting and Work Study (Time And Motion Study)

16 hours

Quality Control: Introduction, Quality, Fundamental Factors Affecting Quality, Need for Controlling Quality Inspection, Types of Quality Control, Steps in Quality Control, Objectives of Quality Control, Benefits of Quality Control, Seven old and new Tools for Quality Control, Causes of Variation in Quality, Statistical Process Control Introduction. Methods of Demand Forecasting, Theory and Problems of Demand Forecasting, Productivity, Work Study, Method Study Motion study, time study, work measurement.

Suggested Readings:

1. S. Anil Kumar and N Suresh, (2015) *Production and Operations Management*, New Age International publishers.
2. K. Aswathappa, G. Sudarsana Reddy, M Krishna Reddy, (2013) *Production and Operations Management*, Himalaya Publishers.
3. Gaither, N & Frazier, (2002) *Production & Operations Management*, Thomson Learning Publications.
4. Stevenson WJ, (1998) *Production and Operations Management*, Irwin McGraw Hill Publications.

Course Code	Duration	Course Title	L	T	P	C
B19BH3030	16 weeks	Fundamentals of Financial Management	2	0	1	3

Course Objectives:

- 1 The basic objective of the course is to equip the students with the understanding time value of money & use it for decision making.
- 2 To familiarize the student's the basic tools and techniques required in modern financial management.
- 3 To familiarize the students with the Principles and Practices of financial management.
- 4 To understand the general concepts of valuing financial assets and calculate the value of debt and equity securities.
- 5 To be able to distinguish between risk and return.

Course Outcomes:

After completion of the course the students shall be able to:

- 1 Understand the use of finance for decision making.
- 2 Describe time value of money, how a project is made and appraised.
- 3 Outline capital requirements for starting a business & management of working capital.
- 4 Explain the general concept of valuing financial assets and calculate the value of debt and equity securities.
- 5 Discuss the relationship between risk and return and demonstrate how risk is measured through Capital Asset Pricing Model (CAPM).

Course Content:

Unit-1: Introduction and Long-Term Investment Decisions **16 hours**

Nature, scope and objective of financial management, Time value of money, Risk and return relationship
Long term investment decisions: The Capital Budgeting Process, Cash Flow Estimation, Payback Period Method, Accounting Rate of Return, Net Present Value (NPV), Net Terminal Value, Internal Rate of Return (IRR), Profitability Index-Problems and solution.

Unit-2: Financial Decisions **16 hours**

Financing Decisions: Sources of Long-term financing, Estimation of components of cost of capital, Methods for calculating Cost of Equity, Cost of Retained Earnings, Cost of Debt and Cost of Preference Capital, Weighted Average Cost of Capital (WACC) –Problems and Solutions, Capital Structure-Theories of Capital Structure Net Income, Net operating Income, MM Hypothesis, Traditional Approach.

Unit-3: Dividend Decisions and Capital Structure **16 hours**

Theories for Relevance and irrelevance of dividend decision for corporate valuation-Walter's Model, Gordon's Model. MM Approach, Cash and stock dividends, Dividend policies in practice, Determinants of capital structure, operating and Financial leverages – problems and solutions

Unit-4: Working Capital Decisions **16 hours**

Concepts of Working Capital, Operating & Cash Cycles, sources of short-term finance, working capital estimation, cash management, receivables management, inventory management.

Spreadsheet is the recommended software for doing basic calculations in finance and hence can be used for giving students subject related assignments for their internal assessment purpose.

Reference Books: -

1. Khan, M.Y and Jain P.K. Financial Management, Text and Problems. Tata McGraw Hill
2. Srivatsava, Rajiv and Mishra, Anil, Financial Management, UK: Oxford University Press.
3. Singh, Preeti, Financial Management, New Delhi: Ane Books Pvt.Ltd
4. Singh, J K. Financial Management- text and problems, Delhi, Dhanpat Rai and Company
5. Rustagi, R.P. Financial Management, Galgotia Publishing Company
6. Pandey, I.M, Financial Management, Vikas Publications.
7. Chandra, P. Financial Management – Theory and practice. Tata McGraw-Hill

Course Code	Duration	Course Title	L	T	P	C
B19BH3040	16 weeks	International Business	2	1	0	3

Course Objectives:

1. To expose students to the concept, importance and dynamics of international business
2. To differentiate business activities domestically and internationally
3. To elaborate on different economic integrations and International Trade
4. To enable the student to gain the knowledge on foreign exchange transactions.

Course Outcomes:

By the end of the this course the student shall be able to

1. Apply the knowledge of International Business Activities and international business operations in organizational scenario.
2. Understand the impact of regional integration on various aspects of International Trade
3. Understand the flows of funds from different countries will impact the global trade
4. Gain the knowledge on exchange rates and its impact on trade promotions.

Course Content:

Unit-1: International Business and Environment

16 hours

Introduction to International Business: Globalization and its growing importance in world economy: Impact of globalization; International business contrasted with domestic business – complexities of international business; Internationalization Stages and Orientations Modes of entry into international business. International Business Environment: National and foreign environments and their components - Physical, economic, demographic, cultural and political- legal environments; Global trading environment – recent trends in world trade in goods and services; Trends in India’s foreign trade.

Unit-2: International Trade and Regional Economic Integration

16 hours

International Trade – Theories of International Trade, tariff and non-tariff measures; Balance of payment account and its components. Regional Economic Integration: Forms of regional integration; Integration efforts among countries in Europe, North America and Asia, Cost and benefit of regional economic Integration, RTB.

Unit-3: International Financial Environment

16 hours

International Financial Environment: International financial system and institutions; Foreign exchange markets, Spot market, spot rate quotations, bid-ask spreads, Trading in spot markets, Cross exchange rates; Forward Market; forward rate, long and short forward positions, forward premium and discount, Arbitrage, hedging and speculation; Foreign investments – types and flows; Foreign investment in Indian perspective.

Unit-4: Exchange Rate Determination and Foreign Trade Promotions

16 hours

Exchange Rate Determination: Factors affecting exchange rate – Relative inflation rates, relative interest rates, relative income levels, government controls, expectations, etc. Government intervention and government influence on exchange rates. Theories of exchange rate – Purchasing Power Parity, Interest Rate Parity and Fisher’s effect. Foreign Trade promotions measures and organizations in India: Special economic zones (SEZs) and 100% export oriented units (EOUs); Measures for promoting foreign investments; Indian joint ventures and acquisitions abroad.

Suggested Readings:

1. Subba Rao, P, International Business, 2014, 4th Edition
2. Aswathappa, K, International Business, 2015, 6th Edition
3. Daniels, John D, Radebaugh, Lee H. et al., International Business, 2014, 5th Edition
4. Paul,Justin , International Business 2011, 5th Edition
5. International Business Czinkota, Michael R & others, 2013, 8th Edition
6. RBI, Report on currency and Finance.
7. Griffin, Ricky W, and Michael W, Pustay, International Business – A Managerial Perspective, Prentice Hall.
8. Sharan, V. International Business, Pearson Education.

Course Code	Duration	Course Title	L	T	P	C
B19BH3050	16 weeks	Human Resource Management	2	1	0	3

Course Objectives:

1. To familiarize the students about the different aspects of managing people in the organization from the stage of acquisition to development and retention.
2. To comprehend the various aspects of human resource development strategies for better management of people in the organizations.
3. To develop better people management skills in students to handle people relations
4. To get detailed insights on various functions of HRM.

Course Outcomes:

1. Appreciate the functions and practices of HRM applied in business organizations.
2. Describe the importance of Human resources and their effective management in organizations.
3. Explain the various tools used in forecasting and planning HR needs.
4. Demonstrate a detailed understanding of recruitment and selection process.

Unit-1: Introduction to HRM

16 hours

Introduction – concept of RM,Evolution,meaning,significance,scope,objectives,nature,principles of HRM ; Functions – operative, managerial and advisory; Career Opportunities in HRM – Professional Associations in HRM, HR Managers (duties and responsibilities); Recent Trends in HRM. An overview of SHRM

Unit-2: Recruitment, Selection & Appointment

16 hours

Recruitment – meaning, significance, objectives, sources & methods; Selection – meaning, importance, steps/process, selection techniques (tests, interviews, offer letter, appointment letter); placement induction

(meaning, objective, types). A quick glance at talent and competency based HRM.

Unit-3: Development & Compensation

16 hours

Training and Development – Meaning, importance, benefits, methods of training, training process, identification of training needs & measuring its effectiveness; Compensation – Compensation (meaning, significance, executive compensation programmes, employee benefits & services), methods of compensating; Performance Appraisal - meaning, objectives, methods- Including 720degree method of performance appraisal, uses & limitations).

Unit-4: Integration & Maintenance of HRM

16 hours

Integration of HRM–Types and forms of participative management, quality circles, employee empowerment, collective bargaining, quality of work life ; Maintenance of HRM - Job Satisfaction, Discipline and employee rights, employee counseling, Grievances, grievances settlement process; Industrial relations, industrial disputes, collective bargaining, Industrial Dispute settlement machinery, Trade Unions, types, problems, Contemporary issues in HRM. Knowledge management.

Suggested Readings:

1. Dessler, G. (2015). *Human resource management*. Pearson Education India.
2. Bratton, J., & Gold, J. (2017). *Human resource management: theory and practice*. Palgrave.
3. DeCenzo, D.A.& Robbins (2017). *Fundamentals of Human Resource Management*, New York: John Wiley & Sons.
4. Rao, V.S.P (2017) *Human Resource Management - Text and Cases*, Excel Books
5. K. Ashwathappa, (2017), *Human Resources Management: Text and cases*, Mc-Graw Hill India, 8th Edition.

Course Code	Duration	Course Title	L	T	P	C
B19BH3060	16 weeks	Environmental Studies	2	0	0	2

Course Objectives:

The course would enable the students to get in-depth knowledge about environmental aspects and public health issues. The student comprehends and is able to apply the concepts of climate change, implications on health, waste management, policies and practices related to environment protection and diseases in contemporary society.

Course Outcomes:

The course would facilitate the student to apply the knowledge about environment, global warming, climate change, public health on their own conduct and ways to protect the environment for sustainable development of mankind and planet.

Course Content:

Unit-1: Linkages between Environment and Health

16 marks

Understanding linkages between Environment and Public Health Effect of quality of air, water and soil on health. Perspective on Individual health: Nutritional, socio –cultural and developmental aspects, Dietary diversity for good health; Human developmental indices for public health.

Unit-2:**Climate Change and Implications on Public Health****16 marks**

Global warming – Agricultural practices (chemical agriculture) and Industrial technologies (use of non-biodegradable materials like plastics, aerosols, refrigerants, pesticides): Manifestations of Climate change on Public Health-Burning of Fossil fuels, automobile emissions and Acid rain. *Environmental Management Policies and Practices*. Municipal solid waste management: Definition, sources, characterization collection and transportation and disposal methods. Solid waste management system in urban and rural areas. Municipal Solid waste rules.

Policies and practices with respect to Environmental Protection Act, Forest Conservation Act, Wild life protection Act, Water and Air Act, Industrial, Biomedical and E waste disposal rules.

Unit-3: Diseases in Contemporary Society**16 marks**

Definition – need for good health- factors affecting health. Types of diseases – deficiency, infection, pollution diseases-allergies, respiratory, cardiovascular, and cancer Personal hygiene-food – balanced diet. Food habits and cleanliness, food adulterants, avoiding smoking, drugs and alcohol.

Communicable diseases: Mode of transmission –epidemic and endemic diseases. Management of hygiene in public places – Railway stations, Bus stands and other public places. Infectious diseases: Role of sanitation and poverty case studies on TB, diarrhea, malaria, viral diseases. Non-communicable diseases: Role of Lifestyle and built environment. Diabetes and Hypertension.

Unit-4: Perspectives and Interventions in Public Health**16 marks**

Epidemiological perspective – Disease burden and surveillance; Alternative systems of medicine – Ayurveda, Yoga, Unani, Siddha and Homeopathy (AYUSH); Universal Immunization Programme (UIP); Reproductive health-Youth Unite for Victory on AIDS (YUVA) programme of Government of India. Occupational health hazards-physical-chemical and biological, Occupational diseases-prevention and control.

Course Code	Duration	Course Title	L	T	P	C
B19BH3070	16 weeks	Ethical Values For	3	1	0	4

Course Objective:

To learn and apply ethical values in Business and to understand the various ethical values in relevance to business.

Course Outcome:

Students would be able to apply the knowledge of ethics and values in their daily life.

Course Content:**Unit-1: Introduction to Ethics and Values in Business****8 hours**

Business ethical values, meaning, scope and importance-Ethical values, positive, normative and negative values-Moral, Moral standard and judgments. Unethical practices in business-financial cheating in corporate sectors, land grabbing for business sectors, eviction of permanent citizens and deforestations.

Unit-2: Theories and Approaches**8 hours**

Theories and models-Theory of utilitarianism-E.Kant's theory-J.Kohlberg's conditionality theory. Mahatma Gandhi's ethics. Model of compensation for victims-social cost and benefit analysis. Economics profit verses commercialprofit.

Unit-3: Ethical Issues in Business and Environmental Concerns**8 hours**

Business ethical values in Market- adulteration, exploitation of consumers, creation of artificial demand, black market, grey market. Production –waste, accidents and safety, Human resource- gender and racial discriminations, child labour, nepotism, power abuse, sexual harassment and labour exploitation. Environmental concerns: Unethical practices- Externalities-positive and negative externalities. Market failure and its impacts on ecology and environment. Greenhouse gas emissions Pollutions-air, water, soil. Impacts- depletion of ozone layer, global warming effects, Bio diversity failures- Human health deteriorations.

Unit-4: Measures both Preventive and Remedial**8 hours**

Corrective measures- Legal penalties – punishments. Waste management- End of-pipe control- 3R Methods-Whistle blowing-Standard settings-Corporate governance-Corporate social responsibility. Government regulations, taxes. Government incentives of grants and subsidies for ethical based business. Business conservative policies versus value business. Information technology- cybercrimes, intellectual property rights, copy rights and patent rights securities.

Suggested Readings:

1. Ghosh. B.N, *Business Ethics and Corporate Governance*, Mc Graw Hill Publications, 2012
2. John R. Boatright, and Bibhu Prasan Patra, *Ethics and the Conduct of Business*, Person Publications, New Delhi,2011
3. Sanjay Mohapatra and Sreejesh.S, *Case studies in Business ethics and Corporate governance*, Pearson,2013
4. Mruthynajaya, *Business ethics and value systems*, PHI learning P Ltd, 2013

Course Code	Duration	Course Title	L	T	P	C
B19BH3080	16 weeks	Skill Development Course	0	0	2	2

Note: This Course is offered by the School in Association with UIIC. For Exhaustive list of SDC course refer to **Annexure –I.**

Course Code	Duration	Course Title	L	T	P	C
B19BH3090	16 weeks	Soft Skill Training (Placement Department)	0	0	2	2

Course Objectives:

Following are the Course Objectives.

- To improve communication skills – Speaking and Listening skills
- To inculcate self motivation, raised aspirations and belief in one’s own abilities
- To learn basic etiquettes and practice the same for one’s own well being
- To learn team work and to connect and work with others to achieve a set task
- To learn to do best presentations with confidence

Course Outcomes:

On completion of the course learners will be able to:

- Communicate in English to express their thoughts and make others understand
- Develop presentation skills and public speaking ability
- Become self disciplined and matured adult
- Posses team work ability and identify one’s personality as a team player
- Gain self confidence and motivation
- Show improvement and confidence in speaking English language

Course Content:

Unit-1

6 Hrs

Training Introduction: Four different aspects of soft skills and its importance

Basics of communication – Types of communication tools and appropriate use of those.

Communication Barriers - Barriers of Communication and How to overcome it.

Extempore – Communication General Evaluation

Unit-2

6 Hrs

Non Verbal Communication – Introduction (Facial expressions, gestures, postures etc.,)

Listening Skills - Active listening, Barriers of Active Listening

Team formation and Branding - Demonstrate Team Dynamics, Strategic team building and dealing with conspiracy

Unit-3

8 Hrs

Etiquettes & Manners - Classroom Etiquettes Social Etiquettes, Mistakes in Modern manners

Assertiveness – Developing assertive skills in one’s own personal and professional situations

Self Analysis – SWOT

Self and Cross introduction - Do's and Don'ts

Unit-4

8 Hrs

Presentation Skills – Introduction (Different methodologies to give effective presentation)

Self and Cross Introduction – Practice

FOURTH SEMESTER

Course Code	Duration	Course Title	L	T	P	C
B19BH4010	16 weeks	Cost Accounting	3	0	1	4

Course Objectives:

1. To recognize the knowledge of basic concepts of costing.
2. To explain the various elements of cost sheet.
3. To describe and understand the various cost - controlling techniques.

Course Outcomes:

After completion of the course the students shall be able to:

1. Understand and explain the conceptual framework of Cost Accounting.
2. Discuss the role of cost accounting and quantitative analysis within the organization.
3. Apply the principles relating to the costing and control of the different resource inputs into the business.
4. Demonstrate costing methods and techniques appropriate to a variety of different business.

Course Content:

Unit-1: Introduction of Cost Accounting

16 hours

Introduction - Meaning & Definition of Cost, Costing and Cost Accounting- Objectives of Costing- Comparison between Financial Accounting and Cost Accounting-Application of Cost Accounting- Designing and Installing a Cost Accounting System-Cost Concepts-Classification of Costs-Cost Unit-Cost Centre-Elements of Cost-Preparation of Cost Sheet- Tenders and Quotations.

Unit-2: Material Cost Control

16 hours

Meaning-Types-Direct Material-Indirect Material-Material Control-Purchasing Procedure-Store Keeping- Techniques of Inventory Control-Setting of Stock Levels-EOQ- ABC Analysis-VED Analysis-Just in Time-Perpetual Inventory System-Documents used in Material Accounting- Methods of Pricing Material Issues-FIFO-LIFO-Weighted Average Price Method and Simple Average Price Method.

Labour Cost Control: Meaning-Types-Direct Labour-Indirect Labour- Timekeeping-Time booking-Idle Time-Overtime-Labour Turn Over. Methods of Labour Remuneration-Time Rate System-Piece Rate System-Incentive Systems-Halsey plan-Rowan Plan-Taylor's differential Piece Rate System and Merrick's Differential Piece Rate System- Problems

Unit-3: Overhead Cost Control

16 hours

Meaning and Definition -Classification of Overheads-Procedure for Accounting and Control of Overheads-Allocation of Overheads- Apportionment of Overheads-Primary Overhead Distribution Summary-Secondary Overhead Distribution Summary-REPEATED Distribution Method and Simultaneous Equations Method-Absorption of Factory Overheads-Methods of Absorption-Machine Hour Rate-Problems.

Unit-4: Reconciliation of Cost and Financial Accounts and Operating Costing 16 hours

Reconciliation of Cost and Financial Accounts: Meaning, need for Reconciliation-Reasons for differences in Profit or Loss shown by Cost Accounts and Profit or Loss shown by Financial Accounts-Preparation of Reconciliation Statement and Memorandum Reconciliation Account.

Operating Costing: Meaning and application of operating costing, Power house costing or boiler house costing , canteen or hotel costing, hospital costing (Theory only) and Transport Costing – Problems on Transport costing.

Suggested Readings:

1. M.N.Arora, Cost Accounting, Himalaya Publishing House
2. J.Madegowda, Advanced Cost Accounting, Himalaya Publishing House
3. N.K.Prasad, Cost Accounting, Book Syndicate.
4. Gouri Shankar, Practical Costing, Himalaya Publishing House
5. Khanna Pandey & Ahuja, Practical Costing, Sultan Chand.
6. K.S.Thakur, Cost Accounting, New Century Book House Pvt. Ltd.
7. M.L.Agarwal, Cost Accounting, Sahithya Bhawan Publications.
8. Palaniappan & Harihara, Cost Accounting, I.K. International
9. Jain & Narang, Cost Accounting, Kalyani Publishers.

Course Code	Duration	Course Title	L	T	P	C
B19BH4020	16 weeks	Business Research Methodology	3	1	0	4

Course Objectives:

1. To provide basic concepts of research and its process.
2. To make the students familiar with scientific approach to research through understanding the research process
3. To train students on problem identification, formulation, methodology, analysis tools and report writing.
4. To equip them with necessary skills for conducting minor research and conduct interpretations.

Course Outcomes: At the end of the course, Student would be able to-

1. Understand the knowledge of research process and deriving solutions for problems through Business research methods.
2. Practically apply the knowledge of research process and deriving solutions for problems
3. Identify problems and finding solutions through scientific research process.

Course Content:

Unit-1: Introduction to Business Research

16 hours

Definition, Objectives of research, Characteristics of research – Scientific Method, Types of research, Criteria for Good research, Business organizations – Decision Support, Ethics in research. Research Process and Concepts in Research: Research Process – Steps in research process.

Research designs: Meaning, features, merits and demerits ,types of design for Experimental, Explorative and Explanatory, Concepts – Methodology and Methods concepts, constructs variables, Deductive and inductive logic.

Unit-2: Formulation of Research Problem, Measurement, Scales and Hypotheses

16hours

Identifying and formulating research problem, Diagnosis of symptoms and problem, Formulating research problem statement, Literature review, review of literature methods. Defining research objectives.

Measurement Scales – Types of Scales, Scaling techniques, characteristics of good instrument, errors in measurement, Reliability and validity instruments.

Hypothesis – Meaning, Purpose, Sources, Characteristics of hypotheses, types of hypothesis, testing of hypothesis.

Unit-3: Data Collection and Analysis

16 hours

Data sources – primary and secondary data, Data Collection methods-Survey, Observation, Interview, focus group technique. Data collection Questionnaire, schedule, Scheduling, electro-mechanical devices, Sampling-Significance of sampling, Concepts, Steps in sampling, Criteria for good sampling, determining sample size, Sampling Techniques

Data Analysis: Data preparation, Types of statistical analysis – descriptive, validation and inferential tools. Selection of statistical methods – based on objective scale, Interpretation- meaning-Techniques of interpretation.

Unit-4: Report Writing and Presentation of Results

16 hours

Classification and tabulation, Graphical representation, Research presentation, Types of report, essentials of a Business report, Research proposal, Steps in research report, format Layout, Standards (Introduction to APA formatting), Application of Research: Mini project with application of SPSS for analysis.

Suggested Readings:

1. C.R. Kothari, Research Methodology New Age International Publishers,(4th edition)
2. A.K.P.C. Swain (2010) A text book on Research Methodology, Kalyani Publishers, 3rd edition.
3. Research Methodology by Deepak Chawla and Neena Sondhi, Vikas Publishers, 1st edition
4. Dr. J.K. Sachdeva (2009), Business Research Methodology ,Himalaya Publishing House. 3rd edition,
5. Naresh K. Malhotra, Marketing Research: An applied Research , Pearson Prentice hall. 4th edition.

Course Code	Duration	Course Title	L	T	P	C
B19BH4030	16 weeks	Business Law	2	1	0	3

Course Objectives:

1. To provide an exposure and understanding of important business laws in India
2. To differentiate the contractual agreements and its procedures.
3. To familiarize the concept of competition commission and its impact on the development.
4. To adapt the legal framework of business activities held in different parts of the country.

Course Outcomes:

At the end of the course, student shall be able to-

1. Understand the various laws existed and explore more on contractual laws and its framework.
2. Gain enough knowledge on contractual agreements under patents and its procedures.
3. Explore on the competition acts and its importance in managing business activities ethically.
4. Understand the consumer laws under the sale of goods and regulations to overcome the conflicts.

Course Content:

Unit-1: Introduction and Law of Contracts

16 hours

Meaning and Scope of Business Law – Sources of Indian Business Law. Indian Contracts Act of 1972: Definition – types of contracts- Government Contracts: Art. 299 Requirements under Constitution, Scope and Extent of Art. 299, 'Equity, Fairness and reasonableness, Doctrine of Promissory Estoppel V/s. Executive Necessity, No person liability. E-Contracts: Meaning & need for Digital Goods, Unfair terms in E-contract, Information technology Act and E-Contract. Indian Evidence Act– essentials – offer, acceptance, consideration, capacity of parties, free consent, legality of object and consideration, various modes of discharge of a contract, remedies for breach of contract.

Unit-2: Contract of Guarantee and Patents Act

16 hours

Distinction between Indemnity and Guarantee, Kinds of Guarantee, Rights of Surety, Liability of Surety, and Discharge of Surety. Intellectual Property Laws: Meaning and scope of intellectual properties – Patent Act of 1970 and its amendments as per WTO agreement, back ground, objects, definition, inventions, patentee, true and first inventor, procedure for grant of process and product patents, WTO rules as to patents, rights to patentee – infringement – remedies. The Copy Rights Act, Meaning – Its uses and rights. The Trade Marks Act, its meaning, registration, procedures – infringement – Authorities concerned– Remedies.

Unit-3: Competition Law

16 hours

Concept of Competition, Development of Competition Law, overview of MRTP Act 2002, Anticompetitive Agreements, Abuse of dominant position, combination, regulation of combinations, Competition Commission of India; Appearance before Commission, Compliance of Competition Law. Competition Law 2003: Meaning and scope, salient features, offences and penalties under the Act.

Unit-4: The Sale of Goods Act 1930**16 hours**

Definition of goods, Sale and Agreement to Sell, Conditions and Warranties, Rights & Liabilities of a Buyer & Seller, Rights of an Unpaid Seller. Law of Consumer Protection: Consumer Protection Act 1986: Back ground – definitions – consumer, consumer dispute, Complaint Procedure, defect, deficiency, and service, Remedies, Consumer Protection Council, Consumer Redress Agencies, District Forum, State Commission and National Commission.

Suggested Readings:

1. Avtar, S. (2011). Principles of Mercantile Law (9th Edition), Eastern Book Company, New Delhi.
2. Kapoor, N.D (2012.). Elements of Mercantile Law, Sultan Chand & Sons, New Delhi.
3. Maheshwari, S N & Maheshwari, S K, A Manual of Business Laws - 2011, 4 Revised Ed – HPH PUBLICATIONS
4. Chopra, K.C., Business laws, 2011, 5th Edition – HPH PUBLICATION
5. Taxmann Publications Corporate Laws Vol II: 2019, 39
6. Singh Avatar, Law of Sale of Goods, 2019, 8 – Eastern Book Company
7. Singh Avatar & Kaur Harpreet, Introduction to The Torts and Consumer Protection : 2015, 3 – Lexis Nexis
8. Ahuja, V K, Law Relating to Intellectual Property Rights: 2019, 3 – Lexis Nexis
9. Bhandari, M K, Law Relating to Intellectual Property Rights, 2019, 5 – Central Law Publications

Course Code	Duration	Course Title	L	T	P	C
B19BH4040	16 weeks	Self-Study Component (Online Course)	0	0	2	2

ONLINE COURSE (MOOC/ SWAYAM, etc.,)

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering MOOC courses.

A student shall register and successfully complete any of the courses available on SWAYAM. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

Course Code	Duration	Course Title	L	T	P	C
B19BH4050	16 weeks	Skill Development Course	0	0	2	2

Note: This Course is offered by the School in Association with UIIC. For Exhaustive list of SDC course refer to **Annexure –I.**

Course Code	Duration	Course Title	L	T	P	C
B19BH4060	16 weeks	Summer Internship Project – 2	0	0	4	4

Note: Format and Guidelines for the preparation of Summer Internship refer to **Annexure –II.**

Course Code	Duration	Course Title	L	T	P	C
B19BH4060	16 weeks	Soft Skill Training (Placement Department)	2	0	0	2

Course Objectives:

Following are the Course Objectives.

- To improvise participants skills in understanding their own Body language how to communicate with Interviewers- Postures, Gestures, facial expressions, Eye contact
- To improve the public speaking skills and get rid of stage fear
- To enhance the way of writing an effective business emails
- Learn how to write an error free Resumes and cover letters
- To improve the students to learn about the etiquettes to be followed on Telephone
- To learn basic etiquettes and practice the same for one's own well being

Course Outcomes:

On completion of the course learners will be able to:

- Will communicate in English and express themselves clearly, with confidence and power, in a variety of speaking situations
- Will show improvement in public speaking skills
- Will get to know how to communicate over telephone which will help to clear telephonic/Skype interviews
- To gain how to exhibit leadership qualities and to be a good team player
- Will be able to think positive and set their own academic and professional goals
- Become self disciplined and matured adult
- Will be seen improvement in different etiquettes like Classroom,Dining,professionalism and social Etiquettes

Course Content:

Unit-1

6 Hrs

Training Introduction, Communication skills: Soft skills and its importance, Accent Neutralization
Communication Skills – Concepts of Body language, Cultural Difference in Body Language, Different types of BL
Communication Skills – Definition of Just a Minute(JAM) concept, Different topics, Do's and Don'ts, Practice, General Evaluation

Unit-2

8 Hrs

Selling Skills – Sell a product, Advertising and salesmanship, Practice and Evaluation
Email Writing Etiquette – how to write an effective professional email and Elements of email, best practices and Do's and Don'ts, Practice on Email writing
Resume Writing – Difference between Resume, CV and Bio-data, Tips on Objective Writing, Do's and Don'ts of Resume, Collecting first draft of Resume from each individual in the class, Different types of cover letters

Unit-3

6 Hrs

Telephone Etiquette – 10 Essential telephone skills, Words to use during the telephonic conversation (In interviews), How to handle Skype calls, how to open and close a call, Best practices and Mock Telephonic interview activity
Etiquettes & Manners - Classroom Etiquettes Social Etiquettes, Mistakes in Modern manners
Positive Attitude – Need of positive Attitude, Tips to maintain positive Attitude, Different situation, Real life stories will be shared

Unit-4

8 Hrs

Self Assessment – Explanation of the aspects involved in the self assessment and assessment taken from each student through a sheet provided by the trainer
Goal Setting – How to set the Goals, Importance, SMART Goal settings
Group Discussion – Introduction to GD, Group discussion Do's and Don'ts, Prerequisites, Personality Traits in GD

Reference Books:

- You are born to blossom - APJ Abdul Kalam
- Power of positive Thinking - Norman Vincent Peale
- Attitude is everything - Jeff Keller
- A Complete Kit for Group Discussion - S. Hundiwala

Course Code	Duration	Course Title	L	T	P	C
B19BH4111	16 weeks	Advanced Financial Management	2	1	0	3

Course Objectives:

1. To familiarize the students with Investment aspects
2. To gain enough knowledge on the sources of funds for an organization
3. To explore in the areas of creation of capital to a firm
4. To examine the flow of funds and its maintenance.

Course Outcomes:

At the end of the course, student shall be able to -

1. Understand the types of risks that come across in the business activities.
2. Gain knowledge on different ways to pool up the capital which impact on structure of the organization.
3. Examine the different dividend theories and its impact on the organization capital structure.
4. Gain the knowledge on forecasting of Working capital and to manage the critic situations.

Course Content:

Unit 1: Investment Decisions and Risk Analysis

16 hours

Risk Analysis – Types of Risks – Risk and Uncertainty – Techniques of Measuring Risks – Risk adjusted Discount Rate Approach – Certainty Equivalent Approach – Sensitivity Analysis - Probability Approach - Standard Deviation and Co-efficient of Variation – Decision Tree Analysis – Problems.

Unit 2: Sources of Capital

16 hours

Long Term Sources – Meaning – Equity Shares – Preference Shares – Debentures – Differences between Shares & Debentures – Retained Earnings – Long Term Loans and Loans from Financial Institutions.

Unit 3: Capital Structure and Dividend Theories

16 hours

Introduction – Capital Structure – Capital Structure Theories - Net Income Approach - Net Operating Income Approach - Traditional Approach – MM Approach – Problems. Dividend Theories: Introduction – Irrelevance Theory – MM Model. Relevance Theories - Walter Model - Gordon Model – Problems on Dividend Theories.

Unit 4: Planning and Forecasting of Working Capital

16 hours

Concept of Working Capital – Determinants of Working Capital – Estimating Working Capital Needs – Operating Cycle – Cash Management – Motives of Holding Cash – Cash Management Techniques – Preparation of Cash Budget – Receivables Management – Preparation of Ageing Schedule and Debtors Turnover Ratio – Inventory Management Techniques – Problems on EOQ.

Suggested Readings:

1. Reddy, Sudarshana, G. Advanced financial management- 2006, I - Himalaya Publication
2. Sudhindra Bhat, Financial Management Principles and Practice
3. Khan, M Y Jain, P K ,Financial Management, 2007, 2- Edition / MGH PURBLISHER
4. Van Horne Jamese Financial Management Policy, 2006, PHI publication
5. Pandey, I M Financial Management, 2006, 9 – VIKAS PUBLICATION

Course Code	Duration	Course Title	L	T	P	C
B19BH4112	16 weeks	Financial Markets & Services	2	1	0	3

Course Objectives:

1. To provide the student a basic knowledge of financial markets and institutions
2. To familiarize them with major financial services in India.
3. To explore on the foreign transactions and its impact on financial institutions.
4. To understand the overall Financial System in India.

Course Outcomes:

At the end of the course, student shall be able to-

1. Explore the concepts and functions of financial markets and its Services.
2. Differentiate and examine the major financial institutions which fund through various sources in India.
3. Understand various financial services available in India.

Course Content:

Unit-1: An Introduction to Financial System and its Components 16 hours

Financial markets and institutions, Difference between Financial Markets and Institutions, Types of Financial Institutions & its functions, financial intermediation. Flow of funds matrix. Financial system and economic development. An overview of Indian financial system.

Unit-2: Financial Markets 16 hours

Money market-functions, organization and instruments. Role of central bank in money market; Indian money market-An overview. Capital Markets-functions, organization and instruments. Indian debt market; Indian equity market-primary and secondary markets; Role of stock exchanges in India.

Unit-3: Financial Institutions 16 hours

Depository and non-depository institutions, Commercial banking-introduction, its role in project finance and working capital finance. Development Financial Institutions (DFIs)-An overview and role in Indian economy. Life and non-life insurance companies in India; Mutual Funds- Introduction and their role in capital market development. Non-banking financial companies (NBFCs).

Unit-4: Overview of Financial Services Industry, Leasing and Hire-Purchase 16 hours

Fund based and fee based financial services, Merchant banking-pre and post issue management, underwriting. Regulatory framework relating to merchant banking in India. Leasing and hire-purchase : Consumer and housing finance; Venture capital finance; Factoring services, bank guarantees and letter of credit; Credit rating; Financial Counseling and Portfolio management Services.

Suggested Readings:

1. Khan and Jain, Financial Services, Tata McGraw-Hill
2. Singh, J.K., Venture Capital Financing in India. Dhanpat Rai and Company, New Delhi.
3. Annual Reports of Major Financial Institutions in India.
4. Gordon, E & Natarajan, K , Financial Markets and Services - 2014, 1- HPH PUBLICATION
5. Appannaiah, H R & Mukund Sharma , Financial Markets and Services - 2014, 1 - HPH PUBLICATION
6. Gurusamy S, Financial Markets and Institutions - 2014, 3 – TMH PUBLICATION
7. Sannders, Anthony & others Financial Markets and Institutions, 2009, 3 – TMH PUBLICATION
8. Khan, M Y , Indian Financial System, 2013, 8 – McGraw Hill

Course Code	Duration	Course Title	L	T	P	C
B19BH4211	16 weeks	International Human Resource Management	2	1	0	3

Course Objectives:

1. To look at HRM in a broader, comparative and international perspective to deal with complex issues and manifold risks.
2. To enable the student understand the complex IHRM functions in a MNC
3. To enable the student acquire knowledge and skills to perform the IHRM functions in a MNC.

Course Outcomes:

At the end of the course, student shall be able to-

1. Explain the differences between IHRM and domestic HRM,
2. Describe and understand the various IHRM functions.
3. Apply the knowledge of IHRM in performing such functions in a MNC.

Course Content:

Unit-1: Introduction to IHRM

16 hours

Difference between IHRM and Domestic HRM, Reasons for emergence of IHRM, Organizational dynamics and IHRM: Role of culture in IHRM, Organizational Processes in IHRM, Challenges of International Human Resource Management.

Unit-2: Recruitment, Selection in International context

16 hours

International Managers- Parent country nationals, third country nationals, host country nationals, Recruitment methods using head-hunters, cross-national advertising, e-recruitment; Selection criteria and techniques, Selection tests, interviews for international selection.

Unit-3: Performance Management & Compensation

16 hours

A conceptual background, performance management cycle, Contextual model, Appraisal of expatriate, Third and host country employees. International Compensation: Forms of compensation and factors that influence compensation policy, Key components of international compensation.

Unit-4: Training and development in international context

16 hours

Training and development of international staff, types of expatriate training, HCN training, Career Development, repatriate training, developing international staff and multinational teams, knowledge transfer in multinational companies.

Suggested Readings:

1. Monir H. Tayeb, International Human Resource Management, Oxford University Press, 2005.
2. Peter J. Dowling, Denice E. Welch, International Human Resource Management, Cengage Learning.
3. Aswathappa K, Sadhna Das, International Human Resource Management, McGraw Hill.
4. Evans, Pucik, Barsoux, The Global Challenge: Framework for International Human Resource Management - Tata McGraw-Hill Irwin.
5. Tony Edwards, Chris Rees, International Human Resource Management, Person Education.
6. Rao P. L., International Human resource Management, Excel Books.
7. Chris Brewster, International Human resource Management, University Press.

Course Code	Duration	Course Title	L	T	P	C
B19BH4212	16 weeks	Performance Management and Competency Mapping	2	1	0	3

Course Objectives:

1. To develop a deep understanding of the process and methods of performance appraisal.
2. To provide indepth knowledge about competency mapping and types of competencies.

Course Outcomes:

At the end of the course, student shall be able to-

1. Get full understanding of the performance appraisal and competency mapping process
2. Apply the knowledge and skills of Performance management and competency mapping in the organization.

Course Content:

Unit-1: Performance Management

16 hours

Performance Appraisal: Meaning, Types (Traditional & Modern Methods), Appraisal communication, appraisal interview, Feedback, Performance coaching

Performance Management: Meaning, Principles, Objectives, Scope and benefits, Job role and Competency analysis, Goal setting process.

Unit-2: Performance Management System

16 hours

Measuring performance – objectives, measurement approaches – traits, behaviour, results based, types, measurement issues. PMS: Developing, implementing and maintaining PMS, Performance improvement and performance management discipline.

Unit-3: Competency Mapping

16 hours

Competency Mapping: Definitions and components of Competency, skill, knowledge and motive- traits of self-concept. Procedures & Steps: Determining objectives and scope, performance effectiveness, tools for data collection, data analysis, validating competency model, mapping future jobs and single incumbent jobs. Approaches of competency mapping.

Unit-4: Competency and Types of Competencies

16 hours

Threshold competency –Differentiating competency – Functional or Technical competency – Leadership competency –Managerial competency. Ice berg model of Components of Competency. Competency vs Competence. Objectives of Competency development.

Suggested Readings:

1. Performance Management; A.S. Kohli & Tapomay Deb, Oxford University Press
2. The handbook of Competency Mapping; Seema Sanghi, Sage Publications
3. Udai Preekh& T V Rao, *Designing and managing Human Resource Systems*, Oxford publications.
4. Herman Aguinis, *Performance measurement*, Pearson education.

Course Code	Duration	Course Title	L	T	P	C
B19BH4311	16 weeks	Retail Management	2	1	0	3

Course Objectives:

1. To develop in students marketing competencies in retailing and retail consulting.
2. To provide a basic understanding about Retail marketing and its operations.
3. To prepare students for positions in the retail sector or positions in the retail divisions of consulting companies.
4. To foster the development of the student's critical and creative thinking skills.

Course Outcomes:

At the end of the course, student shall be able to–

1. Explain the marketing competencies in retailing and retail consulting.
2. Analyze the Retail marketing mix and non-store functioning of retail business.
3. Discuss best retail merchandising practices.
4. Apply the knowledge in job positions in the retail sector or positions in the retail divisions of consulting companies.

Course Content:

Unit-1: Introduction to Retailing and Formats

16 hours

Definition, Characteristics, Evolution of Retailing in India, Emerging Trends in Retailing, Factors Behind the change of Indian Retail Industry. Retail Formats and Theories: Retail Sales by ownership, On the basis of Merchandise offered, non store Based retail mix & Nontraditional selling. Theories of retail development, concept of retail lifecycle.

Unit-2: Store Planning and Retail Marketing

16 hours

Design & Layout, Location Planning and its importance, retailing image mix, Effective Retail Space Management, Floor Space Management, types of store locations and importance. Retail Marketing: Advertising & Sales Promotion, Store Positioning, Retail Marketing Mix, CRM, Advertising in Retailing.

Unit-3: Retail Merchandising and Pricing**16 hours**

Buying function, Markups & Markdown in merchandise management, shrinkage in Retail merchandise management, process of merchandising buying, Merchandise Pricing: Concept of Merchandise Pricing, Pricing Options, Pricing Strategies, Pricing Objectives, Types of Pricing.

Unit-4: Retail Operation**16 hours**

Elements/Components of Retail Store Operation, Store Administration, Store Manager – Responsibilities, Inventory Management, Management of Receipts, Customer Service, Management of Retail Outlet/Store, Store Maintenance, Store Security.

Suggested Readings:

1. Cullen & Newman: Retailing – Environment & Operations, 1/e, Cengage Learning EMEA, 2006
2. Berman & Evarv: Retail Management: A Strategic Approach, 12th Edition, Pearson 2013.
2. Bajaj, Tuli & Srivastava: Retail Management- 3/e, Oxford University Publications
3. Gibson G Vedamani: Retail Management: Functional principles & practices, 1/e, Jaico Publishing House.
4. Harjit Singh: Retail Management, 2/e, S. Chand Publication.

Course Code	Duration	Course Title	L	T	P	C
B19BH4312	16 weeks	Brand Management	2	1	0	3

Course Objectives:

1. To enable students to understand the significance of branding with the emerging managerial, relational and social perspectives.
2. To provide detailed knowledge about managing brand equity and brand positioning.
3. To equip the students with the knowledge and skills of managing brands

Course Outcomes:

At the end of the course, student shall be able to-

1. Describe and practically apply the concepts of branding in organizational context.
2. Discuss and apply the knowledge about managing brand equity and brand positioning.
3. Practically apply the knowledge and skills of managing brands

Course Content:**Unit-1: Concept of Brand****16 hours**

Brand VS Product, Why Brand, Can everything be brand, Identification of branding challenges and

opportunities; Strategic brand Management Process. Customer: Customer based brand equity; sources of brand equity, CRM, Brand equity VS Customer equity.

Unit-2: Brand Positioning, Leveraging Secondary Brand association

16 hours

Points of parity & points of difference, positioning guidelines, Brand mantras, Internal branding. Brand elements - criteria for choosing it, integrated marketing communication. Leveraging Secondary Brand Associations: co-branding, licensing, celebrity endorsement, event sponsoring.

Unit-3: Managing Brand Equity

16 hours

What it means: how to build it? Understanding and measuring brand equity using Inter-brand methodologies, Monitoring brands, Sources of brand equity (Brand Awareness, Brand personality, Brand loyalty, Brand audit-Brand inventory, brand exploratory, Qualitative & Quantitative Research techniques. Managing Brand Extensions, brand hierarchy, design of a brand strategy, Brand Extension: Types of Brand Extension, Line and Category Extension, Pros and Cons of Brand Extension-Need for extension, Multi-Brand Strategy, Geographical Expansion.

Unit-4: Managing brands Over Time and Special branding categories

16 hours

Brand Architecture: Handling a Large Portfolio, Multi-Brand Portfolio. Brand Hierarchy, Revitalizing brands: Re-launch, Rejuvenation, when brand is dying or stagnating, or when the market is dying or stagnating. Special branding categories: Service brands, Private labels, Industrial brands, Luxury brands, Heritage brands, Internet brands, TOM (Top of mind recall) brands. Brand building in Indian context, Managing Premium brands.

Text Books:

1. Keller, K.L. (2010). Strategic brand management Prentice hall of India (3rd edition).
2. Aaker, D.A. (2011). Brand Relevance: Making Competitors Irrelevant, Jossey-Bass.
3. Aaker, D.A. (1991). Managing Brand Equity. New York: FreePress.
4. Aaker, D.A.. (1996). Building Strong Brands .New York: FreePress.
5. Aaker, D.A., & Joachimsthaler. E. (2000). Brand Leadership. New York: Free Press.
6. Kapferer, Jean- Noel. (1997). Strategic Brand Management. Dover, NH Kogan Page.
7. Holt, D.B, How Brands Become Icons. The Principles of Cultural Branding, Harvard Business School Press.
8. Deming, S. (2007).The Brand who Cried Wolf. Wiley Publishers.

Course Code	Duration	Course Title	L	T	P	C
B19BH4411	16 weeks	Foreign Exchange Operations	2	1	0	3

Course Objectives:

1. To familiarize the student to understand the international environment and policies

2. To enable the students to learn about international foreign exchange policies.
3. To enable the students to acquire necessary skills to deal in foreign exchange markets.

Course Outcomes:

At the end of the course, student shall be able to-

1. Understand and describe the foreign exchange environment and policies
2. Learn about international foreign exchange policies.
3. Acquire necessary skills to deal in foreign exchange markets.

Course Content:

Unit-1: Introduction

16 hours

Introduction to Foreign exchange markets globally, Importance of foreign exchange to India and other foreign countries. Balance of Payments: Concept and components of Balance of Trade and Balance of Payments, Equilibrium and Disequilibrium in the Balance of Payments.

Unit-2: Foreign Exchange Rate

16 hours

Meaning of exchange rates. Fixed, Flexible and Managed Exchange Rates. Convertibility of Rupee on Current Account and Capital Account. Determination of Exchange Rates, Foreign Exchange Market, Purchasing Power Parity Theory, Spot and Forward transactions.

Unit-3: Foreign Exchange Control

16 hours

Meaning and objectives of Exchange Control, Methods of exchange Control, FEMA – Introduction, role, objectives and Features, A brief overview of other Foreign exchange bodies in India and under the WTO.

Unit-4: Foreign Trade Contracts and Documents

16 hours

Terms, Letters of Credit –Meaning and types Documents used in Foreign Trade, applications, limitations and scope.

Suggested Readings:

1. Foreign Exchange – Practice, Concepts and Control – C. Jeevanandam – Sultan Chand and Sons.
2. International Financial Management – P. G. Apte,1998
3. International Financial Management – V. K. Bhalla,2004
4. Financial Management & Policy: Text & Cases, New Delhi, Anmol Publications Pvt. Ltd. 2004.

Course Code	Duration	Course Title	L	T	P	C
B19BH4412	16 weeks	International Business in Service Sector	2	1	0	3

Course Objectives:

1. To highlight the distinctive features operations of the services in the context of international business.
2. To enable the students to learn about international services marketing policies and strategies.
3. To give an understanding as to analyze the opportunities involved in trade in services at the international level.
4. To enable the students to acquire necessary skills to deal in international services markets.

Course Outcomes:

At the end of the course, student shall be able to-

1. To discuss about the distinctive features, operations of the services in the context of international business.
2. Describe the international services marketing policies and strategies.
3. Analyze the opportunities involved in trade in services at the international level.
4. Apply necessary skills to deal in international services markets.

Course Content:

Unit-1: Growth of services sector

16 hours

Factors responsible for Market and Marketability of services as distinct from goods – classification of services – services as fastest growing sector of world trade- Global transferability of services: Main factors affecting transferability of services–Technology Government regulations. Economic liberalization and Globalization.

Unit-2: The role of services in the Indian Economy

16 hours

Employment, Balance of trade, Entrepreneurship, FDI in services sector, Management problems in Services sector: Operations and Processes, Quality, Human resource, Pricing.

Unit-3: Introduction of important Services with export potentials

16 hours

Tourism, Telecommunication, Entertainment, health care, Wellness, Information Technology, Biotechnology, Retailing, Education, Scopes, importance and export potentials of each sector

Unit-4: World Trade in Services

16 hours

Globalization of service- services under W.T.O. agreements description of services covered, Issues related to WTO agreements – Trade barriers in services – International rules for banking, Securities and insurance – Trade related aspects of Intellectual Property Rights settling disputes. Problems in International Trade in Services: Data Collection – Regulations and Negotiations – Services and E-Commerce.- Support Business Services – Liberalization of Services Sector.

Suggested Readings:

- 1) S. Shajahan, International Business, Macmillan.

- 2) V.Jauhari, Kirti Dutta Services, Oxford University Press
- 3) McDonald Mrlcoln Adrian Payne , Marketing plans for service Business, Oxford.
- 4) Datta, Sundaram, Indian Economy – S. Chand and Co., Delhi.
- 5) Raja Gopal, International Marketing Vikas Publishing House Ltd., New Delhi
- 6) Mukherjee N. , WTO and India's Trade Policy in Services, Vikas Publishing House Pvt. Ltd., NewDelhi.

FIFTH SEMESTER

Course Code	Duration	Course Title	L	T	P	C
B19BH5010	16 weeks	Direct Taxes	3	0	1	4

Course Objectives:

1. To expose the students to the various provision of Income Tax Act relating to computation of Income individual assesses only.
2. To make the students competent to compute the total income and tax liability of individual assesses and firms.
3. To provide them the necessary expertise to file return of income tax online.

Course Outcomes:

1. Acquire the knowledge of basic concepts of income tax
2. To learn the computation of various heads of income.
3. To gain knowledge about various deductions under payment.
4. To learn the computation of total income of individual and firms.

Course Content:

Unit-1: Introduction to Income Tax

16 hours

Income Tax: Brief History - Legal Frame Work – Types of Taxes - Cannons of Taxation – Important, Definitions: Assessment – Assessment Year – Previous Year – Exceptions to the general rule of previous Year - Assessee – Person – Income - Casual Income – Gross Total Income – Total Income – Agricultural Income. Residential Status: Determination of Residential Status of an individual (simple problems) - Incidence of Tax (Simple Problems on Computation of Gross Total Income). Exempted Incomes: Introduction – Exempted Incomes U/S 10 (Restricted to Individual Assessee) – Only theory.

Unit-2: Income from Salary

16 hours

Meaning & Definition – Basis of Charge – Allowances – Fully Taxable Allowances – Partly Taxable Allowances: House Rent Allowance, Entertainment Allowance, Transport Allowance, Children Education & Hostel Allowances - Fully Exempted Allowances – Perquisites – Tax Free Perquisites – Perquisites Taxable in all Cases: Rent free accommodation - Concessional accommodation, Personal obligations of the employee met by the employer – Perquisites Taxable in Specified Cases : Gardener, Sweeper, Gas, Electricity, Water and Motor car facility (when the motor car is owned or hired by the employer)– Provident Funds – Deductions from Salary U/S 16 – **Problems on Income from Salary**(excluding retirement benefits).

Unit-3: Income from House Property**16 hours**

Basis of Charge – Exempted Incomes from House Property – Annual Value – Determination of Annual Value – Loss due to Vacancy – Deductions from Annual Value – **Problems on Income from House Property**(Excluding Pre-Construction interest).

Unit 4: Profits and Gains from Business and Profession and Total Income**16 hours**

Meaning and Definition of Business & Profession – Expenses & losses Expressly Allowed – Expenses and losses Expressly Disallowed – Expenses Allowed on Payment Basis - Problems on computation of income from Business of Sole Proprietor. Computation of total income: Income from Capital Gains (excluding exemptions - Theory only) - Income from Other Sources (Theory only) - Deductions U/S 80 C, D & G. **Simple problems on Computation of Total income of an Individual.**

Suggested Readings:

1. Dr. Vinod K. Singhania: Direct Taxes – Law and Practice, Taxmann publication.
2. B.B. Lal: Direct Taxes, Konark Publisher (P)ltd.
3. Dr. Mehrotra and Dr. Goyal: Direct Taxes – Law and Practice, Sahitya Bhavan Publication.
4. Dinakar Pagare: Law and Practice of Income Tax, Sultan Chand and sons.
5. Gaur & Narang: Income Tax, Kalyani Publisher s
6. Dr.V.Rajesh Kumar and Dr.R.K. Sreekantha: Income Tax – I, Vittam Publications

Course Code	Duration	Course Title	L	T	P	C
B19BH5020	16 weeks	Business Policy and Strategy	3	1	0	4

Course Objectives:

1. To provide detailed insight on the strategies adopted by the companies in response to environmental change.
2. To create a comprehensive and integrated understanding of current strategic management thinking in a clear and succinct format.
3. To develop the skill in the student to analyze the business environment and design appropriate strategies.

Course Outcomes:

At the end of the course, student shall be able to-

1. Explain the strategic perspective and analyse the strategies adopted by the companies in response to environmental change.
2. Understand current strategic management thinking in a clear and succinct format.
3. Apply the skills in the student to analyze the business environment and design appropriate strategies.

Course Content:

Unit-1: Introduction to Strategic Management

16 hours

Defining strategy- levels at which strategy operates- approaches to strategic decision making, the strategic management process- Difference between business policy and strategic management. Strategic intent: Vision, mission and objectives. Environmental analysis: The organizations environment- External and internal environment, components of external and internal environment- Environment scanning- Organizations responses to the environment.

Unit-2: Industry and Resource Analysis, Strategy Formulation and Choice

16 hours

A framework for industry analysis, Michael porter's analysis- usefulness of Industry analysis- Competitive analysis: Forces shaping competition in an industry- interpreting the Five force models- Strategic group, and competitor analysis- Internal analysis: Resource based strategy- the resource based view, Resources- capabilities and competencies- approaches to internal analysis- carrying out SWOT. Strategy formulation and choice: Corporate level strategy: Introduction- The balanced score card- Grand strategies- Growth/Expansion strategy- Diversification Strategy- Stability strategy- Retrenchment strategy- combinationstrategy.

Unit-3: Corporate restructuring and Global strategies

16 hours

The concept of corporate restructuring- the process of restructuring- mergers and acquisition- takeovers- cooperative strategies- Reasons for strategic alliances- risks and costs of strategic alliances. Global strategies: Globalisation-risks- global expansion strategies- the MNC mission statement- deciding which market to enter- market entry strategy international strategy - Business level strategy - Strategic analysis and choice.

Unit-4: Strategy implementation, Evaluation and control

16 hours

Issues in strategy implementation- Activating strategy and resource allocation- strategy-structure relationship- the functional structure- divisionalisation- Functional level strategies: Operational strategy, financial strategy, marketing strategy and Human resource strategy. Strategic evaluation and control: Importance, barriers- evaluation criteria- strategic control- operational control- evaluation techniques for operational control- characteristics of an effective control system

Suggested Readings:

1. Dess, G. G., McNamara, G., Eisner, A. B., & Lee, S. H. (2019). *Strategic Management: Creating Competitive Advantages*. McGraw-Hill Education.
2. Srinivasan, R. (2014). *Strategic management: the Indian context*. PHI Learning Pvt. Ltd..
3. Rao, C. A., Rao, B. P., & Sivaramakrishna, K. (2009). *Strategic management and business Policy*. Excel Books India.

1. Rao, V. S. P., & Krishna, V. H. (2009). *Management: Text and cases*. Excel Books India.
4. Azhar, K. (2008). *Strategic management and business policy*. Tata McGraw-Hill Publishing Company Limited, New Delhi 2008.

Course Code	Duration	Course Title	L	T	P	C
B19BH5030	16 weeks	Project Management	3	1	0	4

Course Objectives:

1. To enable the student to evolve a suitable framework for the preparation, appraisal, monitoring and control and hedge risk of industrial project.
2. To develop a deep understanding and skills of project monitoring, quality control and project leadership
3. To equip the students with the skills of project leadership and audit.

Course Objectives:

At the end of the course, student shall be able to-

1. Develop a suitable framework for the preparation, appraisal, monitoring and control and hedge risk of industrial project.
2. Apply the skills of project monitoring, quality control and project leadership
3. Utilize the knowledge and skills of project leadership and audit in project management jobs.

Course Content:

Unit-1: Introduction

16 hours

Concept of Project and Project Management, Why Project Management Value to Business, Project Lifecycle, Project vs. operations Work, Project portfolio management, Strategic Planning and Project, Organization for Project

Project Network and Scheduling: Scope and priorities, Work Breakdown Structure, Project Network Representation Laddering and Tags, Factors influencing Quality of Estimates, Time and Cost Estimation, Project Scheduling PERT and Gantt chart.

Unit-2: Project Duration, Resource Allocation and Risk Management

16 hours

Project Duration and Resource Allocation: Review: Time and Cost Trade-offs, Resource Allocation and Leveling, Use of Project Management Software. Risk Management: Risk Identification, Risk Assessment and simulation, Scenario analysis, Probability analysis, Risk reduction, change management.

Unit-3: Project Monitoring, Control and Project Quality**16 hours**

Project Monitoring and control: Monitoring information system, control processes, Earned value analysis, Communication management, Indexes to monitor progress, Performance measurement, Forecasting project costs and completion time. Project Quality: The need to do it right the first time, lean project management, Six sigma in projects, PM Maturity,

Unit-4: Project Leadership, Audit and Closure**16 hours**

Project Leadership: Managing vs leading a project, Managing project stake holders, Qualities of an effective project manager, Managing project teams, Issues arising out of globalization, Communication, Conflict management.

Project Audit and Closure: Audit process, project closure, project documentation, evaluation of project manager, team and members.

Suggested Readings:

1. Mantel Jr., Samuel J., Jack R. Meredith, Scott M. Shafer, Margaret M. Sutton with M. R. Gopalan (2006). Project Management Core Text Book, First Indian Edition, Wiley, New Delhi.
2. Meredith, Jack R., and Samuel J. Mantel, Jr.(2010). Project Management: A Managerial Approach, 7 I e, Wiley, NewDelhi.
3. Maylor, Harvey (2003) Project Management, 3/e, Pearson, New Delhi.
4. Pinto, Jeffrey K. (2009) Project Management: Achieving Competitive Advantage and MS Project, 1/e, Pearson, New Delhi.

Course Code	Duration	Course Title	L	T	P	C
B19BH5040	16 weeks	Management Accounting	2	1	0	3

Course Objectives:

1. To develop and explore the methodology of Management Accounting.
2. To introduce students to the various tools and techniques of management Accounting.
3. To enlighten students on Financial Statement Analysis with the emphasis on the preparation of fund flow and cash flow statement.

Course Outcomes:

1. Apply management accounting and its objectives in facilitating decision making.
2. Calculate various accounting ratios, reports and relevant data.
3. Prepare Cash Flow and Funds Flow statements this helps in planning for intermediate and long-term finances.
4. Analyze cost-volume-profit techniques to determine optimal managerial decisions
5. Perform cost variance analysis and demonstrate the use of standard costs in flexible budgeting.

Course Content:**Unit-1: Ratio and Financial Statement Analysis** **16 hours**

Management Accounting – Meaning and purpose. Financial Accounting – Preparation of Income statement and Balance Sheet – Interpretation and use of these statements by management.

Ratio Analysis– Interpretation, benefits and limitations. Classification of ratios-Liquidity, Profitability, turnover, capital structure and Leverage.

Unit-2: Fund Flow Statement and Cash Flow Statement **16 hours**

Introduction, Concept of fund, Statement of changes in Working Capital, Funds from Operations, Sources and Application of funds (Simple Problem). Cash Flow Statement: Meaning Advantage of Cash Flow Statement and limitations- Distinction between Fund Flow Statement and Cash Flow Statement, preparation of Cash Flow Statement(AS 3 Indirect Method)

Unit-3: Marginal Costing **16 hours**

Marginal Costing – Cost volume – Profit relationship – Break – Even Analysis – Direct costing vs Absorption costing.

Unit-4: Budgets and Budgetary Control **16 hours**

Budgets and Budgetary Control – Introduction, concepts, Classification of Budgets - Functional Budgets and Flexible Budgets, Management Reporting - Procedures and Utility, Sample Reports

Suggested Readings:

1. Cost Accounting – M.N. Arora, (Himalaya Publishing House)
2. Cost Accounting – S.P. Jain and K.L. Narang (Kaylani Publishers)
3. Cost Accounting – Mahabaleswara Bhatta (Himalaya Publishing House)
4. Cost Accounting –J. Made Gowda (Himalaya Publishing House)

Course Code	Duration	Course Title	L	T	P	C
B19BH5050		Soft Skill Training (Placement Department)	2	0	0	2

Course Objectives:

Following are the Course Objectives.

- To prepare the students to be industry ready
- To motivate students to choose their right career utilizing their opportunities available
- To learn the techniques to crack interview rounds (GD, personal interview, telephone interview and technical interview)
- To develop individuals as a good problem solver and decision maker

Course Outcomes:**On completion of the course learners will be able to:**

- Get recruited in the campus drive and build their career in the right path
- Become competent in the industry and possess good negotiation skills
- Take wise decision and provide solutions for all the problems in the team
- Understand the industry requirements and learn the skills on timely basis
- Gain self confidence and motivation
- Show improvement and confidence in speaking English language

Course Content:**Unit-1****8 Hrs**

Cross Cultural Communication etiquettes – Work culture of different countries and territories and understanding the same to provide team results

Interview facing Skills – Stages in interview, tips to clear interview and FAQ Discussion

Mock GD – GD evaluation and Feedback on individual performance

Unit-2**8 Hrs**

Leadership Skills – Types of Leadership styles and top 10 qualities of leader (Activity)

Grooming – Professional grooming and its importance

Mock Interview – Personal Interview, Telephone Interview and Technical Interview Practicing

Unit-3**6 Hrs**

Problem Solving and Decision making – Activity

Entrepreneurship Skills – Inspiring business leaders and Creative Business Ideas. Process involved in designing a business plan

Resume – Final drafting and submission

Unit-4**6 Hrs**

Overview of Industries – Various Industries and the top performing MNCs in all the industries

Career Options – Job opportunities in various industries and the basic requirement expected from the candidate. Options for higher studies and the scope for the courses

Internship - Various sources to fetch the internship jobs. Dos and Don'ts in Internship

Course Code	Duration	Course Title	L	T	P	C
B19BH5060	16 weeks	Skill Development Course	0	0	2	2

Note: This Course is offered by the School in Association with UIIC. For Exhaustive list of SDC course refer to Annexure –I.

Course Code	Duration	Course Title	L	T	P	C
B19BH5111	16 weeks	Stock and Commodity Market	2	1	0	3

Course Objectives:

1. To provide in-depth knowledge of the emerging areas of Security Market
2. To equip students with the tools and techniques needed to operate in the financial market.
3. To provide a comprehensive knowledge to the students about the functioning of global and domestic commodity markets with a practical approach.
4. To develop practical skills of operating in Stock and Commodity Markets.

Course Outcomes: At the end of the course, student shall be able to-

1. Explain the emerging areas of Security Market
2. Discuss and analyze about tools and techniques needed to operate in the financial market.
3. Describe the functioning of global and domestic commodity markets with a practical approach.
4. Develop and apply practical skills of operating in Stock and Commodity Markets.

Unit-1: Introduction**16 hours**

Meaning & Definition-Primary and Secondary Market-Differences-Issues Mechanism in Securities Market-Trading Procedure in Stock Market-Stock Exchange & its Functions-NSE-BSE: Regulatory Institution-SEBI-Objectives & Powers of SEBI.

Unit-2 : Trading in Stock Market**16 hours**

Pattern of Trading & Settlement in Stock Market- Types of Trading –Speculations- Insider Trading-Book Building Process-Bases of Allotment-Classification of Brokers-NSDL-CSDL-Role & its Functions. (Briefly)

Unit-3: Commodity Market**16 hours**

Introduction-Meaning & Definition of Commodity Market-Origin of Commodity Market in India-Products-Participants and Functions-Commodity Exchanges in India and International-Stock Exchange Platform-MCX, NCDEX, ICEX, NMCE & its Membership.

Unit-4: Trading in Commodity Market**16 hours**

Pattern of Trading & Settlement in Commodity Market-Efficiency of Commodity market-Types of transactions in Commodity market-Benefits of Commodity Market.

Suggested Readings:

1. Bharat Kulkarni: Commodity Markets and Derivatives, Excel Books.
2. Gurusamy, Financial Markets and Institutions, 3rd edition, Tata McGraw-Hill.
3. Srivastava RM : Management of Financial Institutions, HPH
4. Saunders, Financial Markets and Institutions, 3rd edition, Tata McGraw-Hill.
5. Bharat Kulkarni; Commodity Markets and Derivatives, Excel Books.
6. Khan, Indian Financial Systems, 6th edition, Tata McGraw-Hill

Course Code	Duration	Course Title	L	T	P	C
B19BH5112	16 weeks	International Financial Management	2	1	0	3

Course Objectives:-

1. To enable the students to understand the concepts of financial management and the role of financial management in field of Globalization
2. To provide a deep understanding of foreign exchange rates and international financial markets
3. To create awareness in the student about international risk management.

Course Outcomes:- At the end of the course student shall be able to-

1. Describe in detail the concepts of financial management and the role of financial management in field of Globalization
2. Explain the foreign exchange rates and international financial markets
3. Analyse and apply the concepts about international risk management.

Course Content:

Unit-1: International Financial Management

16 hours

Introduction - Meaning of International Finance - Issues involved in International business Finance - Currency to be used - Credit worthiness - Methods of Payment - Foreign Exchange Markets. **Meaning of International Financial Management** - Scope and significance of International financial management in International markets.

Unit-2: Foreign Exchange Rates

16 hours

Need for foreign exchange - Foreign exchange market and Market intermediaries - Exchange rate determination - Foreign Exchange risk – Forwards - futures – swaps - options - Valuation of future and swaps – valuation of options and efficiency of the exchange market Convertibility of a rupee and its implications.

Unit-3: International Financial Markets

16

hours

Foreign Institutional Investors – Regulations governing Foreign Institutional Investors India; Global Depository Receipts – Meaning; Foreign Direct Investment (FDI) – growth FDI; Advantages and Disadvantages of FDI to Host country and home country.

Unit-4: International Risk Management

16 hours

Types of Risk – Political – commercial - exchange control restrictions and remittance

differing tax system - sources of funds - exchange rate fluctuations - different stages and rates of inflation
 - risks of non-payment - Managing Risk - Internal and external technologies.

Suggested Readings:

1. Avadhani, International Financial Management
2. Mittal, International Rate Foreign Exchange Tariff policy
3. Venkataraman K.V, Finance of Foreign Trade and Foreign Exchange
4. Genaro C da Costa, International Trade and Payments
5. Chowdery, Finance of Foreign Trade and Foreign Exchange
6. Balachandran, Foreign Exchange.
7. Somanath, International Financial Management, I.K. International
8. Srivastava, International Finance.
9. MadhuVij, International Financial Management, 3rdEdition.

Course Code	Duration	Course Title	L	T	P	C
B19BH5211	16 weeks	Talent Management	2	1	0	3

Course Objectives:

1. To develop an understanding of the practices used by organizations to attract, engage and retain talent across cultural settings
2. To acquire graduate level knowledge in the area of Human Resources leadership as applied to Talent Management within organizations.

Course Outcomes:

At the end of the course, the student shall be able to-

1. Develop an understanding of the practices used by organizations to attract, engage and retain talent across cultural settings
2. Acquire graduate level knowledge in the area of Human Resources leadership as applied to Talent Management within organizations.
3. Apply the knowledge of the course in managing competent workforce in the organization.

Course Content:

Unit-1: Talent Management

16 hours

Introduction, Definition & Need for Talent Management; Principles of Talent Management – Desert island principle, need to be needed principle, workforce forecast, systematic approach to talent management; Talent Management System – components and benefits of TMS, creating TMS, Challenges in the present context.

Unit-2: Talent Management Process; Talent Acquisition**16 hours**

The recruitment process, attracting the right candidates, assessment and 360⁰ feedback, performance of recruitment methods; Talent Development –Potential identification and development, coaching for sustained & desired change, integrating coaching, training and development with talent management. Talent Integration – fitting leaders within the culture; induction programs, building teams.

Unit-3: Appraising and Rewarding Performance**16 hours**

Performance management, objectives of performance management in managing talent, benefits, strategies to motivate employees; Talent Management Calibration – characteristics & benefits. Talent Retention –motivation and engagement, Return on talent; age of analytics, making outplacement as a part of talent strategy, developing talent management information system.

Unit-4: Role of Information Technology in Effective Talent Management Systems 16 hours

Talent management information system, creating business value through information technology, five steps to a talent management information strategy; Talent Management and Corporate Restructuring - Introduction, Corporate Reconstruction, Timing the Corporate Reconstruction, Business Process Re-engineering; Introduction to HR Analytics for TM Processes.

Suggested Readings:

1. Talent Management: Process of Developing and Integrating Skilled Workers – Ravinder Shukla Global India Publications, New Delhi, 2009
2. Chowdhary, Subir, The Talent Era, Financial Times, Prentice Hall International
3. A Conceptual Approach to Strategic Talent Management – Tapomoy Deb, Indus publishing, 2005
4. The Talent Management Handbook – Lance A. Berger & Dorothy R. Berger, Tata McGraw Hill
5. Performance Management – Herman Aguinis, Pearson Education, 2007

Course Code	Duration	Course Title	L	T	P	C
B19BH5212	16 weeks	Organizational Change and Development	2	1	0	3

Course Objectives:

1. To develop a detailed understanding of the practices used by organizations to change and manage its development.
2. To create awareness about change management and organizational interventions

3. To develop the skills in students to manage OD process, implementation and assessment of OD.

Course Outcomes:

At the end of the course, the students shall be able to-

1. Develop a detailed understanding of the practices used by organizations to change and manage its development and describe them.
2. Describe, analyze and practically apply the knowledge about change management and organizational interventions
3. Practically apply the skills to manage OD process, implementation and assessment of OD.

Course Content:

Unit-1: Organizational development

16 hours

Organizational development –Definition –history of OD –values, assumptions and beliefs in OD; Foundations of OD; Models and Theories –systems theory participation and empowerment – teams and team work –parallel learning structures, an overview of Organization Development in Global settings

Unit-2: Organizational Interventions and Change Management

16 hours

OD Interventions - Team Interventions – Intergroup Interventions- Third party peacemaking intervention, Comprehensive OD; future directions in OD, Theory and Practice on change and changing - nature of planned change. motivating change, Change management- concept, objectives, types of organizational change, change management process, Models of Change – Kurt Lewin Model, Practical Applications.

Unit-3: Managing Organizational Development Process

16 hours

Managing OD Process- Action Research as a process and approach; history and varieties of action research. Operational Components of OD- Diagnostic, Action and Process – Maintenance components; Resistance to change.

Unit-4: Implementation and Assessment of OD

16 hours

Implementation conditions for failure and success in OD efforts; Assessment of OD and change in organizational performance; The impact of OD Structure interventions and applicability of OD –training experiences –T-groups –behavioural modelling –life and career planning – coaching and mentoring –instrumental training, Competencies and Ethics of OD Practitioner.

Suggested Readings:

1. Cummings, T. G., & Worley, C. G. (2014). *Organization development and change*. Cengage learning.
2. Woodman, R. W., Pasmore, W. A., & Shani, A. B. (Eds.). (2009). *Research in organizational*

change and development. Emerald Group Publishing Limited.

3. Anderson, P., & Tushman, M. L. (Eds.). (2004). *Managing strategic innovation and change: A collection of readings*. Oxford University Press.
4. Weick, K. E., & Quinn, R. E. (1999). Organizational change and development. *Annual review of psychology*, 50(1), 361-386.

Course Code	Duration	Course Title	L	T	P	C
B19BH5311	16 weeks	Advertising	2	1	0	3

Course Objectives:

1. To familiarize the students with the basic concepts, tools and techniques of advertising used in marketing.
2. To create a deep understanding about media decisions and marketing communication
3. To enable the students learn about advertising message development
4. To equip the students with the skills of measuring advertising effectiveness and organizational arrangements.

Course Outcomes:

At the end of the course, student shall be able to-

1. Explain the basic concepts, tools and techniques of advertising used in marketing.
2. Develop a deep understanding about media decisions and marketing communication
3. Learn and apply the knowledge about advertising message development
4. Practically apply the skills of measuring advertising effectiveness and organizational arrangements.

Course Content:

Unit-1: Introduction

16 hours

Communication process-basic and elements; Marketing Communication-response hierarchy, models and alternatives; Advertising-meaning, nature and importance of advertising, types and objectives. Audience selection; Setting of advertising budget: determinants and major methods.

Unit-2: Media Decisions

16 hours

Major media types - their merits and demerits; Advertising through internet and interactive media-Issues and considerations; Factors influencing media choice; media selection, media scheduling. Cases on media decisions

Unit-3: Message Development**16 hours**

Advertising creativity; Advertising appeals; Advertising copy and elements of print advertisement creativity; Tactics for print advertisement, Modern trends in advertising.

Unit-4: Measuring Advertising Effectiveness and Organizational Arrangements 16 hours

Arguments for and against measuring effectiveness; Advertising testing process; Evaluating communication and sales effects; Pre- and Post-testing techniques.

Organizational Arrangement: Advertising Agency: Role, types and selection of advertising agency; Reasons for evaluating advertising techniques. Social, ethical and legal aspects of advertising in India; Recent developments and Issues in advertisement.

Suggested Readings:

1. Belch and Belch: Advertising and Promotion, 2/e, Tata McGraw Hill, 2011
2. Sharma, Kavita: Advertising: Planning and Decision Making, 1/e Taxmann Publication, 2011.
3. Mahajan, J.P., and Ramki: Advertising and Brand Management, Ane Books, New Delhi, 2013
4. Burnett, Wells, and Moriatty, Advertising: Principles and Practice, Pearson Education
5. Terence A. Shimp, Advertising and Promotion: An IMC Approach, 1/e, South Western, Cengage Learning, 2014
6. O'Guinn, Advertising
7. and Promotion: An Integrated Brand Approach, 1/e Cengage Learning 2009.

Course Code	Duration	Course Title	L	T	P	C
B19BH5312	16 weeks	Consumer Behavior	2	1	0	3

Course Objectives:

1. To equip students with the basic knowledge about the issues and dimensions of consumer behavior
2. To equip students with the skills and ability to analyze consumer information
3. To develop understanding of consumer behavior oriented marketing strategies.

Course Outcomes:

At the end of the course, student shall be able to-

1. Understand the various aspects of consumer behavior and analyze it to make marketing mix decisions
2. Apply the skills and ability to conduct market research and analyze consumer information and feedback
3. Understand and apply the knowledge of the influence of consumer behavior and

personality on consumer purchase decisions.

Course Content:

Unit-1: Consumer Behavior

16 hours

Nature, scope & application: Importance of consumer behavior in marketing decisions, characteristics of consumer behavior, role of consumer research, consumer behavior-interdisciplinary approach. Introduction to 'Industrial Buying Behavior' Market Segmentation: VALS 2 segmentation profile.

Unit-2: Consumer Needs & Motivation

16 hours

Characteristics of motivation, arousal of motives, theories of needs & motivation: Maslow's hierarchy of needs, McClelland's APA theory, Murray's list of psychogenic needs, Bayton's classification of motives, self-concept & its importance, types of involvement. Personality & Consumer Behavior: Importance of personality, theories of personality Freudian theory, Jungian theory, Neo-Freudian theory, Trait theory: Theory of self-images; Role of self-consciousness. Consumer Perception: Concept of absolute threshold limit, differential threshold limit & subliminal perception: Perceptual Process: selection, organization & interpretation. Learning & Consumer Involvement: Importance of learning on consumer behaviour, learning theories: classical conditioning, instrumental conditioning, cognitive learning & involvement theory. Consumer Attitudes: Formation of attitudes, functions performed by attitudes, models of attitudes: Tri-component model, multi-attribute model, attitude towards advertisement model: attribution theory, Changing of consumer attitude.

Unit-3: Group Dynamics & consumer reference groups

16 hours

Different types of reference groups, factors affecting reference group influence, reference group influence on products & brands, application of reference groups.

Family & Consumer Behavior: Consumer socialization process, consumer roles within a family, purchase influences and role played by children, family life cycle. Social Class & Consumer behavior: Determinants of social class, measuring & characteristics of social class. Culture & Consumer Behavior: Characteristics of culture, core values held by society & their influence on consumer behavior, introduction to sub-cultural & cross-cultural influences. Opinion Leadership Process: Characteristics & needs of opinion leaders & opinion receivers, interpersonal flow of communication.

Unit-4: Diffusion of Innovation

16 hours

Definition of innovation, product characteristics influencing diffusion, resistance to innovation, adoption process. Consumer Decision making process: Process- problem recognition, pre- purchase search influences, information evaluation, purchase decision (compensatory decision rule, conjunctive decision, rule, Lexicographic rule, affect referral, disjunctive rule), post purchase evaluation; Situational Influences Models of Consumer Decision making: Nicosia Model, Howard-Sheth Model, Howard Sheth. Family Decision

Making Model, Engel, Kollat& Blackwell Model, Sheth Newman Gross Model of Consumer Values, Practical Implications and challenges in Millennial consumer context.

Suggested Readings:

1. Leon G.Schiffman & Leslie L.Kanuk: Consumer Behaviour, Prentice Hall Publication, latest Edition
2. Solomon, M.R.: Consumer Behaviour – Buying, Having, and Being, Pearson Prentice Hall.
3. Blackwell, R.D., Miniard, P.W., & Engel, J. F.: Consumer Behaviour, Cengage Learning.
4. Hawkins, D.I., Best, R. J., Coney, K.A., & Mookerjee, A: Consumer Behaviour –Building Marketing Strategy, Tata McGrawHill.
5. Kotler, P. & Keller, K. L.: Marketing Management (Global Edition), Pearson.
6. Assael, H. Consumer Behaviour and marketing Action, Ohio, South Western, 1995.

Course Code	Duration	Course Title	L	T	P	C
B19BH5411	16 weeks	International Marketing	2	1	0	3

Course Objectives:

1. To familiarize the student about the international environment and international marketing policies
2. To enable the students to learn about international marketing skills.
3. To develop in-depth knowledge about international marketing strategies.
4. To equip students with necessary skills to deal in international market with indepth understanding of pricing strategy.

Course Outcomes:

At the end of the course, student shall be able to-

1. Discuss about the international environment and international marketing policies
2. Explain about international marketing channels, strategies and international policies.
3. Express knowledge about international marketing strategies.
4. Apply skills to deal in international market with in-depth understanding of pricing strategy.

Course Content:

Unit-1: Introduction Concept of International Marketing

16 weeks

Introduction, scope, Objectives of International Marketing, Challenges and Opportunities in International Marketing, Importance of international marketing strategies and policies, Underlying forces of International Marketing Channels, Reason of entry in International Marketing.

Unit-2: International Policy**16 weeks**

International Policy: Recent Import Export Policies and Procedures, Facilities and Incentives relating to Export Business, International marketing regulations in India and SAARC countries. Procedural Aspect: Export Documentation, Preparing Export Document Shipping and Customer Clearance of goods. Processing/Manufacturing goods for Export and their inspection by Government Authorities Compulsory Quality Control and Pre-shipment Inspections, Excise Clearance, Insuring goods against marine risk, Marine Insurance, Submitting documents to Bank for purchase/Collection/ Negotiation under L/C. Export Credit Limit.

Unit-3: International Marketing Strategy**16 weeks**

International Marketing Strategy: Rules for successful exporting. International Market Segment Preliminaries for starting Export Business. Registration of Exporters. Sending/Exporting Samples. Appointing Overseas Agents obtaining a License (Export License).

Unit-4: Pricing and Finance Strategy for International Marketing**16 weeks**

Pricing and Finance Strategy: International Pricing Decisions and factors influencing these decisions. Uniform pricing Vs. Market by market pricing. Arranging Finance for Exports: Financial and fiscal incentives provided by the Government and Foreign exchange facilities by the R.B.I. and EXIM Bank. Institutional support from Government, Semi Government and Autonomous Organizations for Exporters Obtaining export credit Insurance. Exchange rates, Understanding foreign exchange rates and protection against their adverse movement. Labeling, Packaging, Packing and Marketing Goods for Orientation to GATT and functions of W.T.O.

Suggested Readings:

1. Bhattacharya, Winning The World Marketing
2. B.M. Wahi and A.B.Kalkundribar, International Trade and Export Management
3. Varshney and Bhattacharya , International Marketing Management
4. S.ShivaRamu , International Marketing Export Marketing
5. S.S. Rathor, J.S.Rathor , International Marketing
6. Douglas & Craig, Global Marketing Strategy
7. Michael Vaz, Export Marketing
8. Francis Cherunilam, Export Marketing
9. Export Marketing – B. Bhattacharya

Course Code	Duration	Course Title	L	T	P	C
B19BH5412	16 weeks	Forex Management	2	1	0	3

Course Objectives:-

1. To enable the students to understand the concepts, rates and trends of foreign exchange and markets.
2. To provide a deep understanding of foreign exchange market in India.
3. To create awareness in the student about international risk management.
4. To create interest and deep understanding of forex management and analysis.

Course Outcomes:

At the end of the course student shall be able to-

1. Describe in detail the concepts, rates and trends of foreign exchange and markets.
2. Explain the foreign exchange rates and international financial markets
3. Analyse and apply the concepts about international risk management.
4. Practically apply the skills of forex management and analysis.

Course Content:

Unit-1: Foreign Exchange and Markets

16 weeks

Introduction – Meaning – Elements – Importance – Evolution of Exchange Rate System – International Monetary System – Gold Standard – types of exchange rates – Fluctuations in Foreign Exchange rates – Causes and Effects – Need for Stable foreign exchange Rates – Determination of Exchange rates – Theories of Determination of Foreign Exchange Rates.

Unit-2: Forex Market in India

16 weeks

Introduction – Meaning – Types – Operations – Convertibility - Objectives of Foreign Exchange Control – Problems of Foreign Exchange market in India – Mechanism to settle the problems - Role of RBI in settlement of foreign exchange problems in India.

Unit-3: Forex Risk Management

16 weeks

Meaning, Definition, Participants, Types of Exchange risks, Foreign Exchange Risk Management – Hedging, Speculation and Management of Transaction Exposure – Using Forward Markets for Hedging – Hedging with Money Market - Currency Options and Currency Futures – Internal Strategies – Speculation in Foreign Exchange and Money Market.

Unit-4: Exchange Rate Management

16 weeks

Exchange Rate Determination and Forecasting – Setting the Equilibrium Spot Exchange

Rate – Theories of Exchange Rate Determination – Exchange Rate Forecasting.
Management of Interest Rate Exposure – Nature and Measurement – Forward Rate
Agreements (FRA's) Interest Rate Options – Caps - Floors and Collars - Cap and Floors –
Options on Interest Rate Futures - Some Recent Innovations – Financial Swaps.

Suggested Readings:

1. Chaudhuri & Agarwal: Foreign Trade and Foreign Exchange, HPH
2. Mcrae T.N and D.P Walkar, Foreign Exchange Management, Prentice Hall.
3. Avadhani B.K, International Finance Theory and Practice.
4. Somanatha: International Financial Management I.K. International Publishers
5. Aseem Kumar, Export and import management, Excel Books
6. Foreign Trade Policy, 2005-2009

SIXTH SEMESTER

Course Code	Duration	Course Title	L	T	P	C
B19BH6010	16 weeks	Good and Services Tax (GST)	3	0	1	4

Course Objectives:

1. To provide an in depth study on the various provisions of GST law and their impact on Business Environment.
2. To provide in-depth knowledge about levy and collection of tax
3. To provide clarity on GST network and technology
4. To create awareness about input tax and credit, assessment and returns.

Course Outcomes:

At the end of the course, student shall be able to-

1. Learn various provisions of GST law and their impact on Business Environment in depth.
2. Gain knowledge about levy and collection of tax
3. Acquaint the knowledge about system framework of GST
4. Learn about input tax and credit, assessment and returns.

Course Content:

Unit-1: Fundamentals of GST ACT 2017

16 hours

Introduction, Overview of GST- Key concepts of GST Act-Features of GST- Need for GST in India- Pros & Cons of GST implementation in India-Objectives- taxes subsumed in GST- Dual GST Model- Structure of GST (SGST,CGST,IGST, UTGST)- Powers and Functions. GST ACT 2017: Overview of GST Act 2017- Salient features of CGST Act, SGST Act (Karnataka State), IGST Act. Important Definitions under GST Act- Actionable claim, Address of Delivery, Aggregate Turnover, Agriculturalist, Associated enterprises, Business, GST Council, Credit note and Debit note, Deemed Exports, Draw-back, Electronic Credit Ledger, Exempt supplies, Input, Input service, ISD, Input tax, Input Tax Credit, Job work, Intra-state supply of goods, Reverse charge, Invoice, Composition scheme, Person, Turnover in state.

Unit-2: Levy and collection of tax

16 hours

Introduction-Supply: meaning and Scope of Supply, types of supply, treatment of mixed & composite Supply, Liability of tax payable person, Rate and value of tax, transactions without considerations, List of transactions for supply of goods & services and list of transactions for non supply of goods & services- Reverse charge Mechanism. **(problems on types of supply)**

Unit-3: Time of supply, GST network and technology**16 hours**

Introduction- time of supply-forward charge, Reverse charge, residuary, special charges
 Time of supply of service- forward charge, reverse charge, Vouchers, Residuary, Special charges. **Problems on determination of time of supply.** GST NETWORK: Structure, Vision and Mission, Powers and Functions, Goods & Service Tax Suvidha Providers (GSP): Concepts, Framework and Guidelines and architecture to integrate with GST system- GSP Eco system.

Unit-4: Input Tax and Credit, Assessment and Returns**16 hours**

Input Tax : Meaning, conditions for taking credit, ineligible input tax credit, availability of credit in special circumstances, Input tax credit and change in constitution of registered person, Taking input tax credit in respect of inputs and capital goods sent for job work, Manner of Distribution of Credit by Input Service Distributor (ISD). Overview of Assessment, returns- Types- Furnishing details of outward supplies and Inward supplies, Claim on ITC, Matching reversal and reclaim of ITC, Steps for Filing forms, Levy of late fee. **Problems on Assessment of tax and tax liability.**

Reference Books:

1. GST Law and Analysis with Conceptual Procedures, Bimal Jain and Isha Bansal (Set of 4 Volumes)
2. Goods and Services Tax, H.C. Meharotra and V.P. Agarwal, Sahitya Bhavan Publications, 4th Edition.
3. Goods and Services Tax, Usha Devi and Poddar, Vision Book House, 2017.

Course Code	Duration	Course Title	L	T	P	C
B19BH6020	16 weeks	Operational Research for Managerial Decision	3	1	0	4

Course Objectives:

1. To provide knowledge on the basic tools of Operations research in solving the management problems using mathematical approach for decision making.
2. To create awareness about linear programming methods and various types of OR models for decision making.
3. To provide knowledge and skills on decision and queuing theory.

Course Outcomes:

At the end of the course, student shall be able to-

1. Describe the basic tools of Operations research in solving the management

problems using mathematical approach for decision making.

2. Explain and utilize linear programming methods and various types of OR models for decision making.
3. Analyze and apply the knowledge and skills on decision and queuing theory in problem solving and decision making.

Course Content:

Unit-1: Introduction to Operations Research

16 hours

Nature and scope of Operations research: Origins of OR, Applications of OR in different Managerial areas, Problem solving and decision making, Quantitative and qualitative analysis, Defining a Mathematical Model, Types of model, Process for developing an operations research model, Practices, opportunities and short comings of using an OR model.

Unit-2: Linear Programming Method

16 hours

Structure of LPP, Assumptions of LPP, Applications areas of LPP, Guidelines for formulation of LPP, Formulation of LPP for different areas, solving of LPP by Graphical Method: Simplex method(Basic Problems up to 3 Iterations), converting primal LPP to dual LPP, Limitations of LPP.

Unit-3: Transportation Problem and Assignment Model

16 hours

Mathematical Model of transportation problem, Methods for finding Initial feasible solution: Northwest corner Method, Least Cost Method, Vogel's approximation Method, Test of Optimality by MODI Method, Unbalanced Transportation Problem (Supply and Demand) , Degeneracy and its resolution.

Assignment Model: Algorithm for solving assignment model, Hungarians Method for solving assignment problem, variations of assignment problem: Multiple Optimal Solutions, Maximization case in assignment problem, unbalanced assignment problem, travelling salesman problem.

Unit-4: Decision and Queuing Theory

16 hours

Introduction, ingredients of decision problems. Decision making – under uncertainty, cost of uncertainty, under risk, under perfect information, Decision Tree, Construction of Decision Tree.

Queuing Theory: Queuing Structure and basic component of an Queuing Model, Distributions in Queuing Model, Different in Queuing Model with FCFS, Queue Discipline, Single and Multiple service station with finite and infinite population. Game Theory, Saddle Point, Value of the Game (OptimalSolution)

Suggested Readings:

1. S. D. Sharma, Operations Research, Kedarnath Ramnath and Company, 2008.
2. R. Pannerselvam, Operations Research, Prentice Hall International , 3e,2012
3. J. K. Sharma, Operations Research: Theory and applications, 5e, Macmillian, 2013.

4. Anderson, Sweeney, Williams, Camm, Martin, Quantitative Methods for Business, 12e, Cengage Learning, 2013.
5. Hamdy A. Taha, Operations Research: An Introduction, 9 e, Pearson, 2013.
6. Prem Kumar Gupta, D.S. Hira, Operations Research 5e, S. Chand, 2012.

Course Code	Duration	Course Title	L	T	P	C
B19BH6030	16 weeks	Marketing Metrics	3	1	0	4

Course Objectives:

1. To provide insights into accurately measuring marketing performance and ROI of firms.
2. To create in-depth knowledge about margins, profits, product and portfolio management.
3. To develop understanding about sales and channel management and pricing strategies.
4. To enable students to apply the skills of promotion, advertising media and web metrics.

Course Outcomes:

At the end of the course, student shall be able to-

1. Utilise marketing metrics for accurately measuring marketing performance and ROI of firms.
2. Explain about margins, profits, product and portfolio management.
3. Discuss about sales and channel management and pricing strategies.
4. Apply the skills of promotion, advertising media and web metrics

Course Content:

Unit-1: Introduction to Marketing Metrics

16 hours

Introduction: What is a metric? Why do you need metrics? Marketing Metrics: Opportunities, Performance and Accountability. Share of Hearts, Minds, and Markets: Customer perceptions, market share, and competitive analysis.

Unit-2: Margins and Profits, Product and Portfolio Management

16 hours

Margins and Profits: Revenues, cost structures, and profitability. Product and Portfolio Management: The metrics behind product strategy, including measures of trial, growth, cannibalization, and brand equity.

Unit-3: Sales Force and Channel Management, Pricing Strategy

16 hours

Sales Force and Channel Management: Sales force organization, performance, and compensation. Distribution coverage and logistics. Pricing Strategy: Price sensitivity and

optimization, with an eye toward setting prices to maximize profits.

Unit-4: Promotion, Advertising Media and Web Metrics

16 hours

Promotion: Temporary price promotions, coupons, rebates, and trade allowances. Advertising Media and Web Metrics: The central measures of advertising coverage and effectiveness, including reach, frequency, rating points, and impressions. Models for consumer response to advertising. Specialized metrics for Web-based campaigns. Marketing and Finance: Financial evaluation of marketing programs.

Reference Book:

1. Bendle, N.T., Farris, P.W., Pfeifer, P.E. and Reibstein, D.J., 2016. Marketing metrics: The manager's guide to measuring marketing performance. Pearson Education, Incorporated.

Course Code	Duration	Course Title	L	T	P	C
B19BH6040	16 weeks	New Venture Creation	2	1	0	3

Course Objectives:

1. To provide detailed exposure to students regarding different aspects of setting up a new business.
2. To develop an understanding of the process of identifying various sources of new business ideas of products and services
3. To examine, evaluate and approach different sources of finance, the nature of marketing effort required
4. To develop a comprehensive business plan.

Course Outcomes:

At the end of the course, student shall be able to-

1. To understand detailed knowledge regarding various aspects of setting up a new business.
2. Describe in detail about the process of identifying various sources of new business ideas of products and services
3. Examine, evaluate and approach different sources of finance, the nature of marketing effort required through the understanding of this course.
4. Conduct market potential analysis and develop a comprehensive business plan.

Unit 1: Starting New Ventures

16 hours

Opportunity identification, the search for new ideas, Source of innovative ideas, Techniques for generating ideas, Entrepreneurial imagination and creativity thinking, Developing your creativity, Impediments to creativity. Methods to Initiate Ventures: The pathways to New

Ventures for Entrepreneurs, Creating New Ventures, acquiring an established Venture: Advantages of acquiring an ongoing Venture, Examination of key issues, Franchising: How a Franchise works. Franchise Law. Evaluating the franchising opportunities.

Unit 2: Legal Challenges in Setting up Business

16 hours

Intellectual Property Protection: Patents, Trademarks and Copyrights, Requirements and Procedure for filing a Patent, Trademark and Copyright. Legal acts governing businesses in India. Identifying Form of Organisation: Sole Proprietorship, Partnership, Limited Liability Partnership and Company, Highlights of Companies Act.

Unit 3: The Search for Entrepreneurial Capital

16 hours

The entrepreneur's Search for Capital, The Venture Capital Market, and Criteria for evaluating New Venture Proposals, evaluating the Venture Capitalist. Financing Stages, Alternate Sources of Financing for Indian Entrepreneurs, bank Funding, Government Policy Packages, State Financial Corporation (SFCs), Business Incubators and Facilitators, informal risk capital: Angel investors, Bootstrapping, Crowdfunding

Unit 4: The Marketing Aspects of New Venture and Business Plan Preparation for New Venture

16 Hours

Developing a Marketing Plan: Customer Analysis, sales Analysis and Competition Analysis, Market Research, Sales Forecasting, evaluation, Pricing Decision. Business Plan Preparation for New Venture: Business Plan: Concept, Pitfalls to avoid in Business Plan, Benefits of a Business Plan, Developing a Well-Conceived Business Plan, Elements of a Business Plan: Executive Summary. Business Description. Marketing: Market Niche and Market Share. Research, Design and Development, Operations, Management, Finances, Critical-Risk. Harvest Strategy, Milestone Schedule.

Reference Books:

1. Tom Rath. Strengths Finders 2.0, Gallup Hisrich, Peters, & Shepherd, 2017.
2. Entrepreneurship, 10th Edition, Boston, MA: Irwin McGraw Hill. (ISBN 978-0-07-811284-3)
3. Spinelli, & Adams. 2016. New Venture Creation: Entrepreneurship for the 21st Century. 10th Edition, Boston, MA: Irwin McGraw-Hill.
4. Timmons, Zacharakis, & Spinelli, 2004. Business Plans that Work: A Guide for Small Business, New York, NY: McGraw-Hill.

Course Code	Duration	Course Title	L	T	P	C
B19BH6050		Skill Development Course	0	0	2	2

Note: This Course is offered by the School in Association with UIIC. For Exhaustive list of SDC course refer to **Annexure –I**.

Course Code	Duration	Course Title	L	T	P	C
B19BH6060	16 weeks	Major Project (Based on Specialization)	1	0	5	6

Note: Format and Guidelines for the preparation of Major Project refer to **Annexure –III**

ANNEXURE-I

List of Skill Development Courses-

- MS Office Tools
- Tally ERP(Accounts)
- Tally GST
- Advance Excel
- Analytics for Business(Beginners)
- ETL & Business Analytics
- Viz Tools

ANNEXURE-II

SUMMER INTERNSHIP

FORMAT FOR PREPARATION OF SUMMER INTERNSHIP (SIP)

SUMMER INTERNSHIP:-

- Documentation of students work.
- A record of original work done by the student in the summer internship of 4 Weeks Duration.

DURATION OF SUMMER INTERNSHIP

- 4 weeks

HOW TO GET AN INTERNSHIP

- Approach Placement Department / Career Development Centre.
- Approach Faculty / Mentor / Guide

- Through Family / Relatives / Friends.
- Take immediate action when you get a lead
- Prepare for the interview
- Be prepared to start immediately
- List out the companies where you want to do your internship
- Follow up
- Paid / unpaid

HOW AN INTERNSHIP WILL HELP YOU?

- Prepare you for the demands of today's work force.
- Gain Valuable Work Experience.
- Explore a Career path.
- Gives you an edge in the Job market.
- Develops and refines your skills.
- In case of paid Internship you will receive financial compensation.
- Career Exploration.
- Leadership and skill development.
- Establishing networks, Mentors and references.
- Resume Enhancement.
- Professional Communication.
- Idea of what your biggest strengths are
- Areas of improvement you should work on
- Hands on Experience.
- Helps to be Proactive.
- Autonomy (or) Independence.

PREPARATION FOR SUMMER INTERNSHIP

- Internship Permission Letter (University)
- Updated Resume.
- Recent Pass-Port Size photographs (5)
- Multiple copies of resume ad internship letter.

WHY IS SUMMER INTERNSHIP IMPORTANT?

- Internship experience makes the student more competitive in the job market. In addition to gaining Exposure and Experience in the field, they also provide an opportunity to see if the particular career field is right one based on the Experience in the related field.

NUMBER OF PAGES IN INTERNSHIP REPORT

- The internship report should be minimum 15 pages and maximum 30 pages.

SEQUENCE OF SUMMER INTERNSHIP REPORT

- Title Page
- Certificate from the company

- Acknowledgement.
- Abstract
- Learning Experience during the course of Internship.
- Learning Outcomes achieved during course of Internship.
- SWOC Analysis – During the course of Internship.
- Future proposed plans – Based on the Experience gained through internship.

SPECIFICATIONS & FORMAT:-

- Summer internship report should be in a4 size. The report should be soft bound using flexible branded cover as per the branding requirements of REVA University.
- Line Spacing - 1.5cm, headings - 14, Content - 12, Font Style – Times New Roman.
- Title Page – Should reflect the place where the summer internship was undertaken, title page should also reflect the name, SRN of the student, Company mentor, Faculty mentor and other requirements.

CERTIFICATE FROM THE COMPANY

- Certificate from the company should be taken in the letter head of the company with seal & sign of the head of the company. The certificate should be taken for 4 weeks duration failing which the student will not be entitled for the SIP credits.

ACKNOWLEDGEMENT:-

- Student should acknowledge the company mentor, faculty mentor, organization and others who have helped for successful completion of the summer internship.

ABSTRACT:-

- Synopsis of the work carried out in 4 weeks (200 to 300 words) should be mentioned under abstract of the report.

LEARNING EXPERIENCE:-

- Student should maintain a diary and make a note of Everyday work carried by him / her in the company.

LEARNING OUTCOMES:-

- Learnings that the student achieved during the course of the internship.

SWOC ANALYSIS:-

- Strengths, Weakness, Opportunities & Challenges faced by student / Intern should be highlighted

FUTURE PROPOSED PLANS:-

- Based on the Experience gained through internship were you able to identify the career path.

FORMAT OF DECLARATION FORM

Date:

Student Name:

SRN:

Class:

To
The Director
School of Commerce
REVA University
Bangalore-560064.

DECLARATION

Respected Madam,

I, _____, a bonafide student of _____ B.Com Honors hereby declare that I will be doing my Internship in _____ Company.

I further declare that

- a. I will not change the company the course of my internship and complete my internship to the satisfaction of the company.
- b. I will perform all duties and responsibilities assigned by the company during my internship period with utmost sincerity and diligence and ensure that University reputation is protected all the time.
- c. Attend the company 100% during all working days.
- d. Submit Weekly Reports duly signed by the company mentor to faculty mentor allotted by the University.
- e. Complete the portion of the internship as per schedule and meet all Internal Assessment requirements.

I am aware that any non-compliance with any internship regulations or negative feedback from the company during my tenure would attract appropriate penal action from the University including disqualifying from the Program.

I also understand that I would be required to submit Internship Completion Certificate on the Re-opening day of B.Com III semester classes and would be eligible to get attendance from the date of submission of Internship Completion Certificate.

Signature of the Student

ANNEXURE-III

Major Project

RESEARCH PROJECT GUIDELINES

Sl.No	TABLE OF CONTENTS	Page No
	Introduction	
	Course Objectives	
	Mentorship	
	Weekly reports	
	Course Credits	
	Evaluation of Project Report (Dissertation) - Important dates	
	Ethics in Research	
	What constitutes plagiarism?	
	Publication	
	Copies of Project Report / Dissertation	
	Size & Quality of Paper	
	Chapter Scheme: - Executive Summary - Chapter I: Introduction - Chapter 2: Industry and Company Profile - Chapter 3: Research Methodology - Chapter 4: Data Analysis and Interpretation - Chapter 5: Summary of Findings, Recommendations and Conclusion	
	Appendices and Annexures	
	Bibliography	
	Submission Guidelines	
	Order of Content	
	Annexure 1- Format to submit Organization and topic	
	Annexure 2- Weekly Report Format	
	Project Front pages:	
	Synopsis Format	

Introduction to Major Project/Dissertation:

All the Sixth semester B.Com Honors students of REVA University are required to undergo a 16 weeks internship program at an organization of their choice. The nature of internship must be based on their area of specialization and future employability, since a good internship could lead to a pre-placement offer.

A Major Project period of five to six months in a real life situation helps the graduates to achieve hands on training on execution and delivery of expected results. The constant interaction with the mentors from the organization and in-house faculty leads to a healthy synthesis of practical experience and the theoretical inputs.

The method ensures a continuous evaluation of the student interns through a comprehensive grade sheet of many of the latent talents like professional judgment, data handling and analysis, decision making abilities, initiative, leadership and team building etc. that may not be entirely visible during the classroom simulations. The industry has the benefit of direct access to the trainees who can be monitored

and evaluated over a period of six months. There is value addition as projects relevant to the industry are executed with the help of trained graduates without additional cost to the company.

Course Objectives

- Develop problem solving, decision making, interpersonal skills by contributing to the organizations’ day to day activities and performing the role assigned.
- Develop work ethics, values and exhibit professionalism.
- Improve researching, reporting and presentation skills.
- Add value to the organization through his/her contributions.

Mentorship

Students will be guided by a corporate mentor and a faculty mentor. The faculty mentor will be allotted to you by the School at the end of third semester. However, it is the responsibility of the student after consulting with the company executives to identify the corporate mentor. All the evaluation formats, project reports and attendance shall be signed by both corporate and faculty mentors.

Weekly reports

Every student shall submit the weekly report by mail (scanned) to the respective faculty guide at the end of each week. The format is given in Annexure 2.

Course Credits

A project work carrying FOUR or SIX credits is called Minor Project work / Dissertation. A project work of EIGHT, TEN, TWELVE or SIXTEEN credits is called Major Project work / Dissertation.

Programme	Title and Course Code	Credits
BBA Honors	Major Project- B19BH6060	06

Evaluation of Project Report (Dissertation)

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the mentors. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

For Undergraduates Projects

IA1	January 1 st Week	Topic Finalization and First Chapter
IA2	March 1 st Week	Second and Third Chapter
IA3	April 1 st week	Fourth and Fifth chapter -Draft Report
SEE	April 3 rd week	Final Evaluation and Viva-Voce. Synopsis of the project along with project has to be submitted.

Important dates:**For Undergraduates Projects**

- Last date to submit the name of the company and topic of internship:
- IA1: 1st Report submission: Topic Finalization and First Chapter (Identification of the problem, research methodology):
- IA2: 2nd Report submission: Second and Third Chapter:
- IA3: 3rd Report submission: Fourth and Fifth chapter - Draft Report:
- SEE: Final report submission:
- Project Viva Voce Starts from.

All interns must report on a weekly basis on the given format.

Ethics in Research

There are many ethical dilemmas associated with the practice of social Science research. There are six key principles of ethical social science research:

- Research should be designed, reviewed and undertaken to ensure integrity and quality;
- Research staff and subjects must be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved;
- The confidentiality of information supplied by research subjects and the anonymity of respondents must be respected;
- Research participants must participate in a voluntary way, free from any coercion;
- Harm to research participants must be avoided;
- The independence of research must be clear, and any conflicts of interest or partiality must be explicit;

What constitutes plagiarism?

A major ethical standard in research focuses on appropriately recognizing and crediting the work of others who have contributed to the body of knowledge in a given area. Plagiarism is simply using someone else's ideas or wording without giving due credit. When you present an idea in your thesis project that originated from another source (written or spoken), even if you modified the wording or parts of the idea, credit to the original source should be given. The thesis is a scholarly work, and as such, extensive citation from the literature is expected. As you make notes from a source, indicate clearly whether your notes are a direct quote or a paraphrased interpretation. If direct quotes are used, the page number is required for a complete citation. Plagiarism software is widely available and routinely used by professors and journal editors.

Note: *The project report has to be tested for plagiarism, and passed the plagiarism test with the similarity score less than 25% and it satisfies the academic requirements in respect of Project work prescribed for the Post Graduate Students Degree.*

Publication

Publishing one research article from project is compulsory for the Postgraduate Students. If any candidate is not published research article out of the study which they carried out are not eligible to submit the Major Project/ Dissertation. For Under Graduate Students, it publication is not compulsory but they are also encouraged to do the same.

Copies of Project Report / Dissertation

Three bound copies of the Project Report / Dissertation must be submitted to the University (the Director of respective School through the / her Project Guide). The candidate is advised to keep a copy of

the same for personal use. Along with **TWO** bound copies of the Project Report / Dissertation the electronic version of the same is to be submitted in CD in pdf format and a copy of the same is to be retained by the candidate.

Size & Quality of Paper

Good quality paper must be used printing the report. The main copy of the Project Report / Dissertation should be original. Preferably other two copies shall also be print ones. In case of photocopy, such copies shall be such that they ensure consistent quality without gray or dark casts to the background. All copies shall be on white A4 paper and printed on one side of a paper.

Chapter Scheme:

Following chapter scheme shall be used while writing the report.

Executive Summary (2-3 Pages)

A brief summary for the project in 2-3 pages. Executive summary must include a brief introduction to the study, statement of the problem, major objectives of the study, research methodology, data collection plan, data analysis and major suggestions and conclusion.

Chapter I: Introduction (8-10 Pages)

This chapter includes the introduction to the study, industry profile and theoretical background of the study.

1.1 Introduction to the study

1.2 Industry-Brief History, Industry analysis (Porter's Model), Growth and Prospects

1.3 Area of Study - Definition of the terms used, Important and other relevant aspects of the subject in line with the topic of the study.

Chapter 2: Industry and Company Profile (15-20 Pages)

2.1 Inception and History, Type, Nature, Board of Directors, Organization chart, Business operations.

2.2 Product/service profile, Market share, Competitors, Functional chart

2.3 GDP contribution

2.4 Growth and development of company and industry.

2.5 CSR of Companies

2.6 SWOT Analysis, Future prospects/growth

Chapter 3: Research Methodology (15-20 Pages)

3.0: Literature Review

Here relevant theoretical background in brief may be given by referring to some standard text books, journals, newspapers etc. Students should endeavor to collect, compile and concisely cover latest information and data by scanning latest articles published in periodicals, journal etc. Please note that the latest authentic data adds to the quality of the project report and gives a good impression to the viva-committee as well as organizations where in students are placed for summer training. Data collected from others source should be duly acknowledged and cited. (Refer <http://www.waikato.ac.nz/library/study/referencing/styles/apa> for more details.)

3.1 Statement of the problem

3.2 Title of the study

3.3 Objectives of the study

3.4 Hypothesis if any

3.5 Research Design and Sampling

3.6 Research instruments (e.g., questionnaire)

3.7 Definitions of the terms used

3.8 Scope and Limitations of the study

3.9 Chapter scheme

Chapter 4: Data Analysis and Interpretation (25-30 Pages)

The primary and/or secondary data collected must be analyzed to standard formats such as tables /graphs /diagrams and so on and is to be presented in this chapter. This chapter shall include hypothesis testing

using appropriate statistical tools. Use of advanced statistical tools to analyze your data is encouraged. Proper titles, legends, scales, source (s) etc. must be mentioned along with each diagram/table.

Data Interpretation is the most important part of the study. Students are required to apply established theoretical concepts/tools/techniques to the data presented and draw inferences. Students are required to discuss rationally for drawing inferences. For each inference, proper linkages are to be established either with the data analyzed in with the calculation (s) to be included in this chapter. Wherever, calculations are to be carried out, it must be provided before drawing any inference. The inferences are to be presented in narrative form from each data set along with limitation (s) due to data insufficiency, if any.

Each table must have

- Title of the table
- Data table (in tabular and/or visual form)
- Analysis of the table
- Inference of the table
- Source

Hypothesis testing using appropriate statistical tools also to be described here along with interpretation of results. Use excel, SPSS or R for analysis of data.

Chapter 5: Summary of Findings, Recommendations and Conclusion (4-5 Pages)

The chapter begins with objectives and scope of the study to ease the understanding of the reader. The findings should be summarized and presented in a paragraph form, numbering each of the finding. The conclusion of the project should be given so as to justify the objectives of the study.

Recommendations and Conclusion (2-3 Pages)

- Drawn with direct reference to objectives of the study.
- Find specific recommendation/suggestions to each of the objective of the study.
- These recommendations should be specific, acceptable/practical and clear.

Appendices and Annexures

- The copy of the questionnaire and any useful material collected from the organization may be annexed.
- In case of finance topics, the copies of the attested financial statements of three to five years are to be annexed.

Bibliography

- The references made from the text books, articles, journals & magazines and website must be cited both.
- Follow APA style referencing. A few citations are given below.
- India today, “The Melt down: End of good times”, Oct 27, 2008.
- James M, Kaplan; and et.al. “Managing it in a Down Turn: Beyond Cost Cutting”, Indian Management, vol.47 issue 11, Nov 08.
- <http://www.ibm.com/in> (Accessed on(mention the date))

Submission Guidelines

- The report should be printed on A4 size Executive Bond sheet.
- The font used should be Times New Roman and font size should be 12. For Heading; Times New Roman 14 in Bold and for sub heading; Times New Roman 12 in Bold.

- The top, bottom and right margins should be 1” each. The left margin should be set at 2”.
- The line spacing should be fixed at 1.5 lines.
- Table line spacing shall be single line spacing.
- Page numbers should be placed at bottom middle position.
- Chapters should be numbered as 1, 2, 3, etc. The tables and charts should be in the format of 1.1, 1.2, etc. i.e. 1.1 indicates that it is the first table in Chapter 1; 2.1 Indicates first table in Chapter 2. Similarly chart no. 1.1 indicates first chart in Chapter 1.
- The project report should be a minimum of 60 pages and should not exceed 75 pages.
- Students should submit 3 hard copies duly signed by the faculty guide and the Director and soft copy in pdf format.
- The hard copy should be in soft binding format with white thick cover as the cover page.
- Title of the study, objectives, analysis, findings and suggestions should tally.

Order of Content

- Cover Page
- Title page
- Candidate’s Declaration page - containing the signature of the candidate, guide, co-guide if any, and Director of the School.
- Certificate by the Guide and the Co-Guide if any, and the Director of the School concerned for having completed the project and prepared the report as per the requirements of the University.
- Certificate that the Project Report / Dissertation has been revised and resubmitted based on suggestions by examiners, if applicable, signed by the candidate, guide, co-guide, if any, and Director of the School.
- Preface and/or Acknowledgement
- Table of contents with page references
- List of tables with titles and page references
- List of illustrations / Screen Shots if any, with titles and page references.
- List of Symbols, Abbreviation of Nomenclature
- Abstract
- Text
- References,
- Bibliography, if any
- Appendices, if any
- Copies of articles/ Conference papers published

Format to submit Organization and topic

B19CH6060– Organization and Topic	
Name of the student	
SRN	
Name of the company	
Address of the company	
Name of the corporate mentor	
Designation	
Mobile number of the corporate mentor	
E-Mail id of the corporate mentor	
Topic of study	

Weekly Report Format

B19CH6060 – Weekly Report	
Month:	Week : I / II / III / IV
Dates (From- to):	
Details of work done in the Week:	
Job Description:	
1.
2.
3.
Achieved Outcome:	
.....	
Signature and Name of the Reporting Manager :	
Signature and Name of the Student :	
Date:	

Project Front pages:

Specimen of Cover Page

3.012 "

0.839 "

Font : Roboto Slab, Bold, 17pt

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

A PROJECT REPORT *Font : Roboto Slab, Normal, 12pt*
ON

Font : Roboto Slab, Bold, 14pt

"AN AUTOMATED ACCIDENT DETECTION SYSTEM"

submitted in partial fulfilment of the requirement for the award of the degree of
Font : Roboto Slab, Normal, 10pt

MASTER OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING *Font : Roboto Slab, Bold, 16pt*

Submitted by
(Name of the candidate)

(SRN) *Font : Georgia Normal, 12pt*

Under the guidance of
(Name of the Guide)

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Sample Title Page for Project Report / Dissertation

SCHOOL



REVA
UNIVERSITY
Bengaluru, India

OF.....

A Project Report

On

< Title of the project / Dissertation >

Submitted in fulfillment of the requirements for the award of the Degree of
Bachelor of

Submitted by

(Name of the Candidate)

(SRN)

Under the guidance of

(Name of the Guide)

(Name of the Co Guide) (if any)

May 2019

Rukmini Knowledge park , Kattigenahalli, Yelahanka, Bengaluru-560064

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Sample Candidate's Declaration Page for Project Report / Dissertation

DECLARATION

I, Mr. / Ms. <name of candidate> student of B.Com (Industry Integrated) belong in to School of Commerce, REVA University, declare that this Project Report / Dissertationentitled “ < **title of the project** >”is the result the of project / dissertation workdone by me under the supervision of Dr / Prof. <**name of Guide with affiliation** .

I am submitting this Project Report / Dissertationin partial fulfillment of the requirements for the award of the degree of Bachelor of Commerce in Commerce by the REVA University, Bangalore during the academic year 2019-19.

I further declare that this project / dissertation report or any part of it has not been submitted for award of any other Degree/ Diploma of this University or any other University/ Institution.

(Signature of the candidate)

Signed by me on < date, month and year >

Certified that this project work submitted by < name of the candidate > *has been carried out under my / our guidance and the declaration made by the candidate is true to the best of my knowledge.*

Signature of Guide Signature of Co-Guide, (if any)

Date :Date :

Signature of Director of School

Date :

Official Seal of the School

Sample Certificate Page by the Guide for Project Report / Dissertation



SCHOOL OF.....

CERTIFICATE

Certified that the project work entitled < **TITLE** >carried out under my / our guidance by <**Candidate Name**>, < **SRN** >, a bonafide student of REVA University during the academic year 2015-16, is submitting the project report in partial fulfillment for the award of **Bachelor of**in <Program Name> during the academic year **2019–20**. The project report has been tested for plagiarism, and has passed the plagiarism test with the similarity score less than 25%. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Signature with date

Signature with date

Signature with date

**<Guide name>
Guide**

**<Co Guide name>
Co Guide**

**< Name of the Director >
Director**

External Examiner

Name of the Examiner with affiliation Signature with Date

- 1.
- 2.

ACKNOWLEDGEMENT

This is a matter of pleasure for me to acknowledge my deep sense of gratitude to REVA UNIVERSITY and my college, School of Commerce for giving me an opportunity to explore my abilities via this internship program.

I would like to express my sincere gratitude to our internship guide<Name> for his valuable guidance and advice in completing this organisation study.

Let me take this opportunity to thank School Director, **Prof. Shubha A** for the whole hearted support extended to me throughout the conduct of the study. Madam gave me lot of inputs and suggestions to bring out the best in me. The encouraging words that have been extended were great boost for the completion of this work.

I would like to record my sincere appreciation and gratitude towards all the officials and employees of < Company Name>, without whose kind assistance, my internship program would not have succeeded.

I am also very thankful and grateful towards my seniors, colleagues and authorities of School of Commerce, REVA UNIVERSITY for their support, encouragement, and valuable suggestions for the completion of this organisation study.

Last but not the least, I would like to express my sincere thanks to my family members, friends for their immense support and best wishes through-out the internship duration and the preparation of this report.

(Student Name)

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II	Industry and Company Profile	
III	Research Methodology	
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LIST OF TABLES

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LIST OF GRAPHS

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Synopsis Model Format



**CUSTOMERS' RESPONSE TO MOBILE NUMBER PORTABILITY
-A STUDY WITH SPECIAL REFERENCE TO VODAFONE SUBSCRIBERS IN BANGALORE**
(The title should be clear and specific in term of topic and area of study)

Submitted in Partial Fulfilment of the Requirement for the award of the degree

In
COMMERCE

By
Student Name
SRN:XXXXX

Under The Guidance Of
(GUIDE NAME)

School of Commerce

REVA UNIVERSITY

Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru – 560 064
Year of submission

Introduction *(Heading font size 14 and body text 12)*

Mobile number portability (MNP) enables mobile telephone users to retain their mobile telephone numbers when changing from one mobile network operator to another. MNP (Mobile number portability) is implemented in different ways across the globe. In India the Telecom Regulatory Authority of India (TRAI) implemented the MNP facility firstly in Haryana in November 2010 and then extended to all parts of the country in January 2011. The facility is available for both pre-paid and post-paid customers across mobile operators with in the same telecom circle. *(In this paragraph introduce about your topic)*

Vodafone India, formerly Vodafone Essar and Hutchison Essar, is the second largest mobile network operator in India after Airtel. It is based in Mumbai, Maharashtra and which operates nationally. It has approximately 146.84 million customers as of November 2011. In terms of active subscriber base in Karnataka Vodafone is the second largest player with a market share of 19.8%. Karnataka is one of slowest growing market with high proportion of MNP requests. By March 2012, Karnataka registered 2,066,487 Mobile Number Portability (MNP) requests, resulting into churn rate of 6.08% which is one of the highest in India. *(Here introduce about your special reference product or organization)*

This study is an attempt to understand the customers' response towards MNP facility with special reference to Vodafone customers in Bangalore. Bangalore is one of best city in India with respect to development and generating income. *(Here introduce about what you are going to do with this project)*

Significance of the study *(State why your study is relevant and how it will useful to various interested groups)*

Active wireless subscriber base in Karnataka is 72.67% resulting in 24.72 million active mobile users. Vodafone is the second largest mobile operator in terms of active subscriber base and fastest growing wireless operator in Karnataka. By March 2012, Karnataka registered 2,066,487 Mobile Number Portability (MNP) requests, resulting into churn rate of 6.08% which is one of the highest in India. Vodafone is one of the companies which benefitted from the MNP service. So this study highly relevant and will be useful to mobile operators as well as to mobile

subscribers for making informed decision regarding porting from one operator to other.

Statement of the Problem (*State your hypothesis here. Hypothesis is your assumption that you are going to prove through this study*)

Mobile Number Portability is a powerful tool in the hands of customers to bargain from their existing mobile operators for better quality in services and fare tariff for services. Under MNP, if the subscribers are not satisfied with the services of their service provider, they can change their service provider while retaining the existing phone number. But in India this facility has got poor response comparing to other countries because of very little pent up demand for it when compared to other countries. So this study will reveal awareness level, opinion and use of MNP facility among Vodafone subscribers in Bangalore.

Objectives of the study (*Write two or three specific objectives of the study*)

- To know the awareness level of MNP facility among Vodafone subscribers
- To examine the factors influencing the porting decision of mobile users
- To analyse customers satisfaction after availing MNP facility

Methodology and Data Collection

a. Scope of the study (*Scope means the area of coverage. Is the geographical area where you are conducting your study*)

This study will be conducted among Vodafone customers in Bangalore, Karnataka.

b. Sampling Plan (*Mention about the number of samples and methods of sampling*)

30 Vodafone customers will be randomly chosen for the purpose of study. The data will be collected through structured questionnaire.

c. Methodology (*Here mention about the sources of data and methods of collecting data*)

This study will be based on both primary and secondary data. The primary data will be collected through questionnaire specially designed for this survey. And secondary data will be gathered from the relevant journals, web sites and other sources.

Chapterisation (*The chapter in your project along with brief explanation about every chapter*)

The study will be presented through the following chapter schemes

1. Introduction
2. Review of Literature
3. Analysis and Interpretations
4. Finding, Suggestions and Conclusions

Limitations of the study (*Mention two or three factors that will limit the quality of your study*)

1. The shortage of time and money will limit the number of samples in to minimum
2. The advanced statistical tools not used for analysis

Finding and Suggestion

A brief Finding and suggestion of the of the study has to be presented here.

References (*All the sources of the data used for the study has to be cited as per the API rules*)

- The references made from the text books, articles, journals & magazines and website must be cited both
- Follow APA style referencing. A few citations are given below.
- India today, “The Melt down: End of good times”, Oct 27, 2008.
- Bartov, E. & Mohanram, P. (2004). Private information, earnings manipulations, and executive stock-option exercises. The Accounting Review, 79(4), 889-1010.
<http://www.ibm.com/in> (Accessed on(mention the date)

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of commerce is knowledge not only in the subject, but also the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career. The School of Applied sciences also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill

techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

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OF UNIVERSITY
RECOGNITION

20 YEARS OF
ACADEMIC
EXCELLENCE



REVA
UNIVERSITY

Bengaluru, India

**SCHOOL OF PERFORMING ARTS AND
INDIC STUDIES**

BA PaEP

(Performing Arts, English & Psychology)

Handbook 2019-22





School of Performing Arts

BA – PaEPs (Performing Arts, English & Psychology) Hand Book

2019-2022

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Phone No: +91-080-66226622, Fax: 080-2847853

Rukmini Educational
Charitable Trust www.reva.edu.in

Chancellor's Message

“Education is the most powerful weapon which you can use to change the world.”-Nelson Mandela

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when ‘intellectual gratification’ has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.



It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of ‘Knowledge is Power’, we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I’m always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said ‘A University should be a place of light, of liberty and of learning’. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

DIRECTORS MESSAGE

The freedom that students are getting to choose their careers now is much broader than ever before. Unconventional career choice is the new way, and the Gen Y is all about wonderful creativity. School of Performing Arts, aims to benchmark itself in the area of Music, Dance and Theatre courses from the Diploma to Research level degrees. Indian tradition in which Music and Dance plays a pivotal role is a major attraction and a focus of study for not only Indians but westerners too, for, one finds it very scientific and vast area for inter-disciplinary research activities. Department is well equipped to meet the traditional and modern needs of both Indian and foreign nationals. The performing wing of the school shall aim to churn out the most sought after performers and especially thinking dancers. The syllabi is world class and prepares students not just as performers but also in the areas like research, Art Management, Personality development, soft skills, Music, Nattuvangam, Theatre studies and other allied art forms, apart from bringing in internationally acclaimed artistes for workshops, guest lectures and interactive sessions. The field work and Dissertation makes the course rigorous and unparalleled. The curriculum caters to and has relevance to local, regional, national, global development's needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional, ethics, gender, human values, environment & sustainability.

I take this as my privilege to welcome the artistes and connoisseurs to come and explore the finer aspects and unexplored world of Performing Arts at REVA University

Dr Vidya Kumari.S
Director, School of Performing Arts

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognised by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 27 Post Graduate Degree programs, 29 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 18 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed

skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement

(CDC) department with world class infrastructure, headed by a dynamic experienced Professor and Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher-scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the

DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **'Life Time Achievement Award'** to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the **"Founders' Day Celebration"** of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "REVA Life Time Achievement Award" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced **"REVA Award of Excellence"** in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga class everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Within short span of time, REVA University has been recoged as a fast growing university imparting quality higher education to the youth of the country ans received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia'sGreatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by Assocham India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

ABOUT SCHOOL OF PERFORMING ARTS

India proudly treasures the rich heritage and culture which is unparalleled and incomparable to any in the world. Indian arts play a pivotal role and Performing Arts stands as testimony to the richness of this country's cultural legacy. The Performing Arts, comprising of Music, Dance and Theater, are in demand as career choices, like never before. REVA-SPA offers unique, challenging Performing Arts programmes which prepares artistes for the future. The aim of these courses is to bring in a holistic view to the performing arts' education system in India. The School of Performing Arts offers courses like Certificate, Diploma, BAPaEP (Triple degree in Performing Arts, English literature and Psychology), MPA (Masters of Performing Arts) and Ph. D programs. Our Syllabus is world class and bench-marked. The SPA is in the beautiful campus of REVA University - which has received the 'Best Campus' and the 'Best upcoming University' awards. Being the institutional member of International Dance Council (CID), the official member partner of UNESCO, the School of Performing Arts is now concentrating on collaborating with universities abroad for short term and semester exchange programs and on introducing Indian Performing Arts to the foreign students. Internationally acclaimed artistes visit the campus often as visiting faculty members and guest lecturers to interact with students. The performing wing at the School of Performing Arts has performing opportunities all over the country and abroad. Students can expect to become thinking, professional artistes. The seminars, workshops, guest classes are intended make them ready to face the world of Arts that is an amalgamation of a spectrum of experiences and choices.

USP of Programs run by School of Performing Arts:

- Full-time dedicated and highly experienced dance and music faculty members.
- Exclusively dedicated floor for School of Performing Arts in the Rukmini Knowledge Park campus.
- Well-equipped library with hand picked books and Sanskrit Volumes on treatises in Dance, Music and Theatre along with News Papers, Journals, Magazines, Books, e-resources etc., on Performing Arts.
- Audio and Video Facility in all the classrooms.
- Aesthetically designed and acoustically planned classrooms with Modern German Dance flooring for injury free dancing.
- World Renowned artists as Visiting Lecturers and Adjunct Faculty.
- World renowned Artists for lecture demonstratins and Workshops under "Kala Gnana", monthly series conducted in the School of Performing Arts for the benefit of Students.
- Gazebos for conducting classes on campus which not only provides additional space to the Performing Arts' studentsbut also acclimatizes students from other schools with the traditional art forms and traditional teaching methods

- Training and exposure to Research and Publications where students are trained by their mentors on presenting their research papers in conferences and seminars. They are also trained to publish research papers in reputed journals in India and across the globe.

- Certification and training programs for CBSE UGC NET exam. Training in Sanskrit, Telugu and Kannada as part of the curriculum. Language Labs
- Well-equipped Psychology Labs
- Well-planned and challenging syllabus.
- Performing opportunities at prestigious Festivals in India and Abroad as part of the Performing wing of the School of Performing Arts.
- State-of-the-Art facilities for Locker rooms, Changing rooms and Green rooms.
- Mandatory Mentor and Mentee sessions by faculty members every week for the benefit of the students.
- Dedicated auditoriums with International-standard sound and lighting system.
- Global program with an opportunity to pursue a short term or a semester in one of our partnered Universities in USA, Europe etc.,
- Opportunity to also participate in Inter-University competitions at State, National and International levels.
- Dedicated Skill Development Cell that focusses on career-oriented Programs exclusively for Performing Arts' students.
- Special Training in Allied forms like Stage-Craft, Sound System, Lighting, Make-up, Costumes etc.
- Annual Field Trips for the students along with faculty members to historically significant places particularly related to the performing arts.
- Mandatory Internship Programs for UG and PG Students.

VISION

The School of Performing Arts aims to be a Centre of Excellence in Performing Arts through high-quality education, research, innovation, creativity, extension and collaboration and to prepare students to be great performers and innovators and create a global village of peace and prosperity by spreading the message of Indian culture and tradition.

MISSION

- To impart holistic performing arts education by matching contemporary world requirements with traditional pedagogical techniques.
- Attract and develop talented and committed human resources and provide an environment conducive to research, innovation and team spirit.

- Develop and effectively utilise excellent infrastructural facilities; facilitate effective interaction among faculty and students with other schools and promote inter disciplinary learning and research environment.
- Practice and promote high standards of professional artistry with ethics and enrich the personality traits of students to become great performers coupled with moral values.
- Foster networking with alumni, artists and art institutions across the world and other stakeholders and spread the message of Indian culture and tradition for global peace and prosperity.

ADVISORY BOARD

SL No.	Name
1.	Dr. S Ramaswamy, Professor[Retd] Bangalore University, Bangalore
2.	Dr. V. S. Sreedhara, Professor of English , NLSUI, Bangalore
3	Dr. Shivalinga Swamy, Associate Professor and HoD of English, Tumkur University, Tumkur
4.	Dr. Etienne Rassendren, Professor, Dept of English, St Joseph's College[Auto], Bangalore
5	Dr. C. P. Ravichandra, Professor, Dept of English, Mysore University, Mysore
6	Dr. Rajendra Chenni, Professor. Dept of English, Kuvempu University, Shimogga
7	Prof. S. Narayanan, Professor [Retd], Kongadiappa College, Doddabalapura

“Education is the manifestation of the perfection already in man”

- Swami Vivekananda

The ladder of success is best climbed by stepping on the rungs of opportunity.

- Ayn Rand

I think of science fiction as being part of the great river of imaginative fiction that has flowed through English literature, probably for 400 or 500 years, well predating modern science.

- [J. G. Ballard](#)

Literature adds to reality, it does not simply describe it. It enriches the necessary competencies that daily life requires and provides; and in this respect, it irrigates the deserts that our lives have already become.

- [C. S. Lewis](#)

Literature is the art of discovering something extraordinary about ordinary people, and saying with ordinary words something extraordinary.

- [Boris Pasternak](#)

B A - PaEPs (Performing Arts, English and Psychology)

Programme Overview

Performing Arts, English and Psychology disciplines deal with human life and human experience qualitatively. Humanities investigates how do human beings behave? Why do they behave this way? How do human beings interact with each other? How do human beings interpret the world around them? And what kind of political, social and cultural institutions do they form?

The field of humanities include Modern languages, Classical languages, Linguistics, Literature, History, Jurisprudence, Philosophy, Archaeology, Comparative religion, Ethics, History, criticism and theory of the arts, Journalism, Psychology, Political science and such subject areas.

Bachelor of Arts programme in Performing Arts, English and Psychology offered by **School of Performing Arts at REVA UNIVERSITY** intends to focus on performing Arts, English language skills and impart knowledge on psychology amongst its students.

Theatre, music, dance, and other kinds of performances are present in all human cultures. The history of music and dance date to pre-historic times. In India, religion, philosophy and myth cannot be divorced from their art forms. Dance, Drama and music are tied inextricably to ceremony of any kind. Bharatnatyam, Kathakali, Kathak, Manipuri, Odissi, Kuchipudi, Sattriya, Mohiniyattam are some of the classical Dance forms of India. Similarly, the classical music forms of India are Hindustani Classical Music and Carnatic Classical Music, in addition, there are hundreds of regional music forms and there are many musical instruments to compose and play music. Koodiyattam, Yaksha gana, Swang, Bhand Paather, Ankiya Naat Bhaona, Tamasha, Therukoothu, Jatra are some of theatre forms of India. In addition, there are puppet forms. They all adhere to the canons of classical dance laid down in the Natya Shastra, a second century C.E. text ascribed to the sage Bharata, to whom it was supposedly revealed by the Creator, Brahma.

Performing arts in India and its practitioners are referred to as being part of the “entertainment industry.” This indicates a paradigm shift in the manner in which the arts is being viewed by society. The message apparent by the shift is that the audience now expects that the Arts must entertain in the manner defined by the entertainment industry, and they must form part of an organized industry. The performing arts industry in India reached INR236 billion in 2012 and is expected to witness a CAGR of 2.5% over 2012—2018 to reach INR275 billion in 2018. The industry will primarily be driven by new and innovative forms of fund raising by theater and dance groups and a growing demand for Indian culture at an international level.

At present more than 400 million youth are below 18 years of age and they have varied aspirations. A significant number of them would like to work in entertainment industry.

In this context, a n undergraduate University Programme offered by **REVA University** in Performing Arts, English and Psychology is relevant to meet the future human resources requirement of Entertainment Industry and also safe guard Indian tradition and culture.

Programme Educational Objectives (PEOs)

The aim of the programme is to create graduates with critical, analytical and creative abilities to work in the entainment sector.

The Programme Educational Objectives are to prepare the students to:

1. Perform as Dancers/Musicians/Actors in entertainment sector
2. Work as creative directors, choreographers, producers of art and entertainment programmes
3. To work as managers, academicians, administrator or entrepreneurs with strong ethics and communication skills
4. Pursue higher education and research in reputed institutes at national and international level
5. Aware of environmental, legal Issues, cultural and constitutional obligations
6. Adopt lifelong learning for continuous improvement

Programme Outcomes (POs)

After undergoing this programme, a student will be able to:

1. Perform as an artist as a Dancer/Musician/Musical instrument Player/Actor
2. Compose Music
3. Act as a Choreographer
4. Write drama and act
5. Use modern technologies for enhancing the performance of entertainment industry
6. Direct and produce relevant products for entertainment industry
7. Choose appropriate online programmes for further learning, participate in seminars and conferences
8. Manage information, develop technical reports and make presentations
9. Lead a team to successfully c o m p l e t e a project and communicate across teams and set up his/her own enterprise
10. Conduct himself as a responsible citizen

B A (Performing Arts, English and Psychology - PaEPs)

SCHEME OF INSTRUCTION

(Effective from 2019-20)

Sl. No	Course Code	Course Title	Course Type	Credit Pattern and Credit Value			No. of Hrs.	
				L	T	P	Total Credit	Sessions
1	B19BA1011	Language–II:Kannada	CC	2	1	0	3	4
2	B19BA1012	Language–II: Hindi	CC					
3	B19BA1013	Language–II: AdditionalEnglish	CC					
4	B19BA1020	Communicative English–I	CC	2	0	1	3	4
5	B19BA1030	Indian Constitution And Human Rights	FC	2	1	0	3	3
6	B19BA1040	Performing Arts and Art History of India	HC	3	0	0	3	3
7	B19BA1051	Practical1(Fundamentals of Bharatanatyam)	SC	0	0	3	3	6
8	B19BA1052	Practical1(Fundamentals of Kuchipudi)	SC					
9	B19BA1053	Practical1(Fundamentals of Drama)	SC					
10	B19BA1054	Practical1(Fundamentals of Carnatic Music)	SC					
11	B19BA1060	English Literature & Language-I: British Literature (Chaucer to Pope) & Aspects of Language	HC	2	0	1	3	4
12	B19BA1070	Foundations of Psychology–I	HC	3	0	1	4	5
13	B19BA1080	Yoga/Sports	RULO	0	0	2	2	4
Total Credits				14	02	08	24	34
SECOND SEMESTER								
1	B19BA2011	Language–II:Kannada	CC	2	1	0	3	4
2	B19BA2012	Language-II: Hindi	CC					
3	B19BA2013	Language-II: Additional English	CC					
4	B19BA2020	Communicative English–II	CC	2	0	1	3	4
5	B19BA2030	Natya Sastra and Performing Arts	HC	3	0	0	3	3

6	B19BA2041	Practical 2 (Fundamentals of Carnatic Music)	SC	0	0	3	3	6
7	B19BA2042	Practical-2 (Fundamentals of Drama)						
8	B19BA2043	Practical-2 (Fundamentals of Bharatanatyam)						
9	B19BA2044	Practical -2 (Fundamentals of Kuchipudi)						
10	B19BA2050	English Literature & Language-II: British Literature (The Romantic Age) & Aspects of Language	HC	2	0	1	3	4
11	B19BA2060	Foundations of Psychology-II	HC	2	0	1	3	4

12	B19BA2071	Folklore Study–Folk Dance	SC	0	1	1	2	3
13	B19BA2072	Folklore Study–Folk Music						
14	B19BA2073	Folklore Study–Folk Theatre						
15	B19BA2080	Skill Development–1 (Multimedia and Designing)	RULO	1	0	1	2	3
Total Credits				12	02	08	22	31

THIRD SEMESTER

1	B19BA3011	Language–II–Kannada	CC	2	1	0	3	4
2	B19BA3012	Language-II: Hindi						
3	B19BA3013	Language-II: Additional English						
4	B19BA3020	Environmental Studies	FC	3	0	0	3	4
5	B19BA3030	Rasa Theory and its implications in Performing Arts	HC	2	1	0	3	3
6	B19BA3041	Practical -3-Bharathanatyam						
8	B19BA3042	Practical -3–Kuchipudi	SC	0	0	3	3	6
9	B19BA3043	Practical -3–Carnatic Vocal						
10	B19BA3044	Practical -3-Drama						
	B19BA3050	English Literature & Facets of Language - III	HC	2	0	1	3	4
	B19BA3060	Social Psychology	HC	2	0	2	4	5
11	B19BA3070	Skill Development –2 (Indian Classical Dance Makeup)	RULO	4	0	0	4	4
Total Credits				16	03	04	23	30

FOURTH SEMESTER								
1	B19BA4011	LanguageII–Kannada	CC	2	1	0	3	4
2	B19BA4012	Language-II: Hindi						
3	B19BA4013	Language-II: Additional English						
4	B19BA4020	Textual Traditions in Performing Arts	HC	2	1	0	3	4
5	B19BA4031	Practical4-Bharathanatyam	SC	0	0	3	3	6
7	B19BA4032	Practical4–Kuchipudi						
8	B19BA4033	Practical4–CarnaticVocal						
9	B19BA4034	Practical4–Drama						
10	B19BA4040	English Literature & Facets of Language – IV Reading India	HC	2	0	1	3	4
11	B19BA4050	Developmental Psychology	HC	2	0	1	3	4
12	B19BA4060	Internship in Performing Arts	HC	0	0	3	3	6
	B19BA4070	MOOC (SELFSTUDY)	RULO	0	0	2	2	4
		Total Credits		08	02	10	20	32

FIFTH SEMESTER								
1	B19BA5010	Traditions and Innovations in Performing	HC	4	0	0	4	4
2	B19BA5020	ArtsManagement	HC	3	0	0	3	3
3	B19BA5031	Practical 5–Bharatanatyam	SC	0	0	3	3	6
4	B19BA5032	Practical 5–Kuchipudi						
5	B19BA5033	Practical 5–CarnaticVocal						
6	B19BA5034	Practical 5–Drama						
7	B19BA5040	Literary Criticism	HC	2	1	0	3	4

8	B19BA5051	Indian Writings in English-I	SC	2	1	0	3	4
9	B19BA5052	Myths and Mythologies						
10	B19BA5060	Indian and Transpersonal Psychology-I	HC	2	0	1	3	4
11	B19BA5071	Abnormal Psychology-I	SC	2	0	1	3	4
12	B19BA5072	Health Psychology-I						
13	B19BA5080	Skill Development-Employability Skills	RULO	0	0	2	2	4
14	B19BA5090	Open Elective	OE	0	0	2	2	4
		Total Credits		15	2	9	26	37

SIXTH SEMESTER

1	B19BA6010	Aesthetics(IndianandWestern)	HC	4	0	0	4	4
2	B19BA6021	Group Choreography	SC	3	0	0	3	3
3	B19BA6022	Music Kutcheri						
4	B19BA6023	Drama Production						
5	B19BA6030	Introduction to Literary Theory	HC	2	1	0	3	4
6	B19BA6041	Indian Writings in English-II	SC	2	0	1	3	4
7	B19BA6042	Revisionist Writings						
8	B19BA6050	Indian and Transpersonal Psychology-II	HC	2	0	1	3	4
9	B19BA6061	Abnormal Psychology-II	SC	2	0	1	3	4
10	B19BA6062	Health Psychology-II						
11	B19BA6070	Field Trip	HC	0	0	4	4	0
12	B19BA6080	Dissertation	HC	0	0	6	6	12
		Total Credits		15	2	12	29	35

Distribution of Credits Based on L: T: P

Semester	L	T	P	Total
I	14	02	08	24
II	12	02	08	22
III	16	03	04	23
IV	08	02	10	20
V	15	02	09	26
VI	15	02	12	29
Total	80	13	51	144

Distribution of Credits Based on Type of Courses

Semester	HC	SC	OE	RULO	FC	CC	TOTAL
I	12	-	-	4	2	4	22
II	18	-	-	4	2	2	26
III	14	-	4	4	2	-	24
IV	12	6	-	6	-	-	24
V	15	6	-	4	-	-	25
VI	21	-	-	2	-	-	23
Total	92	12	4	24	6	6	144

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours	
I	ᄀᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆ	25 Marks nᄆᄆᄆ, ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ <<ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ	1. ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ 2. ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ 3. ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ 4. ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆ	ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆ	12 Hours
II	ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆ	25 Marks nᄆᄆᄆ, ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ <<ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ	5. ᄆᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ... 6. ᄆᄆᄆᄆᄆᄆᄆᄆ 7. ᄆᄆᄆᄆᄆᄆᄆᄆ 8. ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ	ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ	12 Hours
III	ᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ	25 Marks nᄆᄆᄆ, ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ <<ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ	9. ᄆᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆᄆᄆ 10. ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ 11. ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ <<ᄆᄆᄆᄆ 12. ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ	ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ	12 Hours
IV	ᄆᄆᄆᄆᄆ	25 Marks nᄆᄆᄆ, ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ <<ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ	13. ᄆᄆᄆᄆᄆᄆᄆᄆ	n.ᄆ. ᄆᄆᄆᄆᄆᄆ	12 Hours

ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ:

- ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ. 2014
- ᄆᄆᄆᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2008
- ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ 1,2,3,4,5 ᄆᄆᄆᄆᄆ 6, ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2014
- ᄆᄆᄆᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2007
- ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2010
- ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ. 2010
- ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2010
- ᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2010
- ᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2013
- ᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆᄆ. 2012
- ᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆ. ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ. 1997
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- ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ. ᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ. 2012
- ᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆᄆ. 2015
- ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆ. ᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ ᄆᄆᄆᄆᄆᄆᄆ, ᄆᄆᄆᄆᄆᄆᄆᄆ. 2013

16. uA. ©.Juī. PEĀ±vAgĀvī. PEĒĀuĀA PĀĒĀqĀ fĀI PĀUĀĀĀ, ¥ĀĀ±ĀPĀgĀĀ CAQvĀ ¥ĀĀuĀPĀ, *ĒĀUĀĀSgĀĀ. 2005
17. ±ĀvĀĀgĀĀĀĀ vĀ.uĀĀ., PĀĒĀqĀ uĀ>>vĀi ZĀjvĒ. ¥ĀĀ±ĀPĀgĀĀ vĀĀĀĀQĒĀ vĒĀPĀtĀĀĀ uĀĀgĀPĀ UĀĀxĀvĀĀĒĒ, vĒĒĀSgĀĀ - 2014
18. ±vĀĀĀZĀĀĀ f.Juī. PĀĒĀqĀ uĀ>>vĀi uĀĀĀĀĒĒ, ¥ĀĀ±ĀPĀgĀĀ uĀ¥ĀĀ §ĀPĒ ĒĒĒ, *ĒĀUĀĀSgĀĀ. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA1012	HINDI-I (Language)	CC	2	1	0	3	4

पाठ्यक्रम संरचना :

यह पाठ्यक्रम संरचना, संकाय के अधीन है।

संकाय के अधीन है।

संकाय के अधीन है।

पाठ्यक्रम उद्देश्य : अभिकर्ता पठना

- संकाय के अधीन है।
- संकाय के अधीन है।
- संकाय के अधीन है।
- संकाय के अधीन है।

संकाय के अधीन है :

संकाय के अधीन है।

- संकाय के अधीन है।
- संकाय के अधीन है।

संकाय के अधीन है

- संकाय के अधीन है।

संकाय के अधीन है / संकाय के अधीन है

संकाय	संकाय	संकाय के अधीन है	संकाय	संकाय के अधीन है
I	संकाय के अधीन है	25 घंटे संकाय के अधीन है	संकाय के अधीन है : 1. संकाय के अधीन है 2. संकाय के अधीन है 3. संकाय के अधीन है	12 Hours
II	संकाय के अधीन है	25 घंटे संकाय के अधीन है	संकाय के अधीन है : 4. संकाय के अधीन है 5. संकाय के अधीन है 6. संकाय के अधीन है	12 Hours

III	ਹਰਰਰਰ □ਿਹ ਹਰਰਰ	25 ਹਰ .ਹ.ਹਰਰ ਹਰਰਰਰ' □ਰਰ ਹਰਰਰਰਰ	ਹਰਰਰਰ:ਰ : .7ਹਰਰਰਰ - ਹਰਰ ਰਰ ਹਰ ਹਰਰਰ - ਹਰ ਹਰਰਰ ਰ .8□ਿਹ ਹਰਰਰ - ਰਰਰ ਰਰ ਰਰਰਰ™ - ਹ.ਹਰਰਰਰ ਹ	12 Hours
IV	ਹਰਰਰਰਰ	25 ਹਰ	ਹਰ ਹਰ : ਹਰਰਰ - ਹਰ:ਹਰ	12 Hours
	ਹਰਰਰਰਰ	ਹਰਰਰਰ (ਹ&ਹ) ਰ (ਹਰਰਰਰਰ)	ਰਰ ਹ ਹ	

ਹ:ਰਰ' □:ਹ :

- ਹਰ □ ਹਰਰ - ਹਰ ਰਰ ਰਰ&ਰਰhਰਰ
- ਹਰਰਰ □ਹਰਰ ਹਰ ਰਰ:ਰਰ - ਰਰ. ਹਰਰਰਰ ਰਰ
- ਹਰਰਰਰ □ਹਰਰ ਹਰ ਰਰ:ਰਰ - ਰਰ. ਹਰਰਰਰ:ਹ ਰਰ
- ਰਰ:ਰਰ ਰਰਰ:ਰ ਰਰ ਹਰਰਰਰਰ - ਰਰ. ਹਰਰਰ
- ਰਰਰਰਰ ਰਰ:ਰਰ ਰਰਰ:ਰ ਰਰ ਹਰਰਰਰਰ - ਰਰ. ਹਰਰ ਹਰ
- ਰਰ:ਰਰ ਰਰਰ:ਰ ਰਰ ਹਰਰਰ ਰਰਰਰਰ - ਰਰ. ਹਰਰ ਰਰਰਰ ਹਰ
- ਰਰਰ ਰਰ:ਰਰ ਰਰ ਰਰ ਰਰਰਰ ਰਰ ਰਰ ਰਰਰਰ ਰਰਰਰਰ ਰਰ:ਰਰ
- ਹਰਰਰਰਰ ਹਰਰਰਰਰ ਰਰਰਰਰਰ
- ਰਰਰਰਰਰ ਰਰ ਹ:ਰਰਰ - ਰਰ. ਰਰ. ਹਰ ਰਰਰ&ਰਰਰ ਹਰ

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA1013	ADDITIONAL ENGLISH-I (Language)	CC	2	1	0	3	4

Course Outline:

This is a 3 credit course designed to help the learner gain competency in language through the exploration of various genres of classic literature intended to develop the capacity to appreciate, assimilate and research on the various dimensions of society, culture and life.

Course Objectives:

1. To equip students with the ability to acquire the functional use of language in context.
2. To motivate the students to explore and critique issues related to society and Ethics.
3. To develop in the students a genuine habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

On completion of the course, learners will be able to:

Demonstrate ethical responsibilities in taking cognizance of issues relating to society and values.

Develop an understanding of literature in context.

Interpret and paraphrase their ideas logically and cohesively. Illustrate the systems and ideologies inherent in the society.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Values & Ethics	25 Marks Fill in the blanks/ Short Notes/ Descriptive Questions	Literature: Rabindranath Tagore - Where the Mind is Without Fear William Wordsworth – Three Years She Grew in Sun and Shower Saki – The Lumber-room William Shakespeare – Extract from <i>Julius Caesar</i> (Mark Antony’s Speech) Language: Vocabulary Building	12 Hours
II	Natural & Supernatural	25 Marks Fill in the blanks/ Short Notes/ Descriptive Questions	Literature: John Keats – La Belle Dame Sans Merci Charles Dickens – The Signal Man Hans Christian Anderson - The Fir Tree William Shakespeare – An Excerpt from <i>The Tempest</i> Language: Collective Nouns	12 Hours
III	Travel & Adventure	25 Marks Short Notes/ Descriptive Questions	Literature: R.L. Stevenson – Travel Elizabeth Bishop - The Question of Travel	12 Hours

			H.G. Wells – The Magic Shop Jonathan Swift – Excerpt from <i>Gulliver's Travels Book – I</i> Writing Skills: Travelogue	
IV	Success Stories	25 Marks Short Notes/ Descriptive Questions	Literature: Emily Dickinson – Success is Counted Sweetest Rupert Brooke – Success Dr. Martin Luther King - I Have a Dream Helen Keller – Excerpt from <i>The Story of My Life</i> Writing Skills: Brochure & Leaflet	12 Hours

Reference Books:

- a. Tagore, Rabindranath. *Gitanjali*. Rupa Publications, 2002.
- b. Wordsworth, William. *The Complete Works of William Wordsworth*. Andesite Press, 2017.
Munro, Hector Hugh. *The Complete Works of Saki*. Rupa Publications, 2000.
- c. Shakespeare, William. *The Complete Works of William Shakespeare*. Sagwan Press, 2015.
Chindhade, Shirish. *Five Indian English Poets: Nissim Ezekiel, A.K. Ramanujan, ArunKolatkhar, DilipChitre, R. Parthasarathy*. Atlantic Publications, 2011.
- d. Dickens, Charles. *The Signalman and Other Horrors: The Best Victorian Ghost Stories*
- e. *Charles Dickens: Volume 2*. Createspace Independent Publications, 2015.
- f. Anderson, Hans Christian. *The Fir Tree*. Dreamland Publications, 2011.
- g. Colvin, Sidney (ed). *The Works of R. L. Stevenson. (Edinburgh Edition)*. British Library, Historical Prints Edition, 2011.
- h. Bishop, Elizabeth. *Poems*. Farrar, Straus and Giroux, 2011. Swift, Jonathan. *Gulliver's Travels*. Penguin, 2003.
- i. Dickinson, Emily. *The Complete Poems of Emily Dickinson*. Createspace Independent Publications, 2016.
- j. Publications, 2016.
- k. Brooke, Rupert. *The Complete Poems of Rupert Brooke*. Andesite Press, 2017.
- l. King, Martin Luther Jr. & James M. Washington. *I Have a Dream: Writings And Speeches That Changed The World*. Harper Collins, 1992.
- m. *Changed The World*. Harper Collins, 1992.
- n. Keller, Helen. *The Story of My Life*. Fingerprint Publishing, 2016.
- o. Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
- p. Thorpe, Edgar and Showick Thorpe. *Basic Vocabulary*. Pearson Education India, 2012.
Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.
- q. Murphy, Raymond. *Murphy's English Grammar with CD*. Cambridge University Press, 2004.

Course Code	Course Title	Course	L	T	P	C	Hrs./Wk.
B19BA1020	COMMUNICATIVE ENGLISH - I	CC	2	0	1	3	4

Course Outline:

This is a 3 credit course for first semester consisting of 4 hours of teaching learning per week, inclusive of direct classroom teaching and practice in language lab.

Course Objectives:

1. To attune young minds to concerns and issues which have a broad and wide scope of use and application to life.
2. To acquire a functional use of language in context.
3. To equip students to deliver formal and informal oral presentations to a variety of audiences in multiple contexts
4. To enable students to construct effective written message in various formats and styles.
5. To inculcate the habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

On completion of the course, learners will be able to:

- a. Demonstrate ethical and political responsibilities in taking cognizance of issues relating to society, environment and media.
- b. Develop a process oriented approach to writing.
- c. Make use of grammatical skills developed during the course aptly.
- d. Utilize the target language effectively to focus on interpersonal skills and develop a good command over the language.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Functional English	25 Marks Fill in the blanks/ MCQs/ Comprehension Tasks/ Descriptive Questions	Remedial Grammar: Past Simple; Past Continuous; Irregular Verbs Writing Skills: Paragraph Writing Activities: Conversations; Leaving Phone Messages Literature: Chief Seattle – The End of Leaving and Beginning of Survival	12 Hours
II	Interpersonal Skills	25 Marks Fill in the blanks/ MCQs/ Comprehension Tasks/ Descriptive Questions	Remedial Grammar: Present Simple & Present Continuous; Activity & State Verbs Writing Skills: Official Letters Activities: Making Apologies; Invitations & Making Arrangements Literature: Ruskin Bond – Tiger in the Tunnel	12 Hours
III	Multitasking Skills	25 Marks Fill in the blanks/ MCQs/ Comprehension Tasks/ Descriptive Questions	Remedial Grammar: Present Perfect; For, Since & How Long; -ed & -ing adjectives; Prefix & Opposites of Adjectives Writing Skills: Note Making Activities: Agreeing & Disagreeing with Opinions Literature: Jesse Owens - My Greatest Olympic Prize	12 Hours
IV	Communication Skills	25 Marks Fill in the blanks/ MCQs/ Comprehension Tasks/ Descriptive Questions	Remedial Grammar: Collocations; Prepositions Writing Skills: Precis Writing Activities: Offers, Suggestions & Requests Literature: Avijit Pathak – Onscreen Magic	12 Hours

Reference Books:

1. Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi:
2. MacMillan Publishers, 2010.

2. Thorpe, Edgar and Showick Thorpe. *Basic Vocabulary*. Pearson Education India, 2012.
3. Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.
4. Murphy, Raymond. *Murphy's English Grammar with CD*. Cambridge University Press, 2004.
5. Rizvi, M. Ashraf. *Effective Technical Communication*. New Delhi: Tata McGraw-Hill, 2005.
6. Riordan, Daniel. *Technical Communication*. New Delhi: Cengage Publications, 2011.
7. Sen et al. *Communication and Language Skills*. Cambridge University Press, 2015.

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Week
B19BA1030	Indian Constitution and Human Rights	FC	2	1	0	3	3

Course Objectives:

1. To impart knowledge on Constitution of India.
2. To facilitate the understanding of Fundamental Rights, Duties and other Rights which is been given by our law.
3. To facilitate the understanding of Constitution perspective and make them face the world as a bonafide citizen.
4. To attain knowledge about ethics and also know about professional ethics.
5. Explore ethical standards followed by different companies.

Course Outcomes:

On completion of this course the student will be able to:

1. Explain the Indian constitutional provisions and follow them.
2. Demonstrate the fundamental rights and human rights.
3. Explain the duties and more importantly practice them in a right way.
4. Adopt the habit of raising their voice against a unconstitutionality of any laws and upon any legal discrimination as we have session of debates on Constitutional validity.
5. Demonstrate professional ethics and know about etiquettes about it.
6. Practice ethical standards of different companies which will increase their professional ability.

Course Content:

UNIT- I:

Chapter I: Indian Constitutional Philosophy & Legislature

- a) Features of the Constitution and Preamble
- b) Fundamental Rights and Fundamental Duties,

- c) Directive Principles of State Policy
- d) Union Parliament and State Legislature : Powers and Functions

UNIT- II:

Chapter 2: Executive and Judiciary

- a) President, Prime Minister and Councils of Minister
- b) State Governor, Chief Minister and Council of Ministers
- c) The Supreme Court and High Court: Powers and Function.
- d) Election Commission

UNIT - III:

Chapter III: Concept and Development of Human Rights

- a) Meaning , Scope and Development of Human Rights
- b) United Nations and Human Rights – UNHCR
- c) UDHR 1948, ICCPR1966 and ICESCR 1966

UNIT - IV: Human Rights in India

- a) Protection of Human Rights Act, 1993 (NHRC and SHRC)
- b) First, Second and Third Generation Human Rights
- c) Judicial Activism and Human Rights

Prescribed Books:

1. Introduction to Indian Constitution - D.D. Basu, Prentice Hall of India Pvt. Ltd.. New Delhi
2. SubashKashyap, Indian Constitution, National Book Trust
3. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
4. V.N.Shukla, Constitution of India (Eastern Book Co)
5. S.K. Kapoor - Human Rights
6. Durga Das Basu, Human Rights in Constitutional Law, Prentice Hall of India Pvt. Ltd.. New Delhi

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA1040	Performing Arts and Art History of India	HC	3	0	0	3	4

Course Objectives:

1. Understanding the broad area of Performing Arts.
2. Explain the aims and objectives of performing arts and their development through various stages;
3. Describe the utility of performing arts during the ancient and the medieval period;
4. Examine the importance of the three art forms in the development of human personality; and
5. Analyze the present scenario of Music, Dance and Drama.
6. To get an insider's perspective of the field

Course Outcomes:

1. The response group would have learnt to understand and appreciate the incomparable performing art history.
2. Students shall be able to connect the history and apply its relevance to today's art scenario.
3. Students would be encouraged to apply the learnt subject practically and imbibe the nuances in performances.
4. The response group would become artistes with equal understanding of Music, Dance and Drama.

Course Content:

Unit I	Introduction and overview of Performing Arts	1. Performing arts and its areas 2. Origin and Development 3. Vedic, Ancient and Medieval period of
Unit II	Performing Arts and allied Studies - 1	1. Temple, Dynasty and Stage – The journey 2. Performing Arts and Mythology 3. Performing Arts and Epics
Unit III	Performing Arts and allied Studies – 2 and Texts	1. Performing Arts and Philosophy 2. Performing Arts and Spirituality 3. Important and relevant texts for Dance, Music and Drama
Unit IV	Sources and Art Historians	1. Sources of Arts, Music and Theater 2. Textual and Oral Tradition 3. Performing Arts historians and their contribution

Course Code	Course Title	Course	L	T	P	C	Hrs./Wk.
B19BA1051	Practical 1 – Fundamentals of Bharatanatyam	SC	0	0	3	3	6

Course Objectives:

1. To enable the dancers/artist of School of Performing Arts have a strong foundation in the basics and fundamentals in the practical and performing aspects of the dance form that they are specializing.
2. To teach students the items in dance and also the technical aspects of the items which include taalam, music, literature and the spiritual and philosophical depths in it.

Course Outcomes:

On completion of the course learners will be able to:

1. Perform the fundamentals and the items that they have learned.
2. Will be able to further teach the items and also understand the intricacies in choreographing such items in future

Course Content:

Unit	Topics	Description
1	Exercise and Adavus 1 st half	Exercise is to make the student gain more flexibility for learning dance Adavus are the basic parts of dance. Learning this will make students dance base stronger
2	Adavus 2 nd Half & Jathis	Continuing the Adavu parts Learning the Jathis which makes the student to connect the adavu pieces in a small form of dance
3	Alarippu	A pure Nritha piece which is a non resemblance form of dance. Making connection with the audience is the outcome of this part
4	Pushpanjali	Offering to the god is the metaphor of this dance. The invocatory dance part makes the student very much involved to the art form. Recitation of the items in the syllabus is also a part in the unit

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Wk
B19BA1052	Practical – 1 Fundamentals of Kuchipudi	SC	0	0	3	3	6

Course Objectives: The overall objective of the Course is as follows:

- a. To enable the dancer to have a strong foundation in Kuchipudi dance style.
- b. To enable the dancer to have a strong foundation in the dance style by learning the different items and abhinaya
- c. To enable the students to become more aware of the different items in the repertoire
- d. To teach the students the items in dance and also the technical aspects of the item which include rhythm, music, and literature.

Course Outcomes:

On completion of the course learners will be able to:

- Perform the fundamentals the basic items
- To be able to differentiate the items in the kuchipudi repertoire
- Perform the items that they have learned
- Will be able to further teach the items and also understand the intricacies in choreographing such items in future.

Unit	Topics	Description
1	Exercise and Adavu	Basic exercises are taught to make student's body flexible for dance. Adavus 1st half is also included for the strong basement
2	Adavus Second Half & Jathis	Second half of Adavus is taught with exercises. And Chathurasra jathis will be also taught along with these.
3	Kuchipudi jathis & Bhrahmanjali	Continuation of rest of the jathis is included in this part. Also Bhrahmanjali, the beginner level dance is added within this unit.
4	Jathiswaram	Jathiswaram will be taught. With it recitation of the items in the syllabus is also added.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA1053	Practical-1 (Fundamentals of Drama)	SC	0	0	3	3	6

Course Objectives

1. Develop an appreciation and understanding of dramatic literature.
2. Overcome or control any fears of public speaking and performance anxiety by developing self-confidence.
3. Understand the evolution of drama through study of theatre history and the types of drama.
4. Learn theatre terminology - acting, stage and technical theatre terms.
Learn to express meaning with both body and voice.

Course Outcomes:

1. At the end of the course the students would be in a position to understand the importance and the greatness of the Indian Theater.
2. Be able to overcome fear.
3. Be able to emote and understand the terminologies of theater both theoretically and practically.
4. Student will be able to present any level of performance like Solo, Monologue etc.

Course Content:

UNIT I	Introduction to Indian Theater	<ol style="list-style-type: none"> 1. Origin and development of Indian Theatre 2. Ups and downs of Classical Indian Theatre. 3. Literary evidence of the origin of Indian Drama from Rig Veda, Upanishads, Post Vedic Period and Buddhist period. 4. Brief Introduction to major Indian folk theatre forms with broad focus on art forms which are region specific with unique styles. Eg Jatras, Koodiyatam, Yakshagana etc.
UNIT II	Theatre games & activities.	<ol style="list-style-type: none"> 1. 200 + theatre games by Augusto Boal 2. Creativity of mind and space. 3. Understanding physical abilities.
UNIT III	Understanding the dynamics of Theatre - Working on body, mind and voice	<ol style="list-style-type: none"> 1. Bharat Muni's four acting stages – Angika, Satvika, Vachika and Acharya. 2. Enhancing the three spheres of mind, body and voice to prepare one to be an actor through structured and creative activity 3. Routines and Changes to expand the range of the theatre performer.

UNIT IV	Learning different theatre practices	1. Magical If of Stanislavski 2. Alienation of Berthold Brecht. 3. Invisible Theatre of Augusto Boal.
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Course Code	CourseTitle	Course Type	L	T	P	C	Hrs./Wk.
B19BA1054	Practical-1 (Fundamentals of Carnatic Music)	SC	0	0	3	3	6

Course Objectives:

1. To impart primary knowledge of role and importance of music in dance.
2. Fostering the development of young artistes' musical skills, knowledge and understanding.
3. To enable the dancers/artiste of School of Performing Arts to have a strong foundation in both the practical and the theory of musical concepts.
4. To make the students learn the basics of Carnatic music and to enable them to learn it in the practical way.

Course Outcomes:

1. At the end of the course the students would be in a position to understand the nuances of the Carnatic Music
2. The Students would not only understand the fundamentals of Carnaticmusic but would also understand the importance of tala or time cycle or rhythm.
3. The students would get used to the voice culture exercise
4. Students would understand the importance of music with respect to dance

Course Content:

UNIT I	Music Basics And voice culture	<ul style="list-style-type: none"> • Saralevarase • Madhyastayivarase
UNIT II	Music Basics And voice culture	<ul style="list-style-type: none"> • Jantivarase
UNIT III	Music Basics Theory Music	<ul style="list-style-type: none"> • Mandrastayivarase • Origin of Carnatic music
UNIT IV	Music Basics Theory Music	<ul style="list-style-type: none"> • Technical terms of Music • Tarastayivarase

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA1060	English Literature & Language – I British Literature (Chaucer –Pope) & Aspects of Language	HC	2	0	1	3	4

Course Description:

English literature and language is one of the most significant subjects for the concerned UG program. This course is designed to introduce the students to the basic ideas of literature, mostly focused on the British canon in order to develop their literary as well as cognitive skills which would be surely beneficial for them in their future literary as well as non-literary endeavours.

Course Objectives:

1. To introduce the students to the framework of different literary genres
2. To introduce the students to the idea of literary ages and its significance.
3. To introduce the students to the works of important authors from the medieval age to the neo-classical age.
4. To develop in the students a skill of understanding basic cultural contexts into which the texts are systematically located.

Course Outcomes:

On completion of the course, students will be able to:

1. Identify the major poets from the medieval period up to the neo-classical period and their works in English Literature.
2. Explain the major characteristics of Metaphysical Poetry. Outline the various issues presented in the prose of the period. Demonstrate complete familiarity with the features of Elizabethan theatre.
3. Illustrate a good understanding of speech sounds in English and the structure of words.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Poetry	25 Marks	<i>The Medieval Age:</i> 1. Chaucer - "Wife of Bath" (from <i>Prologue to the Canterbury Tales</i>) <i>The Elizabethan Age:</i> 2. Edmund Spenser – Sonnet 75 (from the <i>Amoretti</i>) 3. William Shakespeare – Sonnet 118 <i>The Puritan Age:</i> 14. John Milton – Extract from <i>Paradise Lost</i> (Book – I) <i>Metaphysical Poetry:</i> 5. John Donne – The Sunne Rising 6. George Herbert – The Altar 7. Andrew Marvell – To His Coy Mistress <i>The Neoclassical Age:</i> 8. Alexander Pope – Extract from <i>The Rape of the Lock</i>	12 Hours
II	Prose	25 Marks	1. Francis Bacon – Of Travel; Of Studies 2. Joseph Addison – Silence 3. Dr. Samuel Johnson – Extract from <i>Preface to Shakespeare</i> 4. Oliver Goldsmith – Extract from <i>The Citizen of the World</i>	12 Hours
III	Drama	25 Marks	William Shakespeare – <i>Macbeth</i> Christopher Marlowe – <i>Dr. Faustus</i>	12 Hours
IV	Language	25 Marks	1. Language 2. Speech Sounds in English 3. The Structure of Words	12 Hours

Reference Books:

- Chaucer, Geoffrey. *The Canterbury Tales*. Harper Press, 2012.
Warren, Robert Penn. *Six Centuries of Great Poetry*. Dell, 1992. Shakespeare, William. *The Sonnets*. Macmillan, 2016.
- Milton, John. *Paradise Lost*. Penguin, 2003.
- Ricks, Christopher, *Metaphysical Poetry*. Penguin, 2006. Kaul, RK. *The Rape of the Lock*. Oxford, 1997.
- Bacon, Francis. *The Essays*. Penguin, 1985.
- Addison, Joseph. *Addison and Steele*. Forgotten Books, 2018.
- Sen, S. *Dr. Johnson: Preface to Shakespeare*. Unique Publishers, 1989.
- Goldsmith, Oliver. *The Citizen of the World*. University Press of the Pacific, 2002. Shakespeare, William. *Macbeth*. Oxford University Press, 2016.
- Marlowe, Christopher, *Dr. Faustus*. Oxford University Press, 2010.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA1070	Foundations of Psychology - I	HC	3	0	1	4	5

Course Description:

This course is designed to give students an overview of what psychological science has discovered about human behaviour and mental processes over the past century. An evolutionary, functional perspective will be applied across the many fields of psychology. Students will gain an understanding of the psychological phenomena that occur in daily life as well as the practical applications of psychological knowledge.

Course Objectives:

In accordance with the American Psychological Association (APA) recommendations for undergraduate psychology learning objectives and outcomes, students will (1) learn the basic principles of traditional psychological content areas and (2) use the scientific method as an approach to critical thinking and sceptical inquiry. Accomplishing this objective involves:

1. Demonstrating knowledge and understanding of theory and research in the general domains of psychology
2. Understanding the overarching themes, questions, and conflicts in psychology
3. Comparing and contrasting the major perspectives in psychology
4. Understanding and evaluating basic research methods used by psychologists to address different hypotheses
5. Evaluating the validity of conclusions derived from psychological research

Course Outcomes:

Upon successful completion of this course, students will be able to:

- Differentiate among various subfields of psychology.
- Identify the primary research methods employed in the study of psychology
- Identify the primary objectives (goals) of psychology.
- Demonstrate knowledge of ethical principles and limitations of research in psychology.
- Critically evaluate sources of information in the field of psychology, including research articles published in major psychological journals.

**Course
Content:**

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	THE SCIENCE OF PSYCHOLOGY	25 Marks Short Notes/ Descriptive Questions	a) Definition and goals of Psychology, History of Psychology b) Modern perspectives of studying human behavior- Psychodynamic perspectives, Behavioral perspectives, Cognitive perspectives, Humanistic perspectives. c) Fields of psychology Applied – General psychology, Educational Psychology, Industrial psychology, clinical psychology, counseling psychology, social psychology, developmental psychology, Para psychology, Positive psychology. d) Types of Psychological Research: Descriptive research – observation method, survey method, interview method, case studies. Experimental Research.	10 Hours
II	PSYCHOLOGICAL BASIS OF BEHAVIOUR	25 Marks Short Notes/ Descriptive Questions	a) Neuron and nerves (neural impulse, neurotransmitters) b) Nervous System: 1. Central Nervous System: Brain Structure of the brain Techniques of studying brain. 2. The peripheral nervous system: somatic & autonomic nervous system. (Sympathetic & Parasympathetic) c) Endocrine system: Endocrine glands and its influences on human behaviour.	08 Hours
III	LEARNING	25 Marks Short Notes/ Descriptive Questions	A. Learning: a) Meaning and definition of learning, factors influencing on learning. b) Theories of learning: 1.Thorndike’s Trial and error learning and laws of learning. 2. Classical conditioning and its principles, (acquisition, generalization, discrimination, extinction and spontaneous recovery) Applications of classical conditioning. 3. Operant conditioning – Skinner’s approach to operant conditioning (positive and negative reinforcement, and primary and secondary reinforcement). Applications of operant conditioning. 4. Insight learning theory and its applications.	10 Hours

IV	MOTIVATION AND EMOTION	25 Marks Short Notes/ Descriptive Questions	A. Motivation a) Meaning and nature of motivations – Homeostasis, Motivation cycle. b) Types of motives: Physiological motives – Hunger, thirst, sex. Social motives – Achievement, power affiliation c) Theories of motivation - Humanistic approach (Maslow’s theory), E-R-G Model of Motivation. B. Emotions:	10 Hours
			a) Meaning, Nature of emotions b) Physiological and Psychological changes. c) Types of emotions. d) Cognitive meditational theory of emotion e) Emotional intelligence.	
	PRACTICALS : PRACTICAL – 1		1. Directed observation and accuracy of report. 2. Habit interference 3. Emotional Intelligence 4. Cueing on recall 5. Maze learning.	2 hrs / Batch/Week

Reference Books:

1. Robert S. Feldman (2004) *understanding Psychology 6th Edition* Tata MrGram – Hill.
2. Saundra K Ciccarelli and Glenn E Meyer (2008), *Psychology, South Asia Edition*,
3. Robert A Baron (2001), *Psychology, III Edition*, Prentice Hall Publications
4. John. W. Santrock (2006), *Psychology Essentials, 2nd Edition* Tata Mc Graw Hill
5. Hillgord & Atkinson (2009), *Introduction to Psychology* Oxford IBH publishing Co. Pvt. Ltd.
6. Morgan, King (2004), *Introduction to Psychology, VII Edition, 1989*, Mc Graw Hill IBH Publication

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Week
B19BA1080	Sports / Yoga / Music / Dance / Theatre	RULO	0	0	2	2	4

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

- To prepare the students for the integration of their physical, mental and spiritual faculties;
- To enable the students to maintain good health;
- To practice mental hygiene and to attain higher level of consciousness;
- To possess emotional stability, self-control and concentration; and
- To inculcate among students self-discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

- Practice yoga for strength, flexibility, and relaxation.
- Learn techniques for increasing concentration and decreasing anxiety.
- Become self disciplined and self-controlled
- Improve physical fitness and perform better in studies
Gain self confidence to face the challenges in the society with commitment to serve the society

Course Content:

Unit-I:

Yoga: Introduction , Surya Namaskara:- 12 counts.

Unit-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana. Asanas: Standing- Tadasana, Trikonasana, Parshwa konasana, Veerabhadrasana.

Unit-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana.

Asanas: Supine Position- Sarvangasana, Halasana.

Mudras- Dhyana mudra, , Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:- Anuloma – Viloma, Basthrika, Bhramari.

Dhyana & its types: Competition format, Rules and their interpretations

B. VOLLEYBALL

Course Objectives:

To learn the rules, fundamental skills, and strategies of volleyball

1. To develop skills in passing, setting, serving, spiking, and blocking.
2. To learn basic offensive and defensive patterns of play.
3. To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with volleyball.
2. Apply these skills while playing volleyball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Introduction about Volleyball
- Players Stance, Receiving and passing
- The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

Unit-II

- Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve(floating)
- Setting the ball- Set for attack, Back set, Jump set

Unit-III

- Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash
- Block- Single block, Double block, Three-man block
- Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

Unit-IV

- Attack Combination, Defense Systems, Libero play
- Court marking, Rules and their interpretations and Duties of officials

C. BASKETBALL

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of Basketball
2. To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.

3. To learn basic offensive and defensive strategies of play.
4. To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
5. To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with basketball.
2. Apply these skills while playing basketball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Basketball: Introduction
- Grip; Player stance- Triple threat stance and Ball handling exercises.
- Passing (Two hand/one hand)- Chest pass, Bounce Pass, Overhead pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
- Receiving-Two Hand receiving, one hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

Unit-II

- Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
- Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
- Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

Unit-III

- Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
- Individual Defensive- Guarding the man with the ball and without the ball.
- Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

Unit-IV

- Court marking, Rules and their interpretations

D. FOOTBALL

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of football.
2. To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.
3. To learn basic offensive and defensive patterns of play
4. To use different parts of the body in utilizing the above skills while playing football

5. To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with football.
2. Apply these skills while playing football and exhibit improved performance
3. Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
4. Improve physical fitness and practice positive personal and lifestyle.
5. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:**Unit-I****1. Football: Introduction**

- Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
- Trapping- Trapping rolling the ball, Trapping bouncing ball withsole

Unit-II

- Dribbling- With instep and outer instep of the foot.
- Heading- From standing, running and jumping.
- Feinting- With the lower limb and upper part of the body.

Unit-III

- Tackling- Simple tackling, Slide tackling.
- Throw-in- Standing and Sliding
- Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

Unit-IV

- Ground marking, Rules and their interpretations.

E. ATHLETICS (TRACK AND FIELD)**Course Objectives:**

1. To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
2. To develop competence among students in demonstrating all the techniques covered in the course.
3. To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
4. To inculcate among students the habit of team work and cooperative learning and

develop competence in detecting / correcting technique errors.

5. To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course learners will be able to:

1. Display competencies in executing basic techniques and skills associated with select track and field events.
2. Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.
3. Learn regular practice of select track and field events and improve physical fitness
4. Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Content:

Unit-I

- Athletics: Introduction
- Track Events - Steeple Chase, Race Walking, Middle and Long distance races
- Race walking - Technique, Faults and Officiating.
- Middle and Long distance races – Technique and Training

Unit-II

- Jumping Events - High Jump and Triple Jump: Basic Skills and techniques
 - High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing
 - Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

- Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
 - Discus Throw - Standing and Rotatory techniques, Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
 - Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

- Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference Books:

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.

8. Briggs Graeme (1987). "Track and field coaching Manual", Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
10. Jarver, Jesse (1987). "The Jumps", Track and Field Coaching Manual Australia.

F. DRAMATICS

Pre-requisites: Students with background in Theatre Arts/ Keen interest in Dramatics.

Course Objectives:

- To imbibe the acting skills.
- To understand the broader applications of theatre studies in allied arts forms.
- To be able to use body language for better communication.
- Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

- Freely express improvisation in non-verbal communication.
- Shall hone good acting skills and be able to emote better.
- Be able to put up a theatre act and play a key role.
- Be able to differentiate good acting and understand the importance of good lyrics, stage crafting, music, dance, costume and lighting.

Course Content:

UNIT – 1

Working on Body:

Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT – 2

Sound and Movement:

Awareness of creating sound patterns, voice modulations, rhythm in speech and dialogues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT – 3

Characterization and Improvisation:

Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT – 4

Group work and Production:

Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Reference Books:

1. All about Theatre – Off stage – Chris Hogget.
2. Rangadalli Anataranga – K V Subbanna
3. The Indian Theatre – Hemendranath Das Gupta.
4. A Practical handbook for an Actor – Milisa Bruder, ee Michel Cohn, Madeleine Oliek et al, Zigler Publisher.

G. INDIAN CLASSICAL DANCE FORMS (Bharatanatyam, Kuchipudi ,Mohiniyattam)

Prerequisites: Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join.

Course Objectives:

- *To develop an understanding about the Indian classical dance forms and its universal application.*
- To be able to understand the fine nuances of Classical dance.
- To understand the importance of health through Indian classical dance, strengthen the body capacity.
- To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.

Course Outcomes:

- To be able to identify and appreciate the classical dance forms.
- To be able to execute basics of Adavus with finesse.
- To be able to express through abhinaya.
- To be able to perform to perform the fundamentals in the chosen dance form.

Course Content:**Unit 1**

An introduction to Indian classical dance forms Bharatanatyam, Kuchipudi, Mohiniyattam

Unit 2

Learning of Fundamentals Exercises and Adavus- I (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 3

Adavus –II (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 4

Learn a basic composition in the chosen dance form.

Reference Books

1. *Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi*
2. *Classical Dances –Sonal Mansingh, Avinash Parischa*
3. *Kuchipudi – Sunil Kothari*

4. *Bharatanatyam An in depth study- Saroja vydyanathan*
5. *Mohiniyattam – Bharathi Shivaji*

H. PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Pre-requisites: Students with background in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Course Objectives:

- To understand the Rhythmology.
- To understand the importance of Laya, Taala.
- To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

- To be able to set instrument to Sruthi.
- To be able to play the fundamentals on instrument.
- To be able to learn and perform a particular taala.

Course Content:

UNIT- 1

1. Introduction to Musical Instruments
2. Percussion Instruments
3. Mridangam and its History

UNIT - 2

1. Introduction to Tala System
2. Definitions of 5 jaathis and their recitation
3. Adi Talam and its various forms
4. Definitions and recitation of different gathis

UNIT- 3

1. Tisra Jaathi, 2. Khanda Jaathi, 3. Misra jaathi, 4. Sankeerna Jaathi

UNIT - 4

1. Learning of Jathi Formation, 2. Basic jathis, 3. Jathis for Dance forms
4. Some Basic Definitions of Korvai, Teermanam etc.,

Reference Books:

1. Mridangam- An Indian Classical Percussion Drum – Shreejayanthi Gopal
2. Theory and practice of Tabala – Sadanand Naimpally.
3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – Srdjan Beronja.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA2012	HINDI-II (Language)	CC	2	1	0	3	4

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हरिहर – 2: हरिहरहर हरिहर, हरिहर हरिहर

हरिहरहर हरिहरहर : 12 hrs.

4. हरिहर हरिहर

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हरिहर – 3: हरिहरहर हरिहर, हरिहर हरिहर

हरिहरहर हरिहरहर : 12 hrs.

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हरिहरहर हरिहरहर : 12 hrs.

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Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA2013	ADDITIONAL ENGLISH-II (Language)	CC	2	1	0	3	4

Course Outline:

This is a 3 credit course designed to help the learner gain a deeper understanding of the society and the world at large, which will be not only beneficial for his professional competence but also contribute towards his/her social and cultural development.

Course Objectives:

- To help the student understand the multiple values of the society.
- To develop a cultural understanding in the student to sharpen his/her social skills.
- To ensure a gradual development of literary interest in the student.

Learning Outcomes:

- On completion of the course, learners will be able to:
- Demonstrate a deep understanding of the society and its values.
 - Develop a constructive understanding of the cultural dimensions of the human world.

Make use of his understanding to become a responsible global citizen of tomorrow.

Course Content:

UNIT-I: ECOLOGY & ENVIRONMENT

Literature:

Toru Dutt - Casuarina Tree
Robert Frost – Stopping by Woods on a Snowy Evening
Tomas Rivera–The Harvest
C.V. Raman – Water – The Elixir of Life

Language:

Degrees of Comparison

UNIT-II: VOICES FROM THE MARGIN

Literature:

Tadeusz Rozewicz – Pigtail
Jyoti Lanjewar – Mother
Sowvendra Shekhar Hansda – The Adivasi Will Not Dance
Harriet Jacobs – Excerpt from *Incidents in the Life of a Slave Girl*

Language: Prefix and Suffix

UNIT-III: WOMEN & SOCIETY

Literature:

Kamala Das – An Introduction
UshaNavrathnaram – To Mother
Rabindranath Tagore – The Exercise Book
Jamaica Kincaid – Girl

Writing Skills:

Dialogue Writing

UNIT-IV: POPULAR CULTURE

Literature:

Rudyard Kipling – The Absent-minded Beggar
Sir Arthur Conan Doyle – The Hound of the Baskervilles
Aldous Huxley – The Beauty Industry

Writing Skills:

Story Writing

Reference Books:

1. Agrawal, K.A. *Toru Dutt the Pioneer Spirit of Indian English Poetry - A Critical Study*. Atlantic Publications, 2009.
2. Latham, Edward Connery (ed). *The Poetry of Robert Frost*. Holt Paperbacks, 2002.
3. Gale, Cengage Learning. *A Study Guide for Tomas Rivera's The Harvest*. Gale, Study Guides, 2017.

4. Basu, Tejan Kumar. *The Life and Times of C.V. Raman*. PrabhatPrakashan, 2016.
- Rozewicz, Tadeusz. *New Poems*. Archipelago, 2007.
5. Manohar, Murli. *Critical Essays on Dalit Literature*. Atlantic Publishers, 2013.
6. Hansda, SowvendraShekhar. *The Adivasi Will Not Dance: Stories*. Speaking Tiger Publishing Private Limited, 2017.
7. Jacobs, Harriet. *Incidents in the Life of a Slave Girl*. Createspace Independent Publication, 2014.
8. Das, Kamala. *Selected Poems*. Penguin Books India, 2014.
9. Tagore, Rabindranath. *Selected Short Stories of Rabindranath Tagore*. Maple Press, 2012.
10. Gale, Cengage Learning. *A Study Guide for Jamaica Kincaid's Girl*. Gale, Study Guides, 2017.
11. Kipling, Rudyard. *The Absent-Minded Beggar*. Hardpress Publishing, 2013.
12. Doyle, Arthur Conan. *The Hound of the Baskervilles*. General Press, 2017.
13. Dixon, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
14. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
15. Samson, T. (ed.) *Innovate with English*. Cambridge University Press, 2010.
16. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.
17. 2009.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA2020	Communicative English - II	CC	2	0	1	3	4

Course Outline:

This is a 3 credit course for second semester consisting of 4 hours of teaching learning per week, inclusive of direct classroom teaching and practice in language lab.

Course Objectives:

1. To prepare the students to become successful professionals by enhancing their communicative skills.
2. To develop the grammatical base of the students which would serve them in the long run.
3. To equip the students to form a strong command over vocabulary.

Learning Outcomes:

On completion of the course, learners will be able to:

Develop professional communicative skills.

Apply their acquired grammatical knowledge in broader spheres of linguistic usage.

Utilize their communicative skills in multiple arenas of practical existence.

Course Content:

UNIT-I: LANGUAGE ACQUISITION

Remedial Grammar: Questions & Negatives; Questions Tags
Writing Skills: Email Writing
Activities: Group Discussions
Literature: Alphonse Daudet - The Last Lesson

UNIT-II: PERSUASIVE SKILLS

Remedial Grammar: Past Simple & Past Perfect
Writing Skills: Report Writing **Activities:**
 Book & Movie Reviews **Literature:** Lord
 Alfred Tennyson – Ulysses

UNIT-III: COGNITIVE SKILLS

Remedial Grammar: Present & Past Passive; Conditionals
Writing Skills: Creative Writing
Activities: Role Plays
Literature: O. Henry – The Gift of the Magi

UNIT-IV: EMPLOYABILITY SKILLS

Remedial Grammar: Reported Speech; Idioms
Writing Skills: Cover Letter & CV
Activities: Exchanging Information
Literature: Saki – The Open Window

Reference Books:

1. Bansal, R.K. and J.B. Harrison. *Spoken English*. Orient Blackswan, 2013.
2. Raman, Meenakshi and Sangeeta Sharma. *Technical Communication*. Oxford University Press, 2015.
3. Thorpe, Edgar and Showick Thorpe. *Objective English*. Pearson Education, 2013.
4. Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
5. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
6. Samson, T. (ed.) *Innovate with English*. Cambridge University Press, 2010.
7. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.
8. Goodale, Malcolm. *Professional Presentation*. Cambridge University Press, 2013.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2030	Natya Sastra and Performing Arts	HC	3	0	0	3	3

Course Objectives

1. To make the students understand the importance of the text Natya sastra in the arena of Performing Arts
2. To make the students learn the basics of the Natya Sastra and the fundamentals of the different Units in it.

Course Outcomes

1. At the end of the course the students would be in a position to understand the importance and the greatness of the text Natya Sastra
2. The Students would not only understand the fundamentals of the different chapters in Natya Sastra but would also try to implement them in their practical and theory learning.

Course Content:

UNIT I	Introduction to Natya Sastra	1. Introduction to Natya Sastra – the encyclopedia on Dramaturgy and its history 2. Natyotpathi – the evolution of Natya
UNIT II	11 aspects of Natya Sastra – a detailed study	1. Rasa 2. Bhava 3. Abhinaya 4. Dharmi 5. Vritthi 6. Pravritthi 7. Sidhi 8. Swara 9. Atodyam 10. Ganam 11. Rangam
UNIT III	Traditional Theatres of South India and Dasaropakas	1. Kudiattam, Krishnattam, Nangiar kuthu, Chakkyar Kuthu, Khyal, Teerukuthu, Nautanki, Tamasha, Bhavai, Jatra, Bayalata, Burrakatha, Chhau, Yakshaganam, Bhagavatha Mela, 2. Ten forms of Drama by Dhananjaya
UNIT IV	Natya Sastra in the Modern World	1. Marga and Desi 2. Indian Classical Dance Forms 3. Carnatic and Hindustani Music 4. Modern Indian theatre. 5. Discovery of Natya Sastra in 19 th century 6. Different works on Natya Sastra from 19 th century

Reference Books:

1. Natya Sastra – Dr. Manomohan Ghosh

2. Bharata – The Natya Sastra – Dr. Kapila Vatsyayan
3. Natya Sastra in the Modern World – Dr. Radhavallabh Tripathi
4. Bharatamuni Praneetha Natyasastra – Acharya P. Ramachandra
5. Abhinava Bharati on Bharata’s Natya Sastra – Manjul Gupta
6. Natya Sastra and the Indian Dramatic Tradition – Dr. Radhavallabh Tripathi

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2041	Practical-2 (Fundamentals of Carnatic Music)	HC	0	0	3	3	6

Course Objectives

- To enable the dancers/artistes of School of Performing Arts to have a strong foundation in both practical and theory of music.
- To teach students the fundamental technicalities in music through varied music scriptures and make them adept in the recitation of the songs in the Carnatic music.
- Voice culture and to make the students understand the nuances of Carnatic Music.
- To enable them to understand the technical terms in music

Course Outcomes:

- At the end of the course the students would be in a position to understand the nuances of Carnatic Music
- The Students would not only understand the fundamentals and basics of the music but would also become a performer.

Course Content:

UNIT I	Music Basics And voice culture	<ul style="list-style-type: none"> • Sapta tala Alankaras
UNIT II	Music Basics And voice culture	<ul style="list-style-type: none"> • DatuVarasegalu • Geethe -1
UNIT III	Music Basics Theory Music	<ul style="list-style-type: none"> • Alankaras • Geethe – 2
UNIT IV	Music Basics Theory Music	<ul style="list-style-type: none"> • Geethe – 3 • Geethe – 4

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2042	Practical-2 (Fundamentals of Drama)	HC	0	0	3	3	6

Course Objectives

1. Develop an appreciation and understanding of dramatic literature.
2. Overcome or control any fears of public speaking and performance anxiety by developing self-confidence.
3. Understand the evolution of drama through study of theatre history and the types of drama.
4. Learn theatre terminology—acting, stage and technical theatre terms.
Learn to express meaning with both body and voice.

Course Outcomes

- a. At the end of the course the students would be in a position to understand the importance and the greatness of the Indian Theater.
- b. Be able to overcome fear.
- c. Be able to emote and understand the terminologies of theater both theoretically and practically.

Course Content:

UNIT I	Theatre practicing and Developing	<ol style="list-style-type: none"> 1. Continuing the previous practices. 2. Trans energy of Antonin Artaud 3. Grotowski's Poor theatre
UNIT II	Play-reading	<ol style="list-style-type: none"> 1. Play-reading and working on a scene for performance 2. Contextual reading, synopsis, and character reading of two scenes from well-known Indian playwrights and two scenes from Western playwrights towards theatrical scene enactment. Suggested scripts - Nagamandala, The Lesson, Sakunthala, Dolls House.
UNIT III	Working on a scene for performance	<ol style="list-style-type: none"> 1. Working on the scenes which have already read. 2. Trying different characters with various characteristics level.

		3. Making the situations of the scenes and character in different manners..
UNIT IV	Application of Theatre and its practice	1. Specific focus on direction, stage management, sets and props, costumes, light, make-up sound and backstage

Reference Books:

1. Natya Sastra – Dr. Manomohan Ghosh
2. KapilaVatsyayan, “Traditional Indian Theatre Multiple streams”. National Book Trust, 1980
3. Minding the body and mending the mind – Joan Borysenko, The Bantam Books
4. All About Theatre – off stage – Chris Hogget
5. The elements of playwriting – Louis Catron
6. An Actor Prepares – Stanislavsky
7. Sāgara, KarnāṭakaRājya: NīnāsamRaṅgaśikṣaṇaKēndraparavāgiAkṣaraPrakāśana.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2043	Practical 2 – Fundamentals of Bharatanatyam	SC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows:

1. To help the Student to have more knowledge and base in the form.
2. To enable the dancer to have a strong foundation in Bharatanatyam
3. To enable the dancer to have a strong foundation in the dance style by learning the different items and abhinaya

Learning Outcomes:

On completion of the course learners will be able to:

- Will be able to attain good flexibility, improved muscle tone and strength
- Perform the fundamentals
- Perform the items that they have learned

Unit	Topics	Description
1	Jatiswaram 1 st part	Jatiswaram is one of the essential dance part in the form. Learning this makes the student understand more depth of the form.
2	Jatiswaram 2 nd part & Shabdam 1 st part	Continuation and Completion of the piece and starting to learn the item Shabdam as its one of the most important part in the form.
3	Shabdam 2 nd part	Competing the item with all aspects and being ready to perform. Along with it continuation of the previous parts is also important.
4	Singing & Sholkattu	The learned items should be able to sing. Sholkattu is also added so that student will have a thorough knowledge about the items.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA2044	Practical 2 – Fundamentals of Kuchipudi	SC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows:

1. To enable the dancer to have a strong foundation in Kuchipudi dance style.
2. To enable the dancer to have a strong foundation in the dance style by learning the different items and abhinaya
3. To enable the students to become more aware of the different items in the repertoire
4. To teach the students the items in dance and also the technical aspects of the item which include rhythm, music, and literature.

Learning Outcomes

On completion of the course learners will be able to:

- Perform the fundamentals the basic items
- To be able to differentiate the items in the kuchipudi repertoire
- Perform the items that they have learned
- Will be able to further teach the items and also understand the intricacies in choreographing such items in future.

Unit	Topics	Description	
1	Ganesha kauthvam 1 st half	Ganesha kauthvam is a beginning piece of the form. Seeking blessings from Lord Vinayaka is presented in the part.	
2	Ganesha kauthvam 2 nd half	Completing the part with all aspects and being ready to perform it. Student should also be able to recite the dance piece.	
3	Poorvarangam	This is also an important beginning piece in the art. Pure dance is the speciality of this part which makes student's base stronger.	
4	Shabdham	Shabdham is an other part in which student will be able to work on both acting and dance movements	

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2050	English Literature & Language – II British Literature (The Romantic Age) & Aspects of Language	HC	2	0	1	3	4

Course Description:

The course is designed to elevate the level of the initial learning of the UG students. The students by now are well acquainted with the basic concepts of literature and language and therefore can address a little complex literary themes and topics to equip themselves to deal with hard core academic texts in the current as well as the upcoming semesters. The main focus is given to the literature falling under the umbrella domain of Romantic period with special reference to the romantic school of poetry. The completion of the course will ensure an overarching competence in Romantic poetry and prose amongst the students.

Course Objectives:

1. To enable the students to understand the context of the literary age and genre focused in the syllabus.
2. To enable students understand and relate British literature chronologically in reference to select authors of the Romantic period.
3. To appreciate the vivacity of the canon of British literature.

Course Outcomes:

On completion of the course, students will be able to:

1. Identify the major poets of the Romantic period and their works in English Literature.
2. Outline the various issues presented in the prose of the period.
3. Demonstrate complete familiarity with the features of novels of the Romantic period. Illustrate a good understanding of the structure of sentences and discourse.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Poetry	25 Marks	<i>The Age of Transition:</i> 1. William Blake – The Chimney Sweeper <i>The Romantic Age:</i> 2. William Wordsworth – A Slumber did my spirit seal; Daffodils 3. Samuel Taylor Coleridge – Kubla Khan 4. Lord Byron – On This Day I Complete My Thirty-Sixth Year 5. Percy Bysshe Shelley – Ode to the West Wind 6. John Keats – Ode on a Grecian Urn	12 Hours
II	Prose	25 Marks	1. Charles Lamb – Dream-Children: A Reverie 2. William Hazlitt – On the Feeling of Immortality in Youth 3. Percy Bysshe Shelley – Extract from <i>A Defence of Poetry</i> 4. Mary Wollstonecraft – Extract from <i>A Vindication of the Rights of Women</i>	12 Hours
III	Fiction	25 Marks	1. Ann Radcliffe – <i>The Mysteries of Udolpho</i> 2. Jane Austen – <i>Pride and Prejudice</i>	12 Hours
IV	Language	25 Marks	1. The Structure of Sentences 2. Discourse	12 Hours

Reference Books:

- Wordsworth, Jonathan. *The Penguin Book of Romantic Poetry*. Penguin, 2006. Applebaum, Stanley. *English Romantic Poetry: An Anthology*. Dover, 1996. Driver, Paul. *Poetry of the Romantics*. Penguin, 2000.
- Blaisdell, Bob. *Great English Essays: From Bacon to Chesterton*. Dover, 2005.
- Wollstonecraft, Mary, *Vindication of the Rights of Women*. Penguin, 2010. Sinha, Susanta K. *English Essayists*. Oxford University Press, 1997. Austen, Jane. *Pride and Prejudice*. Penguin, 2009.
- Radcliffe, Ann. *The Mysteries of Udolpho*. Penguin, 2001.
- Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
- Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2060	FOUNDATIONS OF PSYCHOLOGY -II	HC	2	0	1	3	4

Course Description:

This course is designed to give students an overview of what psychological science has discovered about human behavior and mental processes over the past century. An evolutionary, functional perspective will be applied across the many fields of psychology. Students will gain an understanding of the psychological phenomena that occur in daily life as well as the practical applications of psychological knowledge. This course is designed to give other basic aspects of psychology such as sensational aspects, perceptual process, attentional process, personality and its overview, thinking process and intellectual aspects of human being.

Course Objectives:

- a. To introduce the student to the field of sensory processes, perceptual processes and attentional processes.
- b. To familiarize them with study of personality and its development.
- c. To help the student to collect and analyze about how our thinking processes involved in different cognitive abilities.
- d. To help the students with the study of intelligence and its different components.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	SENSATION AND PERCEPTION	25 Marks Short Notes/ Descriptive Questions	<p>a) Sensation - Nature and steps in sensation.. Purposes of sensation, sensory receptors and the brain; Sensory adaptation. Types of sensation: Vision.</p> <p>b) Perception – Nature and meaning of perception; Gestalt laws of perceptual organization, The Constancies (Size, Shape and Brightness); Errors in perception.</p>	10 Hours

II	PERSONALITY	25 Marks Short Notes/ Descriptive Questions	a) Nature and definition of personality (Allport's definition). b) Factors influencing on development of personality. c) Approaches to personality theories. Psychodynamic Perspectives: Freud's theory Trait approaches: NEO-5 theory. Social Learning theory: Bandura's theory of Personality. d) Measurement of personality: Objective Measurement: Questionnaires, rating scales. Projective Techniques.	10 Hours
III	THINKING	25 Marks Short Notes/ Descriptive Questions	a) Nature and definition of thinking, Cognition. Forms of thinking: Concept formation, Categorization, Problem solving, Reasoning, Decision making, Creativity.	08 Hours
IV	INTELLIGENCE	25 Marks Short Notes/ Descriptive Questions	a) Intelligence in historical perspective b) Broader conceptions of Intelligence: Spearman's two factor theory, Sternberg's triarchic theory, Multiple Intelligences, Guilford's theory. d) Types of intelligence tests. e) Extremes of Intelligence.	10 Hours
	PRACTICALS: PRACTICALS-2		a) Signal detection b) Stroop effect c) Bilateral Transfer d) Muller Lyer Illusion e) Concept Formation/Levels of Categorization	2 hrs/Batch/Week

Course Outcomes:

On completion of the course, the students will be able to:

1. Gain an understanding of the sensory aspects, perceptual processes, and attentional aspects of human beings.
2. Able to understand the concept personality, factors influencing, different components of personality.
3. Gain an understanding of how our thinking process involved in our cognitive abilities. Gain an understanding the concept of intelligence and its components.

Reference Books:

1. Robert S. *Feldman* (2004) *understanding Psychology 6th Edition* Tata MrGram – Hill.
2. Saundra K Ciccarelli and Glenn E Meyer (2008), *Psychology, South Asia Edition*,
3. Robert A Baron (2001), *Psychology, III Edition*, Prentice Hall Publications
4. John. W. Santrock (2006), *Psychology Essentials, 2nd Edition* Tata Mc Graw Hill
5. Hillgard & Atkinson (2009), *Introduction to Psychology* Oxford IBH publishing Co. Pvt. Ltd.
6. Morgan, King (2004), *Introduction to Psychology, VII Edition, 1989*, Mc Graw Hill IBH Publication.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2071	Folklore Study – Folk Dance	SC	0	1	1	2	3

Course Content:

Unit – 1	Introduction to Folk arts	<ol style="list-style-type: none">1. Introduction and importants of folk arts2. Characteristics of folk arts3. Folk art forms of India4. Folk art forms that have survived generations
Unit – 2	Folk dances of India	<ol style="list-style-type: none">1. Folk dances from different states of India2. Puppetry3. History and development of folk dances of India
Unit – 3	Dakshinatya Pravritti	<ol style="list-style-type: none">1. Detailed study of Folk dances of Andhra2. Detailed study of Folk dances of Tamil Nadu3. Detailed study of Folk dances of Kerala4. Detailed study of Folk dances of Karnataka5. Detailed study of Folk dances of Maharashtra
Unit – 4	Practical session	<ol style="list-style-type: none">1. Learning and practicing any folk dance form

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2072	Folklore Study – Folk Music	SC	0	1	1	2	3

Course Content:

Unit – 1	Introduction to Folk arts	<ol style="list-style-type: none"> 1. Introduction and important of folk arts 2. Characteristics of folk arts 3. Folk art forms of India 4. Folk art forms that have survived generations
Unit – 2	Development of Folk Music	<ol style="list-style-type: none"> 1. Earliest records of Indian folk music 2. History and regionality
Unit – 3	Instruments used for folk dance	<ol style="list-style-type: none"> 1. Sushira, Avanadha, Thanthri, Ghana Vadys used in folk music <p>Instruments used in north and south folk music.</p>
Unit – 4	Practical session	<ol style="list-style-type: none"> 1. Learning and practicing any folk music form

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2073	Folklore Study – Folk Theatre	SC	0	1	1	2	3

Course Content:

Unit – 1	Introduction to Folk arts	<ol style="list-style-type: none"> 1. Introduction and important of folk arts 2. Characteristics of folk arts 3. Folk art forms of India 4. Folk art forms that have survived generations
Unit – 2	Folk Theatre of India	<ol style="list-style-type: none"> 1. Introduction 2. Different Theatre forms of Ancient India 3. Medieval India 4. Modern India

Unit – 3	Dakshintya Pravritti	1. Koodiyattam 2. Yakshagana 3. Veddhi Natakam 4. Therukoothu 5. Tamasha
Unit – 4	Practical session	5. Learning and practicing any folk theatre form

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2080	Skill Development -1 (Multimedia and Designing)	RULO	1	0	1	2	3

Note: Skill Development (Multimedia and Designing) courses are organised by the **Placement and Training Centre**. The students have to undergo Soft Skill Courses conducted by the said Centre.

UNIT – I [12 Hrs]

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UNIT – II [12 Hrs]

CvÁzÁsvÁ - uÁÁ.gÁA.JPÁÁAr
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ÉÁÉÁÁ °ÁtvÉ - f.Juī.Juī.
agÁAvÁÉÁ zÁ°Á - ZÁÉÁ«ÁgÁ PÁt«

UNIT – III [12 Hrs]

vÁÁÁzÁt vÁÁÉÉsÁgÁvÉÁ uÉÁÁ - vÁÁÁzÁt
zÁ½ ÉÁqÉzÁvÁ CuÁ - CvÁÁgÉÁ±Á ÉÁÁUÁqÉsÁt
PÉsÉÁÁÁ VgÁQ - ægÁAdÉÁ
CvÁÉÁw - vÉÁd¹

UNIT – IV[12 Hrs]

«ÁÁrÁÁÁ - CÉÁÁvÁzÁ. PÉ. vÁÁgÁÁÁÁ 1zÁÁ

ÉÁgÁ¹±Áð Á UÁAxÁUÁÁÁ :

1. vÁÁÁUÁ½ gÁA.2nd, PÁÉÁqÁ uÁ»vÁi ZÁjvÉ. ÉÁÁ±ÁPÁgÁÁ VÁvÁ §ÁPī °Éuī, vÉÁÁUÁsgÁÁ. 2014
2. 1ÁvÁÁwÁvÁ PÁÉÁqÁ uÁ»vÁi ZÁjvÉ uÁÁÁÁ 1,2,3,4,5 vÁÁvÁÁ 6, PÁÁvÉÁÁÁ PÁÉÁqÁ CzÁÁÁÁÁÁ uÁÁuÉ, vÉÁÁUÁsgÁÁ «±Á«zÁÁ±ÁÁÁ, vÉÁÁUÁsgÁÁ. 2014
3. qÁ. CgÁ«AzÁ vÁÁÁUÁw, uÁ»vÁi uÁÁUÁw vÁÁvÁÁ zÁÁvÁ ÉÁÉÉ, ÉÁÁ±ÁPÁgÁÁ PÁÉÁqÁ uÁ»vÁi ÉÁjµÁvÁÁ, ·ÉÁUÁÁÁsgÁÁ. 2014
4. qÁ. F.Juī. DvÁÁsgÁ, PÁÉÁqÁ PÁxÁÉÁ uÁ»vÁi : PÁzÁsÁj, ÉÁÁ±ÁPÁgÁÁ uÁÁÁÁ §ÁPī °Éuī, ·ÉÁUÁÁÁsgÁÁ. 2016
5. QÁvÁðÉÁxÁ PÁÁvÁðPÉsÁn, PÁÉÁqÁ uÁ»vÁi uÁÁUÁw, ÉÁÁ±ÁPÁgÁÁ PÁÁvÁðPÉsÁn vÉÁvÉsÁjÁÁÁÉī lÁī, zÁgÁvÁqÁ. 2009
6. uÁ. ©.Juī. PÉÁ±ÁvÁgÁvī. PÉÉÁuÁÁ PÁÉÁqÁ ÉÁÁPÁUÁÁÁ, ÉÁÁ±ÁPÁgÁÁ CAQvÁ ÉÁÁuÁPÁ, ·ÉÁUÁÁÁsgÁÁ. 2005
7. ±ÁvÁÁgÁÁÁÁ vÁÁÁ., PÁÉÁqÁ uÁ»vÁi ZÁjvÉ ÉÁÁ±ÁPÁgÁÁ vÁÁÁQÉÁ vÉÁPÁtÁÁÁÁ uÁÁgÁPÁ UÁAxÁvÁÁÉÉ, vÉÁÁUÁsgÁÁ - 2014
8. DzÁÁ±Á PÁÉÁqÁ PÁvÁi ·ÁUÁ-2, PÁÁvÉÁÁÁ PÁÉÁqÁ CzÁÁÁÁÁÁÁ uÁÁuÉ, vÉÁÁUÁsgÁÁ «±Á«zÁÁ±ÁÁÁ, vÉÁÁUÁsgÁÁ. 2004
9. 2vÁgÁÁzÁÁÁ f.Juī. PÁÉÁqÁ uÁ»vÁi uÁ«ÁÁPÉ, ÉÁÁ±ÁPÁgÁÁ uÁÁÁÁ §ÁPī °Éuī, ·ÉÁUÁÁÁsgÁÁ. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA3012	HINDI-I (Language)	CC	2	1	0	3	4

□ हंदी भाषा का इतिहास

हंदी – 1: हंदी : हंदी का इतिहास – डॉ. हंदी हंदी हंदी हंदी : 12 hrs.

हंदी

(हंदी 79 हंदी)

79 हंदी

हंदी – 2: हंदी : इतिहास हंदी हंदी हंदी : 12 hrs.

हंदी

हंदी

हंदी – 3: हंदी : हंदी का इतिहास हंदी हंदी 12 hrs. हंदी 79 हंदी

हंदी 79 हंदी –

4: हंदी हंदी, हंदी हंदी हंदी हंदी हंदी : 12 hrs. हंदी

हंदी : हंदी हंदी - हंदी (हंदी हंदी हंदी हंदी)

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हंदी 4 हंदी :

• हंदी का इतिहास – डॉ. हंदी हंदी

• हंदी हंदी हंदी हंदी हंदी – डॉ. हंदी हंदी

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Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3013	Additional English - III (Language)	CC	2	1	0	3	4

Course Outline:

This is a 3 credit course designed to help the learners gain competency in language and literature by exposing them to a variety of literary genres and in the process also develop their subjective perception of the society and the world at large.

Course Objectives:

- To ensure the development of the linguistic prowess of the students.
- To motivate the students to appreciate literature.
- To promote an appreciable reading habit among the students.

Learning Outcomes:

On completion of the course, learners will be able to:

- Demonstrate a thorough understanding of sensitive and critical social issues.
- Develop their own ideas about their own society and culture.
- Express their own opinions in a coherent and communicable manner.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Gender & Identity	25 Marks Short Notes/ Descriptive Questions	Anne Sexton – Consorting with Angels Eugene Field – The Doll’s Wooing Suniti Namjoshi – Extracts from <i>Feminist Fables</i> Ruth Vanita & SaleemKidwai (ed) – <i>Same Sex Love in India</i> (Extract) Charlotte Perkins Gilman – The Yellow Wallpaper	12 Hours
II	Love & Romance	25 Marks Short Notes/ Descriptive Questions	Alfred Noyes – The Highway Man William Shakespeare – Sonnet 116 Frank Richard Stockton – The Lady or the Tiger? Oscar Wilde – The Nightingale and the Rose William Shakespeare – <i>Excerpt from Romeo and Juliet</i> (Balcony Scene)	12 Hours
III	War & Trauma	25 Marks Short Notes/ Descriptive Questions	Lord Alfred Tennyson – The Charge of the Light Brigade TaufiqRafat – The Medal Guy de Maupassant – Two Friends Sadaat Hasan Manto – Toba Tek Singh Bertolt Brecht – Excerpt from <i>Fear and Misery of the Third Reich</i>	12 Hours
IV	Children’s Literature	25 Marks Short Notes/ Descriptive Questions	William Wordsworth – Three Years She Grew in Sun and Shower D.H. Lawrence – Discord in Childhood Hans Christian Anderson – The Snow Queen Anna Sewell – <i>The Black Beauty</i> (Extract) Rudyard Kipling – <i>The Jungle Book</i> (Extract)	12 Hours

References:

- Sexton, Anne. *The Complete Poems*. Houghton Mifflin, 1999.
- Namjoshi, Suniti. *Feminist Fables*. Spinifex Press, 1998.
- Vanita, Ruth & SaleemKidwai (ed.) *Same Sex Love in India*. Penguin India, 2008.
- Gilman, Charlotte Perkins. *The Yellow Wallpaper*. Rockland Press, 2017.
- Gale, Cengage Learning. *A Study Guide for Alfred Noyes's "The Highwayman"*. Gale, Study Guides, 2017. (Kindle Edition Available)
- Shakespeare, William. *Poems and Sonnets of William Shakespeare*. Cosimo Classics, 2007.

- Stockton, Frank Richard. *The Lady, or the Tiger?* Createspace Independent Publications, 2017.
- Wilde, Oscar. *The Collected Works of Oscar Wilde*. Wordsworth Editions Ltd., 1997.
- Shakespeare, William. *Romeo and Juliet*. Rupa, 2001.
- Tennyson, Lord Alfred. *The Complete Works of Alfred Tennyson*. Forgotten Books, 2017.
- Owen, Wilfred. *The Poems of Wilfred Owen*. Wordsworth Editions Ltd., 1994.
- Maupassant, Guy de. *Guy de Maupassant-The Complete Short Stories*. Projapati, 2015.
- Manto, SadaatHasan. *Manto: Selected Short Stories*. RHI, 2012.
- Brecht, Bertolt. *Fear and Misery in the Third Reich*. Methuen Drama, 2012.
- Ricks, Christopher. *Metaphysical Poetry*. Penguin, 2006.
- Anderson, Hans Christian. *Fairy Tales by Hans Christian Anderson*. Read Books, 2010.
- Sewell, Anna. *The Black Beauty*. Maple Press, 2014.
- Kipling, Rudyard. *The Jungle Book*. Amazing Reads, 2018.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3020	Environmental Studies	FC	3	0	0	3	4

Course Objectives:

1. The course is to understand the fundamental concepts of Environment and its Components like air, water, soil and minerals.
2. To understand the working of various bio diversities, Ecosystems, and natural resources.
3. To acquire the knowledge of transformation of Energy in the nature in different forms.
4. To get familiarized with the problems of the earth like pollution, degradation, overpopulation etc

Course Outcomes:

By the end of the course student shall be able to:

1. Analyze the environmental conditions and protect it. Identify and recognize the role of individual, government and NGO in environmental protection.
2. List and illustrate the causes of environmental pollution & find ways to overcome them.
3. Express motivation to find new renewable energy resources with high efficiency through active research & design pollution controlled products
4. Relate to the ecological imbalances and protect it.

Course Content:

UNIT -1Multidisciplinary Nature of Environmental Studies11hr

Environment, objectives and guiding principles of environmental education, Components of environment, Structure of atmosphere, Sustainable environment/Development, Impact of technology on the environment in terms of modern agricultural practices and industrialization, Environmental Impact Assessment. Environmental protection – Role of Government-Assignments of MOEF,

Functions of central and state boards, Initiative and Role of Non-government organizations in India and world.

Self-study: Need for public awareness on the environment, Gaia Hypothesis.

UNIT-2 Environmental Pollution, Degradation and Waste Management 10hr

Environmental Pollution – Definition, sources and types, Pollutant-Definition & classification, Concepts of air pollution, water pollution, Soil pollution, Automobile pollution-Causes, Effects & control measures.

Self-study: Case studies of London smog, Bhopal gas tragedy, marine pollutions and study of different waste water treatment processes.

Environmental Degradation – Introduction, Global warming and greenhouse effect, acid rain-formation & effects, Ozone depletion in stratosphere and its effect. Solid Waste management – Municipal solid waste, Biomedical waste, Industrial solid waste and Electronic waste (E-Waste).

Self-study: Disaster management, early warning systems-bio indicators for Tsunami and other natural disasters.

UNIT-3 Energy and Natural Resources 11hr

Energy – Definition, classification of energy resources, electromagnetic radiation-features and applications, Conventional/Non-renewable sources – Fossil fuels based (Coal, petroleum & natural gas), nuclear energy, Non-conventional/renewable sources – Solar, wind, hydro, biogas, biomass, geothermal, ocean thermal energy, Hydrogen as an alternative as a future source of energy.

Self-study: Remote sensing and its applications, Chernobyl (USSR) nuclear disaster and Fukushima (Japan) nuclear disaster.

Natural resources – water resource (Global water resource distribution, Water conservation methods, Water quality parameters, Uses of water and its importance), Mineral resources (Types of minerals, Methods of mining & impacts of mining activities), Forest wealth (Importance, Deforestation-Causes, effects and controlling measures)

Self-study: Hydrology & modern methods adopted for mining activities.

UNIT-4 Ecology and Ecosystem 10hr

Ecology-Definition, branches, objectives and classification, Concept of an ecosystem – Structure and functions, Characteristics of an Ecosystem-Ecosystem Resilience, Ecological succession and productivity, Balanced ecosystem, Components of ecosystem-abiotic and biotic, biological diversity.

Biogeochemical cycles and its environmental significance – Carbon

and nitrogen cycle, Energy flow in ecosystem, food chains –types, food web & Ecological Pyramids.

Self-study: Need for balanced ecosystem and restoration of degraded ecosystems.

Text Books:

1. R.J. Ranjit Daniels and Jagadish Krishnaswamy “**Environmental Studies**”, , (2017), Wiley India Private Ltd., New Delhi, Co-authored & Customised by Dr.MS Reddy & Chandrashekar, REVA University.
2. Benny Joseph, “**Environmental Studies**” Tata McGraw – Hill Publishing Company Limited.
3. Dr.S.M.Prakash, **Environmental Studies** by Elite Publishers Mangalore, 2007

Reference Books:

1. Rajagopalan R., “**Environmental Studies – from Crisis to cure**”, Oxford University Press 2005
2. Arvindwalia, Kalyani **Environmental Science** Publications, 2009.
3. Anilkumar Dey and Arnabkumar Dey **Environmental Studies**.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3030	Rasa Theory and its implications in Performing Arts	HC	2	1	0	3	3

Course Objectives:

1. Understanding Rasa.
2. To learn to imbibe Rasa in practice
3. To be able to relate Rasa to allied arts
4. To improve the acting skills of the performer.

Course Outcomes:

1. The response group would have learnt to understand and appreciate the concept of Rasa.
2. Students shall be able to connect the Rasa and apply its relevance to today’s art scenario.
3. Students shall be able to dwell deeper in concepts given and approach in a scholastic manner.
4. Can apply the various Rasa concepts in their performances.

Course Content:

Unit I	Overview and Analysis of Rasa	<ol style="list-style-type: none"> 1. The concept of Rasa. 2. What is Rasa? Ras-sutra of Bharata and its various constituents.(NS) 3. Literature and Commentators on Rasa and texts
Unit II	Nava Rasa	<ol style="list-style-type: none"> 1. Study of Nava-Rasa and their application in practice. 2. Rasa Prakarna according to Bhatta lollata, Shree Shankuka.

Unit III	Application of Rasa	1. Rasa principles according to scholars Bhatta Nayaka, Abhinava Gupta 2. Episodes to depict rasa from the Epics, plays and contemporary situations.
Unit IV	Rasa in Contemporary Times	1. Rasa theory in contemporary Indian literature. 2. Paribhashika (foreign) words like Dhvani, Alankara, Bhava, Auchitya etc

Reference Books:

1. Natya Sastra – Dr. Manomohan Ghosh
2. Susan L Schwartz – Rasa; Performing the Divine in India
3. David Buchta – Rasa Theory
4. Srinivas Reddy - Theory of Rasa

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3041	Practical 3 – Bharatanatyam	SC	0	0	3	3	6

Course Objectives: The overall objective of the Course is as follows:

- A. Elevating their artistic talent to a higher level
- B. To provide exposure to the gestural language of Bharatanatyam.
- C. Enable the students to understand the possibilities of mimetic language of dance.
- D. Finding the possibilities to channelize their skills and improve them

Learning Outcomes

On completion of the course learners will be able to:

- Will be able to perform important dances of Bharatanatyam repertoire
- Will develop their acting and dancing skills.
- Improve their understanding of musical and rhythmic correlation
- Able to sing and recite jathis to the learnt items.

Course Content:

Unit	<u>Topics</u>	<u>Description</u>
1	Hastabhedas	Viniyogas of Mudras - Samyutha Asamyutha Hastas are taught to the students. This will take their vocabulary of Mudra to a higher level and will be useful while composing new choreographies.
2	Kauthvam 1 st part	Learning of a Kauthvam provides more practical knowledge and develops their acting skills.
3	Kauthvam 2 nd part	Second part of Kauthvam to be taught. Also training for singing and recitation of syllables to be given
4	Sloka	Students acquire more acting skills and develop the knowledge of literature.

Course Code	Course Title	Course Type	L	T	P	C	Hrs /Wk
B19BA3042	Practical – 3 Kuchipudi	SC	0	0	3	3	6

Objectives: The overall objective of the Course is as follows:

- To give Student more attention to the art.
- Making their artistic talent to a higher level
- Finding the possibilities of their skills and improve them.

b) Learning Outcomes

On completion of the course learners will be able to:

- Will be able perform some of the major item in the respective field
- Will develop their acting and dancing skills.
- Able to sing and do the jathis to the learned items.

Unit	Topics	Description
1	Keerthana	Keerthanam is one of the part in which student's acting skills could get developed.
2	Sloka	Student will learn a Sloka part so that the expansion of acting and improvisation can be developed
3	Thillana	This is one of the last parts in the Kachery format. Student will focus on the body and dance movements in the part.

4	Recitation	Recitation of all the items learned for a thorough knowledge. Revising the previous pieces is also added
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CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3043	Practical – 3 (Carnatic Music)	SC	0	0	3	3	6

Course Objectives:

- To improve the students’ understanding of Carnatic Music by exposing them to higher levels of training
- To make the students learn the composition in Carnatic music and to enable them to learn it in the practical way
- To enable them to understand the advanced technicalities of this genre

Course Outcomes:

- At the end of the course the students would be in a position to render the lessons taught to them in a confident manner.
- The students would not only understand the fundamentals and basics of the music but would also become a performer.
- The artistes will have a greater knowledge of music theory.

UNIT I	Music; Basics, Theory	<ul style="list-style-type: none"> • LakshanaGeetha • 72 Melakartha theory as per venkatamaki ,chaturdantiprakashika • (south Indian music of sambamurthi book 3, page 45,55)
UNIT II	Learning Raga	<ul style="list-style-type: none"> • Jathiswaram – kalyani • NottuSwaras
UNIT III	Jathi & Composition	<ul style="list-style-type: none"> • SwaraJathi Definition of compositional forms
UNIT IV	Sloka/Devotional Song and Raga	<ul style="list-style-type: none"> • Chakra Division Theory in Raga System Devotional song/ Sloka

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3044	Practical-3 (Drama)	SC	0	0	3	3	6

Course Objectives

- Understanding the dynamics of dramatic literature.
- Improving the ability of reading more dramas
- Understand the more about the wide concepts of stage and plot
- Preparing characters and finding out the perspectives of different role as an actor.

Course Outcomes

- Will be able understand the influences made on social impact by the plays written in different period.
- Be able to have a wide range of reading habit
- Student will be able to design a scenes in different patterns depends on the situation and emotion of plays
- Student will be able to present any level of performance like Solo, Monologue, etc.

Course Content:

UNIT I	Play reading	<ol style="list-style-type: none"> 1. Reading plays in different perspectives and different moods. 2. Both Eastern & Western classics should be read. 3. Oedipus Rex, Macbeth, Ascharyachoodamani, Sakuthalam
UNIT II	Scene Design	<ol style="list-style-type: none"> 4. Designing scenes of the plays which have read. 5. Finding out the possibilities of experimenting the classics in contemporary
UNIT III	Character building and developing	<ol style="list-style-type: none"> 1. Building a character in different viewpoints and enacting in different situations 2. Finding the possibilities of physical involvement in the developed characters 3. Posting the characters in different manners to understand the dynamics of the creativity.
UNIT IV	Actor and Director practices	<ol style="list-style-type: none"> 1. Developing directorial skills 2. Working with co-actors as a director. 3. Creating short scenes as director

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3050	English Literature & Language – III (Semester III) British Literature (Victorian & Modern) & Aspects of Language	HC	2	0	1	3	4

Course Description:

This course is designed to familiarize the students with literary works of significant authors from the Victorian and Modern period of the British literary canon. In order to master the history of English literature, this course is extremely important. After completion of this course, the students will have a wholesome grasp over British literature in its full demeanor and he/she will be able to apprehend and appreciate other literary texts from multiple literary periods competently.

Course Objectives:

- To introduce the students to the literary works from Victorian and Modern period.
- To enable the students to understand key concepts of Victorianism and Modernism.
- To initiate them to the basic social and cultural theories of modern age.

Course Outcomes:

On completion of the course, the students will be able to:

- Identify the major poets of the Victorian and Modern periods and their works in English Literature.
- Outline the various issues presented in the prose of the periods.
- Demonstrate complete familiarity with the features of novels of the Victorian period.
- Illustrate a good understanding of the various components of Speech and Writing and Tenor and Domain.
- Show a good understanding of Stylistic Analysis.

Course Content:

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Poetry	25 Marks	<i>The Victorian Age:</i> 1. Alfred Tennyson – Ulysses 2. Robert Browning – My Last Duchess 3. Christina Rossetti – Goblin Market 4. Mathew Arnold – Dover Beach <i>Modern Poetry:</i> 5. W.B. Yeats – An Acre of Grass 6. W.H. Auden – The Shield of Achilles 7. T.S. Eliot – Prelude	12 Hours
II	Prose	25 Marks	1. D.H. Lawrence – The Rocking-Horse Winner 2. R.L. Stevenson – An Apology for Idlers 3. Virginia Woolf – Extract from <i>A Room of One's Own</i> 4. Lewis Carroll – Excerpt from <i>Alice's Adventures in Wonderland</i>	12 Hours
III	Fiction	25 Marks	1. Charles Dickens – <i>The Adventures of Oliver Twist</i> 2. Charlotte Bronte – <i>Jane Eyre</i>	12 Hours
IV	Language	25 Marks	1. Speech and Writing 2. Tenor and Domain 3. Introduction to Style 4. Stylistic Analysis: A Framework	12 Hours

Reference Books:

- Cunningham, Valentine. *Victorian Poetry*. Blackwell, 2003.
- Negri, Paul. *English Victorian Poetry: An Anthology*. Dover, 1998.
- Yeats, W.B. *WB Yeats: Collected Poems*. Vintage, 1990.
- Eliot, T.S. *The Complete Poems and Plays of T.S. Eliot*. Faber, 2004.
- Sen, S. *W.H. Auden: Selected Poems*. Unique Publishers, 2015.
- Lawrence, D.H. *The Rocking Horse Winner*. Perfection Learning, 1982.
- Woolf, Virginia. *A Room of One's Own*. Penguin, 2002.
- Dickens, Charles. *Oliver Twist*. Norton, 2009.
- Bronte, Charlotte. *Jane Eyre*. Penguin, 2002.
- Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
- Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3060	(Psychology – III) Social Psychology	HC	2	0	2	4	5

Course Description:

Social Psychology will provide you with an introduction to the field of social psychology. Social psychology is a subfield of the science of psychology that focuses on the perceptions, thoughts, feelings, and behaviors of individuals and groups within a social context. This course introduces students to the theory and research on the social factors that influence individual and group behaviour. Prosocial behaviour, aggression, interpersonal attraction, attitudes, prejudice are among the topics covered in the course. The course will include both individual and group work to facilitate awareness, understanding and application of social psychological principles and concepts. As this is a survey course, this class will give you a broad overview of the major theories and findings within social psychology.

Course Objectives:

- To introduce the historical and scientific origin and development of the field in the western and Indian context
- To help the students to demonstrate an understanding of the basic scientific method underlying social psychological research.
- To generate awareness about a general knowledge of the major theories and current findings within each of the research topics covered in this course.
- To delve in to major issues and concepts in the field of Social Psychology
- To help the students to recognize and appreciate how basic theory and experimental findings apply to everyday situations.

Course Outcomes:

After the completion of this course, a student will be able to:

- Demonstrate the ability to articulate independently and creatively about human Social Behavior and the cultural influences that affect our behavior.
- Understand the historical and scientific origin and development of the field in the western and Indian context.
- Describe, discuss and analyze major issues and concepts in the field of Social Psychology.
- Demonstrate the ability to state the fundamental principles of Social Psychology.
- Describe the development of the self and the dynamics of interpersonal attraction, prosocial behaviour, aggression, prejudice, group processes and attitude formation and change in a social context.
- Comprehend the nature of scientific methods employed to study behaviour in the social context.

Course Content:

Unit-I: Introduction 12 Hours

- a) Definition; History- Origin and Development.
- b) Social psychology in India;
- c) Theories - Cognitive, Decision making, Interdependence, Socio-cultural, Evolutionary, and Mid-range theories.

Unit-II: Social Perception 12 Hours

- a) Self concept – Beginnings, Formation, Self- schemas and Multicultural perspective
- b) Self- presentation - False modesty, Self-handicapping, Impression management. Self-esteem- Development and Consequences.
- c) Perceiving persons- Attribution theories and biases, Integration, Confirmation bias

Unit-III: Positive Social Relations and Negative Social Relations 12 Hours

- a) Prosocial behavior – Helping influences - Personal, Interpersonal and Situational, Receiving help. Interpersonal attraction and affiliation – Characteristics of the individual, others and situational influences.
- b) Perceiving groups- Stereotypes – Cognitive foundations, how stereotypes distort perceptions; why stereotypes persist; Prejudices- Individual differences; Types of prejudices – Sexism and Racism; Reducing prejudice.

Unit-IV: Social Influences 12 Hours

Attitudes – Definition; Theories – Cognitive Dissonance and Dual Processing; Attitude and Behaviour; Attitude change

Group - Basic features; Group performance – Types of tasks, Brainstorming; Group decision making; Group polarization, and Group think.

Practicals-III

- a. Learning Styles -VARK
- b. Student Problem Checklist
- c. Free Association
- d. Paired Association Learning
- e. Creativity

Reference Books:

1. Brehm, S.S. and Kassir, S.N. (1996) *Social Psychology*, 3rd edition. Boston : Houghton Mifflin Company.
2. Crisp, R.J. and Turner, R.N. (2007), *Essential Social Psychology*. New Delhi: Sage Publications India Pvt Ltd.
3. Misra, G. and Dalal, A.K. (2001). *Social Psychology in India: Evolution and Emerging trends*. Edited by Ajit.K.Dalal and Girishwar Misra. New Directions in Indian Psychology, Volume I: Social Psychology. New Delhi: Sage Publications India Pvt.Ltd.

4. Myers, D.G (2002) *Social Psychology*, 7th international edition.New York: McGraw Hill Companies.
5. Taylor, S .E, Peplau, L.A and Sears, D.O. (2006) *Social Psychology*, 12th edition.New Delhi: Pearson Prentice-Hall of India Pvt Ltd.
6. Baron, Robert A. and Byrne, D. (2001) *.Social Psychology* 8th Edition (Reprint).New Delhi: Prentice-Hall of India Pvt Ltd.
7. Baumeister.R.F. and Bushman,B.J. (2008).*Social Psychology and Human nature*.Belmont,CA: Thomson Wadswort

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3070	Skill Development–II (Indian Classical Dance Make-up)	RULO	4	0	0	4	4

Students will have to compulsorily undergo ONE Skill Development training in Indian Classical Makeup of Four credits conducted either by the School of Performing Arts or by REVA University or the Skill Development Centre during this Semester.

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11. DzÄÄᄁPÄ PÄÉÄQÄ PÄVÄI "ÄUÄ-2, PÄVÉAҒÄÄ PÄÉÄQÄ CzÄÄÄÄÄÄÄ uÄAuÉ, vÉÄÉuÄSgÄÄ «±Ä«zÄÄᄁÄÄÄ, vÉÄÉuÄSgÄÄ. 2004
12. 2vÄgÄÄzÄÄᄁÄÄ f.Juİ. PÄÉÄQÄ uÄ»vÄI uÄ«ÄÄPÉ, ҒАҺА±АРгАА uÄҒÄᄁÄÄ ᄁÄPІ °Éuİ, "ÉAUÄÄÄSgÄÄ. 2013

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Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA4013	ADDITIONAL ENGLISH-IV (Language)	CC	2	1	0	3	4

Course Outline:

This is a 3 credit course designed to help the learners gain competency in language and literature by exposing them to a larger variety of literary genres and themes to encourage their interests in critical social and cultural issues within literary as well as non-literary domains.

Course Objectives:

- To introduce the students to the multiplicity of literature from all over the world.
- To contribute in the emotional and social development of the students.
- To develop in the students an ability to appreciate cultural and social diversity.

Learning Outcomes:

On completion of the course, learners will be able to:

- Demonstrate a visible understanding of the significant issues of the society.
- Summarize the basic as well as the latent concepts of the texts provided in the syllabus and do justice to them.
- Explain the major and minor themes of the select texts and their significance in the broader context of real life.

Unit	Description	Evaluation Pattern	Topics	Teaching Hours
I	Myths & Mythology	25 Marks Short Notes/ Descriptive Questions	John W. May – Narcissus W.B. Yeats – The Second Coming DevduttPattanaik - <i>Shikhandi and the Other Stories They Don't Tell you</i> (Extracts) IravatiKarve – <i>Yuganta</i> (Extract)	12 Hours
II	Family & Relationships	25 Marks Short Notes/ Descriptive Questions	Nissim Ezekiel – Night of the Scorpion Langston Hughes – Mother to Son Vijay Dan Detha – Double Life Kate Chopin – The Story of an Hour Henrik Ibsen – <i>A Doll's House</i> (Extract)	12 Hours
III	Horror & Suspense	25 Marks Short Notes/ Descriptive	Edgar Allan Poe – The Raven Bram Stoker – A Dream of Red Hands	12 Hours

		Questions	Satyajit Ray – Adventures of Feluda (Extract) Stephen King - Gramma	
IV	Education	25 Marks Short Notes/ Descriptive Questions	The Dalai Lama – The Paradox of Our Times Kamala Wijeratne – To a Student Sudha Murthy – In Sahyadri Hills, a Lesson in Humility Booker T. Washington – Extract from <i>Up from Slavery</i> (Chapter 3: The Struggle for Education) Frigyes Karinthy – <i>Refund</i>	12 Hours

Reference Books:

- Finneran, Richard J. *The Collected Works of W.B. Yeats*(Volume I: The Poems: Revised Second Edition). Simon & Schuster, 1996.
- Pattanaik, Devdutt. *Shikhandi: And Other 'Queer' Tales They Don't Tell You*. Penguin Books, 2014.
- Karve, Irawati. *Yuganta: The End of an Epoch*. Orient Blackswan, 2007.
- Ezekiel, Nissim. *Collected Poems* (With A New Introduction By John Thieme). OUP, 2005.
- Hughes, Langston. *The Collected Poems of Langston Hughes*. Vintage, 1995.
- Chopin, Kate. *The Awakening and Selected Stories of Kate Chopin*. Simon & Schuster, 2004.
- Ibsen, Henrik. *A Doll's House*. Maple Press, 2011.
- Poe, Edgar Allan. *The Complete Poetry of Edgar Allan Poe*. Penguin USA, 2008.
- Stoker, Bram. *Dracula*. Fingerprint Publishing, 2013.
- Ray, Satyajit. *The Complete Adventures of Feluda* (Vol. 2). Penguin Books Ltd., 2015.
- Lama, Dalai. *Freedom In Exile: The Autobiography of the Dalai Lama of Tibet*. Little, Brown Book Group, 1998.
- Murthy, Sudha. *Wise and Otherwise: A Salute to Life*. Penguin India, 2006.
- Wsahington, Booker T. *Up from Slavery*. Infinity, 201

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4020	Textual Traditions in Performing Arts	HC	2	1	0	3	4

Course Objectives:

- a. To enable the students to understand the tangible heritage of India and the different arenas where the traditions and cultures could be found related to Performing Arts
- b. To make the students learn the different texts from ancient, medieval and modern periods related to Performing Arts.

Course Outcomes

- a. At the end of the course the students would be able to understand the importance and the greatness of the Cultural heritage of India and their Tangible sources.
- b. The Students would not only understand the Tangible sources of Performing Arts but also would be able to read, understand and apply them to the performances of them.

UNIT I	History of Indian Performing Arts and its Sources	<ol style="list-style-type: none"> 1. History and development of Performing Arts 2. Tangible sources 3. Intangible Sources 4. List of World Heritage Sites in India
UNIT II	Tangible Sources for Performing Arts	<ol style="list-style-type: none"> 1. Manuscripts 2. Sculptures 3. Temple architectures 4. Hindu Mythology and Iconography of Gods and Goddesses 5. Books on Dance, Music and Theatre 6. Film Archives
UNIT III	Texts on Performing Arts	<ol style="list-style-type: none"> 1. Abhinaya Darpanam of Nandikeshwara– 2nd century AD 2. Abhinava Bharati of Abhinava Gupta – 10th century AD 3. Nritta Ratnavali of Jayapasena– 13th century AD 4. Brihaddeshi of Matanga Muni – 6th to 8th century AD 5. Abhilashitartha Chintamani

		(Manasollasa) of Someshwara – 12 th century AD 6. Sangeeta Ratnakara – 13 th century AD 7. Kalidasa's Abhignanashakunt alam – 1 st century BC to 4 th century AD 8. Silappadikaram of Ilango Adigal – 2 nd century AD 9. Ratnavali of Harsha – 7 th century AD
UNIT IV	Modern textual traditions in Performing Arts	1. V. Raghavan 2. Kapila Vatsyayan 3. Ananda Coomaraswamy

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4031	Practical – 4 Bharatanatyam	SC	0	0	3	3	6

Course Objectives

- A. To impart advanced skills of dancing and acting to the students
- B. To develop stamina of students
- C. Learning more items so that the students can have performances.
- D. Attaining detailed knowledge in the field of arts

Course Outcomes

- Give performances in the respective field.
- Acquire a good knowledge on the significant dance of the tradition.
- Recite the Trikala jati and other jatis confidently
- Will be able to further teach the dances and also understand the intricate aspects of Bharatanatyam

Course Content:

UNIT I	Varnam 1 st part	The most important dance of the repertoire is taught. Trikalajathi, abhinaya for pallavi and anupallavi are taught.
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UNIT II	Varnam 2 nd part	Continuation of the Varnam. Jatis and abhinaya for sahitya are taught.
UNIT III	Varnam 3 rd part	Second half of the Varnam.
UNIT IV	Recitation of Jathis	Reciting the musical parts of the dance along with Jathis

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4032	Practical – 4 (Kuchipudi)	SC	0	0	3	3	6

Course Objectives

- a. Improve more skills of dancing and acting
- b. Learning more items so that student can have performances.
- c. Attaining detailed knowledge in the field of arts

Course Outcomes:

- Have own performances in the respective field.
- Can have good knowledge on the important items of the field.
- Able to help the beginner level students the art field.

Course Content:

UNIT I	Tharangam 1 st part	Tharangam is an essential piece in the form. Student will be enabling to develop their overall skills through this.
UNIT II	Tharangam 2 nd part	Continuing and completing the part is the activity here. Student must also skilled to recite the item.
UNIT III	Keerthana 1 st part	One more part is added to understand the differences in this piece. With this talents of student will also increase
UNIT IV	Keerthana 2 nd part	Completing the item and getting ready to perform. Revision of the previous items will also takes place along with the present units.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4033	Practical 4–Carnatic Vocal	SC	0	0	3	3	6

Objectives: The Overall Objective of the course is As Follows:

- To make the students learn the Kacheri compositions in Carnatic music and to enable them to learn it in the practical way.
- To enable them to understand the theoretical aspects of compositions.
- To provide them higher levels of vocal training
- To empower them with concert related technicalities and training

Learning Outcomes:

On completion of the course learners will be able to:

- The Students would be able to understand the concept of the alapana and swarakalpana
- The Students would be able to sing the manodharmasangeeta
- The students would be able to sing different compositional forms in concert.
- Students would acquire stronger capacity to effectively render more challenging compositions

Course Content:

Unit	Topics	Description	
1	Basics of concert music	Tana Varnam in one speed	
2	Basics of concert music	Javali	
3	Basics of concert music	Kriti with alapana and swarakalpana	
4	Basics of concert music	Thillana	

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4034	Practical 4–Drama	SC	0	0	3	3	6

Course Objectives: The overall objective of the Course is as follows:

- Understanding the dynamics of dramatic literature.
- Improving the ability of reading more dramas
- Understand the more about the wide concepts of stage and plot
- Preparing characters and finding out the perspectives of different role as an actor.

Course Outcomes:

- a. Will be able understand the influences made on social impact by the plays written in different period.
- b. Be able to have a wide range of reading habit
- c. Student will be able to design a scenes in different patterns depends on the situation and emotion of plays
- d. Student will be able to present any level of performance like Solo, Monologue, etc.

Course Content:

Reference Books:

1. An Actor Prepares – Konstantin Stanislavski
2. Ascharya Chudamani – Sakthibhadran
3. Tragedy and Comedy – Walter Kerr
4. The Director’s Craft – Katie Mitchell
5. Changing Styles & Methods of Theatre Acting – Bharti Sharma.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4040	English Literature & Facets of Language -IV - Reading India	HC	2	0	1	3	4

Course Description:

This course is designed to expose the learners to the various facets of the multicultural India. This richness of our nation is an amalgamation of several cultures, spanning across the Indian subcontinent and has been greatly influenced by a history that is several millennia old. This course aims to acquaint the learners with this variety of India’s socio-political and cultural background.

Course Objectives:

- To acquaint the students with the culture and aesthetics of India.
- To expose the students to the various issues related to the formation of India as a nation.
- To introduce the students to the issues of caste, class and gender related problems in India.
- To familiarize the students with contemporary politics in India.

Course Outcomes:

On completion of the course the students will:

- Develop an insight into the richness of India's culture and aesthetics.
- Demonstrate familiarity with the various issues related to the formation of India as a nation.
- Be able to explain the issues of caste, class and gender related problems in India.
- Be able to outline their familiarity with contemporary politics in India.
- Outline the various issues presented in the prose of the period.
- Demonstrate complete familiarity with the features of novels of the Romantic period. Illustrate a good understanding of the structure of sentences and discourse.

Course Content:

Unit	Description	Evaluation	Topics	Teaching
I	Culture and Aesthetics	25 Marks	1. AnandCoomaraswamy: The Dance of Shiva (from <i>The Dance of Shiva: Fourteen Essays</i>) 2. Amir Khusrau: Multilingual Literary Culture (from <i>Indian Literary Criticism: Theory and Interpretation</i>) 3. David Frawley: India and the Coming Century(from <i>Hinduism and the Clash of</i>	12 Hours
II	Nation	25 Marks	1. Vikram Chandra: <i>Red Earth and Pouring Rain</i> 2. RamachandraGuha: Redeeming the Public (from <i>Patriots and Partisans</i>) 3. RituMenon and KamlaBhasin: <i>Borders and Boundaries - Women in India's Partition</i> (Extract) Suggested Reading: Salman Rushdie: <i>Dynasty</i> (from <i>Imaginary</i>	12 Hours
III	Caste, Class & Gender	25 Marks	1. BaburaoBagul: Mother 2. Meena Kandaswamy: Becoming a Brahmin 3. Devanur Mahadeva: One Who Sold Themselves 4. RajiaSajjadZaheer: Neech 5. A. Revathi: <i>The Truth about Me – A Hijra</i>	12 Hours
IV	Contemporary Politics	25 Marks	1. Arundhati Roy: My Seditious Heart – An Unfinished Diary of Nowadays (Published in <i>The Caravan: A Journal of Politics and Culture</i>) 2. Basharith Peer: <i>Curfewed Nights</i> (Extract)	12 Hours

Reference Books:

- Coomaraswamy, Ananda. *The Dance of Shiva: Fourteen Essays*. Rupa Publications India, 2013.
- Devy, G.N. *Indian Literary Criticism: Theory and Interpretation*. Orient Blackswan, 2010.
- Frawley, David. *Hinduism and the Clash of Civilizations*. Voice of India, 2001.
- Chandra, Vikram. *Red Earth and Pouring Rain*. Penguin India, 2000.
- Guha, Ramchandra. *Patriots and Partisans*. Penguin India, 2013.
- Menon, Ritu and KamlaBhasin. *Borders and Boundaries - Women in India's Partition*. Kali for Women, 1998.
- Rushdie, Salman. *Imaginary Homelands*. Random House India, 2010.
- Revathi, A. *The Truth About Me – A Hijra Life Story*. Penguin India, 2010.
- Peer, Basharith. *Curfewed Nights*. RHI, 2009.
- Tharoor, Shashi. *India – From Midnight to the Millennium and Beyond*. Penguin India, 2012.
- Roy, Arundhati. *My Seditious Heart – An Unfinished Diary of Nowadays*. *The Caravan: A Journal of Politics and Culture*. May 1, 2016.

URL: <http://www.caravanmagazine.in/essay/seditious-heart-arundhati-roy>

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA4050	Developmental Psychology	HC	2	0	2	4	5

Course Description:

This course is a study of human growth and development. Emphasis is on major theories and perspectives as they relate to the physical, cognitive, and psychosocial aspects of development from conception to death. Upon completion, students should be able to demonstrate knowledge of development across the life span. Course work includes projects which emphasize research. This course has been approved to satisfy the Comprehensive Articulation Agreement for the general education core requirement in social/behavioral sciences.

Course Objectives:

- Explain the importance of studying life-span development.
- Describe the history of interest in the life-span perspective and indicate how contemporary concerns have arisen from previous views.
- Discuss the nature of development as a pattern of movement or change occurring throughout the life span.
- Define and distinguish between biological processes, cognitive processes, and socio-emotional processes.
- Understand the major developmental periods from conception to death.
- Understand, compare, and contrast the key development theories
- Define and distinguish between theory, hypotheses, and the scientific method, and understand the different research measures used by developmental psychologists.
- Understand the standard ethics of developmental research.

Course Outcomes:

On completion of the course, students will be able to:

- Identify the major issues, tasks and milestones of human development, such as physical, cognitive, social and emotional development throughout the lifespan.
- Evaluate core concepts, strengths, and weaknesses of the major theories of lifespan development.
- Evaluate how ethnicity, culture, class, and gender influence lifespan development.
- Explain the impact of biological/genetic influences on physical growth, cognition and behavior.
- Assess how current research supports and critiques the major theories of development.
- Demonstrate the developmental aspects such as physical development, cognitive development, psychosocial development and emotional development in each stage of human life span.

Course Content:

Unit-I: Introduction and Prenatal Development 12 Hours

- Concept of human development-Introduction, stages of life span development.
- Aspects of human development- Physical, social, cognitive, moral.
- Factors influencing human development-Ecological factors, hereditary factors.
- Overview of theories of human development- Erickson, Piaget, Kohlberg.
- Conceiving a new life**-Fertilization; Multiple Births
- Mechanisms of Heredity**- Genetic Code, Sex Determination, Patterns of Genetic Transmission -Dominant and Recessive Inheritance.
- Chromosomal and Gene linked abnormalities. – Chromosomal Abnormality-Down syndrome; **Sex-linked chromosomal abnormalities** - Klinefelters, fragile X, Turner's, XYY; **Gene linked abnormalities** - PKU, Sickle Cell Anaemia.
- Stages of prenatal development.**
- Prenatal Assessment- Amniocentesis, chorionic villus sampling, embryoscopy, pre-implantation diagnosis, maternal blood test, umbilical cord blood sampling, ultrasound.
- Birth Process- Stages of Child Birth .

Unit-II: Infancy to Childhood

12 Hours

- Newborn appearance, reflexes, assessment and states
- Physical and motor development, cognitive and language development, psychosocial development: Emotions.

Unit-III: Puberty and Adolescence 12 Hours

- Puberty: Meaning, biological changes: Sexual maturation, growth spurt, primary and secondary sexual characteristics; responses to physical change; Development of identity;
- Adolescent relationships: Family, Peers.

Unit-IV: Adulthood 12 Hours

- Physical development
- Foundations of intimate relationships: friendship, love, and sexuality; Marriage: Marital adjustment and conditions influencing it. Parenthood: adjustment to parenthood.
- Occupational adjustment: Stable and unstable patterns, preparation for retirement, work retirement and leisure in late adulthood.
- Psychosocial changes: Coping with Mid-life crisis, Primary and secondary ageing.

e) Psychosocial aspects: lifestyle and social issues: Personal relationships: Relationship with adult children, great-grandparenthood.

f) Stages and patterns of grieving.

Practicals-IV

1. Self-Concept Rating Scale (R.K.Saraswat)
2. Happiness Inventory
3. Concept Formation for height and size
4. Two Point Threshold
5. Size and weight Illusion

Reference Books:

1. Diane E Papalia (1998), Human Development 7th International Edition, Mc Graw Hill Publications
2. Lois Hoffman (1988), Developmental Psychology Today 5th Edition, Mc Graw Hill Inc.
3. Elizabeth B Hurlock(1987), Developmental Psychology-a life-span approach 5 th Edition, Tata Mc Graw Hill publication
4. Laura E Berk (1999), Child Development Prentice Hall of India
5. Hetherington & Parke (1999), Child Psychology. 5 th International Edition, Mc Graw, Hill
6. John W. Santrock (1999) Life Span Development, 7 th Ed. Mc Graw Hill Publication

Course Code	Course Title	Course Type	L	T	P	C	H
B19BA4060	Internship in Performing Arts	HC	0	0	3	3	6

Students have to do an internship program in an institution of their respective field. This is to develop their teaching skills and make them more focused into the artistic career which they are approaching

Course Code	Duration	Course Title		L	T	P	C	H
B19BA4070	20 Weeks	MOOC/SWAYAM/ Edx / HARVARD ONLINE COURSES	HC	0	0	2	2	4

MOOC/ SWAYAM:

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering OOC courses.

A student shall register and successfully complete any of the courses available on SWAYAM. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

FIFTH SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA5010	Traditions and innovations in performing arts	SC	4	0	0	4	4

Course Objectives

- 1.To provide an understanding of traditions in dance drama music
- 2.To provide an understanding of innovations in performing arts
3. To provide an understanding of transitions in performing arts from ancient to post modern period.
4. To provide an understanding of terminologies with reference to the topic.

Course Outcomes

1. The response group would have understood the importance of traditions in performing arts.
- 2.The response group would have understood that innovations are inseparable part of traditions .
3. The response group would have understood the paradigms of the topic.
4. The response group would have understood the application of innovations and creativity based on traditions.

Course Contents

Unit	Topics	Description
1	Definitions of Traditions, Transitions and innovations in Performing Arts	1. Understanding of the timeline with reference to performing arts 2. Defining tradition 3. Defining innovation 4. Defining dance drama and music 5. Defining transition in traditions
2	Marga in Performing Arts	1. Defining paradigm 'Marga' in dance, drama and music 2. Sculptures art architecture and performing arts 3. literature and performing arts. Nrityalakshana and nritya lakshya. 4. Natyasastra study and performing arts.
3	Desi in Performing Arts	1. Defining the paradigm 'Desi' in dance drama and music 2. Sculptures art architecture and performing arts 3. literature and performing arts Nritya lakshana and nritya lakshya 4. Sangeeta ratnakara and performing arts
4	Traditions and Transitions in Performing Arts	1. Venkatamakhi to the music trinity 2. Haridasas, Vaishnavism Bhakthi movement 3. Royal composers, court poets and their contribution to innovation in performing arts.

		4. Tradition and transition in the modern and post modern period. 5. Application of the above study practically by the response group.
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Course Code	Duration	Course Title		L	T	P	C	Hrs/ W
B19BA5020	16 Weeks	ARTS MANAGEMENT	HC	3	0	0	3	3

Course Objectives:

- To enable the dancers/artist of School of Performing Arts to gain knowledge in the management and its allied aspects related to Dance.
- To be able to deliver the theoretical aspects of Marketing and Branding that would help them to emerge as holistic artists.

Course Outcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensibly and communicate with the World about themselves.
- To be able to apply for programmes, grants, scholarships and all the allied aspects related to dance and giving hands on experience.

Course Contents:

UNIT	DESCRIPTION	TOPICS
1	Arts Administration	Arts Administration Audience development Programme Planning
2	Budget Management	Budget Management Fund Raising Grantsmanship in Arts
3	Legal Aspects and Marketing	Arts Administration Policies and Legal Aspects Marketing Concept
4	Dance Company Management	Dance Company Management in India Dance Company Management abroad

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA5033	Practical 5–Carnatic Vocal	SC	0	0	3	3	6

Course Objectives

- To make the students learn distinctive features of Indian music
- To enable them to understand the great composers of Indian classical music
- To make the student understand the similarities of kathakali - yekshagana sangeetham, Kathak-Odissi Music.
- To empower them with concert related technicalities and training

Course Outcomes:

On completion of the course learners will be able to:

- The Students would be able to understand the features of Indian music theory
- The Students would be able to understand the great composers of Indian classical music the students would be able to sing different compositional forms in concert
- Students would acquire render more challenging compositions and to have a stronger knowledge on the music in Vedic times.

Course content

Unit	Topics	Description
1	Basic for concert music	Distinctive features of Indian Music
2	Life history	Prominent stalwarts of yester years in vocal: Semmangudi Srinivasa Iyer., Palghat K V Narayanaswami, M D Ramanathan, Madurai Mani Iyer., D K Pattambal, M S Subbalakshmi, M L Vasanthakumari.
3	Music for dance	A study on Kathakali music & Yekshagana music ragas and talas figuring in it.
4	Basic for concert music	Music in the Vedic time

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA5034	Practical 5–Drama	SC	0	0	3	3	6

Course Objectives

- Develop an appreciation and unerring zeal towards dramatic literature.
- Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
- Elevate the pupils to perceive the Social contexts of theatrical performances.
- Analyse the social perception and executive measures of theatre historically.
- Cultivate an analytical mind on the social credentials of a script.

Course Outcomes

- The completion of the course enables pupils to realize the historical implementations of social perception in Theatre performances.
- Be able to subdue the fear of expression in a social scenario.
- Be able to dissect a play script through the lenses of social discourse.
- Be able to effectively perform in a social structure.

Course Content:

Unit	Topics	Description
1	Speech work	Tongue twisting Exercises Different types of Reading Narrations Diction Intonation Emphasis Pauses Tempo Dialogues delivery Practicing speech with a literary piece.
2	Contemporary playwrights In Kannada	1. T P Kailasam 2. Girish Karnad 3. Samsa 4. P. Lankesh
3	Play-reading	Play-reading exercises and practicing with a script Contextual reading, synopsis and character reading of scenes. Script Analysis of scripts Oedipus Macbeth Tuglaq Charandas Chor

		ript Editing of plays as per the performative convenience. Suggested scripts : Any Sanskrit script.
4	Acting 3 - Scene work	Working on a scene for performance. Experimenting on the variants of characters in selected scripts Training on Completeness (gesture, posture, movement) Interaction: Eye contact and actor, reaction with co-artists, relating to other elements of performance.

Reference Books:

1. Nandi Bhatia, *Acts of Authority, Acts of Resistance*
2. Erwin Piscator, *The Political Theatre*
3. Badal Sircar, *The Third Theatre*
4. Augusto Boal, *Theatre of Oppressed*
5. Chris Hogget, *All About Theatre*
6. Katie Mitchell, *The Director's Craft*
7. Janelle Reinelt & Gerald Hewitt, *The Political Theatre of David Edgar*
8. Clifford & Christopher J Herr, *American Political Theatre*

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA5031	Practical 5–Bharatanatyam	SC	0	0	3	3	6

Course Objectives:

- To ensure that students learn the various items in the Bharatanatyam repertoire.
- To enable the dancer to understand the choreography patterns of Devarnama and Kriti.
- To enable the dancer to have a strong foundation in the knowledge of Different treatises
- To teach the students the items in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

- Understand the approach in the choreography of Devarnama and Kriti
- Explain the Historical aspects of Padam and Kriti.
- Analyze the pattern of abhinaya in Padam and Devarnama.
- Demonstrate the structural aspects of Devarnama, Kriti and Padam.

Course content

Unit	Topics	Description
1	Dance 1	Devaranama – 1
2	Dance 2	Kriti – 1
3	Dance 2	Padam -1

4	Singing and Recitation	Learning of singing the lyrics of the item and the recitation of the jathis and solkattus
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Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA5032	Practical 5–Kuchipudi	SC	0	0	3	3	6

Course Objectives

- To help the students to understand the nuances of Abhinaya in Kuchipudi
- To help the students in understanding the difference between krithi and javali.
- To teach the students more dances and develop their understanding about the dance form.
- To teach the students the items in dance and also the technical aspects of the dances which include taalam, music, and literature

Course outcome

- Understand the structure of Tyagaraja Kritis
- Learn about the significance and uniqueness of Thyagaraa kritis
- Demonstrate the improvisation in Abhinaya
- Analyze the structure of javali and krithi.

Course content

Unit	Topics	Description
1	Dance 1	Tyagraja Kritis 1 st part
2	Dance 1	Tyagraja Kritis 2 nd part
3	Dance 2	Javali
4	Singing and Recitation	Learning singing the lyrics of the items and also the recitation of the jathis and the solkattus

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B19BA5052	Myths and Mythologies	SC	2	1	0	3	4

Course Objectives

- To acquaint the students with readings of myths and mythologies across the globe.
- To expose the students to the reading of the Indian epics, the *Ramayana* and the *Mahabharata* and the co-related and prevalent myths.
- To introduce the students to the classical Greco-Roman mythology.
- To familiarize the students with inter-relation of myths and mythologies of South, East and Southeast Asian regions.

Course Outcomes

On completion of the course the students will be able to:

1. Develop an insight into the huge arena of myths and mythologies across the globe.
2. Demonstrate familiarity with the readings of the two great Indian epics, the *Ramayana* and the *Mahabharata*.
3. Explain the basics of the classical Greco-Roman mythology.
4. Apply Greek Literary Criticism to evaluate themes and characterization in classical Greco-Roman epics
5. Critically compare Indian epics with Greco-Roman epics
6. Outline their familiarity with myths and mythologies of South, East and Southeast Asian regions.

Course Contents

Unit – I: Background to Reading Myths & Mythologies

1. JawaharLal Nehru: The Epics, History, Tradition and Myth (from *Discovery of India*)
2. Kumkum Roy: *The Power of Gender and the Gender of Power: Explorations in Early Indian History*(Extract)
3. DevduttPattanaik: Myths and Mythology (from *Indian Mythology*)

Unit – II: Reading Indian Epics

1. Arshia Sattar (Trans): *The Ramayana* as Epic – Introduction till two realms of the Ramayana (from Valmiki's *The Ramayana*)
2. C. Rajagopalachari: Preface to the 2nd Edition (from *Mahabharata*)

Unit – III: Reading Classical Greco- Roman Mythology

1. Sophocles: *Oedipus Rex*
2. Homer: *The Iliad* (Extracts)
3. Virgil: *Aenid* (Extracts)

Unit – IV: Myths and Mythology in South, East and Southeast Asia

Introduction to:

1. Buddhist Mythology (Buddhas, Bodhisattvas, Yidam, Devas, Yakshas)
2. Chinese Mythology (The Chinese Dragon, Important Deities, Mythical Creatures)
3. Burmese Mythology (History and origin, *Nat-kadaw*, Folk beliefs and practices)
4. Vietnamese Mythology (The 'linh', Important Deities, Forms of worships and practices)

REFERENCES:

- Nehru, Jawaharlal. *The Discovery of India*. Penguin India, 2008.
- Roy, Kumkum. *The Power of Gender and the Gender of Power: Explorations in Early Indian History*. OUP, 2010.
- Pattanaik, Devdutt. *Indian Mythology*. Simon and Schuster, 2001.

- Sattar, Arshia (Trans). *The Ramayana*. Penguin Random House India, 2016.
- Rajagopalachari, C. *Mahabharata*. Bharatiya Vidya Bhavan, 2010.
- Sophocles. *The Three Theban Plays*. Penguin, 1984.
- Homer. *The Iliad*. Penguin, 2003.
- Virgil. *The Aeneid of Virgil*. University of California Press, 1992.
- Clayton, Matt. *Chinese Mythology: A Captivating Guide to Chinese Folklore including Fairytales, Myths, and Legends from Ancient China*. Createspace Independent Publishing Platform, 2018.
- Campbell, Joseph. *Oriental Mythology: The Masks of God*. Penguin USA, 1991.
- Barthes, Roland. *Mythologies*. RHUK, 2009.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B18BA5071	Abnormal Psychology-1	HC	2	1	0	3	4

Course Objectives

1. To sensitize on nature, history and diagnosis of mental disorders.
2. To learn the different perspectives in understanding abnormal behaviour.
3. To learn the symptoms and causes of Anxiety Disorders and Obsessive Compulsive Disorders.
4. To learn the symptoms and causes of Trauma and Stress related disorders and Depressive Disorders.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Explores the nature, history and diagnosis of abnormal behaviors
2. Discovers the different perspectives in understanding the abnormal behavior
3. Discovers the symptoms, causes and diagnosis of Anxiety and Obsessive-compulsive disorder.
4. Discover the symptoms, causes and diagnosis of Trauma and Stress related disorders and Depressive Disorders.

Course Contents

Unit-I: Introduction to Psychopathology

- a. Definition: Abnormal Psychology, Mental Disorder. The science of Psychopathology, The stigma of Abnormal Behavior, Adaptive and Maladaptive behaviour.
- b. Historical conceptions: the ancient western world, the Middle ages, renaissance, age of reason and the Enlightenment, The reform movement.
- c. Diagnosing Psychological disorders: Classification Systems- ICD and DSM.
- d. Seeking help for Abnormal Behavior: reasons for clinical contacts, sources of help.

Unit-II: Theoretical Perspectives on Maladaptive Behavior

- a. The Biological Perspective: genetic factors, nervous system and the Brain, The Endocrines, The Neuroscience Revolution, Integration of Biological and Psychological Systems.
- b. The Psychodynamic Perspective: Freud and Psychoanalysis, More recent approaches to psychoanalysis.

- c. The Behavioral Perspective: Classical conditioning, Operant conditioning and Social-cognitive theories.
 - d. The Cognitive Perspective: Maladaptive behaviour and cognition.
 - e. The Humanistic perspective
 - f. The Existential perspective
- The Community-cultural perspective.

Unit-III: Anxiety and Obsessive-compulsive disorders (DSM-5)

- a. Definition of Anxiety, Fear and Panic.
- b. Prevalence of Anxiety disorder, gender difference if any.
- c. Clinical Description of Types: Generalized Anxiety Disorder, Panic disorder, agoraphobia, Specific Phobia-animal, natural environment, Blood-injection-injury, situational, Social Anxiety Disorder, Separation Anxiety Disorder, selective Mutism.
- d. Obsessive-compulsive disorders: OCD, excoriation (skin-picking) disorder, hoarding disorder, Body Dysmorphic Disorder, clinical Description and causes.

Unit-IV: Trauma- and stressor-related disorders and Depressive disorders

Trauma- and stressor-related disorders:

- a. Definition of Trauma and Stress, type. Stressors
- b. Clinical Description and causes of Posttraumatic stress disorder (PTSD), acute stress disorder, reactive attachment disorder and disinhibited social engagement disorder, Adjustment disorders.

Depressive disorders: Disruptive Mood Dysregulation Disorder, Major Depressive Disorder-single episode-mild, moderate, severe, recurrent episode-mild, moderate severe, Persistent Depressive Disorder(Dythymia), Premenstrual Dysphoric Disorder.

Reference Books:

1. Alloy, L.B., Riskind, JH., and Manos,M.J. (2006). Abnormal Psychology – Current Perspectives. 9th Edition. New Delhi: Tata McGraw- Hill Edition.
2. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed., text revision). Washington, DC: Author.
3. Barlow,D.H. and Durand,M.V. (2000). Abnormal Psychology. 2nd Edition. New Delhi: Thomson Publication.
4. Bootzin,R.B.,Acocella,J.R. and Alloy,L.B. (1993). Abnormal Psychology–Current perspectives. 6th Edition, International Edition,Tata Graw –Hill Inc., USA.
5. Carson, R.C., Butcher, J.N and Mineka ,S.(2004). Abnormal psychology. 13th Edition. New Delhi: Pearson Education.
6. DSM-5 manual,
<https://cdn.website-editor.net/30f11123991548a0af708722d458e476/files/uploaded/DSM%2520V.pdf>
7. Davidson and Neal (1996). Abnormal psychology. Revised 6th Edition, John Wiley Sons World Health Organization. (2008). ICD-10: International statistical classification of diseases and related health problems (10th Rev. ed.). New York, NY: Author.

Paper-VI (B)

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B18BA5072	Health Psychology-I	SC	2	1	0	3	3

Course Objectives

Students are expected to develop an understanding of health psychology and gain skills in the following:

1. To understand the nature, history, origin and scope of Health Psychology.
2. To learn the cognitive aspects of illness and factors influence compliance.
3. To learn about health promoting behaviors
4. To learn the connection between Pain and Psychological factors.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Explores the connection between Health and Psychology and its relevance.
2. Analyzes the impact of cognition on illness and explore the need for compliance and factors influencing it.
3. Explores the various behaviors that promotes health
4. Explore the psychological aspects related to pain perception and evaluate strategies for dealing with pain sensation and perception

Course Contents

Unit-I: Introduction

- a) Definition of Healthy Psychology,
- b) History of Health Psychology
- c) Aims of health psychology.
- d) Future of health psychology
- e) Advantages of the Biopsychosocial Model, Clinical Implications of the Biopsychosocial Model.
- f) The Biopsychosocial Model: The Case History of Nightmare Deaths.
- g) The Need for Health Psychology: Changing Patterns of Illness, Advances in Technology and Research, Expanded Health Care Services, Increased Medical Acceptance.
- h) Health Psychology Research: The Role of Theory in Research, Experiments, Correlational Studies, Prospective and Retrospective Designs, The Role of Epidemiology in Health Psychology, Methodological Tools.

Unit-II: Illness Cognition and Compliance

Definition of Health, illness

Illness cognition: definition, dimensions, evidences for dimensions, Measurement.

Leventhal's Self-regulatory model

Symptom Perception

Coping with crisis of illness

Using the self-regulatory model to predict outcomes-adherence, recovery from stroke and MI

Illness cognitions and health outcomes

Compliance: Definition, work of ley-predicting the patient's compliant, improving compliance

Unit-III: Health-Promoting Behaviors

- a) **Health Promotion:** health behaviors and health habits, Practicing and changing health behaviors, barriers to Modifying poor Health Behaviors, Intervening with Children and Adolescents, Intervening with At-risk people, Health promotion and Older Adults, Ethnic and Gender Differences in health risks and habits.
- b) **Exercises:** Benefits of Exercises
- c) **Accident Prevention:** Home and Workplace Accidents
- d) **Cancer-Related Health Behavior:** Mammograms, Colorectal Cancer Screening, Sun safety practices
- e) **Developing a Healthy Diet:** changing diet, Resistance to Modifying Diet, Intervention to Modify Diet.
- f) **Sleep:** Sleep and Health
- g) **Rest, Renewas, Savoring**

Unit-IV: Pain

- a) Pain: nature, definition, cross-cultural perspective on pain, measuring pain, physiology of pain.
- b) Pain theories: early theories, gate control theory.
- c) Role of Psychosocial factors in pain perception.
- d) Clinical Issues in Pain Management: acute and chronic pain, pain and personality.
- e) Pain control techniques: Pharmacological Control of Pain Surgical Control of Pain Sensory Control of Pain Biofeedback Relaxation Techniques Distraction Coping Skills Training Cognitive-Behavioral Therapy.

References Books:

1. Jane Ogden (2010) Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi.
2. Shelley E. Taylor (2006) Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi.
3. Steve R. Baumgardner & Marie K. Crothers (2009) Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
4. M. Robin Dimatteo & Leslie R. Martin (2002) Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.

SEMESTER 6

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA6010	Aesthetics (Indian and Western)	SC	4	0	0	4	4

Course Objectives :

1. To provide an understanding of the term 'Aesthetics' in general.
2. To provide an understanding of the Philosophy of Aesthetics and Art Appreciation
3. To provide an understanding of Indian Aesthetics and contributions of Indian Aestheticians
4. To provide an understanding of Western Aesthetics and contributions of western Aestheticians
5. To provide an insight into both occidental and oriental aesthetic theories.

Course Outcomes :

1. The response group would have learnt to appreciate art and apply aesthetic approach.
2. The response group would be aware of Indian and western aesthetic theories
3. The response group would be encouraged to apply the learnt subject practically in their performances.
4. The response group would become artistes with increased awareness of aesthetic paradigms.

Course content

Unit	Description	Topic
1	Fundamentals of Aesthetics	<ol style="list-style-type: none">1. Classifications of arts2. Defining the term 'Aesthetics'3. Art Appreciation and defining ART4. Philosophy of Aesthetics5. Understanding 'isms' in relation to aesthetics
2	Principles of Aesthetics	<ol style="list-style-type: none">1. Amalgamation of Visual and performing arts2. Chaturvidha Abhinaya and Aesthetics3. Principles of Aesthetics4. Understanding Beauty and Philosophy5. Why the study of Aesthetics is Important to a student of performing art
3	Indian Aesthetics	<ol style="list-style-type: none">1. Indian Aesthetics2. Ancient to the 4 medieval Theories3. Aesthetic process and 'Rasa' theory4. Contributions and works of prominent Aestheticians – till post modern period5. Application of Aesthetics and performance – a discussion
	Western Aesthetics	<ol style="list-style-type: none">1. Western Aesthetics2. Ancient to Modern period- theories3. Aesthetic Process and various aspects – a discussion4. Contributions and works of prominent Aestheticians5. Application of Aesthetics and performance – a discussion

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B19BA6030	Introduction to Literary Theory	HC	2	1	0	3	4

Course Objectives

- To appraise the basic ideas of literary criticism.
- To outline the development of literary criticism.
- To analyze the diversity of literary criticism and its application in literary and non-literary endeavours.
- To examine the modern developments in literary criticism.

Course Outcomes

On completion of the course, the students will be able to:

1. Develop an initial association with literary criticism of different eras.
2. Explain the major characteristics of Greek Literary Criticism.
3. Demonstrate a good understanding of Elizabethan, Neo-Classical and Romantic Criticism and enhancing their analytical skills.
4. Outline the major features of Victorian, Modern and Postmodern Criticism.
5. Differentiate between Classical and Neo-Classical criticism as well as Modern and Postmodern criticism.
6. Apply their understanding of literary criticism to unseen texts

Course Contents

Unit – I: Introduction

1. Introduction to Literary Criticism
2. Function of literature and literary criticism
3. Brief history of literary criticism

Unit – II: Introduction to Greek Literary Criticism

1. Introduction to Greek Literary Criticism
2. Plato: *The Republic* (Extract)
3. Aristotle: *Poetics* (Extract)

Unit – III: Elizabethan, Neo-Classical and Romantic Criticism

1. Introduction to Elizabethan, Neo-Classical and Romantic Criticism
2. Dryden: Extract from *Essay of Dramatic Poesy* (Neander's views on English drama)
3. William Wordsworth & Samuel T. Coleridge: Extract from Preface to *Lyrical Ballads* ()

Unit – IV: Victorian, Modern and Postmodern Criticism

1. Introduction to Victorian, Modern and Postmodern Criticism

2. Matthew Arnold: *The Study of Poetry* (Extract)
3. T.S. Eliot: Tradition and Individual Talent (Extract)
4. Lawrence E. Cahoon: What Postmodernism Means

REFERENCE:

- Habib, M.A.R. *Literary Criticism from Plato to the Present: An Introduction*. Wiley India, 2012.
- Plato, *The Republic*. Maple, 2013.
- Aristotle, *Poetics*. Penguin, 1996.
- Sen, S. *John Dryden: An Essay of Dramatic Poesy*. Unique Publishers, 2009.
- Wordsworth, William & S.T. Coleridge. *Lyrical Ballads*. Penguin, 2006.
- Arnold, Mathew. *Culture and Anarchy and Other Selected Prose*. Penguin, 2015.
- Eliot, T.S. *Sacred Wood: Essays on Poetry and Criticism*. Nabu Press, 2013.
- Cahoon, Lawrence E. *From Modernism to Postmodernism*. Wiley-Blackwell, 1995

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B19BA6042	Revisionist Writings	SC	4	0	0	4	4

Course Objectives

- To acquaint the students with the genre of revisionist writings.
- To expose the students to the reinterpretation of Indian epics.
- To introduce the students to the contemporary retellings and associative myths of the *Ramayana* and the *Mahabharata*.
- To familiarize the students to the contemporary revision of myths and its connotation.

Course Outcomes

On completion of the course the students will be able to:

1. Develop an insight into the growing body of revisionist literature.
2. Demonstrate familiarity with the various retellings of the two great Indian epics, the *Ramayana* and the *Mahabharata*.
3. Outline the major concerns of the contemporary revision of the *Ramayan* the *Mahabharata*.
4. Demonstrate restructuring of Indian myths and mythologies and their relevance.
5. Prepare re-visionist texts of their own
6. Apply literary theories to analyse select revisionist texts

Course Contents

Unit – I: Introduction

1. A.K. Ramanujan: Three Hundred *Ramayan*s: Five Examples and Three Thoughts on Translation
2. Paula Richman: Hundred *Ramayan*s

Unit – II: Retellings of *The Ramayana* & *The Mahabharata*

1. Sreekantan Nair & Sarah Joseph: *Retelling the Ramayana - Voices from Kerala* (Introduction by Satchidanandan)
2. John Brockington: Introduction to *Yuganta: The End of an Epoch*
3. Shashi Deshpande: *The Stone Women* (Extracts)

Unit – III: Contemporary Retellings of *The Ramayana*

1. Devdutt Pattanaik: *Sita– An Illustrated Reading of the Ramayana* (Extracts)
2. Kavita Kane: *Lanka's Princess* (Extracts)
3. Volga: The Reunion (from *Liberation of Sita*)

Unit – IV: Contemporary Retellings of *The Mahabharata*

1. Mahasweta Devi: *After Kurukshetra* (Kunti and the Nishadin)
2. V. Raghunathan: *Duryodhana* (Extracts)
3. Sharath Komarraju: *The Rise of Hastinapur* (Extracts)

REFERENCE:

- Dharwadker, Vinay (ed). *Collected Essays of A.K. Ramanujan*. OUP, 2004.
- Richman, Paula. *Many Ramayanas: The Diversity of a Narrative Tradition in South Asia*. OUP India, 1997.
- Richman, Paula. *Questioning Ramayanas: A South Asian Tradition*. OUP, 2003.
- Nair, Sreekantan & Sarah Joseph. *Retelling the Ramayana - Voices from Kerala*. OUP, 2005.
- Karve, Irawati. *Yuganta: The End of an Epoch*. Orient Blackswan, 2007.
- Deshpande, Shashi. *The Stone Women*. Writers Workshop, 2000.
- Pattanaik, Devdutt. *Sita: An Illustrated Retelling of Ramayana*. Penguin, 2013.
- Kane, Kavita. *Lanka's Princess*. Rupa Publications, 2016.
- Volga. *The Liberation of Sita*. HarperPerennial, 2016.
- Devi, Mahasweta. *After Kurukshetra*. Seagull Books, 2010.
- Raghunathan, V. *Duryodhana*. HarperCollins, 2014.
- Komarraju, Sharath. *The Rise of Hastinapur*. HarperCollins India, 2015.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA6062	Health Psychology-II	SC	2	1	0	3	3

Course Objectives

1. To learn about causes and consequences of stress.
2. To learn about strategies to cope with various stressors.
3. To understand the psychological contribution in onset, treatment of life style disorders.
4. To understand the psychological correlates of psychoneuroimmunological and immunology disorders.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Demonstrate understanding the sources of stress.
2. Demonstrates skills of coping with stress.
3. Evaluate the role of Psychological factors in the onset, worsening, treatment of various life-style disorders.
4. Explores the ways in which quality of life and longevity can be enhanced among people suffering from various Life-style disorders. Evaluate the role of Psychological factors in the onset, worsening, treatment of various Psychoneuroimmunological and immune related disorders.

Course Contents

Unit-I: Stress

- a. Stress: Definition, Stressor, Appraisal of Stressors.
- b. Origins of the Study of Stress: Fight or Flight, Selye's General Adaptation Syndrome, Tend-and-Befriend, Stress and Illness
- c. The Physiology of Stress: Effects of Long-Term Stress, Individual Differences in Stress Reactivity, Physiological Recovery, Allostatic Load.
- d. Stressful Events: Dimensions of Stressful Events, Perception of Stress, adaptation to ongoing stress.
- e. Studying Stress: Studying Stress in the Laboratory, Inducing Disease, Stressful Life Events, Daily Stress.
- f. Sources of Chronic Stress: Effects of Early Stressful Life Experiences, Chronic Stressful Conditions, Stress in the Workplace, Some Solutions to Workplace Stressors, Combining Work and Family Roles

Unit-II: Coping Strategies

Coping with Stress and Resilience: Personality and Coping, Psychosocial Resources, Resilience, Coping styles, Problem-Focused and Emotional-Focused Coping.

Coping and External Resources

Coping Outcomes

Coping Interventions: Mindfulness Meditation and Acceptance/Commitment, Therapy, Expressive Writing, Self-Affirmation, Relaxation Training.

Social Support: What is Social Support, Effects of Social Support on Illness, Biopsychosocial pathways, Moderation of Stress by Social Support, Effective kinds of Support, Enhancing Social Support.

Unit-III: Life-style Disorders

CHD: Nature of CHD, Stress and CHD, Women and CHD, Personality, Cardiovascular Reactivity, and CHD, Depression and CHD, Other Psychosocial Risk Factors and CHD, Management of Heart Disease.

Hypertension: measurement, causes, treatment, stress and personality, The Hidden disease

Stroke: risk factors, consequences, rehabilitative Interventions.

Type II Diabetes: Health Implications of Diabetes, The Management of Diabetes.

Unit-IV: Psychoneuroimmunology and Immune related disorders.

Psychoneuroimmunology: the immune system, assessing immune functioning, stress and immune functioning, negative affect and immune functioning, stress, immune functioning and interpersonal relationships, coping and immune functioning, intervention to improve immune functioning.

Cancer: difficulty in studying it, predictors, psychosocial factors and cancer, adjusting to cancer, psychosocial issues and cancer, finding meaning in cancer, interventions, therapies with cancer patients.

Type I Diabetes: Problems of Adolescent Diabetics.

Reference Books:

1. Jane Ogden (2010) Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi.

2. Shelley E. Taylor (2006) Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi.
3. Steve R. Baumgardner & Marie K. Crothers (2009) Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
4. M. Robin Dimatteo & Leslie R. Martin (2002) Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.
5. Alan Carr- Positive Psychology, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B19BA6061	Abnormal Psychology–II	SC	2	1	0	3	3

Course Objectives

5. To learn about causes and consequences of stress.
6. To learn about strategies to cope with various stressors.
7. To understand the psychological contribution in onset, treatment of life style disorders.
8. To understand the psychological correlates of psycho neuroimmunological and immunology disorders.

Course Outcomes

Upon successful completion of this course, students will be able to:

5. Demonstrate understanding the sources of stress.
6. Demonstrates skills of coping with stress.
7. Evaluate the role of Psychological factors in the onset, worsening, treatment of various life-style disorders.
8. Explores the ways in which quality of life and longevity can be enhanced among people suffering from various Life-style disorders. Evaluate the role of Psychological factors in the onset, worsening, treatment of various Psychoneuroimmunological and immune related disorders.

Course Contents

Unit-I: Stress

- g. Stress: Definition, Stressor, Appraisal of Stressors.
- h. Origins of the Study of Stress: Fight or Flight, Selye's General Adaptation Syndrome, Tend-and-Befriend, Stress and Illness
- i. The Physiology of Stress: Effects of Long-Term Stress, Individual Differences in Stress Reactivity, Physiological Recovery, Allostatic Load.
- j. Stressful Events: Dimensions of Stressful Events, Perception of Stress, adaptation to ongoing stress.

- k. Studying Stress: Studying Stress in the Laboratory, Inducing Disease, Stressful Life Events, Daily Stress.
- l. Sources of Chronic Stress: Effects of Early Stressful Life Experiences, Chronic Stressful Conditions, Stress in the Workplace, Some Solutions to Workplace Stressors, Combining Work and Family Roles

Unit-II: Coping Strategies

Coping with Stress and Resilience: Personality and Coping, Psychosocial Resources, Resilience, Coping styles, Problem-Focused and Emotional-Focused Coping.

Coping and External Resources

Coping Outcomes

Coping Interventions: Mindfulness Meditation and Acceptance/Commitment, Therapy, Expressive Writing, Self-Affirmation, Relaxation Training.

Social Support: What is Social Support, Effects of Social Support on Illness, Biopsychosocial pathways, Moderation of Stress by Social Support, Effective kinds of Support, Enhancing Social Support.

Unit-III: Life-style Disorders

CHD: Nature of CHD, Stress and CHD, Women and CHD, Personality, Cardiovascular Reactivity, and CHD, Depression and CHD, Other Psychosocial Risk Factors and CHD, Management of Heart Disease.

Hypertension: measurement, causes, treatment, stress and personality, The Hidden disease

Stroke: risk factors, consequences, rehabilitative Interventions.

Type II Diabetes: Health Implications of Diabetes, The Management of Diabetes.

Unit-IV: Psychoneuroimmunology and Immune related disorders.

Psychoneuroimmunology: the immune system, assessing immune functioning, stress and immune functioning, negative affect and immune functioning, stress, immune functioning and interpersonal relationships, coping and immune functioning, intervention to improve immune functioning.

Cancer: difficulty in studying it, predictors, psychosocial factors and cancer, adjusting to cancer, psychosocial issues and cancer, finding meaning in cancer, interventions, therapies with cancer patients.

Type I Diabetes: Problems of Adolescent Diabetics.

Reference Books:

6. Jane Ogden (2010) Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi.
7. Shelley E. Taylor (2006) Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi.
8. Steve R. Baumgardner & Marie K. Crothers (2009) Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
9. M. Robin Dimatteo & Leslie R. Martin (2002) Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.
10. Alan Carr- Positive Psychology, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA6021	Group Choreography	SC	3	0	0	3	3

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA6022	Music Kutcheri	SC	3	0	0	3	3

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA6022	Drama Production	SC	3	0	0	3	3

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Performing Arts is knowledge in the subject, but also the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including

interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career. The School of Applied sciences also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

LIST OF FACULTY MEMBERS

Sl	Name	Designation	Email ID	Contact No
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6	Prof. Nayan R Yavagal	Assistant Professor	nayanryavagal@reva.edu.in	9844342894
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10 YEARS
OF UNIVERSITY
RECOGNITION
20 YEARS OF
ACADEMIC
EXCELLENCE



REVA
UNIVERSITY
Bengaluru, India

School of CSA

Master of Science in Computer Science (MS-CS)

HANDBOOK 2019-2020

Rukmini Knowledge Park
Kattigenahalli, Yelahanka, Bengaluru – 560064
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SCHOOL OF COMPUTER SCIENCE AND APPLICATIONS

Master of Science in Computer Science (MS-CS)

HANDBOOK

2019

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Chancellor's Message

“Education is the most powerful weapon which you can use to change the world.”

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when ‘intellectual gratification’ has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of ‘Knowledge is power’, we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I’m always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said ‘A University should be a place of light, of liberty and of learning’. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.



Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

Director Message

Welcome note to students

It's my pleasure to welcome you to the School of Computer Science and Applications. Computer, being considered as most significant and revolutionary invention of mankind has metamorphosed the planet earth completely. Predominantly School of Computer Science and Applications have acquired the control of the modern life in a myriad way.



The MS (Computer Science) program is designed keeping in view the current situation and possible future developments, both at national and global levels. This program is designed to give greater emphasis on computer science. There are ample number of courses providing knowledge in specialized areas of network security, python programming and cloud computing etc. facilitating students to choose specialized areas of their interest. Adequate attention is given to provide students the basic concepts in computer applications.

The program is designed to expose students to various subjects having applications in computers, IT and electronics related industries through outcome based teaching and learning process which emphasizes practical exposure rather than memorization. A variety of activities such as mini projects, seminars, interaction with industries, cultural activities and social activities are in place to shape the all-round development of students.

The benefits of choosing MS (Computer Science) program are:

- Flexibility to choose various fields upon graduation.
- Opportunity to work on live problems.
- Opportunity to work on environmental related technologies.
- Opportunity for programmers to develop software for varied applications in different sectors.

Students after successful completion of MS (Computer Science) program:

- Can start-up their career in either government sector or private sector since there are ample employment opportunities in these sectors.

- Can also start their career as software programmers / engineers, testing engineers, data base administrators, system and network administrators, multimedia / web programmers, web designers etc.,
- Can seek placements in diversified fields like banking, e-commerce, insurance, entertainment, and such others.
- The computer application trained graduates are sought after by varied firms for their software based skills.
- Can opt for higher studies in computer science, IT, business management and so on.

The curriculum caters to and has relevance to local, regional, national and global development needs. All courses are focussed on building skill, employability and entrepreneurship of students. Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

I am sure the students choosing MS (Computer Science) in REVA University will enjoy the curriculum, teaching and learning environment, the vast infrastructure and the experienced teachers involvement and guidance. We will strive to provide all needed comfort and congenial environment for their studies. I wish all students pleasant stay in REVA and grand success in their career.

Dr. S. Senthil
Director – School of Computer Science and Applications

RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. **Rukmini Educational Charitable Trust** (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 13,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette No. 80 dated 27th February, 2013. The University is empowered by UGC to award degrees any branch of knowledge under Sec.22 of the UGC Act. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 23 Post Graduate Degree programs, 20 Degree and PG Degree programs in various branches of studies and has 12000+ students studying in various branches of knowledge at graduate and post graduate level and 302 Scholars pursuing research leading to PhD in 18 disciplines. It has 800+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of

education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano-Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counselors and Placement Officers.

The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Okalahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher-scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director IISc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is 'Life Time Achievement Award' to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the "Founders' Day Celebration" of REVA University in presence of dignitaries, faculty members and students gathering and the first "REVA Life Time Achievement Award" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO on the occasion of Founder's Day Celebration, 6th January, 2016 and the second "REVA Life Time Achievement Award" for the year 2016 has been awarded to Shri. Shekhar Gupta, Renowned Journalist on the occasion of Founder's Day Celebration, 6th January, 2017.

REVA organises various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year

students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognised by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Recognizing the fast growth of the university and its quality in imparting higher education, the BERG (Business Excellence and Research Group), Singapore has awarded BERG Education Award 2015 to REVA University under Private Universities category. The University has also been honoured with many more such honors and recognitions.

REVA University Vision

“REVA University aspires to become an innovative university by developing excellent human resources with leadership qualities, ethical and moral values, research culture and innovative skills through higher education of global standards”.

Mission

- To create excellent infrastructure facilities and state-of-the-art laboratories and incubation centers
- To provide student-centric learning environment through innovative pedagogy and education reforms
- To encourage research and entrepreneurship through collaborations and extension activities
- To promote industry-institute partnerships and share knowledge for innovation and development
- To organize society development programs for knowledge enhancement in thrust areas
- To enhance leadership qualities among the youth and enrich personality traits, promote patriotism and moral values.

Objectives

- Creation, preservation and dissemination of knowledge and attainment of excellence in different disciplines
- Smooth transition from teacher - centric focus to learner - centric processes and activities
- Performing all the functions of interest to its major constituents like faculty, staff, students and the society to reach leadership position
- Developing a sense of ethics in the University and Community, making it conscious of its obligations to the society and the nation
- Accepting the challenges of globalization to offer high quality education and other services in a competitive manner

ABOUT SCHOOL OF COMPUTER SCIENCE AND APPLICATIONS

The School of Computer Science and Applications is shouldered by well qualified, experienced and highly committed faculty. The state-of-the-art infrastructure digital classrooms, well equipped advanced computer laboratory, conference rooms and the serene academic atmosphere at REVA University will enhance the transfer as well as creation of knowledge. The School offers BCA, B. Sc. (Honors) in Computer Science with specialization in Cloud Computing and Big Data, MCA and MS (Computer Science) programs. The School also has research program leading to doctoral degree. The curriculum of both graduate and post graduate degree programs have been designed to bridge the gap between industry – academia and hence they are industry oriented. These programs provide ample scope to enter into a wide range of business opportunities, entrepreneurship ventures and as well as job opportunities in different sectors. This is reflected in various core subjects / courses offered within the program. Further the school provides an interactive, collaborative peer tutoring environment that encourages students to break down complex problems and develop strategies for finding solutions across a variety of situations and disciplines. The school aims to develop a learning community of critical thinkers who serve as models of innovative problems solving in the university environment to enrich their academic and professional careers.

VISION

To transform students into good human beings, responsible citizens and competent professionals, focusing on assimilation, generation and dissemination of knowledge in the area of Computer Applications

MISSION

- To impart quality education to meet the needs of profession and society, and achieve excellence in teaching-learning and research in the area of Computer Applications;
- To attract and develop talented and committed human resource, and provide an environment conducive to innovation, creativity, team-spirit and entrepreneurial leadership in Computing field;
- To facilitate effective interactions among faculty and students of the School of Computer Applications, and foster networking with alumni, industries, institutions and other stakeholders; and
- To practice and promote high standards of professional ethics, transparency and accountability

OBJECTIVES

- To impart programs at graduate, post-graduate and doctoral levels in the field of computer applications;
- To adopt innovative methods of teaching and promote student centric learning process;
- To create infrastructure of international standard and facilitate and create conducive environment for teaching, learning and research;
- To promote faculty development and encourage faculty members and students to organize and participate in national and international level conferences, seminars, symposia and such others;
- To encourage teachers and students to take-up interdisciplinary studies and research;
- To promote students participation in co-curricular and extension activities and develop their personality traits and team spirit.

ADVISORY BOARD

SL. No	Name and Affiliation
1	Dr. Anand Kumar Professor and Dean-Academics, MCA Department, M.S Engineering College
2	Dr. Muralidhar B.L Professor and Coordinator, MCA Programme, Bangalore University
3	Dr. Dharani Dhamre Professor, Dept of MCA, RVCE
4	Mr. Manikantan Mohanavelu Head Training Tower-India, HP
5	Mr. Madusudan R Practice Lead, Engagement & System Operations-IBM
6	Mr. Dharshan Maheshbhai Project Lead- Cognizant Technology Pvt Ltd
7	Mr. Ashish Tanwar, University Relations Manager-India, Dell

MASTER OF SCIENCE in COMPUTER SCIENCE (MS-CS) PROGRAM

Programme Overview

Computers have become ubiquitous part of modern life, and new applications are introduced every day. The use of computer technologies is also commonplace in all types of organizations, in academia, research, industry, government, private and business organizations. As computers become even more pervasive, the potential for computer-related careers will continue to grow and the career paths in computer-related fields will become more diverse. Since 2001, global information and communication technologies (ICTs) have become more powerful, more accessible, and more widespread. They are now pivotal in enhancing competitiveness, enabling development, and bringing progress to all levels of society.

The career opportunities for Master of Science in computer science graduates are plenty and growing. Programming and software development, Information systems operation and management, telecommunications and networking, computer science research, web and Internet, graphics and multimedia, training and support, and computer industry specialists are some of the areas where the graduates find opportunities.

The School of Computer Science and Applications at REVA UNIVERSITY is offering Master of Science in Computer Science (MS) –a two year postgraduate programme. The aim of the programme is to create motivated, innovative, creative thinking graduates to fill in the roles of Software Engineers who can conceptualize, design, analyze and develop computer software to meet the modern day industry requirements.

This MS programme in Computer Science is offered by **School of Computer Science and Applications at REVA UNIVERSITY in collaboration with University of Alabama in Huntsville (UAH), USA. The students of this programme who completes first year of study successfully at REVA University has a choice either to pursue their second year of study at UAH or continue in REVA.**

The programme is designed to develop human resources to meet the challenges of ever-growing technologically advanced IT industry and digital revolution. The programme deals with important present day topics like data analytics; information security; Data warehousing and Data mining; mobile application development and cloud computing.

Program Educational Objectives (PEO's)

The aim of the programme is to produce postgraduates with advanced knowledge and understanding of Computer Science; higher order critical, analytical, problem solving and transferable skills; ability to think rigorously and independently to meet higher level expectations of ICT industry, academics, research establishments or take up entrepreneurial route.

The Programme Educational Objectives are to prepare the students to:

PEO-1	Be skilled Computer Application Developers, Use existing algorithms to develop computer applications, Provide computer based solutions for real life problems, Design, develop and test software /computer applications for specific needs
PEO-2	Understand the concepts and theories behind computer science and Adapt to the upcoming trends and technologies to the level of developing of commercially viable, robust and reliable software by ensuring that projects are completed satisfactorily, on time, and within budget ,
PEO-3	Work as a member of a team and communicate effectively across team members, to be equipped to be competent in the field of computer science and be equipped to act as a business administrators or as administrators in public, private and government organisations or become an entrepreneur.
PEO-4	understand environmental, legal, cultural, social, ethical, public safety issues work along with engineering, medical, ICT professionals and scientists to assist them in their research and development work after further training

Program Outcomes (POs)

After undergoing this programme, a student will be able to:

- **PO 1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of computer science that form a part of the graduate programme Master of Science in Computer Science
- **PO 2: Scientific reasoning:** Ability to analyse, and understand concepts in computer science, and explain the theories behind computer science. critically evaluate ideas, logical reasoning and experiences in programming, software development and application development.
- **PO 3: Problem solving:** Capacity to extrapolate and apply competencies to solve different kinds of non-familiar problems, such as solving of real life problems through computing, provide Solutions to computing problems, analyze existing algorithms of different applications, design and develop new algorithms, operate various commercial software tools

to solve scientific and business problems

- **PO 4: Environment and Sustainability:** Understand the issues of environmental contexts and sustainable development and provide solutions for the same using domain knowledge in Computer science.
- **PO 5: Research-related skills:** Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation in current technologies.
- **PO 6: Ethics:** Conduct as a responsible citizen by recognizing different value systems and understand and **accept responsibility of the moral dimensions and take** decisions which conform to cultural, environmental, sustainability and ethical issues for them.
- **PO 7: Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
- **PO 8: Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups
- **PO 9: Self-directed and Life-long Learning:** Acquire the ability to engage in independent and **life-long learning** in the broadest context socio-technological changes.

Programme Specific Outcomes (PSO)

After successful completion of the programme, the graduates will be able to

1. Apply the latest trends in technology to design, develop and test software applications for specific needs.
2. Explore the concepts and theories behind computer science to develop innovative software applications.
3. Instill life-long learning skills through the development of a research environment and higher educational opportunities.

School of Computer Science and Applications
Master of Science in Computer Science – MS (CS) Programme
Scheme of Instructions – 2019 Batch

FIRST SEMESTER

Sl. No	Course Code	Course Title	HC/SC/FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1	M19MS1010	Big Data Analytics	HC	3	0	1	4	5
2	M19MS1020	OOP with JAVA	HC	4	0	0	4	4
3	M19MS1030	Data Mining and Knowledge Discovery	HC	4	0	0	4	4
4	M19MS1040	Advanced Computer Networks	HC	4	0	0	4	4
5	M19MS1050	Probability & Statistics	HC	4	0	0	4	4
6	M19MS1061	Advanced Operating Systems	SC	2	1	0	3	4
	M19MS1062	Advanced DBMS						
7	M19MS1070	Sports/Yoga/Music/Dance/Theatre	RULO	2	0	0	2	2
8	M19MS1080	JAVA Lab	HC	0	0	2	2	4
9	M19MS1090	Data Mining LAB	HC	0	0	2	2	4
Total Credits				23	1	5	29	35

SECOND SEMESTER

Sl. No	Course Code	Course Title	HC/SC FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1	M19MS2010	Machine Learning using Python	HC	4	0	0	4	4
2	M19MS2020	Linear Algebra	HC	3	1	0	4	5
3	M19MS2030	Big Data with NoSQL	HC	4	0	0	4	4
4	M19MS2041	System Modelling and Simulation	SC	2	1	0	3	4
	M19MS2042	Internet of Things						
5	M19MS2051	Pattern Recognition	SC	2	1	0	3	4
	M19MS2052	Social Network analysis						
6	M19MS2061	Service Oriented Architecture	SC	2	1	0	3	4
	M19MS2062	Business Intelligence						
7	M19MS2070	Soft Skill	RULO	2	0	0	2	2
8	M19MS2080	Python lab	HC	0	0	2	2	4
9	M19MS2090	Big Data and NoSQL Lab	HC	0	0	2	2	4
Total Credits				19	4	4	27	35

THIRD SEMESTER

Sl. No	Course Code	Course Title	HC/SC FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1	M19MS3010	Cloud Computing	HC	4	0	0	4	4
2	M19MS3021	Mobile Computing and APP store Management	SC	2	1	0	3	4
	M19MS3022	Deep Learning Techniques						
3	M19MS3031	Multivariate Methods for Data Analysis	SC	2	0	1	3	4
	M19MS3032	Advanced Web Technologies						
4	M19MS3040	Open Elective	OE	4	0	0	4	4
5	M19MS3050	Soft Skill	RULO	2	0	0	2	2
6	M19MS3060	Minor Project	HC	3	0	3	6	9
7	M19MS3070	MOOC/SWAYAM	RULO	4	0	0	4	4
Total Credits				21	1	4	26	31

FOURTH SEMESTER

Sl No	Course Code	Title of the Course	Credit Pattern L:T:P	Credits	Working Hrs
1	M19MS4010	Internship/ Certification	2:0:2	4	6
2	M19MS4020	Major Project	0:0:10	10	20
		Total Credits	2:0:12	14	26

*** Note:**

- 1. Project Work and Dissertation will be mandatory of 10 Credits**
- 2. The student can select either Internship or Certification Course for 4 Credits.**

CREDIT SUMMARY

Semester	Credits
First	29
Second	27
Third	26
Fourth	14
Total	96

CREDIT DISTRIBUTION

Semester	Hard Core(HC)	Foundation Course(FC)	Softcore Course(SC)	Open Elective(OE)	Others	Total Credits
First	24	-	3	-	2	29
Second	16	4	9	-	2	27
Third	10	-	6	4	6	26
Fourth	14	-	-	-	-	14
Total Credits for Programme						96

MS in Computer Science
DETAILED SYLLABUS – 2019

FIRST SEMESTER

M19MS1010	Big Data Analytics	L	T	P	C
Duration: 60 Hours		3	0	1	4

Course Objectives:

The objectives of this course are to:

- Analyze the basic challenges in handling big data.
- Explore the fundamental concepts of big data analytics
- Compare the types of Data analytics
- Discover the challenges in Big data processing for analytics using R

Course Outcomes:

On successful completion of this course; the student will be able to:

- Determine the challenges in working with big data platform
- Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
- Analyse the fundamentals of various big data analysis techniques.
- Demonstrate Map Reduce Concepts in Big Data processing

Course Content:

UNIT I Introduction to Big Data

15 Hours

Introduction to BigData and its importance, Understanding the Characteristics of Big Data-The Vs,

Types of Data- Examples of structured, unstructured and Semi-structured data. Understanding the Waves of managing Data, Big Data architecture, Big Data Technology Components. Industry examples of Big Data , big data and Digital marketing, fraud and big data, risk and big data, credit risk management, big data and healthcare, advertising and big data.

Mobile business intelligence, Crowd sourcing analytics.

UNIT II Data Science and BigData Analytics

15 Hours

Data Science: Business Intelligence vs Data Science. Role of a Data scientist, Profile of a Data Scientist.

Big Data Analytics- Importance, Types of Big data Analytics: Diagnostic, Descriptive, Predictive and Prescriptive analytics. Data Analytics Life cycle –the six Phases Viz. Discover, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize. Analysis Vs Reporting, Modern Data Analytic Tools.

UNIT III Data Analytics process and Hadoop Related Tools

15 Hours

Advanced clustering: K means, Regression, Regression models, Text Analytics, Analytics for Unstructured data.

Technologies and tools: Introduction to distributed computing, Hadoop and Hadoop Eco system, cloud and big data, Introducing Map Reduce. Examples of Map Reduce.

UNIT IV R Programming and Data Analytics

15 Hours

Using R for analytics: Introduction to R, Analyzing and exploring data, methods for model building and Evaluation.

Data Visualization: data Visualization techniques and methods, problems and Case Studies.

Use cases– Text analytics, Web analytics

Text Books:

1. Ambiga Dhiraj , Michael Minelli, Michehe Chambers, “Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today’s Business”, 1st Edition, , Wiely CIO Series, 2013.
2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, and Marcia Kaufman, Big Data For Dummies, Wiley,2013
3. Data Science and Big Data analytics, EMC2 Educational services, Wiley,2015
4. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams

with Advanced Analytics”, 1st Edition, Wiley and SAS Business Series, 2012.

5. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN: 9788126551071, 2015.

Reference Books:

1. Chris Eaton, Dirk Deroos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics For Enterprise Class Hadoop And Streaming Data”, Mcgrawhill Publishing, 2012
2. Glenn J. Myatt, “Making Sense Of Data”, John Wiley & Sons, 2007
3. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.

Unit Wise Text Books:

UNIT-I:

Text 2:Big Data For Dummies Part I and II

Text 1:Chapters 1 and 2

UNIT-II:

Text Book 3: Chapter 1

Text Book 2: Part IV

UNIT-III:

Text book 3: Chapter 2

UNIT-IV:

Text book 4: Chapter1, 2

R PROGRAMMING LAB

Course Content:

Lab Exercises

1. Program to Perform the following Statistical operations in the vector sequence
 - a. Sum
 - b. Length
 - c. Median
 - d. Standard Deviation
 - e. Variance
 - f. Summary
 - g. Min
 - h. Max
2. Program to import data set and perform the various statistical operations
3. Program to perform matrix operations

4. Program to perform t test
5. Program to Perform Linear Regression
6. Program to perform Logistic Regression
7. Program to perform Polynomial regression
8. Program to merge the dataset
9. Program to perform Scatter Plot
10. Program to plot 3D Graphs.

M19MS1020	OOP with JAVA	L	T	P	C
Duration:60 Hours		4	0	0	4

Course Objectives:

The objectives of this course are to:

- Understand fundamentals of object-oriented programming in Java, including defining Classes, invoking methods, using class libraries, exception handling etc.
- Solve problems using object-oriented paradigm
- Develop applications using threads and applet programming.
- Understand Java Database Connectivity.

Course Outcomes:

On successful completion of this course, the student will be able to:

- Implement Java classes from specifications.
- Effectively create and use objects from predefined class libraries.
- Use interfaces, inheritance, and polymorphism as programming techniques.
- Use exceptions and multithreading.
- Use applets and GUI based controls.

Course Content:

Unit I Introduction to JAVA Programming

15 Hours

An Overview of Java - Data Types – Variables – Arrays – Operators - Control Statements. Introducing Classes - Overloading Methods- Introducing Access Control- Introducing final. String Handling: The String Constructors- Special String Operations- String Comparison -StringBuffer.

Unit II Inheritance, Packages & Interfaces, Exception Handling: 15 Hours

Inheritance: Inheritance Basics-using super - Method Overriding- Using Abstract Classes – using final with Inheritance. **Packages and Interfaces:** Packages – importing packages – interfaces. **Exception Handling:** Fundamentals – types – Uncaught Exceptions – Using try and catch – throw-throws-finally –Builtin Exceptions.

Unit III Multithreaded Programming,Applets, AWT & Event Handling 15 Hours

Multithreaded Programming: The Java Thread Model - The Main Thread - Creating a Thread/multiple threads – Interthread Communication. **Applet class:** Applet Basics - An Applet Skeleton - Simple Applet Display Methods. **Introducing the AWT:** AWT Classes- Window Fundamentals - Working with Graphics. **Event Handling:** Event Handling mechanisms - The Delegation Event Model - Event Classes - Event Listener Interfaces –Adapter classes.

UNIT IV Advanced Java 15 Hours

Java Beans : what is a Java Bean? – Advantages of Java Beans – Developing a simple Bean using the SDK - The Java Beans API. **A tour of Swing:**JApplet – Icons and Labels – Text Fields – Buttons – Combo Boxes. **Servlets:**Life cycle of a Servlet – Servlet API – javax.servlet Packages. **Accessing Databases with JDBC:** Introduction – SQL – Creating Database – Manipulating Databases with JDBC.

Text Book:

1. Herbert Schildt, Java 2: The Complete Reference. 5th Edition, McGraw-Hill Education Group.(Chapter 2,3,4,5,6,7,8,9,10,11,13,19,20,21,25,26,27)
2. Deitel and Deitel, Java How to Program, 9th Edition, PHI publisher,2013. (Chapter 28).

Reference Book:

1. Kassem, Nicholas, and Enterprise Team. Designing enterprise applications: Java 2 platform. Addison-Wesley Longman Publishing Co., Inc., 2000. Unit 4
2. Herbert Schildt, Java™: The Complete Reference, 2014, 9th Edition, Oracle Press.
3. Aaron Walsh and John Fronckowick, “Java Bible, Programming Version 2”, IDG Books Worldwide, Inc. 2000.

M19MS1030	Data Mining and Knowledge Discovery	L	T	P	C
Duration: 60Hours		4	0	0	4

Course Objectives:

The objectives of this course are to:

- Learn data analysis techniques through Data Mining.
- Understand Data mining techniques and algorithms.
- Comprehend the data mining environments and application.
- Understand the process of Knowledge discovery

Course Outcomes:

On successful completion of this course, the student will be able to:

- Compare various conceptions of data mining as evidenced in both research and application.
- Characterize the various kinds of patterns that can be discovered by association rule mining.
- Evaluate mathematical methods underlying the effective application of data mining.
- Evaluation of Association Patterns and compact representation of frequent item sets.

Course Content:

UNIT I Introduction to Data Mining

15 Hours

Introduction to Data mining – Getting to Know about the Data. **Data Pre-processing:** An Overview – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Discretization.

UNIT II Classification

15 Hours

Basic Concepts – Decision Tree Induction – Bayes Classification Methods- Rule Based Classification – Techniques to Improve Classification Accuracy. Advanced Methods: Classification by Back Propagation - Support Vector Machines – k- NN Classifiers.

UNIT III Clustering

15 Hours

Cluster Analysis: Basic Concepts and Methods: Cluster Analysis - Partitioning Methods –

Hierarchical methods – Density-Based Methods – Grid-Based Methods. **Advanced Cluster Analysis:** Probabilistic Model-Based Clustering – Clustering High- Dimensional Data – Clustering with Constraints – Outlier Analysis.

UNIT IV Association Analysis

15 Hours

Basic Concepts and algorithms : Problem Definition – Frequent Itemset Generation –Rule Generation –Compact representation of Frequent itemsets – Alternative methods for generating Frequent Itemsets- FP- growth Algorithm –Evaluation of Association Patterns.

Text Book:

1. Jiawei Han and Micheline Kamber, “Data Mining - Concepts and Techniques”, Third Edition, Elsevier, 2012.(Unit I, II & III)
2. Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Addison Wesley, 2006.(Unit IV)

Reference Books:

1. Daniel. T. Larose Knowledge discovery, An Introduction to Data Mining, Wiley Publishers, 2014
2. Margaret H.Dunham, “Data mining introductory and advanced topics”, Pearson education, 2003.
3. G. K. Gupta: Introduction to Data Mining with Case Studies, 3rd Edition, PHI, New Delhi, 2009.

M19MS1040	Advanced Computer Networks	L	T	P	C
Duration: 60 Hours		4	0	0	4

Course Objectives:

The objectives of this course are to:

- Make students build an understanding of the fundamental concepts of computer networking;
- Make students to become Familiar with the basic taxonomy and terminology of the computer networking area;

- Introduce the students to advanced networking concepts, preparing the student for entry Advanced courses in computer networking;
- Allow the students to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes:

On successful completion of this course, the student is expected to be able to:

- Understand and explain Data Communications System and its components;
- Enumerate the layers of the OSI model and TCP/IP and apply the function(s) of each layer on network applications;
- Identify the different types of network devices and their functions within a network and identify the new protocols for the same;
- Illustrate of environmental parameters measurement and become familiar with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Content:

UNIT I Computer Networks and the Internet

15 Hours

What Is the Internet? Network Edge; Network Core; Delay, Loss, and Throughput in Packet-Switched Networks; Protocol Layers and Their Service Models.

Application Layer: Principles of Network Applications; Web and HTTP; File Transfer: FTP; Electronic Mail in the Internet; DNS—The Internet’s Directory Service; Peer-to-Peer Applications; Socket Programming: Creating Network Application.

UNIT II Transport Layer

15 Hours

Introduction and Transport-Layer Services; Multiplexing and Demultiplexing; Connectionless Transport: UDP; Principles of Reliable Data Transfer; Connection-Oriented Transport: TCP; Principles of Congestion Control; TCP Congestion Control

The Network Layer: Introduction; Virtual Circuit and Datagram Networks; what’s Inside a Router? The Internet Protocol (IP): Forwarding and Addressing in the Internet; Routing Algorithms; Routing in the Internet; Broadcast and Multicast Routing

UNIT III The Link Layer: Links, Access Networks, and LANs

15 Hours

Introduction to the Link Layer; Error-Detection and -Correction Techniques; Multiple Access Links and Protocols; Switched Local Area Networks; Link Virtualization: A Network as a Link Layer; Data Center Networking

Wireless and Mobile Networks

Introduction; Wireless Links and Network Characteristics; WiFi: 802.11 Wireless LANs; Cellular Internet Access; Mobility Management: Principles; Mobile IP; Managing Mobility in Cellular Networks; Wireless and Mobility: Impact on Higher-Layer Protocols

UNIT IV Security in Computer Networks

15 Hours

What Is Network Security? Principles of Cryptography; Message Integrity and Digital Signatures; End-Point Authentication; Securing E-Mail; Securing TCP Connections: SSL; Network-Layer Security: IPsec and Virtual Private Networks; Operational Security: Firewalls and Intrusion Detection Systems

Network Management: What Is Network Management? The Infrastructure for Network Management; The Internet-Standard Management Framework

Textbook

1. James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach, . Addison- Wesley, 6/E edition, 2013. (Ch 1 to 8)

Reference Books

1. Nader F. Mir, Computer and Communication Networks, Pearson Education, 2007.
2. Behrouz A. Forouzan, Data Communications and Networking, Fourth Edition, Tata McGraw Hill,2007.
3. Andrew S. Tanenbaum , Computer Networks , , Prentice Hall, 5th edition, 2011.
4. Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Morgan Kaufmann, 5th edition, 2011.

M19MS1050	Probability and Statistics	L	T	P	C
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Duration: 60 Hours		4	0	0	4
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Course Objectives:

The objectives of this course are to:

- Know the different Sampling Techniques used in Big data and related areas
- Introduce Random variables and Probability distributions
- Learn the statistical procedures most often used by practicing engineers.
- Understand apply for business applications.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Classify variables as quantitative or categorical, create appropriate numerical and graphical summaries for each type, and use these to explain/identify relationships between variables.
- Understand, apply and examine the goodness-of-fit test, test for independence, and coefficient of correlation for bivariate data.
- Illustrate and apply the concepts of discrete and continuous random variables, the discrete and continuous probability distributions and the joint probability distributions and solve real world problems in appropriate contexts by using standard techniques.
- Recognize and compute the single and multi-sample tests for m descriptive and inferential statistics in many different fields

Course Content:

UNIT I

15 Hours

Descriptive Statistics

Introduction meaning and scope of Statistics - Data classification, Tabulation, Frequency and Graphic representation - Measures of central Tendency - Arithmetic mean, Mode, Partition Values - Median, Quartiles, Deciles, Percentile - Measures of Dispersion – Range, Quartile deviation, Mean deviation,

standard deviation, coefficient of Variance, Measure of Skewness, Moments & Kurtosis.

UNIT II

15 Hours

PREDICTIVE ANALYTICS

Predictive modeling and Analysis - Regression Analysis, Correlation analysis, Rank correlation coefficient, multiple correlation, least square, Curve fitting and goodness of fit.

UNIT III

15 Hours

RANDOM VARIABLE AND PROBABILITY DISTRIBUTION

Introduction probability and its property, Random variable, its types DRV, CRV and its distributions, two dimensional R V, joint probability function, marginal density function. Some special probability distribution - Binomial, Poison, Uniform, Exponential and Normal Distribution.

UNIT IV

15 Hours

HYPOTHESIS TESTING Introduction Sampling, Sampling distribution, one and two tailed test,

Test of significance, (mean, difference of means), confidence interval 1% and 5% level of significance - Design of Experiments, one way classification, two way classification, ANOVA.

Text Books:

1. Gupta. S.C and Kapoor V.K. Fundamentals of Mathematical Statistics 10 edition , Sultan Chand and sons, 2010
2. Larsen, Richard J., and Morris L. Marx. An introduction to mathematical statistics and its applications. Vol. 5. Pearson, 2017.

References Books:

1. Berenson and Levine, Basic Business Statistics, Prentice- Hall India (1996, 6th edition)
2. S.P. Gupta, "Statistical methods"- Sultan Chand & Sons, New Delhi, 2012 Edition
3. Ross Sheldon, A First Course in Probability, Macmillan , (6th edition)
4. Medhi.J, "Statistical methods - An introductory text", new age publications, 2009 edition.
5. D.C. Montgomery and G.C. Runger, "Applied Statistics and Probability for engineers", New Jersey, John Wiley and Sons, 3rd edition, 2003.
6. P K Srimani and M Vinayaka Murthy, "Probability and Statistics", Subhas Stores, 2000
7. W.N. Venables, D.M Smith, "An introduction to R"
8. S M Ross, "Introduction to Probability and Statistics for Engineers and Scientists", Academic Foundation, 2011
9. <http://cran.r-project.org/doc/manuals/R-intro.html>

M19MS1061	Advanced Operating Systems	L	T	P	C
Duration: 60 Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Introduce the overview of operating system, process description and its control
- Study Threads, SMP, and microkernel and virtual memory concepts.
- Provide systematic and comprehensive treatment of operating system;
- Provide a strong foundation in distributed resource management components. viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols;

Course Outcomes:

On successful completion of this course; the student will be able to:

- Demonstrate a fundamental knowledge of Windows, Linux, Unix, TinyOS, description and its control
- Impart the knowledge about Threads, SMP, microkernel and virtual memory concepts.
- Demonstrate a fundamental knowledge of the various resource management techniques for distributed systems;
- Gain expertise in the security and kernel organization

Course Content:

UNIT I Multiple Processor Systems 18 Hours

MULTIPROCESSORS: Definition, Advantages, Classification, Multiprocessor Interconnections, Types of Multiprocessor Operating Systems, Multiprocessor OS Functions and Requirements, OS Design and Implementing Issues, Multicomputer, Virtualization, Multiprocessor Scheduling.

UNIT II Distributed Operating System 14 Hours

Definition, Need, Models of Distributed Systems, Distributed Message Passing, Remote Procedure calls, Algorithms for Distributed Processing.

UNIT III Multimedia Operating Systems 14 Hours

Introduction to Multimedia; Multimedia files: Video Encoding, Audio Encoding; Video compression: The JPEG Standard, The MPEG Standard; Audio compression; Multi-media process Scheduling.

UNIT IV Embedded System & Network Operating System 14 Hours

Embedded System: Definition, Need, Characteristics, Types of Embedded OS- Tiny OS; Network OS: Definition, Features of NOS, Types Of NOS, Windows Server VS Linux Server.

Textbooks

1. “Modern Operating System” By Andrew S Tanenbaum, 3rd ed (chapter 7, 8)
2. Tanenbaum, Andrew S. Distributed operating systems. Pearson Education India, 1995. (chap 1 , 2)

Reference Books:

1. “Operating Systems” Internals and design Principles By William Stallings ,6th edition.
2. Springer, Springer transaction for advance in Distributed computing and middleware.

M19MS1062	Advanced DBMS	L	T	P	C
Duration: 60Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- learn the modeling and design of databases
- acquire knowledge on parallel and distributed databases and its applications
- study the usage and applications of Object Oriented database
- understand the usage of advanced data models
- acquire inquisitive attitude towards research topics in databases.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Select the appropriate high performance database like parallel and distributed database
- Design a semantic based database to meaningful data access
- Embed the rule set in the database to implement intelligent databases
- Represent the data using XML database for better interoperability

Course Content:

UNIT I Overview of Storage and Indexing

12 Hours

Memory hierarchy: RAID; Disk space management; Buffer manager: Files of records; Page formats and record format, Structured Indexing,, Data on external storage; File organizations and Indexing, Index data structures; Comparison of file organizations; Indexes and performance tuning. Intuition for tree indexes; Indexed sequential access method; B+trees , Hash-Based Indexing.

UNIT II Overview of Query Evaluation, External Sorting and Relational Query Optimizer

18 Hours

The system catalog, Introduction to operator evaluation; Algorithm for relational operations; Introduction to query optimization; When does a DBMS sort data? A simple two-way merge sort; External merge sort, Evaluating Relational Operators The Selection operation; General selection conditions; The Projection operation; The Join operation; The Set operations; Aggregate operations; The impact of buffering.

UNIT III Concurrency Control

18Hours

Serializability and Transaction processing: Enforcing, Serializability by Locks, Locking Systems With Several, Lock Modes, Architecture for a Locking Scheduler Managing . **Transaction processing:** Introduction of transaction processing, advantages and disadvantages of transaction processing system, online transaction processing system, resolving deadlock, Transaction management in multi-database system, long duration transaction, high-performance transaction system.

UNIT IV Parallel and Distributed Databases and XML data

12 Hours

Architectures for parallel databases; Parallel query evaluation; Parallelizing individual operations;

Parallel query optimizations; Introduction to distributed databases; Distributed DBMS architectures; Storing data in a Distributed DBMS;

Information retrieval and XML data: Colliding Worlds: Databases, IR, and XML, Introduction to Information Retrieval, Indexing for Text Search, Web Search Engines, Managing Text in a DBMS, A Data Model for XML, XQuery: Querying XML Data.

Mobile databases, Multimedia databases, geographic databases, temporal databases, biological databases

Text Books:

1. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, 3rd Edition, McGraw-Hill, 2003[Chapters:8,9,10,11,12,13,14,22,23,27,29]

Reference Books:

1. Michael Rosenblum and Dr. Paul Dorsey,” PL/SQL FOR DUMMIES”,WILLEY Publications 2006
2. Elmasri and Navathe: Fundamentals of Database Systems, 5th Edition, Pearson Education, 2007.
3. Conolly and Begg: Database Systems, 4th Edition, Pearson Education, 2002.
4. Steven Feuerstein,”oracle PL/SQL Programming”,OREILLYpublications,Sixth edition 2014

M19MS1070	SPORTS/ YOGA/ MUSIC /DANCE/ THEATRE	L	T	P	C
Duration: 30 Hours		2	0	0	2

Course Objectives:

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

- To prepare the students for the integration of their physical, mental and spiritual faculties;
- To enable the students to maintain good health;
- To practice mental hygiene and to attain higher level of consciousness;
- To possess emotional stability, self control and concentration; and
- To inculcate among students self discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

- Practice yoga for strength, flexibility, and relaxation.
- Learn techniques for increasing concentration and decreasing anxiety
- Become self disciplined and self-controlled
- Improve physical fitness and perform better in studies
- Gain self confidence to face the challenges in the society with commitment to serve the society

Course Content:

UNIT I

Yoga: Introduction, Tips from Sage Patanjali's Yoga Sutras

Surya Namaskara:- 10 counts,12 counts,16 counts

UNIT II

Asanas: Sitting-Vajrasana, Dandasana, Padmasana, Matsyasana, Ardha Matsyendrasana, Suptavajrasana, Paschimottasana, Bakasana, Simhasana, Shirasasana.

Asanas: Standing-Tadasana, Trikonasana, Parshwa konasana, Veerabardrasana, Parivrutta trikonasana.

UNIT III

Asanas:Prone Position-Bhujangasana, Dhanurasana, Shalabhasana.**Asanas: Supine Position-**Sarvangasana, Sethubandha sarvangasana, Halasana,Karnapeedasana.
Mudras- Dhyana mudra, Chinmaya mudra, Namaste mudra, Nasika mudra

UNIT IV

Pranayams:- Ujjayi, Nadi Shodhana, Anuloma – Viloma, Basthrika, Bhramari, Sheethali
Dhyana & its typesCompetition format, Rules and their interpretations

B. VOLLEYBALL

Course Objectives:

- To learn the rules, fundamental skills, and strategies of volleyball.
- To develop skills in passing, setting, serving, spiking, and blocking.
- To learn basic offensive and defensive patterns of play.
- To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

- Learn basic skills and knowledge associated with volleyball.
- Apply these skills while playing volleyball and exhibit improved performance
- Improve physical fitness and practice positive personal and lifestyle.
- Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

UNIT I

1. Introduction about Volleyball
2. Players Stance, Receiving and passing
3. The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

UNIT II

1. Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)
2. Setting the ball- Set for attack, Back set, Jump set

UNIT III

1. Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash
2. Block- Single block, Double block, Three-man block
3. Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

UNIT IV

1. Attack Combination, Defense Systems, Libero play
2. Court marking, Rules and their interpretations and Duties of officials

C. BASKETBALL

Course Objectives:

- To learn the rules, fundamental skills, and strategies of Basketball
- To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.
- To learn basic offensive and defensive strategies of play.
- To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
- To develop positive understanding and appreciation of the basketball game

Course Outcomes:

On completion of the course learners will be able to:

- Learn basic skills and knowledge associated with basketball.
- Apply these skills while playing basketball and exhibit improved performance
- Improve physical fitness and practice positive personal and lifestyle.

- Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork

Course Content:

UNIT I

1. Basketball: Introduction
2. Grip; Player stance- Triple threat stance and Ball handling exercises
3. Passing (Two hand/one hand)- Chest pass, Bounce Pass, Over head pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
4. Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

UNIT II

1. Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
2. Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
3. Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

UNIT III

1. Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
2. Individual Defensive- Guarding the man with the ball and without the ball.
3. Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

UNIT IV

1. marking, Rules and their interpretations

D. FOOTBALL

Course Objectives:

- To learn the rules, fundamental skills, and strategies of football.
- To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.

- To learn basic offensive and defensive patterns of play
- To use different parts of the body in utilizing the above skills while playing football
- To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

- Learn basic skills and knowledge associated with football.
- Apply these skills while playing football and exhibit improved performance
- Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
- Improve physical fitness and practice positive personal and lifestyle.
- Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

UNIT I

Football: Introduction

1. Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
2. Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

UNIT II

1. Dribbling- With instep and outer instep of the foot.
2. Heading- From standing, running and jumping.
3. Feinting- With the lower limb and upper part of the body.

UNIT III

1. Tackling- Simple tackling, Slide tackling.

2. Throw-in- Standing and Sliding
3. Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

UNIT IV

1. Ground marking, Rules and their interpretations

E. ATHLETICS (TRACK AND FIELD)

Course Objectives:

- To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
- To develop competence among students in demonstrating all the techniques covered in the course.
- To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
- To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.
- To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course learners will be able to:

- Display competencies in executing basic techniques and skills associated with select track and field events.
- Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.
- Learn regular practice of select track and field events and improve physical fitness
- Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Content:

UNIT I

1. Athletics: Introduction
2. Track Events - Steeple Chase, Race Walking, Middle and Long distance races
3. Race walking - Technique, Faults and Officiating.
4. Middle and Long distance races – Technique and Training

UNIT II

1. Jumping Events - High Jump and Triple Jump: Basic Skills and techniques
2. High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing
3. Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

UNIT III

1. Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
2. Discus Throw -Standing and Rotatory techniques,Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
3. Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

UNIT IV

1. Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference books and manual for Athletics Specialization

(Athletics Part-I and Athletics Part-II)

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). “Track and field coaching Manual”, Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. Carr, Gerry (1999). “Fundamentals of Track and Field. Track Athletics 1 Title G.V. 1060 5.e. 368.
10. I.A.A.F. Level-II (2001). Text Book on Jumping Event.

11. Jarver, Jesse (1987). "The Jumps", Track and Field Coaching Manual Australia.

M19MS1080	JAVA Lab	L	T	P	C
Duration: 30Hours		0	0	2	2

Course Objectives:

The objectives of this course are to:

- Understand fundamentals of object-oriented programming in Java Programming, including defining Classes, invoking methods, using class libraries, exception handling etc.
- Solve Programming problems using object-oriented paradigm
- Develop applications using threads and applet programming.
- Understand Java Database Connectivity with Programming

Course Outcomes:

- On successful completion of this course, the student will be able to:
- Implement Java classes from specifications.
- Effectively create and use objects from predefined class libraries with Programming.
- Use interfaces, inheritance, and polymorphism as programming techniques.
- Use applets and GUI based controls.

List of Experiments:

1	Program to define a structure of a basic JAVA program
2	Program to define the data types, variable, operators, arrays and control structures.
3	Program to define class and constructors. Demonstrate constructors.
4	Program to define class, methods and objects. Demonstrate method overloading.
5	Program to define inheritance and show method overriding.
6	Program to demonstrate Packages.
7	Program to demonstrate Exception Handling.
8	Program to demonstrate Multithreading.
9	Program to demonstrate I/O operations
10.	Program to demonstrate Applet structure and event handling.
11	Program to demonstrate Layout managers.

M19MS1090	Data Mining Lab	L	T	P	C
Duration: 30Hours		0	0	2	2

Course Objectives:

The objectives of this course are to:

- Learn data analysis techniques through Data Mining Programming.
- Understand Data mining techniques and algorithms with Programs.
- Comprehend the data mining environments and applications.
- Understand the process of Knowledge discovery program

Course Outcomes:

On successful completion of this course, the student will be able to:

- Compare various conceptions of data mining as evidenced in research, Programming and applications.
- Characterize the various kinds of patterns that can be discovered by association rule mining.
- Evaluate Programming methods underlying the effective application of data mining.

List of Experiments

1	Build Data Warehouse and Explore WEKA.
2	Create data-set in .arff file format. Demonstration of preprocessing on WEKA data-set.
3	Demonstrate performing association rule mining on data sets(contact lenses.arff /supermarket using apriori algorithm.)
4	Demonstration of classification rule process on WEKA data-set using j48 algorithm.
5	Demonstration of classification rule process on WEKA data-set using Naive Bayes algorithm.
6	Demonstrate performing clustering on data sets(data-set iris.arff using simple k-means).
7	Demonstrate performing Regression on data sets.
8	Write a program of Naive Bayesian classification using C.
9	Write a program of cluster analysis using simple k-means algorithm using any programming language.
10.	Write a program of Apriori algorithm using any programming language.

SECOND SEMESTER

M19MS2010	Machine Learning using Python	L	T	P	C
Duration: 60 Hours		4	0	0	4

Course Objectives:

The objectives of this course are to:

- Describe the basic components of Machine Learning with concepts of Python
- Differentiate broad categories of Machine learning
- Compare different types of algorithms used in Machine Learning domain with limitations
- Examine the limitations of various machine learning algorithms and the way to evaluate performance of machine learning algorithms

Course Outcomes:

On successful completion of this course; the student will be able to:

- Explain concepts and theories of Machine Learning
- Formulate innovative ideas or techniques of machine learning for the real world problems
- Apply Machine Learning algorithms for specific problems.
- Understand the challenges and issues related to machine learning application areas

Course Content:

UNIT I

15 Hours

Python: Origin, Programming Basics, data types and Operators, Program Files, Directories, Changing Data Through Names, Copying Data, Accessing a Tuple Through Another Tuple, packages and libraries.

Overview of ML, broad categories of Machine learning- Supervised, Unsupervised, Semi-supervised, and Reinforcement Learning, Applications areas of Machine Learning. Examples and Case studies

UNIT II

15 Hours

Supervised Learning: Introduction, Classification and Linear Regression, k-Nearest Neighbor, Linear models, Decision Trees, Naive Bayes Classifiers, Kernelized Support Vector Machine (SVM)

Algorithm. Neural Networks (deep learning), Comparison of different algorithms, discussions on case studies.

UNIT III

15 Hours

Unsupervised Learning: Introduction, types and challenges, preprocessing and scaling of datasets, Dimensionality reduction, feature extraction. Principal Component Analysis (PCA), k-means, agglomerative, and DBSCAN clustering algorithms. Comparison of different cluster algorithms, discussions on Case studies

UNIT IV

15 Hours

Semi-supervised: Introduction, discussion on Generative models and Graph-based methods.

Reinforcement: Introduction, the learning task, Q learning –function, convergence, & updating sequence, rewards and actions, relationship to dynamic programming, discussions on Case studies

Text Books:

1. Introduction of Machine Learning with Python – by Andreas C Muller & Sarah Guidp – O’Reilly & Shroff publishers. Chapters 1, 2 and 3.
2. Introducing Python by Bill Lubanovic(chapters 1-6), Oriely Publications, 1st Edition
3. Python Programming for absolute beginners by Michael Dawson, Course Technology-A part of CENGAGE Learning, 3rd Edition
4. Machine Learning by Tom M Mitchell – McGraw Hill Education publication – 2013. Chapter 13.

References Books:

1. Machine Learning: The Art and Science of algorithms – by Peter Flach – Cambridge University Press. Chapter 12
2. Machine Learning - by EthemAlpaydin – PHI learning private limited. Chapter 1, 7, 16, 18, 19
3. Bayesian Reasoning and Machine Learning – by David barber - Cambridge University Press. Chapter 13, 15
4. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2006
5. Semi-Supervised Learning - by Olivier Chapelle, Bernhard Schölkopf, and Alexander Zien - The MIT Press Cambridge
6. The Elements of Statistical Learning – by Trevor Hastie, Robert Tibshirani and Jerome Friedman – Springer 2017 publication
7. Python Programming for absolute beginners-3rd Edition by Michael Dawson

M19MS2020	Linear Algebra	L	T	P	C
Duration: 60Hours		3	1	0	4

Course Objectives:

This course will:

- Recall basic concepts of matrices and matrix algebra
- Present methods of solving systems of linear equations
- Demonstrate basic concepts of vector spaces
- Interpret the concepts of linear transformations by using the matrices
- Develop methods of computing and using eigen values and eigenvectors

Course Outcomes:

Students in this course will able to:

- Solve the system of Linear Equations by using Matrix Algebra
- Derive the Norms and Inner Product Spaces
- Summarize the vector space properties.
- Analyze different forms of the Linear Transformations

Course Content:

UNIT I

15 Hours

Vector Spaces, Subspaces, Linear Combinations and Systems of Linear Equations, Linear Dependence and Linear Independence, Bases and Dimension, Maximal Linearly Independent Subsets; Linear Transformations, Null Spaces, and Ranges, The Matrix Representation of a Linear Transformation, Composition of Linear Transformations, and Matrix Multiplication, Invertibility and Isomorphisms, The Change of Coordinate Matrix, The Dual Space; Elementary Matrix Operations and Elementary Matrices, The Rank of a Matrix and Matrix Inverses, Systems of Linear Equations.

UNIT II

15 Hours

Properties of Determinants, Cofactor Expansions, Elementary Operations and Cramer’s Rule; Eigenvalues and Eigenvectors, Diagonalizability, Invariant Subspaces and the Cayley-Hamilton Theorem; Inner Products and Norms, (No theorem proof).

UNIT III

15 Hours

The Adjoint of a Linear Operator, Normal and Self-Adjoint Operators, Unitary and Orthogonal Operators and Their Matrices, Orthogonal Projections and the Spectral Theorem; Bilinear and Quadratic Forms (No theorem proof).

UNIT IV

15 Hours

The Diagonal form, The Triangular form; The Jordan Canonical Form; The Minimal Polynomial; The Rational Canonical Form (No theorem proof).

Books for Reference:

1. S. Friedberg, A. Insel, and L. Spence - Linear Algebra, Fourth Edition, PHI, 2009.
2. Jimmie Gilbert and Linda Gilbert – Linear Algebra and Matrix Theory, Academic Press, An imprint of Elsevier.
3. I. N. Herstein – Topics in Algebra, Vikas Publishing House, New Delhi.
4. Hoffman and Kunze – Linear Algebra, Prentice-Hall of India, 1978, 2nd Ed.,
5. P. R. Halmos – Finite Dimensional Vector Space, D. Van Nostrand, 1958.
6. S. Kumeresan – Linear Algebra, A Geometric approach, Prentice Hall India, 2000.

M19MS2030	Big Data with NoSQL	L	T	P	C
Duration: 60Hours		4	0	0	4

Course Objectives:

The objectives of this course:

- Learn the latest trends in databases.
- Learn various NoSql systems and their features
- Compare NoSql databases with each other and relational systems
- Acquire knowledge in parallel, distributed databases and its applications.
- Understand the usage of advanced data models.
- Learn emerging databases like MongoDB, HBase.

Course Outcomes:

On successful completion of this course, the student will be able to:

- Define, compare and use the four types of NoSQL Databases (Document oriented, Key Value Pairs, Column oriented and Graph).
- Analyze the need of NoSQL databases in handling Big data
- Compare the Difference between the types of NOSQL databases.
- Demonstrate the data models in these databases.

Course Content:

UNIT I Introduction to NOSQL

15 Hours

Introduction to NoSQL Definition of NOSQL-Challenges in traditional RDBMS- Need for NOSQL- Big Data and NoSQL, Need for schema less databases. History of NOSQL. Aggregate data models, Distribution models, CAP theorem, Types of NOSQL Data bases- key-value Column store, document data models and Graph Data models. Scalability and NoSQL.

UNIT II Key Value Stores and Column stores

15 Hours

Introduction to Key-value stores- Exploring Redis Redis data model Storing Data in and Accessing Data from Apache Redis –Querying in Redis using examples Redis use cases. Introduction to Column stores- Exploring HBASE – HBASE data model Storing Data CRUD operations in HBASE.

UNIT III Document stores and its applications

15 Hours

Introduction to Document stores, Exploring MongoDB, MongoDB data model, Storing Data in and Accessing Data from MongoDB, Querying in MongoDB using examples, Interact with MongoDB

using any one Language Binding with PHP.

UNIT IV Big Data Handling and Graph Databases

15 Hours

Big Data processing with MongoDB, Import and Export commands in MongoDB, MongoDB Indexing, MongoDB Database Administration.

Graph Databases, Introduction, What Is a Graph-A High-Level View of the Graph Space, Performance, Graph Databases, Graph Compute Engines, The Power of Graph Databases,, Options for Storing Connected Data, Relational Databases Lack Relationships, NOSQL Databases Also Lack Relationships, Graph Databases Embrace Relationships.

Data Modeling with Graphs, Models and Goals, The Labeled Property Graph Model, Querying Graphs: An Introduction to Cypher, Cypher Philosophy, MATCH, RETURN, other Cypher clauses.

Text Books:

1. Pramod. J. Sadalge, Martin Fowler, NoSQL distilled, A brief guide to emerging world of Polyglot persistence. Addison-Wesley 2013.
2. Lars George HBase: A definitive Guide, O'Reilly publications, 2011.
3. Josiah L. Carlson, Redis in Action, Manning Publications, 2013.
4. The Definitive guide to MongoDB, The NoSQL Database for Cloud and Desktop Computing, Apress 2010 .
5. Ian Robinson, Jim Webber & Emil Eifrem, Graph Databases

Reference Books:

1. "Professional NOSQL" by Shashank Tiwari, 2011, WROX Press
2. Kristina Chodorow, MongoDB: The Definitive Guide, 2nd Edition, O'Reilly publications, 2013

Reference Websites:

1. www.mongodb.org
2. www.redis.io
3. www.hbase.apache.org

Unit wise Text books reference.

Unit 1- R1- Chapter 1, T1-Chapter 1-4,5,3.1

Unit 2- www.redis.io, www.hbase.apache.org

Unit 3-T4-chapter 4,6

Unit 4-Chapter 9; T5-Chapter 1-3

M19MS2041	System Modeling and Simulation	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Make the students to understand the importance simulation and modeling in a range of important application areas.
- Explain the event – scheduling, time-advance algorithm in computer networks.
- Introduce discrete event stochastic models and queuing models.
- Learn the benefits of probability, random process verification and validation of the models.

Course Outcomes:

On successful completion of this course, the student is expected to be able to:

- Outline the various applications of simulation.
- Describe the role of important elements of simulation in modeling paradigm.
- Generate Random numbers using different techniques.
- Apply simulation on various layers for Optimization and random number generation and Present the Modeling techniques for event systems

Course Content:

UNIT I Introduction

15 Hours

Why is Simulation Important? When simulation is the appropriate tool and when it is not appropriate? Areas of application, Systems and system environment; Components of a system, Discrete and continuous systems, Model of a system; Types of Models; Discrete-Event System Simulation. Simulation examples: Simulation of queuing systems; Simulation of inventory systems; other examples of simulation. What is model? Advantages and Disadvantages of Modeling and Simulation, Common Pitfalls of Modeling and Simulation and Rules of Thumb, Overview of M&S

tools.

UNIT II General Principal, Statistical & Queuing Models

15 Hours

Simulation Software: Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using Event scheduling; List processing. Review of terminology and concepts; Useful statistical models; discrete distributions; Continuous distributions; Poisson process; Empirical distributions. Characteristics of queuing systems; Queuing notation; Long-run measures of performance of queuing systems; Steady-state behavior of M/G/1 queue; Networks of queues.

UNIT III Random-Number

15 Hours

Properties of random Numbers; Generation of pseudo-random numbers; Techniques for generating random numbers; Tests for Random Numbers. Random-Variate Generation: Inverse transform technique; Acceptance-Rejection technique; Special properties.

Input Modeling: Data Collection; Identifying the distribution with data; Parameter estimation; Goodness of Fit Tests; Fitting a non-stationary Poisson process; selecting input models without data; Multivariate and Time-Series input models.

UNIT IV Verification and Validation of Simulation Models

15 Hours

Model building, verification and validation; Verification of simulation models; Calibration and validation of models. Optimization via Simulation. Modeling and Simulation using Network Simulator: RF Propagation Wired MANE, Network Layer.

Text Books:

1. Jerry Banks , John S. Carson II , Barry L. Nelson , David M. Nicol, "Discrete-Event System Simulation", Pearson Education, 5th edition, 2015 (chapters 1-10).
2. Averill M. Law, "Simulation Modeling and Analysis", Tata McGraw-Hill, 4th edition, 2007.(chapters 7, 8).
3. Wehrle, Klaus, Günes, Mesut, Gross, James, "Modeling and Tools for Network Simulation", 2010.(chapters 1-5).

Reference Books:

1. Sheldon M Ross, "Simulation", Elsevier Publication, 5th Edition, 2014(chapters 4, 7, 8 and 11).

M19MS2042	Internet of Things	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Discuss the basics of Internet of Things
- Identify different IoT applications and their application areas.
- Explain the emerging field of wireless sensor networks and IoT, which consist of many tiny, low-power devices equipped with sensing, computation, and wireless communication capabilities.
- Describe operating systems, radio communication, networking protocols, Methodologies of IoT

Course Outcomes:

On successful completion of this course; the student will be able to:

- Understand and analyze the usability of the IoTs across various real-world applications
- Analyze low-power devices equipped with sensing, computation, and wireless communication capabilities along with M2M communication.
- Illustrate of environmental parameters measurement and monitoring by exposing participants to the comprehensive fundamentals of Smart Sensors and Internet of Things
- Understand the operating systems, radio communication, networking protocols and develop application with a programming language.

Course Content:

UNIT I Introduction to Internet of Things

15 Hours

Definition & Characteristics of IoT, Physical Design of IoT, Things in IoT, IoT Protocols, Logical

Design of IoT, IoT Functional Blocks , Communication Models , IoT Communication APIs,IoT Enabling Technologies,Wireless Sensor Networks, Cloud Computing , Big Data Analytics, Communication Protocols , RFID Basics, Embedded Systems, IoT Levels & Deployment Templates.

UNIT II IoT and M2M

15 Hours

Introduction; M2M, Difference between IoT and M2M , SDN and NFV for IoT , Software Defined Networking , Network Function Virtualization , IoT System Management with NETCONF-YANG, Need for IoT Systems Management, Simple Network Management Protocol (SNMP) , Limitations of SNMP , Network Operator Requirements, NETCONF, YANG, IoT Systems Management with NETCONF-YANG.

UNIT III Developing Internet Of Things

15 Hours

IoT Design Methodology, Step 1: Purpose & Requirements Specification, Step 2: Process Specification , Step 3: Domain Model Specification , Step 4: Information Model Specification , Step 5: Service Specifications , Step 6: IoT Level Specification, Step 7: Functional View Specification, Step 8: Operational View Specification ,Step 9: Device & Component Integration, Step 10: Application Development. Case Study on IoT System for Weather Monitoring, Motivation for Using Python

UNIT IV Advanced topics in IoT

15 Hours

Logical Design of IOT using Python, Introduction to Python, Basics of Programming with Raspberry PI with PYTHON, IOT Physical devices and end points. Python Packages of Interest for IoT-JSON. IoT Physical Servers & Endpoints, Introduction to cloud storage Models for IOT.

Text Book:

1. Internet of Things-An Hands on Approach- Vijay Madiseti (Author), Arshdeep Bahga, 2014 (chapter 1,3,4, 5, 6).

Reference Books:

1. Cuno Pfister Getting Started with the Internet of Things, OReilly, 2011.
2. Francis DaCosta, Rethinking Internet of things, Apress Open Edition, 2013
3. Adrian McEwen, Hakim Cassimally, Design of Internet of Things, 2014 John Wiley and Sons, Ltd.

M19MS2051	Pattern Recognition	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Understand basic concepts in pattern recognition
- Gain knowledge about state-of-the-art algorithms used in pattern recognition research
- Understand pattern recognition theories, such as Bayes classifier, linear discriminant analysis.
- Apply pattern recognition techniques in practical problems.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Understand basic concepts in pattern recognition
- Gain knowledge about state-of-the-art algorithms used in pattern recognition research
- Understand pattern recognition theories, such as Bayes classifier, linear discriminant analysis.
- Apply pattern recognition techniques in practical problems.

Course Content:

UNIT I Introduction

15 Hours

Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation. Bayesian Decision Theory : Introduction, continuous features – two categories classifications, minimum error-rate classification- zero– one loss function, classifiers, discriminant functions, and decision surfaces

UNIT II Normal density

15 Hours

Univariate and multivariate density, discriminant functions for the normal density different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context.

Maximum likelihood and Bayesian parameter estimation : Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case

UNIT III Un-supervised learning and clustering **15 Hours**

Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Data description and clustering – similarity measures, criteria function for clustering

UNIT IV Discrete Hidden Markov Models **15 Hours**

Introduction, Discrete–time markov process, extensions to hidden Markov models, three basic problems for HMMs. Continuous hidden Markov models: Observation densities, training and testing with continuous HMMs, types of HMMs.

Text Books:

1. Pattern classifications, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, Second Edition, 2001. {Chapters: 1, 2, 3, 10}
2. Fundamentals of speech Recognition, Lawrence Rabiner, Biing – Hwang Juang Pearson education, 1993. {Chapters: 6}

Reference Books:

- Pattern Recognition and Image Analysis – Earl Gose, Richard John baugh, Steve Jost PHI 2004

M19MS2052	Social Network Analysis	L	T	P	C
Duration: 45 Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Understand the concept of semantic web and related applications.
- Learn knowledge representation using ontology.
- Understand human behaviour in social web and related communities
- Learn visualization of social networks.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Develop semantic web related applications.
- Appreciate how network analysis can contribute to increasing knowledge about diverse aspects of society and knowledge using ontology.
- Predict human behavior in social web and related communities.
- Understand basic principles behind network analysis algorithms

Course Content:

UNIT I

15 Hours

Social Networks: Introduction, Research Issues & Topics in Social Networks. Statistical Properties of Social Networks: Definitions & Data description, Static Properties of Unweighted Graphs & Weighted Graphs, Dynamic Properties of dynamic Unweighted Graphs & dynamic Weighted Graphs
Community Discovery in Social Networks: Applications, Methods and Emerging Trends, Communities in Context, Core Methods, Quality Functions, The Kernighan-Lin (KL), Agglomerative/Divisive, Spectral Algorithms, Multi-level Graph Partitioning, Markov Clustering, Other Approaches, Community Discovery in Dynamic Networks, Heterogeneous Networks, and Directed Networks.

Coupling Content and Relationship Information for Community Discovery, Cross-cutting Issues.

UNIT II

15 Hours

Node Classification in Social Networks: Introduction, Problem Formulation, Representing data as a graph, The Node Classification Problem, Methods using Local Classifiers Iterative Classification Method, RandomWalk based Methods, Label Propagation, Graph Regularization, Adsorption, Applying Node Classification to Large Social Networks, Basic Approaches, Second-order Methods, Implementation within Map-Reduce.

Evolution in Social Networks: Introduction, Framework, Modeling a Network across the Time Axis, Evolution across Four Dimensions, Challenges of Social Network Streams.

Models and Algorithms for Social Influence Analysis: Introduction, Influence Related Statistics, Edge and Node Measures, Social Similarity and Influence, Homophily, Existential Test for Social

Influence, Influence and Actions, Influence and Interaction, Influence Maximization,

UNIT III

15 Hours

Expert Locations in Social Networks: Definitions and Notation, Expert Location without Graph Constraints, Language Models for Expert Location, Expert Location with Score Propagation, PageRank Algorithm, HITS Algorithm, Expert Score Propagation, Expert Team Formation, Metrics, Forming Teams of Experts, Agent-based Approach, Influence Maximization, Expert Location Systems.

Link Prediction in Social Networks:

Introduction, Background, Feature based Link Prediction, Feature Set Construction, Classification Models, Bayesian Probabilistic Models, Link Prediction by Local Probabilistic Models, Network Evolution based Probabilistic Model, Hierarchical Probabilistic Model, Probabilistic Relational Models, Relational Bayesian Network, Relational Markov Network. Linear Algebraic Methods

Privacy in Social Networks: Introduction, Privacy breaches in social networks, Identity disclosure, Attribute disclosure, Social link disclosure, Affiliation link disclosure, Privacy definitions for publishing data, k-anonymity, l-diversity and t-closeness, Differential privacy, Privacy-preserving mechanisms, for social networks, affiliation networks.

UNIT IV

15 Hours

Data Mining in Social Media: Motivations, Data Mining Methods for Social Media, Data Representation, Data Mining - A Process, Social Networking Sites - Illustrative Example, The Blogosphere: Illustrative Examples, Related Efforts, Ethnography and Netnography, Event Maps

Text Mining in Social Networks: Introduction, Keyword Search, Query Semantics and Answer Ranking, Keyword search over XML and relational data, Keyword search over graph data, Classification Algorithms, Clustering Algorithms, Transfer Learning in Heterogeneous Networks, case study on any one of social media network

Text Books:

1. Social Network Data Analytics – by Charu C. Aggarwal, Springer 2011
2. Scott, J., & Carrington, P. J. (Eds.). (2011). The SAGE Handbook of Social Network Analysis. London; Thousand Oaks, Calif: SAGE Publications Ltd.

3. Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2013). Analyzing social networks. Los Angeles; London: SAGE Publications.

Reference books:

1. D. Easley, J. Kleinberg. Networks, Crowds and Markets: Reasoning About a Highly Connected World. Cambridge University Press, 2010.
2. M. E. J. Newman. Networks: An Introduction. Oxford University Press, 2010.
3. W. de Nooy, A. Mrvar, V. Batagelj. Exploratory Social Network Analysis with Pajek. Cambridge University Press, 2005.
4. Shamanth Kumar, Fred Morstatter, Huan Liu. Twitter Data Analytics. Springer-Verlag New York, 2014.
5. Wasserman, S., & Faust, K. (1994). Social Network Analysis: Methods and Applications. New York: Cambridge University Press.

M19MS2061	Service Oriented Architecture	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- gain understanding of the basic principles of service orientation
- Learn service oriented analysis techniques
- Analyse technology underlying the service design
- Understand the concepts such as SOAP, registering and discovering services.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Get the foundations and concepts of service based computing
- Advocate the importance and means of technology alignment with business
- Understanding the basic operational model of web services,
- Gain the knowledge of key technologies in the service oriented computing arena
- Apply and practice the learning through a real or illustrative project/case study s

Course Content:

Course Content

UNIT I **15 Hours**

Service-Oriented Computing and SOA:

Fundamental SOA, Common characteristics of contemporary SOA, Common misperceptions about SOA, Common tangible benefits of using SOA, Common pitfalls of adopting SOA.

UNIT II **15 Hours**

Service-Orientation:

Introduction to Service-Orientation, Problems Solved by Service-Orientation, Challenges Introduced by Service-Orientation, Effects of Service-Orientation on the Enterprise, Origins and Influences of Service-Orientation

UNIT III **15 Hours**

Analysis

Service oriented analysis ,Business-centric SOA , Deriving business services- service modeling ,Service Oriented Design , WSDL basics , SOAP basics , SOA composition guidelines, Entity-centric business service design ,Application service design , Task centric business service design

UNIT IV **15 Hours**

Understanding Design Principles:

Using Design Principles, Principle Profiles, Design Pattern References, Principles that Implement vs. Principles that Regulate, Principles and Service Implementation Mediums, Principles and Service Contract Granularity.

Text Books:

1. Erl, Thomas, Paulo Merson, and Roger Stoffers. Service-Oriented Architecture: Analysis and Design for Services and Microservices. Prentice Hall, 2017. (chap 3, 4, 5)
2. Service-Oriented Architecture: Concepts, Technology, and Design, Thomas Erl, Pearson Education, 2005 (chap 3, 4,)

Reference Book:

1. Hentrich, Carsten, and Uwe Zdun. Process-Driven SOA: Patterns for Aligning Business and IT. Auerbach Publications, 2016.

M19MS2062	Business Intelligence	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Outline different decision making components in business intelligence system.
- Examine modeling and decision support system.
- Demonstrate business intelligence life cycle and the techniques used in it
- Evaluate data analysis tools and techniques.

Course Outcomes

On successful completion of this course; the student will be able to:

- Analyze and Understand the role of decision models and explore solutions of BI
- To understand and apply the mathematical models of Decisions making .

- Provide solutions to real life problems using classification techniques and clustering algorithms and evaluate the methodologies. .
- Identify decision process using Software tools and intelligence for individual applications.

Course Content:

UNIT I

Components of decision making process

15 Hours

Business Intelligence: Effective and timely decisions-Data, information and knowledge-The role of mathematical models-Business intelligence architecture-Ethics and business intelligence.

Decision support system: Definition of system-representation of the decision making process-Evolution of information system- Definition of decision support system-development of decision support system.

UNIT II

15 Hours

Mathematical model for decision making: Structure of mathematical models-Development of model-classes of models. Regression: Structure of regression models-simple linear regression-multiple linear regression. Time series: Definition of time series-Evaluating time series models-Analysis of the component of time series.

UNIT III

15 Hours

Classification: Classification problems-Taxonomy of classification models-Evaluation of classification models. Association rules: Motivation and structure of association rules-single dimension association rules-general association rules. Clustering: Clustering Methods-partition method-hierarchical methods-evaluating of clustering models.

UNIT IV

15 Hours

Business intelligence Applications

Marketing models-Sales force management-Decision process in sales forces management. Business Case studies: Retention in telecommunications-acquisition in the automotive industry-Cross selling in the retail industry.

Text Books:

1. Carlo Verzellis, “Business Intelligence”, Wiley publications, 2015 (Chapter 1 & 2, Chapter 4, 8 & 9, Chapter 10, 11 & 12, Chapter 13),

Reference Books:

1. Galit Shmueli, Nitin R. Patel, Peter C Bruce, “Data Mining for Business Intelligence, Wiley publications, 2014
2. Efraim Turban, Ramesh Sharda, Dursun Delen, “Decision Support and Business Intelligence Systems”, 9th Edition, Pearson 2013.
3. David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager’s Guide”, Second Edition, 2012.

M19MS2070	Soft Skills	L	T	P	C
Duration: 30 Hours		2	0	0	2

M19MS2080	Python Lab	L	T	P	C
Duration: 30Hours		0	0	2	2

Course Objectives:

The objectives of this course are to:

- Describe the basic components of Machine Learning with concepts of Python Programming
- Differentiate broad categories of Machine learning Programming
- Compare different types of Programming used in Machine Learning domain with limitations
- Examine the limitations of various machine learning algorithms and the way to evaluate performance of machine learning algorithms

Course Outcomes:

On successful completion of this course; the student will be able to:

- Explain concepts and Programming of Machine Learning
- Formulate innovative ideas or techniques of machine learning for the real world problems

- Apply Machine Learning algorithms/ Programming for specific problems.
- Understand the challenges and issues related to machine learning application Programming

Lab Experimentents:

Part A

1. Demonstrate runtime reading of Strings.
 - i) Illustrate the concept of String Slicing.
 - ii) Also demonstrate a minimum of 5 functions defined on Strings.
2. Write a program to add two integers and print the result on the screen. Accept the values at runtime.
3. Demonstrate the usage of math and cmath module.(For Ex. Program to find the roots of a Quadratic Equation)
4. Illustrate the usage of files with the help of different functions defined on Files(such as write, read(demonstrate all four forms), open, and close(use both the forms of closing a file)
5. Write a program to find the largest of two numbers
6. Write a program to find the biggest of three numbers
7. Design a menu driven program to check whether the number is
 - i)A perfect number or not
 - ii)Armstrong number or not
 - iii)Palindrome or not
8. Show the different operations defined on Lists, Tuples and Dictionaries
9. Write a program to find the factorial of a number using functions and without using functions. Accept the input at runtime.
10. Demonstrate the i) Designing of a class ii) Creation of Object of that class iii) accessing the methods and instance variables in the class. The student is at the liberty of choosing their own Description of the object for designing the class.

Part B:

Lab modules:

1. Implementation of regression algorithm
2. Implementation of Naïve Bayes algorithm
3. Implementation of Decision Tree algorithm
4. Implementation of K-means algorithm
5. Implementation of PCA algorithm
6. Implementation of SVM algorithm

7. Implementation of Q- algorithm

The above algorithms has to be executed on different sets/types of datasets

M19MS2090	Big Data and NoSQL Lab	L	T	P	C
Duration: 30Hours		0	0	2	2

Course Objectives:

The objectives of this course:

- Learn the latest trends in databases.
- Learn various NoSql systems and their features
- Compare NoSql databases with each other and relational systems
- Learn emerging databases like MongoDB, HBase.

Course Outcomes:

On successful completion of this course, the student will be able to:

- Define, compare and use the four types of NoSQL Databases (Document oriented, Key Value Pairs, Column oriented and Graph).
- Analyze the need of NoSQL databases in handling Big data.
- Compare the Difference between the types of NOSQL databases.

- Demonstrate the data models in these databases.

Lab Experiment:

CRUD Operations in MONGODB

1: Student Database

Create a Student database with the fields: (SRN, sname, degree, sem, CGPA)

- Insert 10 documents.
- Display all the documents.
- Display all the students in BCA.
- Display all the students in ascending order.
- Display first 5 students.
- Display students 5,6,7.
- List the degree of student "Rahul".
- Display students details of 5,6,7 in descending order of age.
- Display the number of students in BCA.
- Display all the degrees without _id.
- Display all the distinct degrees.
- Display all the BCA students with CGPA greater than 6, but less than 9.
- Display all the students in BCA and in 6th Sem.

2. Employee Database

Create an employee database with the fields: {eid, ename, dept, desig, salary, yoj, address {dno, street, locality, city}}

- Insert 10 documents.
- Display all the employees with salary in range (50000, 75000).
- Display all the employees with designation.
- Display the Salary of "Rahul".
- Display the city of employee "Rahul".
- Update the salary of developers by 5000 increment .
- Add field age to employee "Rahul".
- Remove YOJ from "Rahul".
- Add an array field project to "Rahul".
- Add p2 and p3 project to "Rahul".
- Remove p3 from "Rahul".
- Add a new embedded object "contacts" with "email" and "phone" as array objects to "Rahul".

xiii. Add two phone numbers to “Rahul”.

3. Book Database

Create a book Data Base with the fields: (isbn, bname, author [], year, publisher, price)

- i. Insert 5 documents.
- ii. List all the documents.
- iii. List all book names except year and price.
- iv. Display all the books authored by rudresh.
- v. List all the books published by pearson.
- vi. List the publisher of book java.
- vii. List the author, publisher and year of the book let us see.
- viii. Display the price of “let us see” except _id.
- ix. Sort and display all books in ascending order of book names.
- x. Sort and display only 3 books in descending order of price.
- xi. Display all the books written by herbet and kuvempu.
- xii. Display all the books either written by herbet and kuvempu.
- xiii. Display all the books where rama is the first author.

4. Food Database

Create a Food Database with the fields: (food id, food cat, food name, chef name [], price, ingredients [], hotel name, hotel address {no, street, locality, city})

- i. Insert 10 documents.
- ii. List the price of pizza with ingredients.
- iii. Display the item in the price range(500,800).
- iv. Display the item prepared by x and y.
- v. Display the item prepared by x or y.
- vi. Add one chef to the food pizza.
- vii. Add ingredients to the food Burger.
- viii. Delete last ingredient added to the food burger.
- ix. Delete all the ingredients from the food biryani.
- x. Add food type to the food Burger.
- xi. Modify the burger price by 200.
- xii. Add or insert a new food item with the food Id “f08 “ using upsert as True.
- xiii. Increment the price of all food item in food cat: fastfood by 120.

5. Import and export Bigdata to MongoDB

PART B

PHP with MONGODB

1. Demonstrate how to establish connection between PHP and MongoDB.

2. Grouping Data with Map/Reduce

3. Create Employee Database (PHP) and perform following operations.

- i. Connect to MongoDB.
- ii. Insert 5 documents into the employee database.
- iii. Find all documents in the database.
- iv. Find one document with condition.
- v. Display two Documents in the database using LIMIT Command.
- vi. Display from 5th document.
- vii. Sort the documents in Ascending order based on pin.
- viii. Display the prescribed number in an array object using SLICE operator.
- ix. Display the prescribed number in an array object using SLICE with SKIP-LIMIT.

4. Create Employee Database (PHP) and perform following operations.

- i. Connect to MongoDB.
- ii. Insert 5 documents into the employee database.
- iii. Display find with condition (where)
- iv. Demonstrate OR condition, AND condition, Conditional operators lt,lte,gt,gte,ne, in operator, all operator, EXISTS operator-checks whether field has a value.

5. Demonstrate Indexing in MongoDB.

THIRD SEMESTER

M19MS3010	Cloud Computing	L	T	P	C
Duration: Hours		4	0	0	4

Course Objectives:

The objectives of this course are to:

- Introduce the broad perceptiveness of cloud architecture and model
- Understand the concept of Virtualization and design of cloud Services
- Be familiar with the lead players in cloud.
- Apply different cloud programming models as per need.
- Learn to design the trusted cloud Computing system

Course Outcomes:

On successful completion of this course; the student will be able to:

- Understand the fundamentals of Cloud Computing and evaluate ideas for building cloud computing environments.
- Explain the fundamental concepts of Virtualization and analyze the characteristics of virtualized environments.
- Analyze existing cloud architecture to design and develop new systems using software tools that can solve real time problems without harming environment.
- Explore cloud computing applications in various areas and analyze their usage.

Course Content:

UNIT I Fundamentals of Cloud Computing

15 Hours

Cloud computing at a glance, The vision of cloud computing, Defining a cloud, A closer look, Historical developments, Building cloud computing environments Application development. Characteristics of Cloud computing. Scalability, types of scalability. Horizontal Scalability and Cloud Computing. Computing platforms and technologies, Principles of Parallel and Distributed Computing.

Programming Models : Parallel and Distributed Programming Paradigms , MapReduce.

UNIT II Fundamental concept and Models

15 Hours

Basics of Virtualization, Characteristics of virtualized environments, Taxonomy of virtualization techniques, - Types of Virtualization, Virtualization and cloud computing, Technology examples, Xen: paravirtualization, VMware: full virtualization –Just introduction.

UNIT III Cloud Infrastructure Mechanisms and Architecture

15 Hours

Fundamentals of Cloud Architecture, The cloud reference model, Cloud Delivery Models: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), Comparing Cloud Delivery Models, Cloud Deployment Models: Public Clouds, Community Clouds, Private Clouds, Hybrid Clouds, Introduction to Cloud Software Environments , Architecture of Eucalyptus, Open Nebula, OpenStack, Aneka.

UNIT IV Cloud Applications and AWS Cloud platform

15 Hours

Scientific applications, Healthcare: ECG analysis in the cloud, Biology: protein structure prediction, Geoscience: satellite image processing, Business and consumer applications, CRM and ERP, Social networking, media applications.

Cloud Storage systems. Deploying applications in the cloud, open cloud platforms AWS,GAE.

Textbooks:

1. Rajkumar Buyya, Christian Vechiolla, Thamarai Selvi, “**Mastering Cloud Computing** , Elsevier publications, 2013, USA. (Unit 1 : Chapter 1 and 2, Unit 2: Chapter 3, Unit 3:Chapter 4,5.1, Unit 4:Chapter 8,9.1,9.2 and 10)

References:

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski, “**Cloud Computing: Principles and Paradigms**”, Wiley, India.
2. Kai Hwang, Geoffrey C Fox, Jack G Dungaree, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012
3. Thomas Erl, Zaigham,Mahmood, Ricardo Puttini, “ **Cloud Computing:Concepts, Technology & Architecture**”, Prentice Hall/Pearson.

M19MS3021	Mobile Computing and APP store Management	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Impart basic understanding of the wireless communication systems.
- Expose students to various aspects of mobile computing techniques.
- Understand the basic concepts of mobile computing.
- Be familiar with the network protocol stack
- Gain knowledge about different mobile platforms and application development

Course Outcomes:

On successful completion of this course; the student will be able to:

- Impart basic understanding of the wireless communication systems.
- Expose students to various aspects of mobile computing techniques.
- Understand the basic concepts of mobile computing.
- Be familiar with the network protocol stack and Gaining knowledge about different mobile platforms and application development

Course Content:

UNIT I Mobile Computing Application and Services

15 Hours

Introduction to mobile computing, Middleware and Gateways, Application and services, Internet-Ubiquitous networks, Architecture and three-tier architecture for Mobile Computing, Design consideration for Mobile Computing. Spread spectrum – Direct sequence, Frequency hopping. Medium Access Control - SDMA, FDMA, TDMA, CDMA, Cellular concepts- channel assignment strategy- hand off strategy interface and system capacity- improving coverage and capacity in cellular system, Satellite Systems-GEO, LEO, MEO. Wireless Communication Systems- Telecommunication Systems- GSM- GSM services & features, architecture -DECT features & characteristics, architecture.

UNIT II Mobile Computing Architecture

15 Hours

Wireless LANS: Wireless LAN Standards – IEEE 802 Protocol Architecture, IEEE 802.11 System Architecture, Protocol Architecture & Services, Cellular Networks: Channel allocation, multiple access, location management, Handoffs. MAC Layer & Management, Routing - Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Discovery.

UNIT III Introduction to Android

15 Hours

Introduction to Android Architecture: Introduction, History, Features and Android Architecture. Android Application Environment, SDK, Tools: Application Environment and Tools, Android SDK. Programming paradigms and Application Components - Part 1: Application Components, Activity, Manifest File, Programming paradigms and Application Components

UNIT IV User Interface Design

15 Hours

User Interface Design part 1: Views & View Groups, Views : Button, Text Field, Radio Button, Toggle Button, Checkbox, Spinner, Image View, Image switcher, Event Handling, Listeners, Layouts : Linear, Relative, List View, Grid View, Table View, Web View, Adapters. User Interface Design part 2: Menus, Action Bars, Notifications : Status, Toasts and Dialogs, Styles and Themes, Creating Custom Widgets, Focus, Touch Mode, Screen Orientation.

Text Books:

1. Asoke K. Talukder, Hasan Ahmad, Mobile Computing Technology- Application and Service Creation, 2nd Edition, McGraw Hill Education. (chapter 1 & 2)
2. Professional Android 4 Development by Reto Meier, John Wiley and Sons, 2012 .(Chapter 1, 2,3)

Reference Books:

1. Erik Hellman, “Android Programming – Pushing the Limits”, 1st Edition, Wiley India Pvt Ltd, 2014.
2. Dawn Griffiths and David Griffiths, “Head First Android Development”, 1st Edition, O’Reilly SPD Publishers, 2015.
3. J F DiMarzio, “Beginning Android Programming with Android Studio”, 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580 4. Anubhav Pradhan, Anil V Deshpande, “ Composing Mobile Apps” using Android, Wiley 2014, ISBN: 978-81-265-4660-2
4. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference”, Google Developer Training Team, 2017.

M19MS3022	Deep Learning Techniques	L	T	P	C
Duration: 45Hours		2	1	0	3

Course Objectives:

The objectives of this course are to:

- Illustrate the foundation of neural networks and deep learning.
- Formulate deep networks for different applications.
- Demonstrate different deep learning architectures.

- Validate deep learning techniques in object recognition and computer vision.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Describe deep learning and why it is essential to the design of intelligent machines.
- Design the deep networks for various real world applications.
- Acquire the knowledge in deep learning and be able to implement deep learning models for language, vision, speech, decision making and more.
- Discriminate different deep learning architectures.
- Assess the deep learning techniques in object recognition and computer vision.

Course Content:

UNIT I **15 Hours**
Foundations of Neural network and Deep Learning: Neural Networks: The biological Neuron- The perceptron-Multilayer feed forward networks. Training neural networks: Back propagation learning. Activation function: Linear-sigmoid- tanh-hard tanh-soft max-rectified linear. Loss functions: Loss function notation-loss function for regression-loss function for classification-loss function for reconstruction. Hyper parameters: Learning rate, regularization, momentum, sparsity.

UNIT II **15 Hours**
Fundamentals of Deep networks:Defining deep learning and deep networks- advantages in network architecture-from feature engineering to automated feature learning-common architecture principles of deep networks: Parameters-layers-activation function-loss function-optimization methods-hyper parameters. Building blocks of deep networks: RBMs-auto encoders- variational auto encoders.

UNIT III **15 Hours**
Major Architecture of Deep networks:Unsupervised pre trained networks: Deep belief networks-generative adversarial networks-convolutional neural networks (CNNs): Biological inspiration-intuition-CNN architecture overview-input layers-convolutional layers-pooling layers-fully connected layers-other applications of CNNs

UNIT IV **15 Hours**

Recurrent and recursive neural networks: Recurrent neural networks: Modelling the time dimension-3D volumetric input-general recurrent neural network architecture-LSTM networks-domain specific applications and blended networks. Recursive neural networks: Network architecture- varieties of recursive neural networks- Basic concepts in tuning deep networks and vectorization. Applications in object recognition and computer vision.

Text Books:

1. Josh Patterson and Adam Gibson, “Deep Learning A practitioners Approach”,Shroff publishers & Distributors, First edition 2017.(Chapter 2,3,4,6,7 & 8)

Reference Book:

1. Aurelian Geron, “Hands-On Machine Learning with Scikit-Learn & Tensor Flow”, Shroff publishers & Distributors, First edition, 2017.
2. Langoog fellow, Yoshuabengio and Aaron courville , “Deep Learning”, MIT press, First edition, 2016.
3. Li Deng and Dong Yu, “Deep LearningMethods and Applications”,Foundations and Trends *in Signal Processing*,2014.
4. Michael A. Nielsen, "Neural Networks and Deep Learning", Determination Press, 2015

Web sites:

1. www.deeplearning.net
2. www.deeplearning.stanford.edu
3. www.deeplearning.cs.toronto.edu

M19MS3031	Multivariate Methods for data Analysis	L	T	P	C
Duration: 45 Hours		2	0	1	3

Course Objectives:

The objectives of this course are to:

- Cover differential, integral and vector calculus for functions of more than one variable.
- Learn mathematical tools and methods are used extensively in the physical sciences, engineering, economics and computer graphic

Course Outcomes:

On successful completion of this course; the student will be able to:

- Apply Matrices and Vectors on free-body diagrams
- Construct free-body diagrams.
- Understand of the analysis of distributed contents.
- Integrate the mathematical model in various disciplines.

Course Content:

UNIT I

15 Hours

Matrices and Vectors: Matrices, Matrices Operations, Related Matrices, Determinants, Properties of Determinants, Solution of Linear System of Equations, Vectors, Scalar or Dot Product, Vector or Cross product, Scalar Product of Three Vectors, Vector Product of Three Vectors, Differentiation of Vectors, Velocity and Acceleration.

UNIT II

15Hours

Partial Differentiation and its Applications: Functions of Two or More Variable, Partial Derivatives, Homogeneous Functions, Total Derivative, Geometrical Interpretation, Taylor's Theorem for functions of Two Variables, Maxima and Minima of Functions of Two Variables, Lagrange's Method of Undetermined Multipliers. Scalar and Vector Point Functions, Del Applied to Scalar Point Functions – Gradient, Del applied Twice to Point Functions, Del Applied to Products of Point Functions.

UNIT III

15 Hours

Double Integrals and its Applications: Double Integrals, Change of Order of Integration, Double Integrals in Polar Coordinates; Area enclosed by Plane Curves, Integration of Vectors, Line Integral, Surface, Green's Theorem in the Plane, Stoke's Theorem.

UNIT IV

15 Hours

Triple Integrals and its Applications: Triple Integrals, Volumes of Solids, Change of Variables, Area of a Curved Surface, Calculation of Mass, Centre of Gravity, Centre of Pressure, Volume Integral, Green's Theorem, Irrotational Fields, Solenoidal Fields, Orthogonal Curvilinear Coordinates, Cylindrical Coordinates, Spherical Polar Coordinates.

Text Book:

1. B S Grewal, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2015, ISBN No: 978-81-7409-195-5

References:

1. Calculus, Early Transcendentals Plus New May Math Lab by William Briggs, Lyle Cochran, and Gillet Pearson, Addison-Wesley, 2014.
2. Edwards, Henry C., and David E. Penney, Multivariable Calculus. 6th ed. Lebanon, IN: Prentice Hall, 2002. ISBN: 9780130339676.

M19MS3032	Advanced Web Technologies	L	T	P	C
Duration: 45Hours		2	0	1	3

Course Objectives:

The objectives of this course are to:

- Introduce server-side Web technologies.
- Impart knowledge about the concepts, design and basic coding of advanced Web applications such as ASP, Perl, CGI and other server side technologies,
- Explain multimedia web; integrating basic database functions;
- Enable students to publish to multiple servers, XML, XSLT, SHTML, and Cascading Style Sheets may be utilized.

Course Outcomes:

On successful completion of this course; the student will be able to:

- Use and apply different web technologies: XML, DTD, XSLT, Xpath,, JavaScript, JSP and Servlets, PHP;
- Work on PHP/MySQL
- Develop Software using PHP/MySQL
- Apply the knowledge of establishing client/server communication.

Course Content:

UNIT I

15 Hours

Programming in Perl: Origins and uses of Perl, Scalars and their operations, Assignment statements and simple input and output, Control statements, Fundamentals of arrays, Hashes, References, Functions, Pattern matching, File input and output, Examples. CGI Scripting, Developing CGI Applications, Processing CGI, CGI.pm, CGI.pm methods, An Example, Adding Robustness, Carp, Cookies

UNIT II

15 Hours

Origins and uses of PHP, Overview of PHP, General syntactic characteristics, Primitives, operations and expressions, Output, Control statements, Arrays, Functions, Pattern matching, Form handling, Files, Building Web applications with PHP Tracking users, cookies, sessions, Using Databases, Handling XML.

UNIT III

15 Hours

Introduction to RUBY: Origins and uses of Ruby ,Scalar types and their operations ,Simple input and output, Control statements, Arrays, Hashes ,Methods, Classes, Code blocks and iterators ,Pattern matching ,Overview of Rails ,Document requests, processing forms , Rails applications with Databases, Layouts.

UNIT IV

15 Hours

Web Services : Web 2.0 and 3.0 ,Software as a Service (SaaS) ,Rich user experience, Social Networking .SOAP ,RPC style SOAP , Document style SOAP ,WSDL ,REST services, JSON format ,WAP Architecture – WAP stack. Online Applications and emerging technologies – Online Shopping – Online databases – Monitoring user event.

Textbooks:

1. Robert W. Sebesta, Programming the World Wide Web, Pearson Education 2008. [chapter 8,9,11]
2. Chris Bates: Web Programming Building Internet Applications 3rd edition Willey india 2009[chapter 10,11,13]

Reference Books:

1. Roy, Uttam K. Web Technologies. Oxford University Press, 2010.
2. Holzner, Steven. PHP: the complete reference. Tata McGraw-Hill Education, 2007.

LAB - Advanced Web programming

1. Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, CGI Revision etc.
2. Write a Perl program to accept UNIX command from a HTML form and to display the output of the command executed.
3. Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.
4. Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
5. Write a Perl program to display a digital clock which displays the current time of the server.
6. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.
7. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.
8. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
9. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.

M19MS3040	Digital Marketing	L	T	P	C
Duration: 60 Hours		4	0	0	4

Course Objectives:

- To develop industry background knowledge to knowledgeably navigate Internet Marketing topics including online advertising, search, social media, and online privacy.
- To evaluate an experiment quantitatively and qualitatively to measure the effectiveness of business decisions and online advertising effectiveness in particular.
- To design and implement an experiment.
- To apply best practices for social media marketing

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Assess the impact of digital technology on the practice of marketing.

- Analyze the use of different forms of digital marketing in the development of an online presence.
- Develop a plan for marketing a product of business online.
- Integrate social media tools into a marketing communications strategy.

Course Content:

UNIT I

15 Hours

Introduction To Digital Marketing:Start with the Customer and Work Backward, What Are the 3i Principles? **Search Engine Optimization (Seo):** An Introduction, Search Engine Result Pages: Positioning, Search Behavior, Goals, On-Page Optimization, Off-Page Optimization, Analyze.

UNIT II

15 Hours

Pay Per Click:An Introduction, Goals, Setup, Manage, Analyze. **Digital Display Advertising :**An Introduction, Display Advertising: An Industry Overview, Define, Format, Configure, Analyze

UNIT III

15 Hours

Email Marketing: An Introduction, Data—Email Marketing Process, Design and Content, Delivery, Discovery. **Mobile Marketing:**An Introduction, Opportunity, Optimize, Advertise, Analyze.

UNIT IV

15 Hours

Social Media Marketing (Smm):An Introduction, Goals, Channels, Implementation, Analyze, Laws and Guidelines

Text Books:

1. Ian Dodson—“ THE ART OF DIGITAL MARKETING : The Definitive Guide to Creating Strategic, Targeted and Measurable Online Campaigns”,1st Edition, Wiley Publications, 2016. (Chapters : 1, 2, 3, 4, 5, 6, 7, 8, 9).

Reference Books:

1. Damian Ryan – “UNDERSTANDING DIGITAL MARKETING : Marketing Strategies for engaging the digital generation” 4th Edition, Kogan Page, 2017.

2. Ryan Deiss and Russ Henneberry – “DIGITAL MARKETING : For Dummies “, , John Wiley & Sons, Inc, 2017.
3. Alan Charlesworth – “ DIGITAL MARKETING : A Practical Approach”, 2nd Edition, Routledge, 2009.

M19MS3050	SOFT SKILLS	L	T	P	C
Duration:30 Hours		2	0	0	2

Course Objectives:

Note: The students will have to undergo Skill Development course being conducted by UIIC & Training and Placement cell of the University.

M19MS3060	Minor Project	L	T	P	C
Duration: 90 Hours		3	0	3	6

Course Objectives:

To carry out the research under the guidance of supervisor and in the process learn the techniques of research.

Course Outcomes:

On successful completion of the project, the student shall be able to:

- Familiarize with literature search
- Conduct the experiments related to research and formulate computational techniques
- Interpret the primary data.
- Write report and defend the research findings.

Project:

Each student or a group of maximum of 3 students will choose the topic of research and work under the guidance of allocated faculty member. The project shall preferably be application oriented or industry need based that could be useful to the society. In case of industry need based project or R & D project, the student may opt co-supervisor from the concerned industry / research institution as the case may be. The student will have to make a preliminary survey of research done in broad area of his/her area of interest and decide on the topic in consultation with his/her supervisor(s). The project work floated should be completed within 16 weeks and project report has to be submitted within the stipulated date by the University/ within 18 weeks whichever is earlier. The student has to meet the concerned supervisor(s) frequently to seek guidance and also to produce the progress of the work being carried out. The student should also submit progress report during 5th week and 10th week of the beginning of the semester and final draft report with findings by 15th week. After the completion of the project the student shall submit project report in the form of dissertation on a specified date by the School.

M19MS3070	MOOC / SWAYAM	L	T	P	C
Duration: Hours		4	0	0	4

Course Objectives:

MOOC / SWAYAM Online Courses: Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses.

A student shall register and successfully complete any of the courses available on SWAYAM / MOOC. Student shall inform the MOOC / SWAYAM coordinator of the school about the course to which he/she has enrolled. The duration and credits of the course shall vary depending upon the agency offering MOOC / SWAYAM courses. The student should submit the certificate issued by the agency offering SWAYAM / MOOC courses to the Coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University.

FOURTH SEMESTER

Sl No	Course Code	Title of the Course	Credit Pattern L·T·P	Credits	Working Hrs
1	M19MS4010	Internship/ Certification	2:0:2	4	8
2	M19MS4020	Major Project	0:0:10	10	20
Total Credits			2:0:12	14	28

* **Note: 1.** Project Work and Dissertation will be mandatory of 10 Credits

2. The student can select either Internship or Certification Course for 4 Credits

Guide Lines

Project survey has to be completed and problem identification for the project must be done. Students must meet the guide and discuss with due PPT presentations at least two hours per Wk. and do the necessary ground work for Phase II devoting at least 6 hours per Wk..

- The project should be inter disciplinary
- Team size should be of max *one* members
- Use any version control software
- Project should be of Research Based
- Proper and meaningful reports should be generated by making use of latest reporting tools
- Project report should follow standard template with the following contents:
 - a) Abstract
 - b) Introduction to project
 - c) Literature Review
 - d) Basic Diagrams like (DFD, ER, Class diagram, etc..)
 - e) Methodology
 - f) Result Analysis
 - g) Concussion
 - h) Future enhancement
 - i) Bibliography
- project reports should be submitted for evaluation

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play

11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improves their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Computer Science is not only knowledge in the subject, but also the skills to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and March forward to make better career. The School of Computer Science and Applications also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other

unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

Programme Regulations

Summary of REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Post Graduate Degree Program

1.0 Teaching and Learning Process

The teaching and learning process under CBCS-CAGP of education in each course of study will have three components, namely-

(i) L= Lecture (ii) T= Tutorial (iii) P= Practice, where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / self-study/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session and it consists of Hands on Experience / Laboratory Experiments / Field Studies / Case Studies that equip students to acquire the much required skill component.

2.0. A course shall have either or all the three components. That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

2.1. Various course of study are labeled and defined as: (i) Core Course (CC) (ii) Hard Core Course (HC), (iii) Soft Core Course (SC), (iv) Foundation Core Course (FC) and (v) Open Elective Course (OE).

(i) **Core Course:** A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course.

(ii) **Foundation Course (FC):**

The foundation Course is a core course which should be completed successfully as a part of graduate degree program irrespective of the branch of study.

(iii) **Hard Core Course (HC):**

The **Hard Core Course** is a Core Course in the main branch of study and related branch (es) of study, if any that the candidates have to complete compulsorily.

(iv) **Soft Core Course (SC):**

A Core course may be a **Soft Core** if there is a choice or an option for the candidate to choose a course from a pool of courses from the main branch of study or from a sister/related branch of study which supports the main branch of study.

(v) **Open Elective Course:**

An elective course chosen generally from other discipline / subject, with an intention to seek exposure is called an **Open Elective Course**.

2.2. Project Work:

Project work is a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem.

2.3. Minor Project:

A project work up to **Six to Eight credits** is called **Minor Project** work. A Minor Project work may be a hard core or a Soft Core as decided by the BOS / concerned.

2.4. Major Project / Dissertation:

A project work of **EIGHT, TEN, TWELVE, SIXTEEN or TWENTY** credits is called **Major Project** work. The Major Project / Dissertation shall be Hard Core.

3.0. Minimum Credits to be earned:

3.1. A candidate has to earn 96 credits for successful completion of M.S in Computer Science degree with a distribution of credits for different courses as prescribed by the university.

3.2. A candidate can enroll for a maximum of 32 credits per Semester. However he / she may not successfully earn a maximum of 32 credits per semester. This maximum of 32 credits does not include the credits of courses carried forward by a candidate.

3.3. Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to IV semester and complete successfully 96 credits in 4 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full time students and for hostel facilities.

4.0. Add- on Proficiency Certification:

In excess to the minimum of 96 credits for the M.S in Computer Science program, a candidate can opt to complete a minimum of 4 extra credits either in the same discipline/subject or in different discipline / subject to acquire **Add on Proficiency Certification** in that particular discipline / subject along with the M.S in Computer Science / MS in Computer Science (with Specialization in Data Science and Analytics) degree.

4.1. Add on Proficiency Diploma:

In excess to the minimum of 96 credits for the M.S in Computer Science program, a candidate can opt to complete a minimum of 18 extra credits either in the same discipline/subject or in different discipline / subject to acquire Add on Proficiency Diploma in that particular discipline / subject along with the M.S in Computer Science / MS in Computer Science (with Specialization in Data Science and Analytics). The **Add -on Proficiency Certification / Diploma** so issued to the candidate contains the courses studied and grades earned.

5. Scheme of Assessment & Evaluation

5.1. The Scheme of Assessment and Evaluation will have **TWO PARTS**, namely;

- i. Internal Assessment (IA); and
- ii. Semester End Examination (SEE)

5.2. Assessment and Evaluation of each Course shall be for 100 marks. The Internal Assessment (IA) and Semester End Examination (SEE) of PG programs shall carry 50 marks each (i.e., 50 marks internal assessment; 50 marks semester end examination).

5.3. The 50 marks of Internal Assessment (IA) shall comprise of:

Internal Test	= 30 marks
Assignments	= 10 marks
Seminars	= 10 marks

5.4. There shall be **three internal tests** conducted as per the schedule given below. **The students have to attend all the three tests compulsorily.**

- **1st test** for 15 marks during **2nd part of the 6th week** of the beginning of the Semester;
- **2nd test** for 15 marks during **2nd part of the 13th week** of the beginning of the Semester; and
- **3rd test** for 15 marks during **2nd part of the 16th week** of the beginning of the Semester.

5.5. The coverage of syllabus for the said three tests shall be as under:

- For the **1st test** the syllabus shall be **First Unit and 1st half of Second Unit** of the Course;
- For the **2nd test** it shall be **Second half of Second Unit and Third Unit** of the Course;
- For the **3rd test** the syllabus will be **Fourth Unit** of the Course.

5.6. **Out of 3 tests, the highest marks secured in two tests are automatically considered while assessing the performance of the students.**

5.7. There shall be two Assignments and two Seminars each carrying 5 marks. Hence two assignments carry 10 marks (5+5 marks) and two seminars carry 10 marks (5+5 marks) as stated at Sl.No.5.3 above. In place of assignments and seminars, there shall be model designs or some task based activity wherein the number of designs/ activity the marks each design / activity carries shall be

decided by the respective School Board. However such decision shall be done well in advance and it should be announced before commencement of the Semester after communicating the same to the Registrar and Registrar (Evaluation) to avoid ambiguity and confusion among students and faculty members.

5.8. The Semester End Examination for 50 marks shall be held during 19th and 20th week of the beginning of the semester and **the syllabus for the semester end examination shall be entire 4 units.**

5.9. **The duration of the internal test shall be 75 minutes and for semester end examination the duration shall be 3 hours.**

5.10. There shall be double evaluation, viz, first valuation by the internal teachers who have taught the subject and second evaluation shall be the external examiner.

5.11. The average of the two evaluations (internal examiner & external examiner) shall be the marks to be considered for declaration of results.

Summary of Continuous Assessment and Evaluation Schedule

Type of Assessment	Period	Syllabus	Marks	Activity
Allocation of Topics for Assignments / Seminars / Model Design	Beginning of 5 th Week	First Unit and Second Unit		Instructional process and Continuous Assessment
First Internal Test	Second Part of 6 th Week	First Unit and 1 st half of Second Unit	15	Consolidation of First Unit and 1 st half of Second Unit
Submission of Assignments/ Model Design	8 th Week	First Unit and Second Unit	5	Instructional process and Continuous Assessment
Seminars	9 th Week	First Unit and Second Unit	5	Instructional process and Continuous Assessment
Second Internal Test	2 nd Part of 13 th Week	2 nd half of Second Unit and Third Unit	15	Consolidation of 2 nd half of Second Unit and Third Unit
Allocation of	11 th	Third Unit		Instructional

Topic for 2nd Assignment / Seminars	Week	and Fourth Unit		process and Continuous Assessment
Submission of Assignments/ Model Design	13 th Week	Third Unit and Fourth Unit	5	Instructional process and Continuous Assessment
Seminars	14 th Week	Third Unit and Fourth Unit	5	Instructional process and Continuous Assessment
Third Internal Test	2 nd Part of 16 th Week	Fourth Unit	15	Consolidation of entire Fourth Unit
Semester End Practical Examination	17 th & 18 th Week	Entire Syllabus	50	Conduct of Semester - end Practical Exams
Preparation for Semester–End Exam	17 th & 18 th Week	Entire Syllabus		Revision and preparation for semester–end exam
Semester End Theory Examination	19 th and 20 th Week	Entire Syllabus	50	Evaluation and Tabulation
	End of 21 st Week			Notification of Final Grades

Note:

1. *As per the model making is concerned, the School shall decide about the Marks and the Number of Model Designs and as well the schedule of allocation and presentation of model design(s). If the model design carries 5 marks, there shall be two model designs; and in case of 10 marks, there shall be one model design. However, the decision of the School should be announced in the beginning of the Semester for students to avoid ambiguity and confusion.

2. Examination and Evaluation shall take place concurrently and Final Grades shall be announced latest by 5 day after completion of the examination.

1. Practical examination wherever applicable shall be conducted after 3rd test and before semester end examination. The calendar of practical examination shall be decided by

the respective School Boards and communicated well in advance to the Registrar (Evaluation) who will notify the same immediately.

6. Assessment of Performance in Practicals

6.1. The performance in the practice tasks / experiments shall be assessed on the basis of:

- a) Knowledge of relevant processes;
- b) Skills and operations involved;
- c) Results / products including calculation and reporting

6.2. The 50 marks meant for continuous assessment of the performance in carrying out practical shall further be allocated as under:

i	Conduction of regular practical / experiments throughout the semester	20 marks
ii	Maintenance of lab records	10 marks
iii	Performance of mid-term test (to be conducted while conducting second test for theory courses); the performance assessments of the mid-term test includes performance in the conduction of experiment and write up about the experiment.	20 marks
Total		50 marks

6.3. The 50 marks meant for Semester End Examination, shall be allocated as under:

i	Conduction of semester end practical examination	30 marks
ii	Write up about the experiment / practical conducted	10 marks
iii	Viva Voce	10 marks
Total		50 marks

6.4. The duration for semester-end practical examination shall be decided by the concerned School Board.

7. Evaluation of Minor Project / Major Project / Dissertation:

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the supervisor. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

i	Periodic Progress and Progress Reports (25%)
ii	Results of Work and Draft Report (25%)
iii	Final Evaluation and Viva-Voce (50%). Evaluation of the report is for 30% and the Viva-Voce examination is for 20%.

8. Provision for Appeal

If a candidate is not satisfied with the evaluation of Internal Assessment components (Mid-term Tests and Assignments), he/she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of respective semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the grievance cell is final.

For every program there will be one grievance cell. The composition of the grievance cell is as follows:-

- The Registrar (Evaluation) - Ex-officio Chairman / Convener
- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department/discipline and/or from the sister schools / departments/sister disciplines – Member.
- One Senior Faculty Members / Subject Experts drawn from outside the University school / department – Member

9.0 Eligibility to Appear for Semester - end Examination.

Only those students who fulfill a minimum of 75% of attendance in aggregate of all courses including practical courses / field visits etc, as part of the program shall be eligible to appear for Semester End Examination.

10. Requirements to Pass a Course / Semester and Provision to Drop / withdraw Course

10.1 Requirements to Pass a Course

A candidate's performance from IA and SEE will be in terms of scores, and the sum of IA and SEE scores will be for a maximum of 100 marks (IA = 50 + SEE = 50) and have to secure a minimum of 40% to declare pass in the course. However, a candidate has to secure a minimum of 25% (12 marks) in Semester End Examination (SEE) which is compulsory.

10.2. Requirements to Pass a Semester

To pass the semester, a candidate has to secure minimum of 40% marks in each subject / course of study prescribed in that semester.

10.3. Provision to Carry Forward the Failed Subjects / Courses:

A student who has failed in a given number of courses in odd and even semesters shall move to next semester of immediate succeeding year and final year of the study. However, he / she shall have to clear all courses of all semesters within the double duration, i. e., within **four years** of admission of the first semester failing which the student has to re-register to the entire program.

10.4. Provision to Withdraw Course:

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is Soft Core Course or Open Elective Course.

A DROPPED course is automatically considered as a course withdrawn.

1. Re-Registration and Re-Admission:

11.1. A candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University and is considered as dropped the semester and is not allowed to appear for Semester End Examination (SEE) shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

11.2 In such a case where in a candidate drops all the courses in a semester due to personal reasons, it is considered that the candidate has dropped the semester and he / she shall seek re-admission to such dropped semester.

2. Attendance Requirement:

a. All students must attend every lecture, tutorial and practical classes.

b. In case a student is on approved leave of absence (e g:- representing the university in

sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.

- c. Any student with less than 75% of attendance in a course in aggregate during a semester shall not be permitted to appear to the end semester (SEE) examination.
- d. Teachers offering the courses will place the above details in the School / Department meeting during the last week of the semester, before the commencement of SEE, and subsequently a notification pertaining to the above will be brought out by the Head of the School before the commencement of SEE examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).
- e. **Absence during Internal Test:**

In case a student has been absent from a internal test due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Head of the School, for conducting a separate internal test. The Head of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and arrange to conduct a special internal test for such candidate(s) well in advance before the Semester End Examination of that respective semester. Under no circumstances internal tests shall be held / assignments are accepted after Semester End Examination.

3. The Grade and the Grade Point:

The Grade and the Grade Point earned by the candidate in the subject will be as given below.

Marks P	Grade G	Grade Point (GP=V x G)	Letter Grade
90 > 100	10	v*10	O
80 > 90	9	v*9	A+
70 > 80	8	v*8	A
60 > 70	7	v*7	B+
55 > 60	6	v*6	B
50 > 55	5.5	V*5.5	C+
40 > 50	5	v*5	C
0-40	0	v*0	F
ABSENT			AB

O - Outstanding; A+-Excellent; A-Very Good; B+-Good; B-Above Average; C+-Average; C-Satisfactory; F – Unsatisfactory.

Here, P is the percentage of marks ($P=[IA + SEE]$) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the grade point.

4. **Provisional Grade Card:**

The tentative / provisional Grade Card will be issued by the Registrar (Evaluation) at the end of every Semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average (SGPA)**. This statement will not contain the list of DROPPED / WITHDRAWN courses.

14.1 Computation of SGPA

The Following procedure to compute the Semester Grade Point Average (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e : **SGPA (Si) = $\sum(C_i \times G_i) / \sum C_i$** where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

Illustration for Computation of SGPA

Illustration No. 1

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A+	9	4X9=36
Course 2	4	O	10	4X10=40
Course 3	3	B+	7	3X7=21
Course 4	3	O	10	3X10=30
Course 5	3	A	8	3X8=24
Course 6	3	B	6	3X6=18
Course 7	2	O	10	2X10=20
Course 8	2	A	8	2X8=16
	24			205

Thus, $SGPA = 205 \div 24 = 8.54$

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	O	10	4X10=40
Course 2	4	A+	9	4X9=36
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	A	8	3X8=24
Course 7	2	B+	7	2X7=14
Course 8	2	O	10	2X10=20
	24			200

Thus, $SGPA = 200 \div 24 = 8.33$

15. Challenge Valuation:

A student who desires to apply for challenge valuation shall obtain a Xerox copy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the Grade awarded to him/her by surrendering the Grade Card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 10 days after the announcement of the results. **This challenge valuation is only for Semester End Examination (SEE) component.**

- b. The answer scripts for which challenge valuation is sought for shall be evaluated by another external examiner (third examiner) who has not involved in the first evaluation. The higher of two marks from the average of first two valuations and challenge valuation shall be the final.**

16. Final Grade Card:

Upon successful completion of M.S in Computer Science / M.S in Computer Science with Specialization in Data Science and Analytics degree a Final Grade card consisting of Grades / CGPA of all courses successfully completed by the candidate shall be issued by the Registrar (Evaluation).

16.1.Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for M.S in Computer Science / M.S in Computer Science with Specialization in Data Science and Analytics degree is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e

CGPA = $\sum(C_i \times S_i) / \sum C_i$ Where S_i is the SGPA of the i^{th} semester and C_i is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration:

CGPA after Final Semester

Semester (i th)	No. of Credits (C _i)	SGPA (S _i)	Credits x SGPA (C _i X S _i)
1	24	8.33	24 x 8.33 = 199.92
2	24	8.54	24 x 8.54 = 204.96
3	24	9.35	24x9.35 = 224.4
4	24	9.50	24x9.50 = 228.0
Cumulative	96		857.28

Thus, **CGPA** = $\frac{24 \times 8.33 + 24 \times 8.54 + 24 \times 9.35 + 24 \times 9.50}{96} = 8.93$

CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Illustration: CGPA Earned 8.93 x 10=89.30

17. Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows.

CGPA	Grade (Numerical Index)	Letter Grade	Performance	FGP
	G			Qualitative Index
9 >= CGPA 10	10	O	Outstanding	Distinction
8 >= CGPA < 9	9	A+	Excellent	
7 >= CGPA < 8	8	A	Very Good	First Class

$6 \geq \text{CGPA} < 7$	7	B+	Good	Second Class
$5.5 \geq \text{CGPA} < 6$	6	B	Above average	
$> 5 \text{ CGPA} < 5.5$	5.5	C+	Average	
$> 4 \text{ CGPA} < 5$	5	C	Satisfactory	Pass

Overall percentage=10*CGPA

18. With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

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10 YEARS
OF UNIVERSITY
RECOGNITION
20 YEARS OF
ACADEMIC
EXCELLENCE



REVA
UNIVERSITY
Bengaluru, India

**(School of Applied Sciences)
M.Sc. Biochemistry
HANDBOOK
2019**

**Rukmini Knowledge Park
Kattigenahalli, Yelahanka, Bengaluru – 560064
Phone No: +91-080-46966966, Fax: 080-28478539
www.reva.edu.in**

**Rukmini Educational
Charitable Trust**



SCHOOL OF APPLIED SCIENCES

M.Sc. Biochemistry Syllabus

With effect from 2019

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bangalore - 560 064
Phone No: +91-080-46966966, Fax: 080-28478539

Rukmini Educational
Charitable Trust

www.reva.edu.in

Chancellor's Message

“Education is the most powerful weapon which you can use to change the world.”

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when ‘intellectual gratification’ has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.



It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of ‘Knowledge is Power’, we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I’m always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centred and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said ‘A University should be a place of light, of liberty and of learning’. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr.P.Shyama Raju

The Founder and Hon'ble Chancellor
REVA University

Vice-Chancellor's Message



The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards interdisciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.

A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavour to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

MESSAGE FROM THE DIRECTOR FACULTY OF SCIENCE & TECHNOLOGY

The curriculum of an Institution of higher learning is a living entity. It evolves with time, reflects the ever changing needs of the society and keeps pace with the growing talent of the students and the faculty. The curriculum of the M.Sc. Biochemistry program of REVA University is no exception. An experience of a decade in preparing graduates and postgraduates in engineering, architecture, law, commerce and science for a wide variety of industries & research organizations has led to creation of the new curriculum. I sincerely believe that it will meet the aspirations of all stake holders – students, faculty and the employers of REVA University. The curriculum has been designed in such a way that the teacher enjoys freedom to expand it in any direction he feels appropriate and incorporates the latest knowledge and stimulates the creative minds of the students. There is also provision for new experiments with new contents and new techniques. This is going to lead to new teaching – learning paradigm with experiential, experimental & industry relevant approaches. The present curriculum is contemporary because it is culmination of efforts of large number of faculty members, experts from industries and research level organizations. An effort of benchmarking this curriculum with curriculum of other institutions of repute like NITs and IITs has been done.

The curriculum caters to and has relevance to local, regional, national, global developmental needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

I am very sure that all students of REVA University enjoy this curriculum and take fullest advantage to expose themselves to fundamentals and applications. Also, imbibe all attributes that are required to term them as Global Engineers. The innovativeness and creativity being introduced should be explored fully by our students.

The flexibility in the curriculum permits staff and students to incorporate changes in terms of addition of new courses and deletion of irrelevant courses keeping the rapid advances in the technology into consideration.

I also record my personal gratitude to Chancellor, Vice-Chancellor and members of Academic Council who have lent every bit of their wisdom to make this curriculum truly superior.

Dr. N. Ramesh
Director, Faculty of Science and Technology

PREFACE

M.Sc Biochemistry conceived by REVA University is an intensive intellectually challenging programme intended to provide students the deeper knowledge in Biochemistry in general and Applied Biochemistry in particular. It also facilitates students to acquire many transposable skills, gain research and industrial experience in contemporary Biochemistry. The curriculum apart from important Hard Core courses covers good number of specialized courses as electives in the areas of Bioinformatics, Food Technology, Pharmacovigilance and SAS, Clinical Biochemistry and Diagnostics, and Plant & Industry Biochemistry. The short term training in industries / R & D institutions, Internships, Student Projects in Biochemistry, Clinical Research, SAS, Clinical Diagnostics provide opportunity for the students to choose and acquire in-depth knowledge and skills in their area of interest.

The students may also choose fast track learning and acquire additional Proficiency Certificate or Diploma in addition to the curriculum. Interactions with Industries, Diagnostic Laboratories, and Research Institutes are achieved through industrial visits, internships, training in industries and research labs in R & D institutions. To ensure this the University has established collaborations and entered into MOUs with various industries and research institutions. To mention a few:

- FRLHT-The Trans disciplinary University
- CIMAP- CSIR Laboratory
- CIFT & other Central Institutes
- Himalaya Drug Company
- Clinical Research Institutes

These initiatives would not only broaden the exposure of the students but also help them to acquire deeper knowledge and better skills. The students thus will have greater opportunities of employment in reputed Chemical, Biological, Healthcare, Pharmaceutical, Agriculture, Petrochemicals, Cosmetics, Food Industries, Clinical data management industries and Diagnostic Laboratories. They will also have better opportunities to join as research scholars in different R & D institutions within the country and abroad.

I am sure the students choosing MSc Biochemistry at REVA University will enjoy the curriculum, teaching and learning environment, the vast infrastructure and the experienced teachers involvement and guidance. We will strive to provide all needed comfort and congenial environment for their studies. I wish all students a pleasant stay at REVA and grand success in their career.

Prof. Jayashree. S
Head, M Sc Biochemistry Program

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. **Rukmini Educational Charitable Trust** (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7thFebruary, 2013. The University is empowered by UGC to award degrees any branch of knowledge under Sec.22 of the UGC Act. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 24 Post Graduate Degree programs, 18 Degree and PG Degree programs in various branches of studies and has 14000+ students studying in various branches of knowledge at graduate and post graduate level and 331 Scholars pursuing research leading to PhD in 18 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities

to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano-Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counsellors and Placement Officers.

The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher-scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director IISc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **‘Life Time Achievement Award’** to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the **“Founders’ Day Celebration”** of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first “REVA Life Time Achievement Award” for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced **“REVA Award of Excellence”** in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organises various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVA Cultural Fest organised every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognised by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes everyday to students, faculty members, administrative staff and their family members and organises yoga camps for villagers around.

Recognizing the fast growth of the university and its quality in imparting higher education, the BERG (Business Excellence and Research Group), Singapore has awarded BERG Education Award 2015 to REVA University under Private Universities category. The University has also been honoured with many more such honors and recognitions.

ABOUT SCHOOL OF APPLIED SCIENCES

The School of Applied Sciences offers graduate and post graduate programs in Biotechnology, Biochemistry, Chemistry, Physics and Mathematics which are incredibly fascinating. It aims to attract talented youth and train them to acquire knowledge and skills useful to industrial sectors, research laboratories, and educational institutions. The School presently offers M.Sc. degree programs in Bio-Chemistry, Bio-Technology, Chemistry, Physics, Mathematics and B Sc with various combinations viz, Physics Chemistry and Mathematics, Mathematics , Physics and Statistics, Mathematics Statistics and Computer Science, and Biology Mathematics & Computer Science and also Post Graduate Diploma in Clinical Research Management. The School also facilitates research leading to PhD in Biotechnology, Biochemistry, Physics, Chemistry, Mathematics and related areas of study.

The School of Applied Sciences is shouldered by well qualified, experienced and highly committed faculty. The state-of-the-art infrastructure digital classrooms, well equipped laboratories, conference rooms and the serene academic atmosphere at REVA University will enhance the transfer as well as creation of knowledge. The school provides an interactive, collaborative peer tutoring environment that encourages students to break down complex problems and develop strategies for finding solutions across a variety of situations and disciplines. The school aims to develop a learning community of critical thinkers who serves as models of innovative problems solving in the university environment to enrich their academic and professional careers.

Vision

To nurture intellect, creativity, character and professionalism among students and impart contemporary knowledge in various branches of Chemical, Biological, Physical and Mathematical Sciences that are socially relevant and transform them to become global citizens.

Mission

To achieve excellence in studies and research through pedagogy and support interface between industry and academia

VALUES

- Excellence in all our academic and research endeavours
- Dedication and service to our stakeholders
- Leadership through innovation
- Accountability and transparency
- Creating conducive academic environment with service motto
- Integrity and intellectual honesty
- Ethical and moral behaviour
- Freedom of thought and expression
- Adaptability to the change
- Team-work

“The constant questioning of our values and achievements is a challenge without which neither science nor society can remain healthy”

— **Aage Niels Bohr**

Advisory Board

Sl. No.	Members	Designation
1	Dr.N.Ramesh Dean, Faculty of Science and Technology REVA University Email: dir.planning@reva.edu.in	Chairperson
2	Dr. U.V Babu Head- Phytochemistry, Research and Development, Himalaya Drug Company. Bengaluru Email: dr.babu@himalayawellness.com	Member
3	Dr. Arumugam Muruganandam Managing Director & CEO Affigenix Bio Solutions Email: radhasanand@gmail.com .	Member
4	Dr. Senthil Duraisamy Managing Director PharmaGenica Healthcare Pvt Ltd Email: senthildu@gmail.com	Member
5	Dr. Renuka Srihari, Professor, Department of Biochemistry, MLACW, Bangalore Email: rsh1_thesis@rediffmail.com	Member
6	Prof.Jayashree.S Professor & Head School of Chemical and Biological Science REVA University Email: jayashrees@reva.edu.in	Member
7	Dr. Veeraraghavan Professor , School of Chemical and Biological Science, REVA University Email: veeraraghavan@reva.edu.in	Member

M.Sc (Biochemistry)

Programme Overview

Biochemistry explores the chemical processes within and related to living organisms. The subject focuses on processes happening at a molecular level. It focuses on what's happening inside our cells by studying components like proteins, lipids and organelles. It also looks at how cells communicate with each other, for example during growth or fighting illness. Biochemists need to understand how the structure of a molecule relates to its function, allowing them to predict how molecules will interact. By using chemical knowledge and techniques, biochemists can understand and solve biological problems

Biochemistry covers a range of scientific disciplines, including genetics, microbiology, forensics, plant science and medicine. Because of its breadth, biochemistry is very important and advances in this field of science over the past 100 years have been staggering. It's a very exciting time to be part of this fascinating area of study.

Biochemists find opportunities in Hospitals, Universities, Agriculture, Food institutes/organisations, Cosmetics, Forensic crime research, Drug discovery and development, and many other sectors.

In India, the hospital, pharmaceutical, food processing and agricultural sectors are all growing at a significant rate and development of biotech industries is being given prime importance by the Government of India to make it \$100 billion industry by 2025, creating greater opportunities for Biochemists.

In this context, University Programme in Biochemistry at postgraduate level in India remains relevant for the creation of trained human resources.

M. Sc. (Biochemistry) at REVA UNIVERSITY has been designed to meet the human resources needs of existing and futuristic biotech industries and biotech research organizations involved in pharmaceuticals, food processing, agriculture, biomedical devices development; academic institutions and hospitals. The programme is designed to produce graduates with higher order critical, analytical, problem solving and research skills; ability to think rigorously and independently to meet higher level expectations of biotech industries, research organizations, hospitals and academic institutions. The programme in addition to core courses covers a number of specialized electives in the areas of Bioinformatics, Food Technology, Pharmacovigilance and SAS, Clinical Biochemistry and Diagnostics, and Plant & Industrial Biochemistry. The short term training in industries / R & D institutions, Internships, Student Projects in Biochemistry, Clinical Research, SAS and Clinical Diagnostics provide opportunity for the students to choose and acquire in-depth knowledge and skills in their area of interest.

Programme Educational Objectives (PEOs)

The aim of the programme is to produce postgraduates with - advanced knowledge and understanding of biochemistry; higher order critical, analytical, problem solving and attitudinal skills (transferable) to meet expectations of hospitals, biotech industry involving biochemical reactions, academia, and research institutions or to take up entrepreneurial route. Hence,

The Programme Educational objectives are to prepare the students to:

1. Develop critical, analytical, problem solving and research skills in biochemistry
2. Provide new ideas and experiments to understand how life works
3. Enhance the understanding of health and disease and contribute to the development of new solutions for better health of the world
4. Work alongside chemists, physicists, healthcare professionals, policy makers, engineers and many more professionals
5. Work as techno managers, academicians, administrator or entrepreneurs with strong ethics and communication skills
6. Pursue higher education and research in reputed institutes at national and international level
7. Aware of environmental and legal Issues, and government regulations
8. Adopt lifelong learning for continuous improvement

Programme Outcomes (POs)

After undergoing this programme, a student will be able to:

1. Describe biochemical reactions and processes
2. Explain the effects of biochemical reactions, processes and address safety and ethical issues
3. Propose chemicals, processes and optimize process parameters for effective and safe biochemical reactions
4. Use modern tools and techniques for the design, analysis and synthesis of new biochemical
5. Instrument and Perform physical experiments for testing and evaluation of biochemical
6. Operate and monitor performance of machines and systems used in development and testing of biochemical and interpret results
7. Conduct research under supervision
8. Choose appropriate online programmes for further learning, participate in seminars and conferences
9. Manage information, develop technical reports and make presentations
10. Lead a team to successfully complete a project and communicate across teams and set up his/her own enterprise

REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Postgraduate Degree programs- 2019

(Framed as per the provisions under Section 35 (ii), Section 7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

1. Title and Commencement:

1.1. These Regulations shall be called the “**REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Post Graduate Degree Programs- 2019**”.

1.2. These Regulations shall come into force from the date of assent of the Chancellor.

2. The Programs:

The following programs and all Graduate Degree programs to be instituted and introduced in REVA University in coming years shall follow these regulations.

M. Sc in:

Biochemistry
Biotechnology
Chemistry
Physics
Mathematics

3. Definitions:

Course: Every course offered will have three components associated with the teaching-learning process of the course, namely:

(i) L= Lecture (ii) T= Tutorial (iii) P=Practice; where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / selfstudy/ desk work/ brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session and it consists of Hands on Experience / Laboratory Experiments /

Field Studies / Case Studies that equip students to acquire the much-required skill component.

4. Courses of study and Credits

4.1. The study of various subjects in M. Sc., degree program is grouped under various courses. Each of these course carries credits which are based on the number of hours of teaching and learning.

4.1.1. In terms of credits, every **one-hour session of L amounts to 1 credit per Semester.**

In terms of credits, every **one-hour session of L amounts to 1 credit per Semester** and a minimum of **two-hour session of T or P amounts to 1 credit per Semester** over a period of one Semester of 16 weeks for teaching-learning process.

4.1.2. **The total duration of a semester is 20 weeks inclusive of semester-end examination.**

4.1.3. **A course shall have either or all the four components.** That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

4.1.4. *The concerned BOS will assign Credit Pattern for every course based on the requirement. However, generally, courses can be assigned with 1-4 Credits depending on the size of the course.*

4.1.5. Different **Courses of Study** are labelled and defined as follows:

Core Course:

A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course. The CORE courses of Study are of THREE types, viz – (i) Hard Core Course, and (ii) Soft Core Course.

a. Hard Core Course (HC):

The **Hard-Core Course** is a Core Course in the main branch of study and related branch(es) of study, if any that the candidates have to complete compulsorily.

b. Soft Core Course (SC):

A Core course may be a **Soft Core** if there is a choice or an option for the candidate to choose a course from a pool of courses from the main branch of study or from a sister/related branch of study which supports the main branch of study.

c. Open Elective Course:

An elective course chosen generally from other discipline / subject, with an intention to seek exposure to the basics of subjects other than the main discipline the student is studying is called an **Open Elective Course**.

d. Project Work / Dissertation:

Project work / Dissertation work is a special course involving application of knowledge in solving / analysing /exploring a real-life situation / difficult problem. A project work carrying **FOUR or SIX** credits is called **Minor Project** work / **Dissertation**. A project work of **EIGHT, TEN, TWELVE or SIXTEEN** credits is called **Major Project** work / **Dissertation**. A **Project work** may be a **hard core** or a **Soft Core** as decided by the **BoS / concerned**.

5. Eligibility for Admission:

Bachelor's degree of 3 years with Biochemistry, Chemistry, Microbiology, Agriculture Sciences, Animal Sciences, Medical Laboratory Technology (B. Sc. MLT), Life Sciences as Biochemistry as principal or subsidiary subject with 45% (40% in case of SC/ST) of marks in aggregate from any recognized University/ Institution or eligible for admission to the program.

6. Scheme, Duration and Medium of Instructions:

6.1. M.Sc., degree program is of 4 semesters - 2 years duration. A candidate can avail a maximum of 6 semesters (3 years) including blank semesters, if any to successfully complete M. Sc. degree. Whenever a candidate opts for blank semester, he/she has to study the prevailing courses offered by the School when he/she resumes his/her studies.

6.2. The medium of instruction shall be English.

7. Credits and Credit Distribution

7.1. A candidate has to earn 96 credits for successful completion of Two-Year Postgraduate degree with a distribution of credits for different courses as given in Table - 1 given below:

Table-1

Credits and Credit Distribution for Two Year Post Graduate degree programs

Course Type	Credits for Two Year (4 Semesters) Post Graduate Degree Programs
Hard Core Course	80
Soft Core Course	6
Open Elective	4
RULO	6
Total	96

7.2. The concerned BOS based on the credits distribution pattern given above shall prescribe the credits to various types of courses and shall assign title to every course including project work, practical work, field work, self-study elective, as **Hard Core (HC) or Soft Core (SC) or Open Elective (OE)**.

7.3. Every course including project work, practical work, field work, self-study elective should be entitled as Hard Core (HC) or Soft Core (SC) or Open Elective (OE) by the BoS concerned.

However, following shall be the

RULO (REVA Unique Learning Offering) courses with credits mentioned against them, common to all branches of study. However, the BOS of respective program/discipline shall decide about the total credits for RULO courses.

Sl. No.	Course Title	Number of Credits
1	Sports/Yoga/Music/Dance/Theatre	2
2	SWAYAM/MOOC/Coursera/Soft Skill/Short term training	4
	Total	6

7.4. The concerned BOS shall specify the desired Program Objectives, Program Educational Objectives, Program Specific Outcomes and Course Outcomes while preparing the curriculum of a particular program.

7.5. A candidate can enrol for a maximum of 28 credits and a minimum of 16 credits per Semester. However, he / she may not successfully earn a maximum of 28 credits per semester. This maximum credit does not include the credits of courses carried forward by a candidate.

7.6. Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to IV semester and complete successfully 96 credits in 4 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full time students and for hostel facilities.

8. Add-on Proficiency Certification / Diploma:

8.1 Add- on Proficiency Certification:

To acquire Add on Proficiency Certification a candidate can opt to complete a minimum of 4 extra credits either in the same discipline /subject or in different discipline / subject in excess to 96 credits for the Two Year Post Graduate degree programs.

8.2 Add on Proficiency Diploma:

To acquire Add on Proficiency Diploma, a candidate can opt to complete a minimum of 8 extra credits either in the same discipline /subject or in different discipline / subject in excess to 96 credits for the Two Year Post Graduate degree programs.

The Add on Proficiency Certification / Diploma so issued to the candidate contains the courses studied and grades earned.

9. Assessment and Evaluation

- a) Each course is assessed for a total weight of 100%. Out of the total 100% weight; 50% weight is for Continuous Internal Assessment (CIA or IA) and the remaining 50% for the Semester End Examination (SEE). This applicable for theory, laboratory, workshop, studio and any such courses
- b) Out of 50% weight earmarked for Internal Assessment (IA)- 15% for test-1, 15% for test-2 and 20% for Assignments and this is applicable for theory-based courses
- c) The tests and assignments are conducted as per the semester academic calendar provided by the University

The details as given in the table

Component	Description	Conduction	Weight Percentage
C1	Test-1: IA1	6 th week from the starting date of semester	15
	Test-2: IA2	12 th week from the starting date of semester	15
C2	Assignment (1&2)	7 th week	10
C3	Seminar (1&2)	13 th week	10
C4	SEE including practical	between 17 th Week-20 th Week	50
Results to be Announced			By the end of 21st Week

Note: IA or CIA includes C1 and C2

Each test must be conducted for a duration of 60 minutes, setting the test question paper for a maximum of 30 marks. The final examination must be conducted for a duration of 3 hours and the question paper must be set for a maximum of 100 marks.

d) Students are required to complete courses like technical skills, placement related courses, Open electives and any such value addition or specialized courses through online platforms like SWAYAM/NPTEL/Coursera Any other reputed online education aggregator. Students are required to choose the courses on the advice of their course coordinator/Director and required to submit the course completion certificate along with percentage of marks/grade scored in the assessment conducted by the online education aggregator. If the online education aggregator has issued a certificate along with the grade or marks scored to students, such courses will be considered for SGPA calculations, in case the aggregator has issued only a certificate and not marks scored, then such courses will be graded through an examination by concerned School, in case, if grading is not possible, students will be given a pass grade and award the credit and the credits will not be considered for SGPA calculations. The Online/MOOCs courses will not have continuous internal assessment component

Such of those students who would like to discontinue with the open elective course that they have already registered for earning required credits can do so, however, they need to complete the required credits by choosing an alternative open elective course.

Setting question paper and evaluation of answer scripts.

- i. For SEE, three sets of question papers shall be set for each theory course out of which two sets will be by the internal examiners and one set will be by an external examiner. In subsequent years by carrying forward the unused question papers, an overall three sets of question papers should be managed and depending on the consumption of question papers either internal or external examiner be called for setting the question paper to maintain an overall tally of 3 papers with the conditioned mentioned earlier. The internal examiner who sets the question paper should have been course tutor
- ii. The Chairman of BoE shall get the question papers set by internal and external examiners.
- iii. The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation. It is the responsibility of the BoE to see that all questions

contained in the question paper are within the prescribed syllabus of the concerned course.

- iv. There shall be single valuation for all theory papers by internal examiners. However, there shall be moderation by the external examiner who has the subject background. In case no external examiner with subject background is available, a senior faculty member within the discipline shall be appointed as moderator.
- v. The SEE examination for Practical work / Field work / Project work/Internship will be conducted jointly by internal and external examiners as detailed below: However, the BoE on its discretion can also permit two internal examiners.
- vi. If a course is fully of (L=0): T:(P=0) type or a course is partly P type i.e, (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

10. Evaluation of Practical's and Minor Project / Major Project / Dissertation

10.3.1 A practical examination shall be assessed on the basis of:

- a) Regular assessment while during practical classes
- b) Knowledge of relevant processes;
- c) Skills and operations involved;
- d) Results /products including calculation and reporting.

10.3.2. In case a course is fully of P type (L=0: T=0:P=4), the performance of a candidate shall be assessed for a maximum of 100 marks as explained below:

- a) Continuous Internal assessment (CIA) = 50 marks
- b) Semester end practical examination (SEE) = 50 marks

The 25 marks for continuous assessment shall further be allocated as under (IA or CIA):

I	Conduction, assessment of regular practical and discipline maintained by the students throughout the semester	20 marks
Ii	Maintenance of lab records	10 marks
Iii	Laboratory test and viva	20 marks
	Total	50 marks

The 50 marks meant for Semester End Examination, shall be allocated as under:

I	Conduction of semester end practical examination and assessment of the performance	30 marks
Ii	Write up about the experiment / practical conducted/spotter	10 marks
Iii	Viva Voce	10 marks
	Total	50 marks

10.3.3. The SEE for Practical work will be conducted jointly by internal and external examiners. However, if external examiner does not turn up, then both the examiners will be internal examiners.

10.3.4. In case a course is partly P type i.e, (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

10.3.5. The duration for semester-end practical examination shall be decided by the concerned School Board.

10.4. Evaluation of Minor Project / Major Project / Dissertation:

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the supervisor. At the end of the semester, the candidate has to submit

final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

1	First Dissertation presentation describing the problem definition	Should be done a semester before the project semester	Weightage: 0%
2	Dissertation Progress presentation-1	7 th week from the start date of project semester	Weightage: 25%
3	Dissertation progress presentation-2	14 th Week from the start date of project semester	Weightage -25%
4	Final project Viva and Dissertation Submission	17 th -20 th Week of project Semester	Weightage: 30% for Dissertation Weightage: 20% for Final Viva Voce

11. Provision for Appeal

If a candidate is not satisfied with the evaluation of C1,C2 components, he/she can approach the grievance cell with the written submission together with all facts, the assignments, test papers etc, which were evaluated. He/she can do so before the commencement of semester-end examination. The grievance cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her submission is found to be baseless and unduly motivated. This cell may recommend taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the grievance cell is final.

For every program there will be one grievance cell. The composition of the grievance cell is as follows: -

- The Registrar (Evaluation) - Ex-officio Chairman / Convener
- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department/discipline and/or from the sister schools / departments/sister disciplines – Member.
- One Senior Faculty Members / Subject Experts drawn from outside the University school / department – Member.

12. Eligibility to Appear Semester End Examination (SEE)

12.1 Only those students who fulfil a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc, as part of the course(s), as provided in the succeeding sections, shall be eligible to appear for SEE examination.

12.2. Requirements to Pass a Course

Students are required to score a total minimum of 40% (Continuous Internal assessment and SEE) in each course offered by the University/ Department for a pass (other than online courses) with a minimum of 20 (40% of 50) marks in final examination

13. Requirements to Pass the Semester

To pass the semester, a candidate has to secure minimum of 40% marks in each subject / course of the study prescribed in that semester.

13.1 Provision to Carry Forward the Failed Subjects / Courses:

A student who has failed in a given number of courses in odd and even semesters of first year shall move to third semester of second and final year of the study. However, he / she shall have

to clear all courses of all semesters within the double duration, i. e., within four years of admission of the first semester failing which the student has to re-register to the entire program.

13.2 Provision to Withdraw Course:

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is Soft Core Course or Open

Elective Course.

A DROPPED course is automatically considered as a course withdrawn.

13.3. Re-Registration and Re-Admission:

a) In case a candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University, such a candidate is considered as dropped the semester and is not allowed to appear for end semester examination (C3) and he / she shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

b) In such case where in a candidate drops all the courses in a semester due to personal reasons, it is considered that the candidate has dropped the semester and he / she shall seek re-admission to such dropped semester.

14. Attendance Requirement:

14.1 All students must attend every lecture, tutorial and practical classes.

14.2 In case a student is on approved leave of absence (e g: - representing the university in sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.

a) Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc, during a semester shall not be permitted to appear to the end semester (C4) examination and such student shall seek re-admission as provided in 7.8.4.

b) Teachers offering the courses will place the above details in the School Board meeting during the last week of the semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Director of the School before the commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

15. Absence during Mid Semester Examination:

In case a student has been absent from a mid-semester (C1, C2) examination due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Head of the School, for make-up examination. The Head of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and arrange to conduct a special test for such candidate(s) well in advance before the C3 examination of that respective semester. Under no circumstances C1, C2 test shall be held after C3 examination.

16. Grade Card and Grade Point

16.1. Provisional Grade Card: The tentative / provisional grade card will be issued by the Registrar (Evaluation) at the end of every semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average (SGPA)**.

16.2. Final Grade Card: Upon successful completion of M.Sc., Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Registrar (Evaluation).

16.3. The Grade and the Grade Point: The Grade and the Grade Point earned by the candidate in the subject will be as given below.

Marks	Grade	Grade Point (GP=V x G)	Letter Grade
P	G	(GP=V x G)	
90 > 100	10	v*10	O
80 > 90	9	v*9	A+
70 > 80	8	v*8	A
60 > 70	7	v*7	B+
55 > 60	6	v*6	B
50 > 55	5.5	V*5.5	C +
40 > 50	5	v*5	P
0-40	0	v*0	F
ABSENT			AB

O - Outstanding; A-Excellent; B-Very Good; C-Good; D-Fair; E-Satisfactory; F - Fail

Here, P is the percentage of marks ($P=[C1+C2+C3]$) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the grade point.

16.3.1. Computation of SGPA and CGPA

The Following procedure to compute the Semester Grade Point Average (SGPA)

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e:

SGPA (Si) = $\sum (Ci \times Gi) / \sum Ci$ where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A+	9	4X9=36
Course 2	4	A	8	4X8=32
Course 3	3	B+	7	3X7=21
Course 4	3	O	10	3X10=30
Course 5	3	P	5	3X5=15
Course 6	3	B	6	3X6=18
Course 7	2	O	10	2X10=20
Course 8	2	A	8	2X8=16
	24			188

Thus, $SGPA = 188 \div 24 = 7.83$

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	P	5	3X5=15
Course 7	2	B+	7	2X7=14
Course 8	2	O	10	2X10=20
	24			175

Thus, $SGPA = 175 \div 24 = 7.29$

Illustration No.3

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	O	10	4 x 10 = 40
Course 2	4	A+	9	4 x 9 = 36
Course 3	3	B+	7	3 x 7 = 21

Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	B+	7	3 x 7 = 21
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A+	9	2 x 9 = 18
	24			199

Thus, **SGPA = 199 ÷ 24 = 8.29**

Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for Two year Post Graduate degree program is calculated taking into account all the courses undergone by a student over all the semesters of a program i. e.,

$$CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

Where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration: No.1

CGPA after Final Semester

Semester (ith)	No. of Credits (C _i)	SGPA (S _i)	Credits x SGPA (C _i X S _i)
1	24	6.83	24 x 6.83 = 163.92
2	24	7.71	24 x 7.71 = 185.04
3	24	8.68	24 x 8.68 = 208.32
4	24	9.20	24 x 9.20 = 220.80
Cumulative	96		778.08

Thus, $CGPA = 24 \times 6.83 + 24 \times 7.71 + 24 \times 8.68 + 24 \times 9.20 = 8.11$

16.3.2. CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Illustration: CGPA Earned 8.10 x 10=81.0

16.3.3. Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows.

CGPA	Grade (Numerical Index)	Letter	Performance	FGP
	G	Grade		Qualitative Index
9 >= CGPA 10	10	O	Outstanding	Distinction
8 >= CGPA < 9	9	A+	Excellent	
7 >= CGPA < 8	8	A	Very Good	First Class
6 >= CGPA < 7	7	B+	Good	
5.5 > = CGPA < 6	6	B	Above average	Second Class
>5 CGPA < 5.5	5.5	C	Average	
>4 CGPA < 5	5	P	Pass	Satisfactory

Overall percentage=10*CGPA

17. Challenge Valuation

a. A student who desires to apply for challenge valuation shall obtain a photo copy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the grade awarded to him/her by surrendering the grade card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 10 days after the announcement of the results. This challenge valuation is only for SEE.

The answer scripts for which challenge valuation is sought for shall be evaluated by the external examiner who has not involved in the first evaluation. The higher of two marks from first valuation and challenge valuation shall be the final.

b. With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

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M.Sc (BIOCHEMISTRY)

Scheme of Instructions and Detailed Syllabus
(effective from Academic Year 2019-20)

Scheme of Instruction

Sl. No	Course Code	Title of the Course	HC/S C/ FC	Credit Pattern			Credits	Contact Hours
				L	T	P		
1	M19BC1010	Organic, Biophysical, Biochemical and Environmental Toxicology	HC	2	1	0	3	4
2	M19BC1020	General Physiology	HC	4	0	0	4	4
3	M19BC1030	Metabolism -I	HC	4	0	0	4	4
4	M19BC1040	Analytical Techniques	HC	4	0	0	4	4
5	M19BC1050	Research Methodology & Statistics	HC	2	1	0	3	4
Practical Courses								
6	M19BC1060	Biophysical chemistry (Laboratory– I)	HC	0	0	2	2	4
7	M19BC1070	Clinical Biochemistry (Laboratory cum Training– II)	HC	0	0	2	2	4
8	M19BC1080	Enzymology (Laboratory– III)	HC	0	0	2	2	4
9	M19BC1090	Microbiology (Laboratory – IV)	HC	0	0	2	2	4
Total Credits				16	02	8	26	36

Second Semester

Sl. No	Course Code	Title of the Course	HC/SC/ FC	Credit Pattern			Credits	Hours
				L	T	P		
1	M19BC2010	Enzymology	HC	4	0	0	4	4
2	M19BC2020	Biotechnology	HC	4	0	0	4	4
3	M19BC2030	Immunology	HC	4	0	0	4	4
4	M19BC2040	Metabolism -II	HC	3	1	0	4	5
5	M19BC2051	Bioinformatics	SC	1	1	0	2	3
6	M19BC2052	Food Technology						
7	M19BC2060	Sports/Yoga/Music/Dance/ Theatre	RULO	0	0	2	2	3
Practical Courses								
8	M19BC2070	Protein Chemistry (Laboratory – V)	HC	0	0	2	2	4
9	M19BC2080	Immunology (Laboratory – VI)	HC	0	0	2	2	3
10	M19BC2090	Molecular Biology (Laboratory – VII)	HC	0	0	2	2	4

11	M19BC20X0	Bioinformatics (Laboratory – VIII)	HC	0	0	2	2	3
Total Credits				16	2	10	28	37

Third Semester

Sl. No	Course Code	Title of the Course	HC/SC/FC	Credit Pattern			Credits	Hours
				L	T	P		
1	M19BC3010	Molecular Biology	HC	4	0	0	4	4
2	M19BC3020	Nutritional Biochemistry	HC	3	0	0	3	3
3	M19BC3030	Biochemical Genetics	HC	2	1	0	3	4
4	M19BC3041	Pharmacovigilance and SAS	SC	4	0	0	4	4
5	M19BC3042	Clinical Biochemistry and Diagnostics						
6	M19BC3043	Plant and Industrial Biochemistry						
7	M19BC3050	Biochemistry in daily life	OE*	3	1	0	4	4
8	M19BC3060	Soft Skill	RULO	2	0	0	2	2
Practical Courses								
9	M19BC3070	Advanced Molecular Techniques (Laboratory – IX)	HC	0	0	4	4	8
10	M19BC3080	Genetic Engineering (Laboratory– X)	HC	0	0	2	2	4
Total Credits				18	2	6	26	33

Note: Open Elective Course “Biochemistry in daily life” offered is for students other than Biochemistry discipline. The students of M Sc Biochemistry shall have to choose the **Open Elective** course offered in other disciplines.

Fourth Semester

Sl. No	Course Code	Title of the Course	HC/SC/FC	Credits Pattern			Credits	Hours
				L	T	P		
1	M19BC4010	Internship	HC	-	-	4	4	8
2	M19BC4020	Submission of Project work and Evaluation	HC	0	0	10	10	20
3	M19BC4030	SWAYAM/MOOC	RULO	2	-	-	2	-
Total Credits				2	0	14	16	28

Semester-wise Summary of Credit Distribution

Semesters	L	T	P	No. of Credits	No. of Hours
First Semester	16	2	08	26	36
Second Semester	16	2	10	28	37
Third Semester	18	2	06	26	33
Fourth Semester	02	0	14	16	28
Total Credits	52	6	38	96	134

Distribution of Credits Based on Type of Courses

Semester	HC	SC	OE	RULO	FC	CC	TOTAL
I	26	-	-	-	-	-	26
II	24	2	-	2	-	-	28
III	16	4	4	2	-	-	26
IV	14	-	-	2	-	-	16
Total	80	6	4	6	-	-	96

M.Sc (BIOCHEMISTRY)
DETAILED SYLLABUS
(effective from Academic Year 2018)

SEMESTER-I

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC1010	ORGANIC, BIOPHYSICAL, BIOCHEMICAL AND ENVIRONMENTAL TOXICOLOGY	HC	2	1	0	3	4

Course Objectives: The objective of the course is to develop an understanding and appreciation of both structure and chemical transformations of organic molecules in students

Course Outcomes: The student shall be able to:

- Apply basic techniques in the organic laboratory for preparation, purification and Identification of organic compounds.
- Apply knowledge on safety rules in the practice of laboratory investigations.
- Design the reaction mechanisms and apply them for laboratory experiments
- Classify the Organic reaction mechanisms.
- Analyze the toxic levels of Organic substances.
- Ascertain the biochemical mechanism of toxicity
- Apply knowledge on buffer preparations and their applications

Course Content:

52 Hrs

Unit-1

13 Hrs

ORGANIC CHEMISTRY: Electronic theory of valency. Electronic displacements in a molecule: Inductive effect, Electronic effect, resonance. The hydrogen bond, hydrophobic interactions. Atomic and molecular orbitals. Shapes of bio molecules, hybridization and tetravalency of carbon.

Types of organic reactions: Substitution, addition, elimination, rearrangement, condensation and polymerization.

Free radicals in biological system: Oxygen as free radical in the auto oxidation of fats. Antioxidants (free radicals inhibitors in the cell such as vitamin A, vitamin E, vitamin C, Se etc)

Mechanism of substitution in benzene ring: ortho, para and Meta directing groups. The concept of resonance with reference to benzene derivatives. Direct influence of substituents- Electronic interpretation.

Unit-2

13 Hrs

Stereochemistry: Structural isomerism, stereoisomerism, geometrical isomerism.

Optical isomerism, optical activity, meso compounds, specific rotation, chirality, chiral centre enantiomers, diastereoisomers, confirmation and configuration, boat and chair forms,

axial and equatorial bonds, anomers and mutarotation, glycoside, epimers, glucopyranose, fructopyranose,

periodic acid oxidation of sugars.

Heterocyclic systems occurring in living systems: Numbering of the ring and properties of pyran, furan, thiazole, indole, pyridine, pyrimidine, purine and pteridine.

Unit-3

11 Hrs

Biophysical chemistry

Thermodynamics studies in chemistry and biochemistry: Definition and application of the first and second law of thermodynamics in understanding energies in living cells, chemical potential, equilibrium constant. Phosphate group transfer potentials.

Biological solvents: Water properties, dipole moments, ionic product of water

Acids, Bases and Buffers: pH scale, acids-bases, Henderson-Hasselbalch equation, buffers, ionization behavior of amino acids and proteins, titration curve, buffer solutions and action.

Microbiology: Physical, environmental and nutritional requirements for growth (growth curve). Continuous culture of bacteria and synchronous growth of bacteria. Preparation of culture media, staining techniques and isolation of pure cultures. Starter cultures for dairy industry. Fermented products. (food and dairy)

Unit-4

15 Hrs

BIOCHEMICAL AND ENVIRONMENTAL TOXICOLOGY

Definition and scope of toxicology: Eco-toxicology and its environmental significance. Toxic effects: Basic for general classification & nature. Dose - Response relationship: Synergism and Antagonism, Determination of ED₅₀ & LD₅₀. Acute and Chronic exposures. Factors influencing Toxicity. Pharmacodynamics & Chemodynamics. OECD guidelines.

Principles & procedures of testing for acute toxic effects: Regulatory guidelines, Mammalian systems affected & the clinical signs of Systemic Toxicity. Factors affecting acute Toxicity studies.

Xenobiotic metabolism: Absorption & distribution. Phase I reactions. Oxidation, Reduction, Hydrolysis and Hydration. Phase II reactions/Conjugation: Methylation, Glutathione and amino acid conjugations.

Biochemical basis of toxicity: Mechanisms of Toxicity: Disturbance of Excitable membrane functions. Altered calcium Homeostasis. Covalent binding to cellular macromolecules & Genotoxicity. Tissue specificity of Toxicity.

Pesticidotoxicity: Insecticides: Organochlorines, Anticholinesterases. Organophosphates and Carbamates. Fungicides Herbicides. Environmental consequences of pesticide toxicity. Biopesticides.

Food toxicity: Common food adulterants, detection of adulterants, sources and effects of food toxicants. Toxicology of food additives i.e preservatives, colourants taste enhancers

Metal toxicity: Toxicology of Arsenic, mercury, lead and cadmium, sources and permissible limits of metals in organs, antidotes.

Reference Books:

1. Stereo chemistry of organic compounds (1994) by E L Eliel & SHW Awley. Inter Science Pub.30. Wiley and sons.Inc.
2. Organic Chemistry (6th ed. 2000) by R T Morrison & R N Boyd. Prentice Hall of India. New Delhi.
3. Organic Chemistry Vol.1 Fundamental Principles (6th Ed. 2003) by IL Finar, ELBS
4. Organic Chemistry, 11th edition 2014, by T W Graham Solomons, Craig B Fryhle and Scott A Synder.
5. Organic chemistry by Stanley H. Pine (4th Edition, 1987) Tata Mc-Graw hill.
6. Vol.2 Stereo Chemistry and the Chemistry of Natural Products. (5th ed. 1985) by I L Finar, ELBS.
7. Lehninger's Principles of Biochemistry (2nd Ed 2000) D L Nelson and M M Cox, Macmillan Worth pub. Inc NY.
8. Physical Biochemistry by Kansal Edward Van Holde (1971) Prentice Hall Inc. New Jersey.
9. Physical biochemistry 2nd nd (1982) by David Friedfelder, W H Freeman and Co. NY.
10. General and Applied Toxicology 1995 by Marrs and Turner. Macmillan Press Ltd.
11. Basic Environmental Toxicology (1994) by Lorriss G. Corkerhem and Barbara S S Shane CRP Press Inc.
12. Introduction to Food Technology by Talayurki Shibamoto & Leonard F Bzeldanes.
13. Molecular Biotechnology 2nd ed 1994 by Barnard R Glick & J J Pasternak.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC1020	GENERAL PHYSIOLOGY	HC	4	0	0	4	4

Course Objective:

To study the basic concepts of cellular physiology and the fundamental properties of eukaryotic cell

Course Outcomes:

After completing the course the students shall be able to:

- Investigate the various causes for specific diseases and diagnose the clinical symptoms of various diseases
- Acquire the complete knowledge and analyze the proper functions of various organs.
- Apply the knowledge on various disorders and detect the real symptoms for curing certain diseases.

Course Content:

52 Hrs

Unit-1:

13hrs

Muscular System: Ultra structure of smooth, skeletal and cardiac muscle fibers. Contractile and other proteins of muscle. Energy metabolism in muscle; Phosphagens, neuro-muscular junctions, excitation of striated muscles. Organization of sarcolemma, transverse-tubular system and sarcoplasmic reticulum, mechanism of muscle contraction. Regulation of contraction in striated and smooth muscle. Calmodulin and its regulatory role, muscular dystrophies.

Resting potentials and action potentials of excitable cells, contraction of skeletal, cardiac and smooth muscles

Cardiovascular system: Anatomy and physiology of blood vessels, structure of heart, cardiac cycle, heart sounds, ECG, blood pressure and haemorrhage.

Unit-2

13 Hrs

Nervous system: Types and structure of neuron. Neurotransmitters and receptors, mechanism of synaptic transmission. Briefly about membrane potential, resting potential and action potential. Briefly about EEG and epilepsy. Outline and function of CNS and PNS. Neuromuscular junctions.

Biochemistry of cancer – carcinogenesis, characteristics of cancer cell, agents promoting carcinogenesis

Respiratory system: Anatomy of lungs, mechanism and regulation of respiration, transport of gases O₂ and CO₂ respiratory, mechanism of acid and base balance with briefly the disorders of respiratory system.

Unit-3:**13 Hrs**

Blood and Body fluids: Composition and functions of blood. Erythrocytes including Hb, leukocytes and thrombocytes plasma proteins in health and diseases. Blood coagulation – mechanism and regulation. Fibrinolysis, anticoagulants, transfers of blood gases – oxygen and carbon dioxide. Hydrogen ion homeostasis- Factors regulating blood pH – buffers. Composition and functions of lymph and CSF Acid-base balance, metabolic and respiratory acidosis and alkalosis.

Digestive system: Secretions, functions and regulation of saliva, gastric, pancreatic, intestinal and bile juice.

Digestion and absorption of carbohydrates, lipids, proteins, nucleic acids, minerals and vitamins.

Unit-4**13 Hrs**

Renal physiology and Excretion: Structure and functional unit of kidney, mechanism of urine formation (Glomerular filtration, Tubular reabsorption and Tubular secretion), concentration of urine, tubular function test, kidney hormones, regulation of acid-base balance, electrolyte and water balance. Renal failure, nephrosis and nephritis

Endocrine system: Chemistry of hormones and hormonal activity. Site of synthesis, secretion, functions and Circulation in blood of hypothalamus, pituitary, thyroid, adrenal cortex, parathyroid and pancreas, local hormones and their biological significance. Degradation and peripheral transformation. Receptors and the mechanism of hormone action. Disorders of endocrine system.

Reference Books:

1. Molecular Biology of the Cells (3rd edn 1994) by Alberts et al., Garland Publications inc NY and London.
2. Cell Biology (1993) by E S Sedava, Jones and Barlett Publishers Boston, London.
3. Cell and Molecular Biology (8th ed. 2001) by E D P de Robertis & E M F de Robertis (Jr) Lippincott Williams & Wilkins, Philadelphia.
4. Principles of Cell Biology (1988) by Klein Smith and M.Kish. Harper-Cellins Pub. Inc. New Delhi.
5. Text book of Medical Physiology (10th ed. 2001) by A C Guyton & J E Hall. Harcourt Asia.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC1030	METABOLISM - I	HC	4	0	0	4	4

Course Objectives:

Understand the fundamental energetic of biochemical processes, and the relation between biochemical defects and metabolic disorders.

Recognize and understand basic mechanisms of pathway regulation.

Course Outcomes:

After completing the course the student shall be able to:

- Acquire the knowledge of carbohydrates and Lipids which makes students easier to study about advanced course in Biochemistry and Molecular Biology.
- Correlate knowledge of carbohydrates and Lipids to central Biochemical processes.
- Acquire the knowledge about the fundamentals of energetic biochemical processes.
- Integrate biochemical defects and metabolic disorders.
- Demonstrate an understanding of the diversity of metabolic regulation, and how this is specifically achieved in different cells.
- Apply the knowledge about the fundamental of energetic biochemical processes. Develop an integrative approach for biological problems.

Course Content:

12hrs

Unit-1

Bioenergetics: Energy transformation, Laws of thermodynamics, Biological oxidations, oxygenases, hydroxylases, dehydrogenases and energy transducing membranes. Gibbs energy, free energy changes and redox potentials, phosphate potential, chemo-osmotic theory. Proton circuit and electrochemical gradient, ionophores. Uniport, antiport and symport mechanisms, shuttle systems.

The mitochondrial respiratory chain, order and organization of carriers, proton gradient, iron sulphur proteins, cytochromes and their characterization. The Q cycle; P/O ratio. Reversed electron transfer, respiratory controls and oxidative phosphorylation, uncouplers and inhibitors of energy transfer. Fractionation and reconstitution of respiratory chain complexes.

ATP – synthetase complex., partial reduction of oxygen, superoxides.

Unit-2

13hrs

Chemistry of Carbohydrates:

Biological importance: Monosaccharides : Elucidation of structure of glucose (open chain and ring structure); Epimers and Anomers-definition and example ; Brief review on configurational and conformational aspects of carbohydrates; Derived monosaccharides: structures and biological importance of : Amino sugars: glucoseamine and galactosamine and their Nacetylated forms, Sugar phosphates: D-ribose-5-P, β -D-ribose-5-P, glucose-6-P and fructose -1,6- diphosphate, Sugar acids: types with examples; Disaccharides: Structure of isomaltose, cellobiose and trehalose; brief discussion on reducing property; Polysaccharides: classification with examples; structure, properties and importance of homo and hetero polysaccharides-Blood group and bacterial polysaccharides; glycosaminoglycans, cardioglycosides, Glycoproteins structure and functions, Lectins-characteristics and biological importance.

Unit-3: Metabolism of carbohydrates

13hrs

Intermediary metabolism: Approaches for studying metabolism. Introduction to metabolism.

Carbohydrates Metabolism: Glycogenesis and glycogenolysis, Glycolysis, citric acid cycles, its function in energy generation and biosynthesis of energy rich bonds, pentose phosphate pathway and its regulation. Alternate pathways (glyoxalic and uronic acid pathways) of carbohydrate metabolism. Gluconeogenesis. Interconversions of sugars. Biosynthesis of starch and oligosaccharides. Regulation of blood glucose homeostasis. Hormonal regulation of carbohydrate metabolism. Disorders: Pentosuria, Hexose interconversion, fructose and lactose intolerance, fructosuria, galactosemia and glycogen storage diseases

Unit-4: Lipids

13 hrs

Chemistry of Lipids: Structure, Classification, Characteristics and biological importance of lipids. Behavior of amphipathic lipids in water, formation of micelles and liposomes. Prostaglandins. Bio membranes, membrane composition and fluid mosaic model.

Lipid Metabolism: Acetyl CoA carboxylase, Fatty acid synthase, desaturase and elongase. Fatty acid oxidation: α , β , ω oxidation and lipoxidation. Lipid Biosynthesis: Biosynthesis of triacylglycerols, phosphoglycerides and sphingolipids, Biosynthetic pathways for terpenes, steroids and prostaglandins. Ketone bodies: Formation and utilization. Metabolism of circulating

lipids: chylomicrons, LDL, HDL and VLDL. Free fatty acids. Lipid levels in pathological conditions.

Disorders: Sphingolipidodystrophies, Lipoproteinemias, fatty liver, hypercholesterolemia.

Reference Books:

1. Biochemistry; Voet , D. and Voet, J.G. [Eds.] (1999) 3 Ed. Jhon Wiley andsons.
2. Biochemistry; David Rawn, J. (1989) Neil PattersonPublishers.
3. Principles of Biochemistry; Smith et al., [Ed.] (1986) McGarwHill.
4. Bioenergetics; A Practical Approach, G.C. Brown and C.E. Cooper (1995) IRL- Oxford UniversityPress.
5. Photosynthesis, D.O. Hall and K. K. Rao, (1999), 6th Edn. Cambridge UniversityPress.
6. Hawk's Physiological Chemistry, Oser (1976) 14th EdnTata-McGraHill.
7. Advances in Carbohydrate Chemistry and Biochemistry; Horton, Elseveir(1994).
8. Biochemistry of Foods, Eskin Elseveir(2012).
9. Text Book of Biochemistry with Clinical correlations; 6th Edn. Thomas M.A.Devlin, Wiley – Liss(2012).
10. Lehninger- Principles of Biochemistry; D. L. Nelson and M.M. Cox 6th Edn Macmillan Publications(2012).
11. Biochemistry and Molecular Biology; 5th Edn. D. Papachristodoulou, A. Snape, W.H. Elliott, and D. C. Elliott, Oxford University Press(2014).
12. Biochemistry; David Rawn, Panima Publishers (2012).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC1040	ANALYTICAL TECHNIQUES	HC	4	0	0	4	4

Course Objectives:

To develop the skills among students to understand the theory and practice of bio analytical techniques

To provide among students the scientific understanding of analytical techniques and detail interpretation of results

Course Outcomes:

After completing the course the student shall be able to:

- Integrate the applications and usage of chromatography in real time industrial environments.
- Acquire knowledge about the interaction of electromagnetic radiations with matter and apply analytical techniques to accurately determine the elements present in the given sample
- Explain the theory for image formation, contrast, resolution of various microscopes
- Correlate the relevance of microscopic approaches to life sciences inquiries.
- Acquire knowledge about the various techniques of centrifugation, extractions, chromatography, electrophoresis, Microscopy and spectroscopy

Course Content:

Unit-1

13hrs

Centrifugation: Basic principles of centrifugation. Factors affecting sedimentation, Sedimentation Coefficient, Instrumentation and applications of Desktop, High speed and Ultra centrifuges; Preparative and Analytical centrifugation; Density gradient and differential centrifugation and Isopycnic Centrifugation,

Extraction methods for preparation of samples: Preparation of extracts for biochemical investigations, physicochemical properties of metabolites and drugs extracts from biological materials. Physico-chemical properties of solvents, solubility and miscibility, ionic bonds, and salting out. Partition, ionization, buffering and their effect on extraction. Choice of solvent for solvent extraction, mixed solvents, solid phase extraction.

Unit-2

13 hrs

Chromatography: Introduction, partition coefficient, phase systems- liquid and solid phases. Principle, instrumentation and applications of paper and thin layer chromatography. column chromatography-Ion exchange, Affinity and gel permeation Chromatography, HPLC.

Gas Chromatography: Principle and design of instrument. Factors affecting GC, .Types of detectors (flame ionization , thermionic , electron capture , mass spectrometer).G.L.C; principle and application.

Unit-3

13hrs

Electrophoresis: Basic principles of electrophoresis and factors effecting electrophoretic mobility, Agarose gel electrophoresis of nucleic acids, capillary and pulse field, capillary electrophoresis. SDS PAGE. Electro blotting: Western, southern, northern equipments and application. GIMSA assay.

Microscopic techniques: Types of microscopy(light, Phase Contrast, fluorescence, dark field. Electron Microscopy- Working principle and applications of TEM and SEM, advantages. Immune gold , cryo-electron and Trans focal microscopy.

Unit-4

13 hrs

Spectroscopic techniques: Electromagnetic spectrum, transition in spectroscopy. Principle, design and application of UV-Visible, fluorescence, IR, Raman IR , Atomic Absorption Spectroscopy, Flame photometer.

Principle, instrumentation and applications of X-RAY crystallography, NMR, ESR,

Mass Spectroscopy: Principle, overview of MS experiment, ionization modes: MALDI, equipments in MS analysis (Identification of metabolites). Interfacing MS with other methods; MS/MS, LC/MS, GC/MS.

Reference Books:

1. Instrumental methods of analysis H.H.Willard, L.L.Merritt, J A Dean.
2. Instrumental Methods of Chemical analysis.
3. Analytical Chemistry G.D. Chritiain. Wiley
4. Introduction of instrumental analysis. R.P.Braun
5. Biophysical chemistry by Upadhyay and Upadhyay .
6. Principles and Techniques of Practical Biochemistry by Keith Wilson, John Walker, 5th Edition, 2000. Cambridge Univ.Press
7. Organic Spectroscopy by Willium Kemp, 3rd edition 2008.
8. Essentials of Nuclear Chemistry- H.J.Arnikaar
9. A text book of quantitative Inorganic analysis A I Vogel.
10. Pharmacopoeia of India , British Pharmacopoeia
11. Standard methods of Chemical analysis A Series of Volumes Edited F.J.Welcher R.G. Krieger Publishing Company.
12. Principles of Instrumental Analysis Fifth edition Skoog, Holler, Niemay
13. Principles and techniques of practical Biochemistry. K.Wilson and J. Walker. 4thEdn. Cambridge University Press (2012).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC1050	RESEARCH METHODOLOGY & STATISTICS	HC	2	1	0	3	4

Course Objective:

To introduce the students to the fundamental aspects of research methods and statistics

To familiarise them with various research techniques such as experimentation, observation etc, and recording data and also interpreting the data and writing report

Course Outcomes:

After completing the course the student shall be able to:

- Understand the importance of research and various research methods and techniques
- Identification of new method and applying them to molecular biology, Immunology and other related fields.
- Identify novel methods of preparation of hormones, steroids and other biological macromolecules.
- Examine, explore and classify the reaction mechanisms and their pathways
- Correlate the analytical data, patients profile etc. using statistics

Course Content:

Unit-1

13 Hrs

Methodology of scientific research. The nature of scientific methods. Quantitative biochemical measurements: Analytical considerations and experimental errors, nature of experimental errors- random and systemic errors. Identification of systemic errors, SOPs. Performance of analytical methods, precision, accuracy, detection limit, analytical range, specificity, sensitivity, and robustness.

Unit-2

13 hrs

Collection and review of research literature, sources of literature and their evaluation. Designing research methodologies. General strategies for preparation of research proposals. Data representation in technical reports, posters, presentation in scientific conferences and workshops. Preparation of manuscripts for publication in national and international journals. Yardsticks employed in evaluation of manuscripts for publications.

Unit-3**15 Hrs**

Gaussian distribution (normal) of data, quantification of precision by standard deviation, coefficient of variation and variance, (data to be provided for calculation of each parameter). Assessment of accuracy; Population statistics- confidence limits and confidence intervals, student's t-test, standard error of mean, examples for calculation. Q tests, examples and applications, Null hypothesis, use of t-test to validate analytical methods unpaired, paired, one-sample, two-sample tests with examples. Calibration methods; Least square method of fitting straight line to data with example. Correlation and regression analyses. ANOVA, one way and two-way ANOVA.

Unit - 4**11 Hrs**

Principles and practice of statistical methods in biological research, Basic statistics: samples and populations, measures of average, measures of dispersion, standard error, confidence limits; Probability distribution: normal, binomial and Poisson distribution; correlation and regression, test of statistical significance, and analysis of variance, Distribution of student's t, chi-square (χ^2), F- test, latest software, introduction of software, exercise on biochemical problems.

Reference Books:

1. Biostatistics : A foundation for analysis in the health. (7th ed. 1999) by W W Daniel John Wiley and Sons Inc., New York.
2. Choosing and Using Statistics; A Biologist Guide, Clavin Dythan, Blackwell Scientific (1999).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC1060	BIOPHYSICAL CHEMISTRY (LABORATORY - I)	HC	0	0	2	2	4

Course Objective:

To be able to communicate and discuss the various methods available to purify and characterize the biological molecules based on their physical and chemical properties.

Course Outcomes:

After completing the course the student shall be able to:

- Demonstrate basic competencies in a range of practical clinical techniques
- Explore the biochemical and molecular tools for the various hereditary and

Course Contents:

1. Preparation of buffers; Acetate, phosphate and trisbuffer.
2. Chromatographic techniques :Paper
3. Chromatographic Techniques: TLC
4. Chromatographic Techniques: Column

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC1070	CLINICAL BIOCHEMISTRY (LABORATORY II)	HC	0	0	2	2	4

Course Objectives:

- To Compare and contrast human body chemistry levels under normal and abnormal conditions.
- To perform, evaluate and explain clinical chemistry procedures and correlate test results with patient conditions.

Course Outcomes:

After completing the course the student shall be able to:

- Examine the biochemical tests and interpret the results performed on body fluids to support diagnosis and treatment
- Monitor various diseases to perform diagnostic tests.

Course Contents:

1. Qualitative Tests for bio constituents in biological sample.
2. Estimation of cholesterol, urea and glucose in biological sample.
3. Estimation of Serum bilirubin by Diazomethod.
4. Estimation of Hemoglobin.
5. Microscopic examination and chemical analyses of blood, urine and stools.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC1080	ENZYMOLGY (LABORATORY III)	HC	0	0	2	2	4

Course Objectives:

- To explore the different enzymes used in industries for various applications and to evaluate the activity of the enzymes

Course Outcomes:

After completing the course the student shall be able to:

- Acquire training with respect to various enzymes
- Explore regarding the functions of different enzymes
- Outline the activity relationship and kinetics of the enzymes in detail

Course Content:

1. Assay of salivary amylases,
2. Assay of Alkaline phosphatases
3. Assay of SGOT, SGPT and LDH

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC1090	MICROBIOLOGY (LABORATORY IV)	HC	0	0	2	2	4

Course Objective:

To attain experience in handling microbes and to illustrate the physical and chemical characteristics of the microorganisms

Course Outcomes:

After completing the course the student shall be able to:

- Attain the experience to handle the microbes to facilitate working in various laboratories
- Improve their skill and competency in various experimentations

Course Contents:

1. Isolation of air microflora Colony characteristics and Counting, pure culture techniques.
2. Biochemical tests for microbial culture, testing water quality by microbial method.

SEMESTER-II

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2010	ENZYMOLGY	HC	4	0	0	4	4

Course Objectives:

To enable students to gain fundamental knowledge on classification, structure, mechanism, Enzyme kinetics, inhibitors and related diseases of enzymes

To integrate the practical aspects of Enzymology with the kinetic theories to provide a mechanistic overview of enzyme activity and regulation in cells

Course Outcomes:

After completing the course the student shall be able to:

- Acquire knowledge about structure, functions and the mechanisms of action of enzymes.
- Attain concepts of kinetics of enzyme catalyzed reactions and enzyme inhibitory and regulatory process.
- Compare and contrast the historical uses of enzyme technology with current applications in a diverse range of industries.
- Demonstrate foundation knowledge in Biochemistry in the areas of Theory & Practical Biochemistry
- Generate a contemporary application of enzyme technology or metabolic engineering and present the results in a well-structured oral presentation.

Course Content:

Unit-1

13hrs

Introduction to Enzymes: Nomenclature and classification of enzymes. Mechanism of enzyme actions. Monomeric and oligomeric enzymes and multi-enzyme complexes with examples viz. Pyruvate dehydrogenase and fatty acid synthetase. Isoenzymes

The investigation of active site structure: The identification of binding sites and catalytic sites—trapping the E-S complex, use of substrate analogs, enzyme modification by treatment with proteolytic enzymes, photo-oxidation and chemical modification of amino acid side chains. The 3-D structural features of active sites.

Unit-2

13hrs

Factors affecting enzyme activity: pH, temperature, substrate concentration, enzyme concentration.

Enzyme catalysis: Chemical nature of enzyme catalysis-General acid-base catalysis, electrostatic catalysis, covalent catalysis, intramolecular catalysis and enzyme catalysis.

Mechanisms of action of the following enzymes-lysozyme, ribonuclease, serine proteases and Triose phosphate isomerases.

Co-enzymes and cofactors: Water soluble vitamins and structure and function of their coenzymes.Metallo enzymes.

Unit-3

14 hrs

Enzyme kinetics: Kinetics of single substrate enzyme catalysed reactions; Michaelis Menton equation; determination of Vmax and Km values; Line-Steady State Kinetics, Eadie-Hofste plot; Kinetics of multi substrate enzymecatalysed reaction- re-order, order and Ping-Pong mechanism. Use of initial velocity, inhibition and exchange studies to differentiate between multi substrate reaction mechanisms.

Enzyme inhibition: Types-reversible, irreversible, competitive, non-competitive, mixed inhibition, partial inhibition, substrate inhibition and allosteric inhibition; irreversible inhibition.

Unit-4

12hrs

Enzyme regulation: General mechanisms of enzyme regulation: Feed Back Inhibition and Enzyme repression control of enzymic activity by products and substrates; Allosteric enzymes, Sigmoidal kinetics and their physiological significance.

Fundamentals of enzyme assay – enzyme units, coupled kinetic assay. Criteria of purity of enzymes.

Industrial uses of enzymes: Amylases, cellulose degrading enzymes, proteolytic enzymes in meat and leather industry, detergents and cheese production; immobilisation of enzymes and their applications; introduction to biosensors.

Reference Books:

1. The chemical kinetics of enzyme action by K J Laidler and P S Bunting, Oxford University Press. London.
2. Enzymes by M Dixon, E C Webb, CJR Thorne and K F Tipton, Longmans, London.
3. Enzyme structure and mechanism (1977) by Alan Fersht, Reading, USA.
4. Enzymatic reaction mechanism (1979) by Cheristopher Walsh, freeman Pub., San Francisco.
5. Immobilized enzymes (1978) by Ichiro Chibata, Haisted Press Book.
6. Enzyme structure and function by S Blackburn (1976) marcel Dekker, Inc., NY.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2020	BIOTECHNOLOGY	HC	4	0	0	4	4

Course Objectives:

To recognize the importance of recombinant DNA technology in the advancement of animals and plants;

To distinguish the difference in plant cell culture and animal cell culture giving an outline of different fermenters used for each of them.

Course Outcomes:

After completing the course the student shall be able to:

- Analyze various tools and techniques used in recombinant DNA technology
- Explain the advancement in sequencing technology.
- Incorporate the recombinant genes and their products in agriculture, industry and environment related fields.
- Illustrate the manufacture of fermenters and to execute efficient fermentation process
- Figure out the importance and applications of plant tissue culture and animal cell culture in modern life science.

Course Content:

Unit-1

Gene transfer to plants: callus culture, Acclimatization of micro propagated plants. Agrobacterium mediated transformation, Ti plasmid, mechanism of T-DNA transfer, Function of T-DNA genes, Ti-plasmid derivatives as plant vectors (disarmed T-DNA), cointegrate and binary vectors, selectable markers for plants, Direct DNA transfer to plants: particle bombardment, chloroplast transformation, electroporation. **11hrs**

Animal tissue culture:

Cell culture media, monolayer and suspension culture, In vitro fertilization and embryo transfer. Transgenic animals as bioreactors for production of recombinant proteins, Bone marrow transplantation, organ culture: techniques. Stem cells and therapeutics, novel sources of MSC, ethical issues regarding genetically modified organisms. **11hrs**

Unit-2

Recombinant DNA Technology

Introduction to recombinant DNA technology, importance of recombinant DNA technology, construction and screening of genomic and cDNA libraries, cloning vectors (-phage, plasmid, cosmids, BAC and YAC vectors), properties of restriction endonucleases and their mode of action. **10hrs**

Unit-3

Sequencing

Sequencing of DNA by Sanger's method, Maxam Gillbert method, shot gun method Principle and technique of pyrosequencing, Protein sequencing by Edman degradation method, site directed mutagenesis, RFLP,RAPD, PCR, DNA finger printing, Phage display ,Yeast-two-hybrid (Y2H), Three hybrid assay. **10hrs**

Unit-4

Fermentation technology

Primary and secondary metabolites in fermentation, continuous and batch type culture techniques, principle types of fermentors for animal and plant culture, fermentation processes brewing, manufacture of penicillin, production of single cell proteins, production strategies for other antibiotics and organic compounds. **10hrs**

Reference Books:

1. Molecular Cloning; A laboratory manual; Michael R. Green, CSHL Press (2012).
2. Molecular Cell Biology; Lodish et al., 7th Edn. W.H. Freeman and Co (2012).
3. Molecular Biology of the Cell; 7th Edn. Bruce Alberts et al., (2008), Garland Publications
4. Molecular Biology; Robert F. Weaver, McGraw Hill (2012).
5. Principles and Techniques of Biochemistry and Molecular Biology; 7th Edn. Keith Wilson and John Walker (2010).
6. Principles of Gene Manipulations; 6th Edn. S.B. Primrose, R.M. Twyman, and R.W. Old, Blackwell Science (2012).
7. Gene Cloning and DNA analysis- An Introduction; T. A. Brown, 5th Edition, Wiley-Blackwell publishing (2006).
8. Molecular biology and Biotechnology; 4th Edn. J.M. Walker and R. Rapley, RSC (2000).
9. Plant Biotechnology and Agriculture; Arie Altman and Paul Hasegawa Academic Press(2011).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC2030	IMMUNOLOGY	HC	4	0	0	4	4

Course Objectives:

Provide students with knowledge on how the immune system works building on their previous knowledge from biochemistry, genetics, cell biology and microbiology.

Course Outcomes:

After completing the course the student shall be able to:

- Ascertain the roles of Immune system in protection against Disease and

Autoimmune disorders.

- Describe the basic mechanisms, distinctions and functional interplay of innate and adaptive immunity
- Define the cellular/molecular pathways of humoral/cell-mediated adaptive responses
- Define the basic mechanisms that regulate immune responses and maintain tolerance
- Explain the cellular and molecular aspects of lymphocyte activation, homeostasis, differentiation, and memory.

Course Content:

52hrs

Unit-1

13 hrs

Introduction to Immune System

Memory, specificity, diversity, innate and acquired immunity, self vs non-self discrimination. Structure and functions of primary and secondary lymphoid organs.

Cells Involved in Immune Responses

Structure and functions of Lymphocytes, Granulocytes, Macrophages, Dendritic cells and mast cells

Nature of Antigen and Antibody

Antigen vs Immunogen, Haptens, Structure and functions of immunoglobulins, Isotypic, allotypic and idiotypic variations. Clonal selection theory – concept of antigen specific receptor.

Unit-2

13hrs

Humoral and Cell Mediated Immune Responses

Complement activation and its biological consequences, Antigen processing and presentation
Cytokines and costimulatory molecules: Role in immune responses. T and B cell interactions.

Major Histocompatibility Complex (MHC) Genes and Products

Polymorphism of MHC genes, Role of MHC antigens in immune responses, MHC antigens in transplantation.

Unit-3

13hrs

Immunological Techniques.

Production of polyclonal and monoclonal antibodies: Principles, techniques and applications.
Agglutination and precipitation techniques, Radio immunoassay, ELISA, Immunofluorescence assays:
Fluorescence activated cell sorter (FACS) technique.

Hypersensitivity

Immune tolerance, Immunosuppression, Hypersensitivity (Type I, II, III and IV).

Unit-4**13 hrs****Immune Responses in Diseases**

Immune responses to infectious diseases: viral, bacterial and protozoal, Cancer and immune system, Immunodeficiency disorders, Autoimmunity.

Immunization

Active immunization (immunoprophylaxis), Passive immunization (immunotherapy), Role of vaccines in the prevention of diseases.

Reference Books:

1. Immunology (4th edn. 1998) by Ivan Roitt, J Brostoff and David Mole (4th edn) Mosby Times Mirror Int. Pub.Ltd.
2. Essential Immunology (9th ed. 1997) by Ivan Roitt Blackwell Science Ltd.
3. Immunology (1992) by Janis Kuby W H Freeman and Co. Ltd. USA.
4. Immunology (2nd edn. 991) by Edwards S Golub, Sinauer Associate, Sunderland.
5. Antibodies– A Laboratory Manual; E. D. Harlow, David Lane, 2nd Edn. CSHL Press (2014).
6. Basic and Clinical Immunology; Stites et al., [Ed] (1982) Lange.
7. Roitt's Essential Immunology; Ivan, M. Rohitt & Petrer J Delves (2001) Blackwell Science.
8. Immunology: Roitt et al., Mosby (2001),
9. Kuby Immunology; Oven, Punt, Stranford, 7th Edn. W. H. Freeman (2013).
10. Immune System; M. C. Connel et al., Eds. (1981) Blackwell Science.
11. Immunology at a Glance: J.H.L. Playfare [ed.] Blackwell Science, (1987).
12. Immunology; Jan Klein [Ed.], Blackwell Science (1990).
13. Introduction to Immunology; Kim Bell [Ed.,] 3rd Edn. McMillan (1990).
14. NMS for Immunology; Hyde and Patnide [Eds.] John Wiley (1990).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2040	Metabolism-II	HC	3	1	0	4	5

Course Objective:

- Understand the fundamental energetic of biochemical processes, and the relation between biochemical defects and metabolic disorders.
- Recognize and understand basic mechanisms of pathway regulation.

Course Outcomes:

After completing the course the student shall be able to:

60 | Compare and contrast the structural organization and functions of Protein and Nucleic acids.

- Apply the knowledge of Bio molecules to carry out research and Projects.
- Attain the chemical logic of metabolic pathways
- Describe and appreciate the modern techniques utilized in understanding the key mechanistic steps at atomic-level detail.
- Apply the knowledge about the fundamental of energetic biochemical processes. Develop an integrative approach for biological problems.

Course Content:

13 hrs

Unit 1: Chemistry of Amino Acids and Proteins

Structure, Classification and properties of amino acids and proteins. Structural organization of proteins- Keratin, silk fibroin, collagen, myoglobin, haemoglobin, Integral membrane proteins, concanavalin-A and Rossmann fold, ribonuclease, glyceraldehyde-3-phosphate dehydrogenase, lysozyme, chymotrypsin, Triosephosphate isomerase.

Unit 2: Amino Acid Metabolism 13 hrs

Overall nitrogen metabolism, digestion of dietary proteins, transamination reaction (ALT, AST), mechanism of action of aminotransferases. Urea cycle and its regulation. Metabolism of ammonia and its disorders. Biosynthesis and degradation of essential and non essential amino acids and their regulation. Synthesis and degradation of catecholamines. In-born errors of amino acid metabolism: Phenylketonuria, alkaptonuria, homocystinuria, maple syrup urine disease.

Heme Metabolism: Biosynthesis and degradation of porphyrin and their regulation, porphyrias, jaundice and Hemoglobinopathies

Unit 3: Chemistry of Nucleic Acids

13 hrs

Nucleic Acids: Structure and properties of Nucleosides and Nucleotides. Structure of nucleic acids— primary, secondary and tertiary structure of DNA. Physico- chemical properties of nucleic acids - effect of alkali, acid and heat (denaturation and renaturation),

Isolation, fractionation and characterization of nucleic acids. Secondary structure of tRNA and role of secondary structure in mRNA stability. Chemical synthesis of oligonucleotides (phosphate and phosphite method). Nucleoproteins – histone and nonhistone.

Unit 4: Nucleic Acid Metabolism:

13 hrs

Biosynthesis of purines and pyrimidines. Degradation of purines and pyrimidines. Regulation of purine and pyrimidines biosynthesis. Structure and regulation of ribonucleotide reductase. Biosynthesis of ribonucleotides, deoxy ribonucleotides and polynucleotides. Inhibitors of nucleic acid biosynthesis. Salvage pathways. Disorders of nucleic acid metabolism: Gout, hyperuricemia, orotic aciduria, Lesch-Nyhan Syndrome

Reference Books:

1. Biochemistry- R. Garret, Charles M Grisham, Belmont (2013)
2. Biochemistry; Geoffrey Zubey, (1998), WCB Publishers.
3. Biochemistry; David Rawn, Panima Publishers, (1989).
4. Text Book of Biochemistry with Clinical correlations; 6th Edn. Thomas M. Devlin (2012), Wiley-Liss.
5. Lehninger- Principles of Biochemistry; D. L. Nelson and M.M. Cox 6th Edn. Macmillan Publications (2012).
6. Principles of Biochemistry; Smith et al., [Ed.] (1986) McGraw Hill.
7. Bioenergetics; A Practical Approach, G.C. Brown and C.E. Cooper (1995) IRL- Oxford University Press.
8. Biochemistry Ed. Donald Voet & Judith G. Voet, John Wiley & Sons, Inc. (2010).
9. Bioenergetics; David Nicholls and Stuart Ferguson, Elsevier (2013).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2051	BIOINFORMATICS	SC	1	1	0	2	3

Course Objectives:

To make the students familiar with the use of a wide variety of internet applications, biological database so that they will be able to apply these methods to research problems.

Course Outcomes:

After completing the course the student shall be able to:

- Analyze and solve biological problems from the molecular level to ecosystem level using basic biological concepts.
- Apply Biological data in drug design using different softwares.
- Develop new methodology by designing new softwares.
- Apply knowledge in the areas of Biotechnology, Pharmaceuticals and software fields.

- Draw the structures of complex molecules of chemical and biological origin

Course Content:

26hrs

Unit-1

13 hrs

Computer basics, Introduction, Scope of Bioinformatics and Biological data bases

- MS windows basics, UNIX basics.
- PC X Windows (NCD PCXWARE).
- File management.
- E-Mail (PINE, EUDORA, NETSCAPE MAIL).
- File transfer (ftp, WSftp).

Operating Systems: System and application software, evolution of operating systems, layered structure of operating system, CUI and GUIs, DOS internet & external commands, Batch files.

Office Applications: MS-office including MS-Word, MS-Excel, and MS-Powerpoint.

Data bases: Databases structure Organization and management of data bases, Data mining. Retrieval tools of biological data. Biological information resources, Nucleic acid and protein data bases.

Unit 2

13 hrs

Sequence Alignment and prediction of structure of protein

Database similarity searches: BLAST and FASTA, Sequence Alignment. Methods of local and global alignment. Dynamic programming, scoring matrix, PAM, BLOSUM, Pairwise and multiple sequence alignment. Phylogenetic tree construction and software, Methods of prediction of structure of protein and structure prediction softwares, Drug designing : Chemo-informatics in Biology.

Reference Books:

1. Discovering Genomics, Proteomics and Bioinformatics, Campbell A M & Heyer L J, 2nd Edn. Benjamin Cummings, (2007).
2. Protein Bioinformatics; M. Michael Gromiha, Academic Press (1983).
3. Principle and Practice of Bioanalysis; Richard F. Venn (Ed.) Taylor and Francis (2000).
4. Attwood, T. and P.S. David. 2006. Introduction to Bioinformatics. Pearson Education Ltd., New York.
5. Baxevanis, A.D., and Ouellette, B.F.F. (eds) 2006. Bioinformatics A Practical Guide to Analysis of Genes and Proteins. 3rd Edition, John Wiley and Sons, New York.
6. Attwood T.K. and Higgs, P.G. 2005. Bioinformatics and molecular evolution. Blackwell Publishers, London.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2052	FOOD TECHNOLOGY	SC	1	1	0	2	3

Course Objectives:

- To develop the knowledge among students about healthy food and safety technologies
- To evaluate the quality food products which are new to the market
- To develop the methods to improve the quality of food products

Course Outcomes:

After completing the course the student shall be able to:

- Attain fundamental understanding of food science and principles of food preparation.
- Apply scientific knowledge to assess and solve food science problems.
- Apply critical thinking and problem solving skills to address current challenges in the food industry.
- Design and conduct experiments related to food quality and analyze research findings.

Course Content:

26hrs

Unit 1

13hrs

Introduction and Constituents of foods

Food: source, functions of food – food groups – basic five food groups, usage of the food guide – food in relation to health – objectives of cooking.

Water: Purification processes – Ion exchangers, reverse osmosis, activated charcoal treatment. Use of chlorination, ozone, and UV light disinfection. Specification of drinking water. Water borne diseases – microbiological examination. Sources and detection.

Milk: Composition and effectiveness as a diet. Fat content in milk, whole and skimmed. Effect of cooking and heat processing of milk – pasteurization. Preservation of milk. Deep freeze

preservation, dairy products – cheese, butter, ghee and kova. Spray drying technique – milk powder, infant food preparation. Lactose intolerance. Milk substitutes – vegetable milk. Toned milk.

Effect of cooking on the nutritive value of carbohydrate, protein, fat, vitamins and minerals food products. Emulsions and emulsifiers, rancidity of fats – chemistry of fat and oil processing , Fortification with vitamins and minerals. Effect of cooking on different methods of cooking of vegetables, fruits – dehydrated fruits, canned fruit, canned fruit juices. Estimation of thiamine, riboflavin (fluorimetry) and metals in tea dust.

Unit 2:

13hrs

FOOD ADDITIVES, ADULTERATION AND HYGIENE

Enzymes in food processing. Enzymic browning – mode of action and prevention of enzymic and non-enzymic browning. Artificial sweetening agents. rancidity of fats ; storage of fats. Fortification with vitamins and minerals.

Food Additives: Food additives: Artificial sweeteners – saccharin, cyclamate, aspartame – food flavours – esters, aldehydes and heterocyclic compounds. Antioxidants. Food colours – changes in cooking..Restricted use. Spurious colours. Emulsifying agents, preservatives – leavening agents. Baking powder –Yeast. Taste enhancers – MSG-vinegar Modern food: Mushroom cultivation and types, . Production of bread, bun and biscuits. Raw materials, methods and machinery required. Functions and uses of food additives.

Beverages: Composition of soft drinks. Preservation of tetrapack. Nitrogen preservation and packing of fruit juices.

Food Adulterants: Common adulterants in different foods – milk and milk products, vegetable oils, fats, spices, cereals and pulses. Prevention of food adulteration

Food preservation and processing: Food deterioration, methods of preservation and processing. Quality control: Specifications and standards: PFA, FPO, FDA, drug license, WHO standards, ISI, AGMARK.

Reference Books:

1. Swaminathan M. Advanced Text Book on Food and Nutrition , volume I and II Printing and Publishing CO., Ltd., Bangalore. 1993.
2. Swaminathan M. Text Book on Food chemistry, Printing and Publishing CO., Ltd., Bangalore. 1993.
3. Norman N. Potter , Food science, CBS publishers and distributors, New Delhi. 1994.
4. Lillian Hoagland Meyer, Food Chemistry, CBS publishers and distributors, New Delhi. 1994.
5. Owen R Fennema, Food Chemistry, Marcel Decker Inc., New York. 1996.

65 | Sri Lakshmi B., Food Science, New age International Pvt. Ltd. Publishers, III ed. 2003.

7. Siva Sankar B., Food Processing and Preservation. Prentice – Hall of India Pvt. Ltd., New Delhi. 2002.
8. Ramakrishnan S., Prasannam K.G and Rajan R –Principles. Text book of medical biochemistry. Orient Longman Ltd. III ed. 2001.
9. Shakuntala Manay N. and ShadaksharaswamyM. FOODS: Facts and Principles. New age International Pvt. Ltd. Publishers

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC2060	YOGA / SPORTS / MUSIC / DANCE/ THEATRE	RULO	0	0	2	2	3

Note: Music, Dance, and Theatre courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

- To prepare the students for the integration of their physical, mental and spiritual faculties;
- To enable the students to maintain good health;
- To practice mental hygiene and to attain higher level of consciousness;
- To possess emotional stability, self control and concentration; and
- To inculcate among students self discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

- Practice yoga for strength, flexibility, and relaxation.
- Learn techniques for increasing concentration and decreasing anxiety
- Become self disciplined and self-controlled
- Improve physical fitness and perform better in studies
- Gain self confidence to face the challenges in the society with commitment to serve the society

Course Content

Unit-I:

Yoga: Introduction, Tips from Sage Patanjali's Yoga Sutras

Surya Namaskara:- 10 counts,12 counts,16 counts

Unit-II:

Asanas: Sitting-Vajrasana, Dandasana, Padmasana, Matsyasana, Ardha Matsyendrasana, Suptavajrasana, Paschimottasana, Bakasana, Simhasana, Shirasasana.

Asanas: Standing-Tadasana, Trikonasana, Parshwa konasana, Veerabdrasana, Parivrutta trikonasana.

Unit-III:

Asanas:Prone Position-Bhujangasana, Dhanurasana, Shalabhasana.

Asanas: Supine Position-Sarvangasana, Sethubandha sarvangasana, Halasana, Karnapeedasana.

Mudras- Dhyana mudra, Chinmaya mudra, Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:- Ujjayi, Nadi Shodhana, Anuloma – Viloma, Basthrika, Bhramari, Sheethali
Dhyana & its types

Competition format, Rules and their interpretations

B. SPORTS (VOLLEYBALL)

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of volleyball.
2. To develop skills in passing, setting, serving, spiking, and blocking.
3. To learn basic offensive and defensive patterns of play.
4. To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with volleyball.
2. Apply these skills while playing volleyball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- **Introduction about Volleyball**
- Players Stance, Receiving and passing
- The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

Unit-II

- Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)
- Setting the ball- Set for attack, Back set, Jump set

Unit-III

- Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash
- Block- Single block, Double block, Three-man block
- Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

Unit-IV

- Attack Combination, Defense Systems, Libero play
- Court marking, Rules and their interpretations and Duties of officials

C. SPORTS (BASKETBALL)

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of Basketball
2. To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.
3. To learn basic offensive and defensive strategies of play.
4. To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
5. To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with basketball.
2. Apply these skills while playing basketball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

- Basketball: Introduction
- Grip; Player stance- Triple threat stance and Ball handling exercises
- Passing (Two hand/one hand)- Chest pass, Bounce Pass, Over head pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
- Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

Unit-II

- Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
- Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
- Stopping- Stride/Scout, Pivoting and Faking /Feinting footwork.

Unit-III

- Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
- Individual Defensive- Guarding the man with the ball and without the ball.
- Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

Unit-IV

- Court marking, Rules and their interpretations

D. SPORTS (FOOTBALL)

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of football.
2. To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.
3. To learn basic offensive and defensive patterns of play
4. To use different parts of the body in utilizing the above skills while playing football
5. To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with football.
2. Apply these skills while playing football and exhibit improved performance
3. Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
4. Improve physical fitness and practice positive personal and lifestyle.
5. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

1. Football: Introduction

- Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
- Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

Unit-II

- Dribbling- With instep and outer instep of the foot.
- Heading- From standing, running and jumping.

-
- Feinting- With the lower limb and upper part of the body.

Unit-III

- Tackling- Simple tackling, Slide tackling.
- Throw-in- Standing and Sliding
- Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

Unit-IV

- Ground marking, Rules and their interpretations

E. SPORTS (TRACK AND FIELD)

Course Objectives:

1. To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
2. To develop competence among students in demonstrating all the techniques covered in the course.
3. To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
4. To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.
5. To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course learners will be able to:

1. Display competencies in executing basic techniques and skills associated with select track and field events.
2. Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.
3. Learn regular practice of select track and field events and improve physical fitness
4. Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Content:

Unit-I

- Athletics: Introduction
- Track Events - Steeple Chase, Race Walking, Middle and Long distance races
- Race walking - Technique, Faults and Officiating.
- Middle and Long distance races – Technique and Training

Unit-II

- Jumping Events - High Jump and Triple Jump: Basic Skills and techniques

- High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air, Clearance over the bar & Landing
- Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

- Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
- Discus Throw -Standing and Rotatory techniques,Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
- Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

- Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference Books:

(Athletics Part-I and Athletics Part-II)

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). “Track and field coaching Manual”, Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. Carr, Gerry (1999). “Fundamentals of Track and Field. Track Athletics I Title G.V. 1060 5.e. 368.
10. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
11. Jarver, Jesse (1987). “The Jumps”, Track and Field Coaching Manual Australia.

F. DRAMATICS

Pre-requisites: Students with background in Theatre Arts/ Keen interest in Dramatics.

Course Objectives:

- To imbibe the acting skills.
- To understand the broader applications of theatre studies in allied arts forms.

71 | To be able to use body language for better communication.

- Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

1. Freely express improvisation in non-verbal communication.
2. Shall hone good acting skills and be able to emote better.
3. Be able to put up a theatre act and play a key role.
4. Be able to differentiate good acting and understand the importance of good lyrics, stage crafting, music, dance, costume and lighting.

Course Content:

UNIT – 1

Working on Body:

Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT – 2

Sound and Movement:

Awareness of creating sound patterns, voice modulations, rhythm in speech and dialogues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT – 3

Characterization and Improvisation:

Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT – 4

Group work and Production:

Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Reference Books:

1. All about Theatre – Off stage – Chris Hogget.
2. Rangadalli Anataranga – K V Subbanna
3. The Indian Theatre – Hemendranath Das Gupta.
4. A Practical handbook for an Actor – Milisa Bruder, ee Milchel Cohn, Madeleine Oliek et al, Zigler Publisher.

G. INDIAN CLASSICAL DANCE FORMS (Bharathanatyam, Kuchipudi ,Mohiniyattam)

Prerequisites: Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join.

Course Objectives:

- To develop an understanding about the Indian classical dance forms and its universal application.
- To be able to understand the fine nuances of Classical dance.
- To understand the importance of health through Indian classical dance, strengthen the body capacity.
- To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.

Course Outcomes:

- To be able to identify and appreciate the classical dance forms.
- To be able to execute basics of Adavus with finesse.
- To be able to express through abhinaya.
- To be able to perform to perform the fundamentals in the chosen dance form.

Course Content:

Unit 1

An introduction to Indian classical dance forms: Bharatanatyam, Kuchipudi, Mohiniyattam.

Unit 2

Learning of Fundamentals: Exercises and Adavus- I (Bharathanatyam , Kuchipudi, Mohiniyattam).

Unit 3

Adavus –II (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 4

Learn a basic composition in the chosen dance form.

Reference Books:

1. Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi
2. Classical Dances –Sonal Mansingh, Avinash Parischa
3. Kuchipudi – Sunil Kothari
4. Bharatanatyam An in depth study- Saroja vydyanathan
5. Mohiniyattam – Bharathi Shivaji

H. PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Pre-requisites: Students with background in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Course Objectives:

- To understand the Rhythmology.
- To understand the importance of Laya, Taala.

- To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

- To be able to set instrument to Sruthi.
- To be able to play the fundamentals on instrument.
- To be able to learn and perform a particular taala.

Course Content:

UNIT 1

1. Introduction to Musical Instruments
2. Percussion Instruments
3. Mridangam and its History

UNIT 2

1. Introduction to Tala System
2. Definitions of 5 jaathis and their recitation
3. Adi Talam and its various forms
4. Definitions and recitation of different gathis

UNIT 3

1. Tisra Jaathi
2. Khanda Jaathi
3. Misra jaathi
4. Sankeerna Jaathi

UNIT 4

1. Learning of Jathi Formation
2. Basic jathis
3. Jathis for Dance forms
4. Some Basic Definitions of Korvai, Teermanam etc.,

Reference Books:

1. Mridangam- An Indian Classical Percussion Drum – Shreejyanthi Gopal
2. Theory and practice of Tabala – Sadanand Naimpally.
3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – Srdjan Beronja.
- 5.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2070	PROTEIN CHEMISTRY (LABORATORY - V)	HC	0	0	2	2	4

Course Objective:

To provide general knowledge on protein structure and function, as well as the experimental techniques in protein chemistry, to develop the ability of identifying the experimental techniques required to solve specific problems related to proteins and enzyme functions and also to train students in the evaluation of the consequences of biochemical and biological tools in their professional activities.

Course Outcomes:

After completing the course the student shall be able to:

- Apply the knowledge about standard laboratory equipment, modern instrumentation & classical techniques to carry out experiments
- To explain the importance of protein-protein interactions in biological systems.

Course Content:

1. Isolation, separation and identification of protein/enzyme using thin layer chromatography.
2. Purification of an enzyme using column chromatography (ion-exchange columns/gel filtration/affinity chromatography).
3. Estimation of protein by Lowry's method.
4. Estimation of tyrosine by Millon's method.
5. Molecular weight determination and kinetic studies on purified enzymes.
6. Protein synthesis in a cell free protein synthesizing system from animal and plant source. (industrial visit)

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2080	IMMUNOLOGY (LABORATORY VI)	HC	0	0	2	2	3

Course Objective:

To familiarize students with the various immunological techniques that include antigen-antibody interactions, quantitation of antigens or antibody, ELISA, agglutination reactions etc.

Course outcomes:

After completing the course the student shall be able to:

- Design experiments to confirm interactions between known proteins using immune precipitation reactions.
- Apply the knowledge of blood group antigens to determine the blood groups.

Course Content:

1. Demonstration of Ag-Ab interaction: Radial immuno-diffusion and ODD.
2. Demonstration of direct agglutination reaction using human blood group antigens.
3. Bacterial agglutination (WIDAL)
4. Antibody titration – ELISA; Direct, Indirect ELISA.
5. Rocket electrophoresis.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC2090	MOLECULAR BIOLOGY (LABORATORY VII)	HC	0	0	2	2	4

Course Objective:

To have the knowledge about the importance of solvents and their uses in the isolation of genomic DNA and plasmid DNA from various sources like plants, bacteria and animal source.

Course Outcomes: The student shall be able to:

- Demonstrate and handle various disease producing microorganisms.
- Differentiate the old techniques used in molecular biology while using latest techniques.
- Apply the short form techniques and they may examine and avoid the unwanted steps and harmful chemicals for producing better results.
- Construct the recent techniques for isolation of various molecular components like DNA, RNA and Cell organelles.
- Explore the disadvantage while using harmful microorganism for the production of large scale products.

Course Content:

1. Isolation of DNA from cauliflower, sheep liver and bacterial source.
2. Isolation, separation, identification and Determination of molecular weight of Proteins by SDS-PAGE.

3. Subcellular fractionation of organelles from liver cells and identification by the use of marker enzymes.(industrial visit)
4. Separation of Protein in HPLC

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC20X0	BIOINFORMATICS (LABORATORY VIII)	HC	0	0	2	2	3

Course Objective:

To make the students familiar with the use of a wide variety of internet applications, biological database so that they will be able to apply these methods to research problems.

Course Outcomes:

After completing the course the student shall be able to:

- To describe the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches,
- Analyze and discuss the results in light of molecular biological knowledge

Course Content:

1. Writing a BASIC computer program to plot graphs of enzyme kinetic data by a variety of linear transforms and the Michaelis- Menten hyperbolic plot.
2. Prediction of structure of a biomolecule by using various softwares.(Rasmol, PDB, Identification of ligands/substrate through docking, chemsketch etc,...)
3. Subcellular fractionation of organelles from liver cells and identification by the use of marker enzymes.(industrial visit)

SEMESTER - III

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3010	MOLECULAR BIOLOGY	HC	4	0	0	4	4

Course Objectives:

To understand the scientific process, in the context of learning the fundamental biological and chemical 'facts' of molecular biology.

To propose hypotheses and explain biological phenomena by adopting scientific methods

Course Outcomes:

After completing the course the student shall be able to:

- Analyze the molecular mechanisms by which DNA controls development, growth or morphological characteristics of organisms
- Explain concepts such as gene structure and function, gene regulation, microbial genetics, mutation and DNA
- Describe the importance of recent discoveries and the applications and potential of molecular biology and the ethical issues associated with these new technologies
- Develop effective, creative and innovative solutions, both independently and cooperatively, to current and future research problems in Molecular Biology
- Analyse, evaluate the information from a wide variety of sources to understand the key principles of Molecular Biology

Course Content:

52 hrs

Unit -1

12hrs

INTRODUCTION: Principle of DNA sequencing, automated sequencing, extending the sequence, shot gun sequencing. Interpretation of DNA sequences. Role of counterions, deep and narrow grooves, single stranded DNA, A, B and Z DNA etc. Chirality of the helix, syn/antiparallel complementary strands.

Physical properties of RNA: Classes of RNA, rRNA, tRNA, mRNA, HnRNA etc.

Unit -2

14hrs

DNA Replication: Replication origin and replication fork, mapping origin of Replication by autoradiography and electrophoresis, semi-conservative and semi-discontinuous replication; DNA Polymerases, Semi-discontinuous synthesis, Replication apparatus of phage. Properties and functions of DNA polymerase-I, Kornberg enzyme, Subunit composition of polymerase –III holoenzyme, telomerase, topoisomerase and gyrase.

Genetic code; Properties of genetic code, coding properties of mRNA, Coding properties of tRNA, triplet binding assay, Khorana and Neirenberg experiments, base pairing between codon and anti-codon, Wobble base pairing., deviation from universal genetic code.

Unit-3

15hrs

Transcription in prokaryotes: RNA synthesis and processing (transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, capping, elongation, and termination, RNA processing, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport).

Protein synthesis and processing (Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post-translational modification of proteins).

Unit -4

11hrs

DNA Repair : Damaging agents and damage recognition, direct repair, Miss-match repair assay for mismatch repair, Base excision repair (BER), Nucleotide excision repair (NER) systems; components and mechanism of repair, error prone repair, SOS and Rec-A.

Satellite DNA: C-value paradox, possible functions of satellite DNA, Mechanical strength, gene library, suppressor mutation, centromeric DNA, split genes

Chromatin: Histone and non-histone proteins . Nucleosomes, role of H1.

Reference Books:

1. Molecular cloning: a laboratory manual (Vol.1,2&3) 1989) by T.Maniatis, E.F.Fritsch, J. Sambrook. Cold Spring Harbor Laboratory Publications.
2. RNA Isolation and Analysis by P.Jones, J.Qiu, D.Rickwood (1st ed.1994) Bios Scientific Publishers.
3. Gene and Probes: A practical Approach Series (1995) by B D Hames and S J Higgins. Oxford university Press.

4. Gel Electrophoresis of nuclei Acids: A practical Approach (1990) by D.Rickwood and B.D.Hames. OxfordUniversity Press.
5. Biochemistry and Molecular Biology of Plant; Buchanan, Gruissum and Jones, (2000), ASPP, USA.
6. Biochemistry; David Rawn, Panima Publishers (2012).
7. The Bacteriophages; Richard Calendar, 2nd Edition, Oxford University Press (2005).
8. Basic Virology; Wagner and Hewlett; Blackwell Science, (2004)
9. LEWINS Gene XI; J.E. Krebs, E.S. Goldstein, and S.T. Kilpatrick, Jones and Bartlett Publishers (2012).
10. Molecular Biology of the Cell, Alberts et al., Garland Publications, (2012).
11. Molecular Biology, David Freifelder, Narosa Publishers, (1997).
12. Molecular Biology Robert F. Weaver, McGraw Hill (2012).
13. Microbial Genetics; Maloy et al., Jones and Bartlett Publishers, (1994).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3020	NUTRITIONAL BIOCHEMISTRY	HC	3	0	0	3	3

Course Objective:

To make the students familiar with various classes of nutritional food groups , contents and their biochemical importance in various health conditions.

Course Outcome:

After completing the course the students shall be able to:

- Acquire the knowledge and analyse the nutritional importance of foodgroups.
- Acquire the knowledge about the allergicsubstances present in various foods.
- Attain the knowledge about fortification and food supplementation.
- Understand the purpose of food analysis to avoid variousfood related diseases.

Course Content:

52hrs

Unit-1

15hrs

Introduction of Nutrition: Energy concept of foods- Definition and characteristic feature of balanced diet, proximate analysis of foods for carbohydrates, proteins, fats, fibre material.Determination of calorific value of foods, like carbohydrates, fats and proteins. Biochemical importance of R.Q. BMR, measurement of BMR, direct and indirect method, factors affecting BMR.

Biological Oxygen Demand: Definition and importance. Energy requirement for different physical activities. Standard Dynamic Action (SDA) of food. Recommended Daily Allowance (RDA) – Definition

for various food and physical activities.

Unit-2

13hrs

Carbohydrates: carbohydrate reserves of the human body, nutritional importance of carbohydrates.

Proteins: Protein reserves of human body. Nitrogen balance studies and factors influencing nitrogen balance. Essential amino acids for man and concept of protein quality. Protein energy malnutrition:

Marasmus, Kwashiorkor, causative factors, symptoms, treatment & prevention

Lipids: Major classes of dietary lipids. Properties and composition of plasma lipo-proteins. Dietary needs of lipids. Essential fatty acids and their physiological functions.

Unit-3

13hrs

Nutritional importance of vitamins: Classification, sources, daily requirement and functions. Hypervitaminosis of fat soluble vitamins

Nutritional importance of Minerals: Definition, classification, sources, daily requirement and deficiency, symptoms. The process of digestion, absorption, functions, toxicity interaction with other nutrients.

Unit-4

11 hrs

Biochemical aspects of oxidative stress and antioxidants. Free radicals- formation and biological importance in human system. Natural antioxidants, role of free radicals and antioxidants in health & diseases.

Starvation : Protein metabolism in prolonged fasting. Protein sparing treatments during fasting. Basic concept of high protein, low caloric weight reduction diets.

Obesity : Definition and classification. Genetic and environmental factors leading to obesity. Obesity related diseases and management of obesity.

Reference Books:

1. Nutrition: An integrated approach (3rd edn. 1984) R L Pike and M L Brown, Wiley & Sons Inc., NY.
2. Text Book of Biochemistry and Human Biology G P Talwar, Prentice Hall.
3. Mechanism and Theory in food chemistry (1996) DWS Wong, CBS, New Delhi.
4. Text Book of Human Nutrition (1996) M S Bamji N Pralhad Rao and V Reddy, Oxford & IBH Publishers.
5. Nutritional Biochemistry and Metabolism Linten.
6. Principles of Food Science-I (Food chemistry) Fennemona D R.
7. Human Nutrition and Dietetics (8th Ed. 1982) by Davidson and Passmore ELBS.

8. Modern Nutrition in Health and Diseases (7th ed. 1988) by Maurice E Skills and V R Young K M VargheseCo. Bombay.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3030	BIOCHEMICAL GENETICS	HC	2	1	0	3	4

Course Objective:

To develop and demonstrate an understanding of the structure and function of genes and the organization of the human genome; the patterns of inheritance and clinical manifestations of genetic diseases; chromosomes, chromosomal abnormalities, and the clinical features of common chromosomal disorders; population genetics; inborn errors of metabolism;

Course Outcomes:

After completing the course the student shall be able to:

- Demonstrate an understanding of how the principles of genetics underlie much of the basis of modern molecularbiology.
- Understand the relationship between the phenotype and genotype in human quantitative traits
- Describe the gene expression regulated at different levels.
- Attain knowledge of basic concepts of hereditary , population genetics and master the calculations of fundamental genetics
- Describe examples of human genetic disorders caused by gene mutations and chromosomal rearrangements

Course Content:

52hrs

Unit 1

Introduction: Chromosomes and genes. Mutation: types of mutation, mutagens, mechanism of mutation
Quantitative Genetics: Human quantitative traits, discontinuous traits and continuous traits, Breeding analysis, estimation of Heritability Index **13 hrs**

Unit 2

Classical Genetics: Review of classical genetics; work on *Pisum sativum*, *Drosophila* *Melanogaster*. Inheritance (sex-linked and others). Population genetics, extranuclear inheritance. Sex determination, Morgan's discovery of sex linked inheritance of sex linked genes, X; linked traits in humans. Identification of sex chromosomes, XX,XY, mechanism of sex determination

13 hrs

Unit 3

Human Genetics: Biochemical events occurring during mitosis and meiosis. Structure of chromatin; nucleosomes and higher orders of organization. Chromosome banding, Chromosome mapping based on recombination frequency data. Transposons. Overview of human genome project, mapping of human genes; techniques used, assignment of important genes. Transposition in human chromosomes. Chromosomal abnormalities.

13 hrs

Unit 4

Bacterial Genetics: Bacterial chromosomes, plasmids; fertility, resistance, colicinogenic and others. Recombination in bacteria.

5 hrs

Viral Genetics: Life cycles of bacteriophages, lytic cycle; replication of T-phages. Lysogeny and its regulation. Transduction; specialized, generalized and abortive. Fine structure analysis of T- phages; Benzers work, concept of cistrons.

8hrs

Reference Books:

1. Discovering Genomics, Proteomics and Bioinformatics, Campbell A M & Heyer L J, 2nd Edn. Benjamin Cummings, (2007).
2. Introduction to Genetics: A Molecular Approach; T A Brown, Garland Science (2011).
3. Molecular Cell Biology; Lodish et al., 7th Edn. W.H. Freeman and Co. (2012).
4. Molecular Biology of the Cell; 7th Edn. Bruce Alberts et al., Garland Publications (2008)
5. Principles of Developmental Genetics; S.A. Moody, Academic Press (2007).
6. The Cell; Geoffrey Cooper, and Robert E.; 5th edn. Hausman Sinauer Associates (2009).
7. Human Genetics; Lewis, 7th Edn. WCB & McGraw Hill (2007).
8. Essential Genetics: A Genomics Perspective; Daniel L. Hartl, 6th Edition, Jones and Barlett Learning (2012).
9. Bacterial and Bacteriophage Genetics; Edward A. Birge, 5th Edition, Springer (2006).
10. Nucleosome Histone, and Chromatin; Part-A; Carl Wu and C. Allis, Academic Press (2012).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3041	PHARMACOVIGILANCE AND SAS	SC	4	0	0	4	4

Course Objectives:

1. Develop special expertise in the corresponding clinical domain and/or research methods.
2. Enable students to gain in-depth knowledge on the best way to collect and report adverse events and safety data
3. Manage the risks associated with certain products.
4. Provide students with the key skills and knowledge needed to operate a fast, effective drug safety or Pharmacovigilance program

Course Outcomes:

After completing the course the student shall be able to:

- Compile, analyse and evaluate reports from scientific literature and databases about adverse drug reactions.
- Explain the importance of pharmacogenomics for individual variation in adverse drug reactions.
- Analyse methods for Pharmacovigilance.
- Analyse and assess warnings, risk management and risk communication about adverse drug reactions.
- Analyse and assess the effects and safety of drugs.

Course Content:

52hrs

Unit-1

13hrs

Drug Development Process and Pharmacoepidemiology

Drug discovery, Permutation and formulation, ICH-GCP Guidelines, ICMR Guidelines, USFDA guidelines, Indian Regulatory Authority Frame Work-CDSCO Regulations, DCGI, Data to be submitted along with the application to conduct clinical trials/import/manufacture of new drugs for marketing in the country, Data required to be submitted by an applicant for grant of permission to import and manufacture

a new drug already approved in the country. Structure, Contents and Format for clinical study reports.

Definitions: epidemiology, Disease distribution, disease determination, disease frequency, Aims of epidemiology, Difference between epidemiology and clinical medicines, Epidemiological approach, Measurements in epidemiology, (rates, ratios, and proportions) Measurement of mortality: international death certificate, limitations and use of mortality data, mortality rates and ratios, crude death rates, specific death rates, case fatality ratio, proportional mortality ratio, survival rate, standardize rates, direct standardization, indirect standardization, Measurement of morbidity: Incidence, Prevalence, uses of prevalence, relationship between incidence and prevalence.

Unit-2

13hrs

Clinical Trial Management and Clinical Data Management:

Definition: Clinical Research, Different phases, study designs in research, glossary, Different parties involved in Clinical research, Regulatory Authorities, IRB/IEC, Sponsor, CRO, SMO, Investigator, Patients, Clinical Research History, Food, Drug & Cosmetic Act, Nuremberg Code, Declaration of Helsinki, ICH, Thalidomide Disaster

Different Regulatory Bodies- an overview, FDA, DCGI, MHRA, MHLW, TGA, IRB/IEC, Schedule Y, IND & NDA Application, Regulatory requirements & Forms, Clinical Trials process & monitoring, Roles of different parties, Clinical Trial process and design, Informed Consent Process, TMF (Trial Master File), Investigator Boucher, Essential Documents

CDM Overview, CRF Design – Theory & Practical Design of the pCRF (Paper CRF) & eCRF (electronic CRF), Data Entry & DE Guidelines, Discrepancy Management, Data Validation, CDISC (SDTM), Query Management, QA, QC in CDM, Audits & Inspections (Indian DCGI & USFDA), SAE Reconciliation, Data Management Systems and Tools, Medical Coding and Medical Dictionaries – MedRA & WHODD, Documentation and Document Management System, Data Archival, Software's in CDM, CDM, **SAS**

Unit-3

13hrs

Pharmacovigilance, Introduction and use of SAS

Introduction, Scope, definition and Aims of Pharmacovigilance. Adverse drug reactions – Classification, mechanism, predisposing factors and casualty assessment. Role of clinical pharmacist in Reporting, evaluation, monitoring, prevention and management of ADR Adverse drug

reaction. Signal detection, PSUR (Periodic safety update report), Safety specification, and Risk management. Exporting and monitoring Drug induced diseases.

Environment of SAS, Library structure in SAS, Data steps and Procstep, manipulating the data- Converting the numeric data to character and vice versa. Using logical operators and where conditions, Merging of the datasets, Writing the data into multiple datasets. Debugging errors in the program. Writing the procedure- Tabulate, Univariate, Means, Median, Mode, Report, Sort, Mixed, Transpose etc. Creating the html reports. Importing the data to SAS and exporting the data from SAS. Overview of SAS macros.

Unit-4

13hrs

Regulatory Affairs, Medical & Scientific writing

Basic Fundamentals of Regulatory Affairs, Introduction to Regulatory Bodies, Introduction to Quality Standards for Regulatory Compliance, Common Technical Documents - CTD (API & Formulation), Introduction to eCTD, ASEAN Common Technical Dossier (ACTD), Marketing Authorization Procedures in USA, Marketing Authorization Procedures/ Channels in Europe, Marketing Authorization Procedures in India, Marketing Authorization Procedures in ROW markets, Maintenance and Annual updates for Marketing authorizations, Reference on Further reading & Dissertation.

What is Medical Writing, Scope of Medical Writing, Medical Writing in Clinical trials, Medical Writing and Scientific Writing, Fundamentals of Medical Writing, Regulatory Medical Writing, The Writing Process, Good Writing Skills: Introduction to basic rules, Elements of style Good Clinical Practice guidelines, The Clinical Study Report

Introduction to publication writing, Regulations and Industry Standards, Writing Effective Documents, Writing standard operating procedures policies, procedures, instructions and methods, Writing quality manuals and plans

Reference Books:

1. Basic and Clinical Pharmacology, Prentice hall, International, Katzung, B.G.
2. Clinical Pharmacology, Scientific book agency, Laurence, DR and Bennet PN.
3. Clinical pharmacokinetics, Pub. Springer Verlag, Dr. D.R Krishna, V. Klotz
4. Remington Pharmaceutical Sciences, Lippincott, Williams and Wilkins
5. Drug interaction, Kven Stockley. Hamsten
6. Drug interaction, Basic Bussiness Publ, Bombay, J.K. Mehra
7. Clinical pharmacology and drug therapy Grahame smith and Aronson,
8. Text Book of Therapeutics Drug and Disease Management Hardbound. Richard A Helms,
9. Clinical Pharmacy and therapeutics Herfindal E T and Hirschman JL, Williams and Wilkin

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3042	CLINICAL BIOCHEMISTRY AND CLINICAL DIAGNOSTICS	SC	4	0	0	4	4

Course Objectives:

1. To describe the principle involved in the measurement of analyses in the clinical biochemistry laboratory,
2. Outline how biochemical analysis can be employed to differentiate between normal and diseased conditions
3. Discuss the function, structure, laboratory investigation and diseases of the different bodysystems.

Course Outcomes:

After completing the course the student shall be able to:

- Illustrate the various metabolic disorders and analyze the diagnostic procedures to find remedy.
- Attain the knowledge of causes, symptoms of various diseases.
- Construct the new diagnostic tools to demonstrate the blue print of variousdiseases

Course Content:

52hrs

Unit-1

13hrs

Human Physiology

Rhythmical excitation of heart, basic theory of circulatory function, blood flow and resistance, function of arterial and venous systems

Microcirculation and lymphatic system, control of blood flow, regulation of arterial pressure, cardiac output.

Spinal cord and motor functions, role of brain stems in controlling motor functions, functions of cerebellum, functions of cortical areas, the limbic system and cerebrospinal fluid system.

Medico –informatics

Introduction to Medical Network Design & Development Emergence of Medical Informatics as a Discipline; Library facilities & Logistics ; Online Resources ; Grading and Class Policies, Medical data acquisition and database systems: PC based multichannel data acquisition system; storage, analysis and retrieval techniques.

Basics of sequence analysis-

Dot matrix method, Needleman–Wunsch Algorithm and Smith-Waterman algorithm, Alignments using BLAST and FASTA, Multiple Sequence Alignment (CLUSTAL-X and CLUSTAL-W), Application of multiple sequence alignment.

Unit-2

13hrs

Analysis tools: Analysis by TreeView, Genedoc and Lasergene. Protein Structure Prediction in Bioinformatics- Ab initio based methods, Homology based methods, prediction with neural networks, secondary structure prediction (helical membrane proteins, beta-barrel membrane proteins). Protein structure comparison of intermolecular and intramolecular methods Phylogenetics- construction by distance based methods, character based methods.

Visual programming concepts

Visual Basic environment, tools and controls; Dynamic data exchange; VB based Medical information System. Basic concepts of Multimedia; Design of Multimedia information systems; Components of virtual reality; Virtual reality applications in medicine. Medical Informatics and its levels; Design and development of educational packages on medical sciences; Integrated design concepts; Interactive multimedia, Virtual and digital libraries, Internet and its applications.

Hospital Information System its design and functional characteristics; Pattern Recognition, Neural Network and Fuzzy Logic in Medicine. Autonomous, Decision-Support & "Expert" System: History of Artificial Intelligence in Medicine; Expert Systems in Medicine; Clinical Software Overview Risks of Decision-Support Systems, Computational Statistics in medical biology.

CLINICAL BIOCHEMISTRY

UNIT – 3

13hrs

Concepts of accuracy, reproducibility, reliability and other factors in quality control: Specimen collection and processing, collection of blood- venepuncture, arterial puncture and anticoagulants.

Collection and analysis of normal and abnormal urine samples, preservation, clinical

significance of sugars, ketone bodies, proteins & bilirubin. Theories of CSF collection, composition and analysis.

Disorders of carbohydrate metabolism: Blood sugar levels, hyper and hypoglycemia, regulation of blood glucose level. Diabetes mellitus- types, causes and symptoms. GTT, HbA1C, GSD, HMP Shunt, fructosuria & fructose intolerance.

Disorders of lipid metabolism: Lipid levels in various conditions, lipoproteins, clinical inter-relationship of lipids.

Diagnostic tests for apolipoproteins, HDL-C, LDL-C, and triglycerides levels in healthy & diseases conditions. Hypercholesteremia, fatty liver and myocardial infarction.

Disorders of protein metabolism: Non-protein nitrogenous constituents in blood- urea, uric acid & creatinine. Plasma protein abnormalities, multiple myeloma, proteinuria, haemoglobinopathies, PKU, AKU, homocystinuria, albinism & Bence Jones proteins.

UNIT – 4

13hrs

Disorders of nucleic acid metabolism: Disorders of purine metabolism- Gout- causes & symptoms, xanthinuria, orotic aciduria & L-N syndrome.

Disorders of mineral metabolism: Hypercalcemia, hypocalcemia, hypophosphatemia & hyperphosphatemia.

Disorders of vitamins & trace elements: Hypervitaminosis- causes & symptoms, trace elements deficiency disorders.

Evaluation of organ function test: Assessment and clinical manifestation of renal, pancreatic, gastric and intestinal functions.

Disorders of heme metabolism: Jaundice- types, causes & symptoms. Clinical importance of diagnostic enzymes- SGOT, SGPT, creatine kinase, aldolase, LDH, CPK, troponin 'C'

Renal and gastric functional test: Acute and chronic renal failure, urinary tract, observation and analysis of urinary calculi, LFT, pancreatic and gastric function test.

Reference Books:

1. R. D. Lele, "Computer in Medicine", Tata McGraw-Hill, New Delhi, 1997.
2. Tay Vaughan, "Multimedia making it work", Tata McGraw-Hill, New Delhi, 1997.
3. Davis Chapman, "Teach Yourself Visual Basic 6 in 21 days", New Delhi, 1997.
4. Harold Sackman, "Biomedical Information Technology", Academic Press, New York, 1997.
5. Tietz Fundamentals of Clinical Chemistry – (5th edn.) C A Burtis, E R Ashwood (eds.) Saunders WB Co.

6. Notes on Clinical Chemistry – Whitby L G, A F Smith, G J Beckett, S M Walker, Blackwell science Inc.
7. Practical Clinical Biochemistry methods and later ,3rd edition,2003,2006 by Ranjna Chawla.
8. Practical Clinical Biochemistry,4th edition,2005,by Harold Valley.
9. Practical Biochemistry-Principles and Techniques,5th edition by Keith Wilson and John Walker(2000).
10. Introductory Practical Biochemistry-3rd edition,2005 by S.K.Sawtrej,Randhir Singh.
11. Biochemical Methods- 3rd edition,2008,by S.Sadasivan and A.Manickam.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3043	Plant and Industrial Biochemistry	SC	4	0	0	4	4

Course Objectives:

- To acquire a good working knowledge of the chemistry of important biological processes in plants,
- To understand and explain secondary metabolites and their potential therapeutic and nutritional uses
- To enable students to readily assess current developments in plant and industrial biochemistry.

Course Outcomes:

After completing the course the student shall be able to:

- Acquire knowledge about how light energy is captured and transformed to power the functions of cells and wholeplants.
- Analyze the response of plants for various factors
- Attain knowledge about the structure, function and biosynthetic pathways of essential biochemical molecules and their key chemical and physicalproperties
- Develop an understanding of various aspects of BioprocessTechnology.
- Develop skills associated with screening of industrially importantStrains

Course Content:

52hrs

Unit-1

13hrs

Structure and functions of plant cell (including cell wall, plasmodesmata, meristematic cells, vacuoles, secretory systems and root quiescent zone), Isolation of cell organelles, absorption, adsorption and transport of water and ions in plants. Evapotranspiration.

Biological nitrogen fixation and ammonia assimilation. Nitrate and sulphate reduction and their incorporation into amino acids. Translocation of inorganic and organic substances. Metabolism of sucrose and starch. Important routes (pathways) of biosynthesis- phenyl propanoid pathway; Mevalonate pathway; Acetate-mevalonate pathway

Photosynthesis – structure of organelles involved in photosynthesis in plants and bacteria. Proton gradients and electron transfer in chloroplasts of plants and in purple bacteria – differences from mitochondria. Light receptors – chlorophyll, light harvesting complexes, bacteriorhodopsin, rhodopsin as ion pump.

Photosystems I and II, their location, mechanism of quantum capture and energy transfer between photosystems – ferridoxin, plastocyanin, plastoquinone, carotenoids.

The Hill reaction, photophosphorylation and reduction of CO₂. C₃, C₄ and CAM metabolism, light and dark reaction. Light activation of enzymes, regulation of photosynthesis. Photorespiration.

Unit-2

13hrs

Special features of secondary plant metabolism, formation of phenolic acids, tannins, lignins, lignans, pigments, terpenes, terpenoids, plant phenolics, alkaloids and surface waxes – their biosynthesis and function, cell wall components.

Plant hormones – Growth regulating substances and their mode of action. Molecular effects of auxin in regulation of cell extension and of gibberlic, abscisic acids and cytokinins in the regulation of seed dormancy, germination, growth and development and embryogenesis. Biochemistry of seed development and fruit ripening. Defence system in plants. Tissue culture and transgenic plants.

Plant responses to biotic and abiotic stresses: Introduction; Plant pathogens and diseases; plant defense systems-hypersensitive response; systemic acquired resistance; induced systemic resistance; Plant abiotic stress responses-Salt stress, drought and heavy metal stress responses; osmotic adjustment and significance of osmotic agents such as proline, sugar alcohols and quaternary ammonium compounds; An overview of oxidative stress and oxidative damage. Antioxidant enzymes and stress tolerance. Plant biotic stress response – pathogen and insects.

INDUSTRIAL BIOCHEMISTRY

Unit-3

13hrs

Nanobiotechnology: Types of nanoparticles, DNA based nanostructures, nanosized carriers for drug delivery. Role of nanoparticles in drug delivery. Nanobiotechnology in gene therapy, tissue engineering and transplantation.

Pharmaceutical Biochemistry and Vaccine Development

Development of new drug/molecules and elucidation of their mechanisms of actions; formulations; pharmacokinetics and pharmacodynamics; factors affecting drug efficacy drug resistance; traditional medicines; biotransformation; large scale production of humanized monoclonal antibodies; vaccine development.

Food Biochemistry

Introduction to different categories of food; constituents of food products and their functional properties; introduction to food processing; food spoilage; intrinsic and extrinsic factors affecting the quality and life of food material; food storage and preservation techniques; food poisoning; molasses and alcohol production. Industrial production of proteases; carbohydrases; lipases and their applications, vaccine production by rDNA technology; downstream processing.

Unit -4

13hrs

Fermentation technology- surface, submerged and continuous culture techniques. Design and operation of fermentors, Agitation and Aeration, selection and growth of microorganisms in controlled environments, medium development. Strategies for improvement and maintenance of the industrial strains, Bioreactors. Production of fermented milks, cheese, alcoholic beverages, breads by yeast. Fermentation production of Antibiotics- penicillin, streptomycin, Organic acid, citric acid, lactic acid, Enzymes –amylase, proteases, Amino acid-glutamic acid, lysine and Vitamins-B12 and vitamin C .

Microbial transformation

Types, techniques and commercial applications. Bioleaching and biosorption, Biodegradation and Bioremediation, Biomass and Bioenergy, Biopolymers and Biosurfactants. Enzyme electrodes and biosensors. Sewage water treatment – primary, secondary and tertiary treatments. Bio-control agents- Insecticidal toxins of *Bacillus thuringensis*.

Bioethics and Biosafety, biosafety guideline and regulations, animals in research, Legal and socio-economic impacts of Biotechnology, Ethical, legal and social implications (ELSI) of HGP. Ethics in

clinical trials. Intellectual property rights and protections for biological inventions. Patent and process involved in patenting.

Reference Books:

1. Handbook of photosynthesis (ed) mohammad pe sarakle, marcel Dekkar, Inc. NY. Basel. Hong Kong 1997.
2. Introduction to plant biochemistry (1983) T W Goodwin and E I mercer. Pergaman press, Oxford, NY< Toronto,Sydney, Paris, Frankfurt.
3. Seed: physiology of development and germination (2nd ed. 1994) J D Bewley and M Black Plenum Press.
4. Biochemistry of energy utilization in plants D T Dennis Blackie, Glasgow and London 1987.
5. Industrial Microbiology by Prescott, 4th ed. CBS Publishers.
6. Biotechnology by Crueger, PANI Publishers.
7. Principles of Fermentation Technology by Stanbury .
8. Industrial Microbiology by A.H.Pate

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC3050	BIOCHEMISTRY IN DAILY LIFE	OE	3	1	0	4	4

Course Objectives:

- To provide the students with theoretical information on micronutrients, water and electrolytes in nutritional biochemistry and their functions in metabolism.
- To develop knowledge about malnutrition and obesity
- To impart knowledge about various diseased conditions and their prevention

Course Outcomes:

After completing the course the student shall be able to:

- Attain knowledge about importance of water,macro and micro nutrients, malnutrition and obesity.
- Analyse the causes, symptoms of various diseased conditions and their prevention.

Course Content:

52hrs

Unit 1

Nutrition

Water; General consideration, role of water in lifeBalanced diet. Nutritional importance of Energy giving, Body building and Protective foods (Vitamins and Minerals) Dietary fiber. Malnutritiondiseases,Overweight and obesity.

Unit 2

Diseases 1

Incidence, symptoms, Prevention and dietary management. of various Diseases:

Diabetes, diseases of Liver, & Pancreas-Hepatitis: alcoholic liver diseases. Renal disease: Acute and Chronic renal failure. Dialysis, medical and nutrition therapy. **13hrs**

Unit 3

Diseases 2

Incidence, symptoms, Prevention and dietary management. of various Diseases:

Gastrointestinal diseases, Gastritis, Peptic, stomach and duodenal ulcer, Diarrhoea, constipation. Cancer and HIV/AIDS: Types, stages of cancer, and colon cancer. HIV infection and social issues. **13hrs**

Unit 4

Interpretation of Diagnostic Reports

Commonly used bio chemical tests for diagnosis of various diseases and their interpretation. Total blood count, Blood glucose and urea; serum lipid–cholesterol, LDL and HDL triglyceride, and serum proteins.

Urine creatinine, Glucose and protein (albumin). *Enzymes*: SGPT, SGOT **13hrs**

Reference Books:

1. Physical Biochemistry. Kansal Edward Van Halde. Prentice Hall.
2. Practical Clinical Biochemistry, ed. Harold Varley, 4th edn. CBS Publishers (1988).
3. Practical Clinical Biochemistry: Methods and Interpretation, ed. Ranjna Chawla, Jaypee Brothers Medical Publishers (1996).
4. Practical and Clinical Biochemistry for Medical Students, ed. T.N. Pattabhiraman, Gajanna Publishers (1994).
5. Hawk's Physiological Chemistry, ed. Oser, 14th Edn.(1976), Tata-McGrawHill.
6. Kuby Immunology; Oven, Punt, Stranford, 7th Edn. W. H. Freeman (2013).
7. Hepatology- A clinical text book by k Mauss, Berg, Rockstroh, Sarrazin, Wedemeyer H (2017)
8. Hepatology: a Textbook of Liver Disease, 4th edition by Zakim, Boyer 2003.
9. Text book of Diabetes 5th edition by Richard I. G. Holt, Clive Cockram, Allan Flyvbjerg, Barry J. Goldstein John Wiley & Sons 2011.
10. Molecular Biology of the Cell; 6 th Edn. Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, Peter Walter; Garland Science (2014).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3060	SOFT SKILL	RULO	2	0	0	2	2

Soft skill training aid the students to know the recent developments in their field and become job-ready. It includes instrument training, Computational Biology and Clinical Research.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3070	Advanced Molecular Techniques (LABORATORY IX)	HC	0	0	4	4	8

Course Objective:

Acquire an advanced level of knowledge on the activity of genes and genomes and the mechanisms of genome regulation at the transcriptional and post- transcriptional level, in the contexts of development, differentiation, cellular homeostasis and cancer.

Course Outcomes:

After completing the course the student shall be able to:

- Understand key principles of how cells work, including gene regulation, protein synthesis and signaltransduction.
- Develop an understanding of the observational and experimental character of science, including
- Learn appreciation of the need for good experimental design and scientific research practices

Course Content:

1. DNA and RNA techniques using nitrocellulose - Southern and Northern Blotting.
2. Electroblothing of DNA restriction fragments.
3. Sequencing of DNA and RNA on polyacrylamide gels.(Industrial Visit)
4. Rapid amplification of polymorphic DNA(RAPD).
5. Amplification of desirable gene by PCR
6. Real Time– Polymerase Chain Reaction RT-PCR. (Industrial Visit)
- 7 .Sequencing of DNA and RNA on polyacrylamide gels.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19BC3080	Genetic Engineering (LABORATORY X)	HC	0	0	2	2	4

Course Objectives:

To achieve basic understanding of molecular genetics, structure, function and regulation of genes in both prokaryotes and eukaryotes, as conceptualized

To provide a firmer conceptual basis for all of genetics

Course Outcomes:

After completing the course the student shall be able to:

- Describe techniques involved in genetic engineering and apply this technology to combine genetic material from two different species
- Diagnose the alteration of an organism's genetics, or hereditary material to eliminate undesirable characters or to produce desirable characters.

Course Content:

1. Preparation of plasmid DNA from bacterial source.
2. Digestion by endonucleases and separation of DNA restriction fragment on agarose gel electrophoresis.
3. Ligation of DNA.
4. Preparation of competent cells
5. Isolation, quantification and characterization of total RNA from plant and microbial source.
6. Digestion of endonucleases and separation of DNA restriction fragment on agarose gel electrophoresis.

SEMESTER - IV

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC4010	INTERNSHIP	HC	0	0	4	4	8

Internship: Minimum of four weeks duration internship should be carried out by the student either in industry or in an R&D organization, including educational institutes with excellent research culture. In case, if a student is unable to secure internship either in industry or in an R&D organization, a project may be carried out within the university. The student is expected to submit a formal report at the end of the internship programme. The student shall be awarded the marks for internship based on the (a) presentation and (b) comprehensive viva by the panel of examiners constituted by the school.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC4020	Submission of Project work and Evaluation	HC	0	0	10	10	20

Course Objective:

To carry out the research under the guidance of supervisor and in the process learn the techniques of research.

Course Outcomes:

On successful completion of the project, the student shall be able to:

1. Familiarize with literature search
2. Conduct the experiments related to research and formulate computational techniques
3. Interpret the scientific data.
4. Write report and defend the research findings.

Project:

Each student will choose the topic of research particularly from any area of soft cores studied and work under the guidance of allocated faculty member. The project shall preferably be application oriented or industry need based that could be useful to the society. In case of industry need base project the student may opt co-supervisor from the concerned industry. The student will have to make a preliminary survey

of research done in broad area of his/her area of interest and decide on the topic in consultation with his/her supervisor(s). The project work floated should be completed within 16 weeks and project report has to be submitted within the stipulated date by the University/ within 18 weeks whichever is earlier. The student has to meet the concerned supervisor(s) frequently to seek guidance and also to produce the progress of the work being carried out. The student should also submit progress report during 5th week and 10th week of the beginning of the semester and final draft report with findings by 15th week. After the completion of the project the student shall submit project report in the form of dissertation on a specified date by the School.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19BC4030	SWAYAM/MOOC	RULO	2	-	-	2	3

Massive Open Online Courses (MOOCs) are online courses that allow participants free access and unrestricted participation to any course of their choice. Besides the conventional modes of teaching such as lectures, videos and reading material; MOOCs also provide a platform for interactive forums.

Globally, MOOC platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses.

A student shall register and successfully complete any of the courses available on SWAYAM / MOOC. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The duration and credits of the course shall vary depending upon the agency offering MOOC / SWAYAM courses. The student should submit the certificate issued by the agency offering SWAYAM / MOOC courses to the Coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University.

Career Development and Placement

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self - motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counselling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counsellors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Biochemistry is knowledge in the subject, but also the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his

/ her interest and march forward to make better career. The School of Chemical and Biological sciences also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

FACULTY MEMBERS

Name	Designation
Dr. Jayashree. S	Professor and Head School of Biochemistry, REVA University
Dr. V. Veeraraghavan	Professor, School of Biochemistry, REVA University
Dr. Ramesh Kumar Kushwaha	Assistant Professor, School of Biochemistry, REVA University
Dr. Sikandar Mulla	Assistant Professor, School of Biochemistry, REVA University
Dr. Satish Kumar M	Assistant Professor, School of Biochemistry, REVA University
Mr. Charan Raj	Assistant Professor, School of Biochemistry, REVA University
Mrs. Deepa. H N	Assistant Professor, School of Biochemistry, REVA University
Ms. Pooja Karkera	Assistant Professor, School of Biochemistry, REVA University

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**School of Applied Sciences
M.Sc. PHYSICS**

HANDBOOK 2019-2021

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School of Applied Sciences

M. Sc. (Physics)

HAND BOOK

2019

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Rukmini Educational
Charitable Trust

www.reva.edu.in

Chancellor's Message

“Education is the most powerful weapon which you can use to change the world.”

- Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when ‘intellectual gratification’ has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.



It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of ‘Knowledge is Power’, we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I’m always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said ‘A University should be a place of light, of liberty and of learning’. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards interdisciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum –Knowledge is Power, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of –Technology Incubation Centers‡ in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, –Intelligence plus character –that is the goal of education‡ (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating —GLOBAL PROFESSIONALS‡.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

Director's Message

Physics is a basic science which enables the students to think beyond their comfort level and brings new and deeper concepts about the Atoms, Molecules, Nanoscale, Microscale and Bulk materials physical properties. The present day buzzing “quantum computers” also rely on the principles of physics like Quantum Mechanics, Electrodynamics and Optics. The Physical sciences deals with subatomic particles to Galaxies. It also gave birth to high end sophisticated technologies like Atomic Force microscope, Tunneling Electron microscope and other advanced technologies which help the people to visualize the unexplored world. M Sc in Physics offered by REVA University aims to provide the required skills and knowledge necessary to pursue a successful career in Research, Teaching and Industry relevant jobs. This program imparts need based, practical education in contemporary world to develop global competence among students. It strives to prepare students to become leaders in the field of Physical Sciences in general and Material science/Optics/Electronics in particular by encouraging them to inculcate scientific thinking coupled with creative and innovative ideas.

The program provides hands- on training and practical skills in the field of Material Science, Optics and Electronics. This course also covers fundamental aspects of Physics in every aspect. The special emphasis on experiments related electricity, magnetism, lasers, spectral analysis and studying other materials properties by varying different parameters help the student to equip with required knowledge in the field of research, teaching & industry.

As far as employment is concerned physics courses are gaining attention in the field of data science, data analysis, statistical modelling and programming are some of the fast- growing sectors. Employment record shows that physics has a great scope in future. Physicist can find careers with electronic, optics and material science related and allied companies. They can be employed in the areas of programming, production and management of sensors and other related industries. There is a large scale employment in research laboratories run by the government as well as the corporate sectors. Further, there is great demand for physicists in numerous industries and sectors after the completion of MSc Physics course.

This handbook provides an outline of regulations for master's degree, scheme of instruction, and detailed syllabus. I am sure the students choosing MSc Physics at REVA University will enjoy the curriculum, teaching and learning environment, the vast infrastructure and the experienced teacher's involvement and guidance. We will strive to provide all needed comfort and congenial environment for their studies. I wish all students a pleasant stay at REVA and grand success in their career.

The curriculum caters to and has relevance to local regional, national, global developmental needs.

Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, gender, human values, environment and sustainability.

Dr. Beena G Director
School of Applied Sciences

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognised by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 27 Post Graduate Degree programs, 29 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 18 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow

learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano-Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Okalahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher–scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **‘Life Time Achievement Award’** to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the **—Founders‘ Day Celebration** of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first **—REVA Life Time Achievement Award** for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced **–REVA Award of**

Excellence in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vaidya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Within short span of time, REVA University has been recognized as a fast growing university imparting quality higher education to the youth of the country and received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia's Greatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by ASSOCHAM India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

ABOUT SCHOOL OF APPLIED SCIENCES

The School of Applied Sciences offers graduate and post graduate programs in Biotechnology, Biochemistry, Chemistry, Physics and Mathematics which are incredibly fascinating. It aims to attract talented youth and train them to acquire knowledge and skills useful to industrial sectors, research laboratories, and educational institutions. The School presently offers M.Sc. degree programs in Bio-Chemistry, Bio-Technology, Chemistry, Physics, Mathematics and B Sc with various combinations viz, Physics Chemistry and Mathematics, Mathematics , Physics and Statistics, Mathematics Statistics and Computer Science, and Biology Mathematics & Computer Science and also Post Graduate Diploma in Clinical Research Management. The School also facilitates research leading to PhD in Biotechnology, Biochemistry, Physics, Chemistry, Mathematics and related areas of study.

The School of Applied Sciences is shouldered by well qualified, experienced and highly committed faculty. The state-of-the-art infrastructure digital classrooms, well equipped laboratories, conference rooms and the serene academic atmosphere at REVA University will enhance the transfer as well as creation of knowledge. The school provides an interactive, collaborative peer tutoring environment that encourages students to break down complex problems and develop strategies for finding solutions across a variety of situations and disciplines. The school aims to develop a learning community of critical thinkers who serves as models of innovative problems solving in the university environment to enrich their academic and professional careers.

Vision

To nurture intellect, creativity, character and professionalism among students and impart contemporary knowledge in various branches of Chemical, Biological, Physical and Mathematical Sciences that are socially relevant and transform them to become global citizens.

Mission

To achieve excellence in studies and research through pedagogy and support interface between industry and academia

VALUES

- Excellence in all our academic and research endeavours
- Dedication and service to our stakeholders
- Leadership through innovation
- Accountability and transparency
- Creating conducive academic environment with service motto
- Integrity and intellectual honesty
- Ethical and moral behaviour
- Freedom of thought and expression
- Adaptability to the change
- Team-work

—The constant questioning of our values and achievements is a challenge without which neither science nor society can remain healthy

— **Aage Niels Bohr**

M. Sc. (Physics) Program

Programme Overview

Physics is a branch of natural sciences. It deals with physical matter and energy; and the natural laws that govern the behavior of matter. The core theories of Physics are: Classical Mechanics, Electromagnetism, Thermodynamics and Statistical Mechanics, Quantum Mechanics and Relativity. There are many more branches of Physics including nuclear and particle physics. Physics plays a key role in the future progress of humankind. The physics education and research in all countries is important because:

- Physics is an exciting intellectual adventure that inspires the young people and expands the frontiers of our knowledge about Nature.
- Physics generates fundamental knowledge needed for the future technological advances that will continue to drive the economic engines of the world.
- Physics contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries.
- Physics is an important element in the education of chemists, engineers and computer scientists, as well as practitioners of the other physical and biomedical sciences.
- Physics extends and enhances our understanding of other disciplines, such as the earth, agricultural, chemical, biological, and environmental sciences, plus astrophysics and cosmology - subjects of substantial importance to all peoples of the world.
- Physics improves our quality of life by providing the basic understanding necessary for developing new instrumentation and techniques for medical applications, such as computer tomography, magnetic resonance imaging, positron emission tomography, ultrasonic imaging, and laser surgery.

Thus, physics is an essential part of the educational system of an advanced society. Indian Society has embraced knowledge economy and its economic growth rate is one of the highest in the world. India has shown highest level of progress in engineering, space, nuclear, aeronautics and information and communication technologies. The subject of physics has played a major role in the development of country and India has produced 2 Nobel laureates in Physics.

In this context, University across the country offer Physics as a subject at undergraduate and physics as a programme at postgraduate level.

M. Sc. (Physics) at REVA UNIVERSITY has been designed to meet the human resources needs of existing and futuristic research establishments, industries and academic institutions. The programme is designed to produce graduates with higher order critical, analytical, problem solving and research skills; ability to think rigorously and independently to meet higher level expectations of industries, research organization and academic institutions. The programme deals with courses in classical mechanics, quantum mechanics, material science, semiconductors, electrodynamics and related areas.

Programme Educational Objectives (PEOs)

The aim of the programme is to produce postgraduates with - advanced knowledge and understanding of Physics; higher order critical, analytical, problem solving and attitudinal skills(transferable) to meet expectations of research establishments, relevant industry and academia or to take up entrepreneurial route. Hence,

The Programme Educational objectives are to prepare the students to:

- PEO1 Pursue higher education through continuous learning with effective communication skills
- PEO2 have successful professional careers in academia, industry and government
- PEO3 Start own enterprise and provide solutions to scientific research problems
- PEO4 Exhibit skills as a member of a team in national and international organizations with highest ethics through lifelong learning

Programme Outcomes (POs)

After undergoing this programme, a student will be able to:

- PO1 **Domain knowledge:** Apply the knowledge of physics and fundamentals for the solution of complex problems in day to day life.
- PO2 **Problem analysis:** Identify, formulate, research literature, and analyze problems to arrive at substantiated conclusions using principles of physical sciences.
- PO3 **Design/development of solutions:** Design solutions for real time problems to meet the specifications with consideration for the public health and safety, the cultural and societal, and environmental considerations.

- PO4 **Conduct investigations of complex problems:** Use research-based knowledge, for analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5 **Modern tool usage:** Apply appropriate techniques, resources, and IT tools including prediction and modeling to complex activities with an understanding of the limitations.
- PO6 **Environmental and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional practice.
- PO7 **Environment and sustainability:** Understand the impact of the solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8 **Ethics:** Apply ethical principles and commit to ethics, and responsibilities and norms of the professional practice
- PO9 **Individual and team work:** Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
- PO10 **Communication:** Communicate effectively with the professional community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.
- PO11 **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Eligibility for M Sc (Physics) Program

Passed Bachelor's Degree of 3 years with Physics as major / optional subject with 45% marks (40% in case of candidate belonging to SC/ST category) of marks in aggregate of any recognized / institution or any other qualification recognized as equivalent there to.

M Sc (Physics) Program
Scheme of Instruction
(Effective from Academic Year 2019-20)

SEMESTER-I

Sl. No.	Course Code	Title of the Course	Course Type	Credit Pattern & Credit Value				Contact Hours
				L	T	P	Total	
1	M19PH1010	Mathematical Physics	HC	3	1	0	4	5
2	M19PH1020	Classical Mechanics	HC	3	1	0	4	5
3	M19PH1030	Electronic devices	HC	3	1	0	4	5
4	M19PH1040	Quantum Mechanics I	HC	3	1	0	4	5
5	M19PH1050	Material Science (General)	HC	3	1	0	4	5
Practical Courses								
6	M19PH1060	General Physics lab - I	HC	0	0	3	3	5
7	M19PH1070	Electronics lab	HC	0	0	3	3	5
Total Credits				15	5	6	26	35

SEMESTER-II

Sl. No.	Course Code	Title of the Course	Course Type	Credit Pattern & Credit Value				Contact Hours
				L	T	P	Total	
1	M19PH2010	Quantum Mechanics II	HC	3	1	0	4	5
2	M19PH2020	Statistical Mechanics	HC	3	1	0	4	5
3	M19PH2030	Condensed matter physics (General)	HC	3	1	0	4	5
4	M19PH2040	Atomic and Molecular Physics	HC	3	1	0	4	5
5	M19PH2051	Electronics - I : Digital Electronics	SC [#]	2	1	0	3	4
6	M19PH2052	Condensed Matter Physics - I	SC [#]					
7	M19PH2053	Material Science - I	SC [#]					
8	M19PH2060	Music, Dance, sports, Theater, Yoga	RULO	0	0	2	2	3
9	M19PH2070	Skill development Programme	RULO	0	0	2	2	3
Practical Courses								
10	M19PH2080	General Physics lab - II	HC	0	0	3	3	5
11	M19PH2090	Atomic and Molecular Physics	HC	0	0	3	3	5
Total Credits				14	5	10	29	40

Note: #Soft Core (SC): Student shall opt for one SC of his/her choice which will be continued in Higher semesters also.

SEMESTER-III

Sl. No.	Course Code	Title of the Course	Course Type	Credit Pattern & Credit Value				Contact Hours
				L	T	P	Total	
1	M19PH3010	Electrodynamics	HC	2	1	0	3	4
2	M19PH3020	Nano-science and Nanotechnology	HC	2	1	0	3	4
3	M19PH3030	Nuclear and Particle physics	HC	2	1	0	3	4
4	M19PH3041	Electronics – II: Electronic Communication Systems	SC [#]	3	1	0	4	5
5	M19PH3042	Condensed Matter Physics - II	SC [#]					
6	M19PH3043	Material Science- II	SC [#]					
7	M19PH3051	Electronics – III: Linear integrated circuits	SC [#]	3	1	0	4	5
8	M19PH3052	Condensed Matter Physics - III	SC [#]					
9	M19PH3053	Material Science - III	SC [#]					
10	M19PH3060	Astrophysics	OE [#]	3	1	0	4	5
Practical Courses								
11	M19PH3070	General Physics lab - III	HC	0	0	3	3	5
12	M19PH3081	Electronics Lab	SC [#]	0	0	3	3	5
13	M19PH3082	Condensed Matter Physics						
14	M19PH3083	Material Science						
Total Credits				15	6	6	27	37

Note: i) [#] OE is Open Elective Course offered for students of other Schools; the students of M Sc – Physics shall take any ONE of the OE course offered by other Schools.

ii) *Soft Core (SC): Students shall have to continue the Soft Core opted during the Second Semester

SEMESTER-IV

Sl. No.	Course Code	Title of the Course	Course Type	Credit Pattern & Credit Value				Contact Hours
				L	T	P	Total	
1	M19PH4010	Major Project	HC	0	0	10	10	20
2	M19PH4020	MOOC/SWAYAM /Internship*	RULO	0	0	4	4	-
Total Credits				0	0	14	14	20
Total Credits of I to IV Semesters				44	16	36	96	132

Note: * The students shall undergo Internship during summer vacation and mid-term vacation soon after Second and Third Semester exams are completed and present the report on the Internship undergone during the Fourth Semester for evaluation.

Semester-wise Summary of Credit Distribution

Semesters	No. of Credits	No. of Hours
First Semester	26	35
Second Semester	29	40
Third Semester	27	37
Fourth Semester	14	20
Total Credits	96	132

Distribution of Credits Based on Type of Courses

Semester	HC	SC	OE	RULO	TOTAL
I	26	-	-	-	26
II	22	3	-	4	29
III	12	11	4	-	27
IV	10	-	-	4	14
Total	70	14	4	8	96

HC=Hard Core; SC=Soft Core; OE=Open Elective;
RULO=REVA Unique Learning Offerings

Distribution of Credits Based on L: T: P

Semester	L	T	P	Total	Total Hours
I	19	5	6	26	35
II	10	5	8	25	40
III	15	6	6	27	37
IV	0	0	14	18	20
Total	44	16	36	96	132

M Sc (Physics) Program
Detailed Syllabus
(Effective from Academic Year 2019-20)

FIRST SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1010	MATHEMATICAL PHYSICS	HC	3	1	0	4	5

Course Objectives:

To make the students understand the basics of mathematical functions necessary for formulating physical systems and phenomena observed in day to day life.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Apply the mathematical skills to solve quantitative problems in the study of physics.
2. Solve the problems related to vectors and matrices for various applications.
3. The student shall be able to apply coordinate transforms to solve the physical problems expressed in tensors.
4. Apply the knowledge of Fourier transforms and Laplace transforms in solving the problems in physics.
5. Apply the suitable mathematical special function to solve the physics problems.

Course Content:

Unit-1:

12 hrs

Review of Vector analysis and curvilinear co-ordinates Gradient, Divergence and Curl operations, Gauss' and Stokes' theorems, Curvilinear co-ordinates, tangent and normal vectors, contravariant and covariant components, Gradient, Curl, divergence and Laplacian in spherical polar and cylindrical polar co-ordinates, Definition of tensors, contravariant and covariant components of tensors, raising and lowering of tensor indices, sum, outer, inner products and contraction of tensors, Quotient law, symmetric, antisymmetric tensors, Levi civita symbol, Brief discussion on moment of inertia tensor.

Unit - 2:**12 hrs**

Linear vector spaces and operators: Vector spaces and subspaces, Linear dependence and independence, Inner product, Orthogonality, Gram-Schmidt orthogonalization procedure, Basis and Dimensions, linear operators, Matrix representation, Similarity transformations, Characteristic polynomial of a matrix, Eigen values and eigenvectors, Self adjoint and Unitary transformations, Eigen values and eigenvectors of Hermitian and Unitary transformations, Minimal polynomial and diagonalization.

Unit - 3:

Fourier series integral transforms Fourier Series : Definition, Properties, Convergence, Application of Fourier series, Fourier Integral and Fourier transform, Convolution theorem, Parseval's theorem, Laplace transform and its properties, convolution theorem, inverse Laplace transforms, solution of differential equations using Laplace transforms, Fourier transform & Laplace transform of Dirac Delta function

Unit - 4:**12 hrs****Special Functions**

Ordinary differential equations and Special Functions: Linear ordinary differential equations, Separation of Poisson and Helmholtz equations in spherical polar and cylindrical polar coordinates, Series solutions – Frobenius' method, Series solutions of the differential equations of Bessel, Legendre, Leguerre and Hermite polynomials, Generating functions, Some recurrence relations, orthogonality properties of these functions, Brief discussion of spherical Bessel functions and spherical harmonics.

Reference Books:

1. Mathematical methods for physicists, Arfken G. B and Weber H.J, 4th Edition, Prism Books Pvt Ltd, India (1995).
2. Mathematical Physics, Sathya Prakash, Sultan Chand and Sons, (1985).
3. Mathematical Physics, Chattopadhyaya P.K, Wiley Eastern, (1980).
4. Methods of Mathematical Physics, Bose H.K and Joshi M.C, Tata McGraw Hill, (1984).
5. Vector Analysis, Murray R Spiegel, Schaum's Outline Series, McGraw Hill International Book Company, Singapore (1981).
6. Tensor Analysis — Theory & Applications. Sokolnik off LS, 211: Edition, John Wiley Sons (1964).
7. Mathematical Methods in the Physical Sciences, Mary L. Boas, 2nd Edition, John Wiley & Sons (1983).
8. Matrices and Tensors in Physics, A.W. Joshi, 4th Edition, New Age International Publishers (1995).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1020	CLASSICAL MECHANICS	HC	3	1	0	4	5

Course Objectives:

1. To give students a solid foundation in classical mechanics.
2. To introduce general methods of studying the dynamics of particle systems.
3. To give experience in using mathematical techniques for solving practical problems.
4. To lay the foundations for further studies in physics.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Apply the Lagrangian methods to analyze and explain the problems in classical Mechanics
2. Apply the concept of Central force problem to analyze and explain the problems Classification of orbits, Kepler's laws in planetary motion.
3. Apply the concept of Hamilton's equations to derive the expression for different principles in classical mechanics
4. Analyse the concept of mechanics of rigid bodies to demonstrate and explain the precession of rotation of earth and Rutherford's scattering in determination of structure of atoms
5. Communicate scientific information of classical mechanics.

Course Content:

Unit - 1:

12 hrs

The Lagrangian Dynamics: Constraints and their classifications, Generalized coordinates, Virtual displacement and work, D'Alembert's principle, Lagrangian equation from D'Alembert's principle, Lagrangian equations for conservative system, Derivation of Lagrangian equations: For (I) A particle in (a) Cartesian coordinates, (b) Spherical polar coordinates and (c) Cylindrical polar coordinates, d) motion under Central force (II) Atwood's machine, III) simple pendulum, Derivation of Lagrange equation from Hamilton principle, Symmetry properties and conservation of Linear Momentum and Kinetic energy.

Unit - 2**12 hrs**

Central force problem: Central force and Motion in plane, Equation of motion under the central force and first integrals, Differential equation for an orbit, Inverse square law of force, Kepler's laws of planetary motion and deduction, Stability and closure of orbit under central force, Artificial satellites, Scattering in a central force field, Rutherford scattering, Impact parameter, Problems.

Unit - 3:**12 hrs**

Hamilton's equations: Derivation of Hamilton's principle (Variational principle), Derivation of Hamilton's equations from the variational principle, Examples (i) the simple harmonic oscillator (ii) Hamiltonian for a free particle in plane and spherical Co-ordinates coordinates. Cyclic coordinates, Canonical Transformations, examples of Canonical transformations, Generating functions (Four basic types), Poisson brackets, properties of Poisson brackets, angular momentum and Poisson brackets relations, Equation of motion in the Poisson bracket notation, The Hamilton-Jacobi equation, the example of the harmonic oscillator treated by the Hamilton-Jacobi method.

Unit – 4**12 hrs**

Mechanics of rigid bodies: Generalized co-ordinates of a rigid body, Degrees of freedom, Angular Velocity, Angular momentum, inertia tensor, principal moments of inertia, kinetic energy of rigid body, Euler equations of motion for a rigid body, Torque free motion of a rigid body, motion of symmetrical top-rotational motion, Precession of earth's axis of rotation, Coriolis force, coriolis force acting on free fall body on earth's surface.

Special Theory of relativity: Galilean Transformation, Principle of relativity and speed of light, Lorentz Transformations and its consequences.

References Books:

1. Classical Mechanics, J.C Upadhyaya, Himalaya Publishing house.(2005)
2. Classical mechanics, H. Goldstein, C. Poole, J. saflco. 3rd edition. Pearson Education inc. (2002).
3. Classical mechanics. K. N. Srinivasa Rao, University press (2003).
4. Classical mechanics, N. C. Rana and P.S. Joag Tata McGraw-Hill (1991).
5. Classical dynamics of particles and systems, J. B. Marion, Academic press (1970).
6. Introduction to Classical mechanics. Takwale and Puranik, Tata McGraw-hill (1983)
7. Classical mechanics, L. D. Landau and E. M. Lifshitz, 4thedition, Pergamon Press (1985).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1030	ELECTRONIC DEVICES	HC	3	1	0	4	5

Course Objectives:

1. To understand the basic working of Semiconducting devices and Linear Integrated Circuits.
2. To give an emphasis to the student to know the various semiconductor devices and its working.
3. To give clear understanding of various fabrication techniques of semiconducting devices.
4. To introduce the basic building blocks of linear integrated circuits.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Analyse the BJT circuits, operation and its characteristics.
2. Design a DC bias circuitry of BJT, UJT and SCR.
3. Construct an OPAMP circuit for different applications.
4. Develop the prototypes of electronic devices.
5. Solve real time examples of BJT, UJT, SCR and OPAMP.
6. Able to describe various opto-electronic devices.

Course Content:

Unit 1:

12 hrs

Transistors: Transistor configurations and characteristics, Methods of biasing-fixed bias, collector to base bias and voltage divider bias, DC and AC load line, Transistor as an amplifier-Single stage and multistage amplifier, frequency response, Push-pull amplifier, Astable multi-vibrator using transistors, Voltage regulator using transistors.

Unit 2:

12 hrs

Field Effect Transistors (FET): JFET: Construction, working, Characteristics and parameters. MOSFET: Construction, working, Characteristics and parameters.

Thyristors: Types of thyristors, working and characteristics of Silicon Controlled Rectifier (SCR), Characteristics and application of TRIAC, Working and characteristics of Unijunction Transistor (UJT), UJT relaxation oscillator.

Unit 3:**12 hrs**

Operational amplifier: Block diagram of an operational amplifier, Characteristics of an ideal operational amplifier, Parameters of an op-amp, Operational amplifier as a feedback amplifier: Inverting and Non-inverting amplifiers, Applications of an operational amplifier: Instrumentation amplifier, Active filters- First order Butterworth low pass and high pass filter, phase shift oscillator.

Unit 4:**12 hrs**

Optoelectronic devices: Photoresistor (LDR)–dark resistance, Principle and working of a photodiode, Principle and working of Light emitting diode, factors affecting the efficiency of LED, Phototransistor-structure and working, Semiconductor laser- basic structure and working. LED, Plasma Display, Liquid Crystal Displays, Numeric Displays.

Reference Books:

1. Basic Electronics and Linear Circuits, NN Bhargava, DC Kulashreshtha and SC Gupta, Tata Mc Graw Hill.
2. Electronic Devices and Circuits: An Introduction, Allen Mottershead, Prentice Hall of India
3. Semiconductor Optoelectronic Devices, Pallab Bhattacharya, Pearson education, Asia.
4. Electronic Principles, A P Malvino, (Sixth Edition, 1999), Tata McGraw Hill, New Delhi.
5. A Text Book of Basic Electronics, RS Sedha, S Chand & Company Ltd.
6. Op-Amps and Linear Integrated Circuits, Remakant A Gayakwad, (Third Edition, 2004), Eastern Economy Edition.
7. Linear Integrated Circuits, D Roy Choudhury and Shail Jain, New Age International Limited.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1040	QUANTUM MECHANICS – I	HC	3	1	0	4	5

Course Objectives:

1. To illustrate the inadequacy of classical theories and the need for a quantum theory.
2. To explain the basic principles of quantum mechanics.
3. To develop solid and systematic problem solving skills.
4. To apply quantum mechanics to simple systems occurring in atomic and solid state physics.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Understand the mathematical representations and analysis used in quantum mechanics.
2. Postulate the basics of quantum mechanics.
3. Apply Schrodinger wave equation for one dimensional problem like, particle in a box, harmonic Oscillator etc.
4. Solve numerical based on angular momentum and spin operators.
5. Analyze the result obtained in Stern-Gerlach experiment.
6. Solve three dimensional problems in quantum mechanics.

Course Content:

Unit – 1

12 hrs

Introduction: Dual nature of matter and waves, Double-slit experiment for photons and electrons as an illustration. Fundamental Postulates of Quantum Mechanics, Review of Linear vector spaces in Dirac Bra-Ket notation, Position and momentum representations, Wavefunctions, Superposition principle, probability densities, probability current, Expectation values, Commutators, Eigenvalues and eigenvectors of a complete set of mutually commuting operators, Waves, wave packets, phase velocity and group velocity, Canonically conjugate variables, General uncertainty principle, Hamiltonian, Time - dependent and independent Schrodinger's wave equation, Ehrenfest's Theorem, Continuity equation.

Unit - 2

12 hrs

Exactly solvable problems in one-dimension: free particle (Unbound state-continuous spectrum), particle in a box (bound state-Discrete spectrum)- potential barrier and wells, Tunneling, Transmission and Reflection co-efficient, Ramsauer -Townsend effect, Alpha decay, Infinite square well potentials: symmetric and asymmetric wells, finite square well potentials: scattering and bound state solutions, Simple Harmonic Oscillator: wave function and operator approach.

Unit – 3

12 hrs

Angular Momentum and spin: Angular momentum operators and their Algebra, Eigen functions and Eigen values of L^2 and L_z using Schrodinger wave mechanics and matrix mechanics, angular momentum operators.

Uncertainty relations: Stern-Gerlach experiment and the concept of spin, Pauli-spin matrices, Addition of angular momentum: Clebsch-Gordan coefficients for two particles.

Unit - 4:**12 hrs**

Exactly solvable problems in three dimensions: separation of Schrodinger equation in Cartesian coordinates, Simple harmonic oscillator in 3-dimensions, Free particle in 3-d box – Effects of the exclusion principle on non-interacting fermions in a box, central potential, Schrodinger equation in Spherical coordinates-separation of variables r, Φ, Θ . The hydrogen atom – radial equation; energy spectrum; degeneracy of the spectrum; radial wave functions and probability density $P(r)$ for finding the electron at a distance from the center; evaluation of expectation values of r^n .

Reference Books:

1. N. Zettili, Quantum Mechanics: Concepts and Applications, 2nd edition, John Wiley (2009)
2. A Ghatak and S Lokanathan, Quantum Mechanics, Theory and Applications, Macmillan(2004).
3. Stephen Gasiorowicz, Quantum Physics, 3rd edition, John Wiley (2003).
4. E. Merzbacher, Quantum Mechanics. 3rd edition, John Wiley(1994).
5. V.K. Thankappan, Quantum Mechanics, Wiley Eastern (1985).
6. P.M. Mathews and K. Venkatesan, A Textbook of Quantum Mechanics, TMH(1977).
7. B.Bransden, C.Joachain, Quantum Mechanics, 2nd ed, Pearson/Prentice Hall, (2000).
8. R.L.Liboff, Introduction to Quantum Mechanics, Pearson Education(2003).
9. J.S.Townsend, A Modern Approach to Quantum Mechanics, 2nd ed, McGraw Hill.
10. C.Cohen-Tannoudji, B.Diu, F.Laloe, Quantum Mechanics (2 vol. set), Wiley Interscience (1996).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1050	MATERIAL SCIENCE (GENERAL)	HC	3	1	0	4	5

Course Objectives:

1. To introduce the basic principles underlying the behavior of materials.
2. To provide scientific foundation for understanding the relations among material properties, microstructure, and behavior of materials.
3. To make the students familiar with the vocabulary for the description of the empirical facts and theoretical ideas about the various levels of structure from atoms through defects in crystals to larger scale morphology of practical materials.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Explain the relationship between a material's microstructure and its properties.
2. Explain how the presence and properties of defects can affect the strength of a material.
3. Distinguish between elastic and plastic behavior of materials.
4. Apply the knowledge of phase diagrams to synthesize different phases of materials.

Course Content:

Unit - 1:

12 hrs

Formation and structure of materials

Introduction to material science- engineering materials- structure - property relationship, Review of ionic, covalent and molecular bindings- bond angle, bond length and bond energy, Lattice energy – Jones potential, Closed pack structures- packing efficiency and density of materials. Crystal morphology - symmetry elements - crystal systems, Point group symmetry- derivation of point groups- elementary ideas on space groups, Principles of X-ray powder diffraction method, interpretation of powder photographs and powder metallurgy.

Unit - 2:

12 hrs

Crystal imperfections and diffusion in solids:

Review of crystalline imperfections- schottky and Frenkel defects- equilibrium concentrations, Line imperfections- edge and screw dislocations-interactions of dislocations, Surface imperfections- grain boundary- tilt and twin boundaries- volume imperfections. Diffusions in solids - Fick's law of diffusion- Solution to Ficks law - error function, Determination of diffusion co-efficients; diffusion couple, Applications based on second law Atomic model of diffusion- electrical conductivity of ionic crystals.

Unit - 3:

12 hrs

Elastic and Plastic Behavior of Materials

Atomic model of elastic behavior- the modulus as a parameter in design- rubber like elasticity-anelastic behavior – viscosity behavior, Fracture of materials – ductile and brittle fracture – ductile brittle transition- protection against fracture. Plastic deformation by slip – the shear strength of perfect and real crystals- CRSS- the stress to move a dislocation – work hardening and dynamic recovery. Methods of strengthening crystalline materials against plastic deformation- strain hardening, grain refinement, solid solution strengthening, precipitation strengthening.

Unit - 4:

12 hrs

Phase diagrams and phase transformations

Phase diagrams- the phase rule and it's applications to binary alloy systems- isomorphous, eutectic and peritectic - the lever rule. Typical phase diagrams-Pb-Sn, Fe-C systems. Heat treatment processes- annealing, hardening and tempering, Phase transformations- Nucleation and growth- nucleation kinetics – transformations in steel. Solidification and crystallization- recovery, recrystallization and grain growth.

Reference Books:

1. Elements of material science and engineering, **Lawrence H. Van Vlack Addison Wesley** (1975).
2. Material science and engineering, **V. Raghavan**, Prentice Hall (1993)
3. Nature of chemical Bond, **L Pauling**, Oxford and IBH (1960)
4. An introduction to crystallography, **F.C. Phillips**, Longman (1970)
5. Crystallography applied to solid state physics, **Verma and srivastava** New age international (2005)
6. Introduction to solid Solid state physics, **C. kittel**, Wiley Eastern (1993)
7. The structure and properties of Materials vol I- IV- **Rose, Shepard** and wulff (1987)
8. Introduction to solids, **L. V Azaroff, Mc Graw Hill** (1977)
9. Foundation of material science and engineering, William **F. Smith**, Mc Graw Hill international Editions (1988)
10. Solid state Physics Source Book- **Sybil P Parker** (Ed), Mc Graw Hill (1987).
11. Solid state phase transformations, **V. Raghavan**, Prentice hall (1991).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1060	GENERAL PHYSICS LAB - I (PRACTICAL)	HC	0	0	3	3	5

Course Objectives:

1. To make the student familiarize with the basics of experimental physics.
2. To enable the student to explore the concepts involved in the thermodynamics and heat.
3. To make the student understand the basic concepts in modern optics.
4. To allow the student to understand the fundamentals of instruments involved.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Verify various laws of physics related to optics.
2. Determine the physical parameters through experiments.
3. Analyze the concepts of physics through experiments.

Course Content:**LIST OF EXPERIMENTS:**

1. Verification of law of intermediate metals
2. Study the thermo emf and hence to determine inversion temperature.

3. Measurement of resistivity of a semiconductor by Four probe method at different temperature and determination of energy gap.
4. Determination of grating constant and wavelength of LASER light by using grating.
5. Design and study of the frequency response of CE transistor amplifier.
6. Determination of Stefan's constant and Verification of Stefan's fourth power law by electrical method.
7. Determination of Energy band gap of two different semiconductors.
8. Determination of solar constant.
9. Thermal Conductivity of a rod by Forbe's method.
10. Determination of temperature sensitivity of a thermocouple and its Calibration.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH1070	ELECTRONICS LAB (PRACTICAL)	HC	0	0	3	3	5

Course Objectives:

- To familiarize the students with the basics of electronics.
- To enable the students to explore the concepts involved in the oscillators.
- To make the students understand the basic concepts in ICs and digital devices.
- To allow the students to understand the fundamentals of multi-vibrators.

Course Outcomes:

On successful completion of this course, the student shall be able to

1. Analyze the characteristics of MOSFET and SCR.
2. Verify the outputs of as table, monostable and VCO circuits using ICs.
3. Design and construct the Single Stage BJT and FET Amplifier circuits.
4. Design voltage regulator using Zener diode and regulated power supply using IC.

Course Content:

List of Experiments:

1. Experiment on UJT and its applications.
2. Astable, monostable and bistable multivibrator using IC 555 timer.
3. Voltage controlled oscillator using IC741 and 555.
4. Zener diode characteristics and voltage regulation.
5. Study of FET characteristics and its applications in amplifier.
6. Study of MOSFET characteristics and its applications as amplifier.

7. Characteristics and applications of SCR.
8. Monostable multivibrator using IC 74127.
9. Design of regulated power supply.
10. Solving Boolean expressions.

SECOND SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2010	QUANTUM MECHANICS –II	HC	3	1	0	4	5

Course Objective:

To familiarize students with the advanced quantum mechanical concepts for better understanding of behavior of sub-atomic particles

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Understand Symmetry in quantum mechanics.
2. Apply approximation methods for quantum mechanical problems.
3. Understand the radiation and matter interaction
4. Understand the concepts of relativistic quantum mechanics.

Course Content:

Unit1:

12 hrs

Symmetry in quantum mechanics: Spatial translation and conservation of linear momentum, Discrete symmetries: parity and time reversal, Permutation symmetry: symmetric and anti-symmetric wave functions for two identical particles, Slater determinant and Pauli exclusion principle, Excited states of helium atom: ortho and para helium atom.

Unit 2:

12 hrs

Approximation methods:

The variational method:-variation principle, application of variational approach to ground states of (i) Hydrogen atom and (ii) Helium atom. The WKB method: one dimensional case, approximate solutions turning points and connection formulae, tunneling through a barrier. Time independent perturbation theory: Perturbation theory for non-degenerate states, Applications. linear and quadratic Stark effects in hydrogen atom. Degenerate perturbation theory, examples: linear Stark effect, Normal Zeeman effect. Time dependent perturbation theory: Time dependent perturbation series. Harmonic perturbation; transition probability, Fermi golden rule, example: sinusoidal perturbation on 1-d simple harmonic oscillator.

Unit 3**12 hrs**

Interaction of radiation with matter: radiation field quantization, spontaneous emission, absorption, induced emission, dipole transitions, selection rules. Identical particles, scattering cross-section, Born approximation, partial waves, optical theorem

Unit – 4:**12 hrs**

Relativistic quantum mechanics: Klein Gordan equation for a free particle and its drawbacks; probability density. Dirac equation for free particle, properties of Dirac matrices, solutions of free particle Dirac equation- ortho normality and completeness, spin of the Dirac particle, negative energy sea, covariant form of Dirac equation. Velocity operator of a free Dirac particle and Zitterbeugung, Non relativistic limit of Dirac equation for a free particle moving in a central potential – spin – orbit energy. Dirac particle under the influence of a uniform external magnetic field – magnetic moment for the Dirac particle

Reference Books:

1. Quantum mechanics, **B.H. Bransden and Joachain**, 2nd Edition Pearson Education (2004).
2. Introduction to Quantum mechanics, **David J. Griffiths**, 2nd Edition, Parson Education (2005).
3. Modern Quantum mechanics, **J.J. Sakurai**, Pearson Education, (2000).
4. Quantum mechanics, **V.KThankappan**, 2nd Edition 2004.Pri
5. Quantum Mechanics, **E. Merzbacher**, 3rd edition, John Wiley(1994).
6. Quantum mechanics, **Stephen Gasiorowicz**, john Wiley (2003).
7. Principles of Quantum mechanics ,**R. Shankar**, 2nd Edition, Premium press, NY (1994)
8. Relativistic Quantum mechanics and Relativistic Quantum fields, **J.D. Bjorken and S.D. Drell**, Mc. Graw-hill,New York (1968).
9. Quantum mechanics, **L.I.Schiff Mc. Graw-hill**, (1955).
10. C.Cohen-Tannoudji, B.Diu, F.Laloe, Quantum Mechanics (2 vol. set), Wiley Interscience (1996).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PH2020	STATISTICAL MECHANICS	HC	3	1	0	4	5

Course Objectives:

1. To make students understand the basics of Thermodynamics and Statistical systems.
2. To make students understand the various laws of thermodynamic.
3. To acquire the knowledge of various statistical distributions.
4. To comprehend the concepts of enthalpy, phase transitions and thermodynamic functions.

Course Outcomes:

On successful completion of this course, the student shall be able to:

- a) Solve day-to-day life selected problems using thermodynamics laws.
- b) Analyse various distribution laws.
- c) Apply the concepts to test distribution laws.
- d) Apply the distribution laws to solve physical problems.

Course Content:**Unit – 1:****12 hrs**

Thermodynamics preliminaries: A brief overview of thermodynamics, Maxwell's relations, specific heats from thermodynamic relations, the third law of thermodynamics. Applications of thermodynamics: Thermodynamic description of phase transitions, Surface effects in condensation. Phase equilibria; Equilibrium conditions; Classification of phase transitions; phase diagrams; Clausius-Clapeyron equation, applications, Van der Waals equation of state. thermoelectric phenomenon, Peltier effect, Seebeck effect, Thompson effect, systems far from equilibrium.

Unit – 2:**12 hrs**

Classical statistical mechanics: The postulate of equal a priori probability; The Liouville theorem; the microcanonical ensemble, canonical ensemble, Grand canonical ensemble, mean value and fluctuations, Entropy and thermodynamic probability, Reduction of Gibbs distribution to Maxwell and Boltzmann distribution, Entropy of an ideal gas; Gibbs paradox; Law of the equipartition theorem; Molecular partition function, translational and rotational and vibrational partition function and applications to solids, Chemical equilibrium.

Unit – 3:**12 hrs**

Quantum statistical mechanics: The postulates of quantum statistical mechanics. Symmetry of wave functions, The Liouville theorem in quantum statistical mechanics; condition for statistical equilibrium; Ensembles in quantum mechanics; The quantum distribution functions (BE and FD); the Boltzmann limit of Boson and Fermion gases; the derivation of the corresponding distribution functions.

Unit – 4:**12 hrs**

Applications of quantum statistics: Equation of state of an ideal Fermi gas (derivation not expected), application of Fermi-Dirac statistics to the theory of free electrons in metals, degeneracy and magnetic susceptibility, Application of Bose statistics to the photon gas, derivation of Planck's law, comments on the rest mass of photons, Thermodynamics of Black body radiation. Bose-Einstein condensation

Reference Books:

1. Agarwal B.K. and Eisner M., Statistical mechanics, New Age International Publishers, 2000.
2. Roy S.K., Thermal physics and statistical mechanics, New Age International Pub., 2000.
3. Huang K., Statistical mechanics, Wiley-Eastern, 1975.
4. Laud B.B., Fundamentals of statistical mechanics, New Age International Pub., 2000.
5. Schroeder D.V., An introduction to thermal physics, Pearson Education New Delhi, 2008
6. Salinas S.R.A., Introduction to statistical physics, Springer, 2004.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2030	CONDENSED MATTER PHYSICS (General)	HC	3	1	0	4	5

Course Objectives:

1. To understand the basic knowledge on crystal structures and systems.
2. To understand the various process techniques available of X-Ray Crystallography.
3. To comprehend the concepts of superconductivity and magnetic properties of solids.

Course Outcomes:

On successful completion of this course, the students shall be able to:

1. Formulate basic models of lattice vibrations for describing the physics of crystalline materials
2. Develop a relation between band structure and the electrical/optical properties of materials
3. Analyze the concepts of superconductivity
4. Analyze of the variation of Fermi energy with temperature and impurity concentration in the case of impurity semiconductors.

Course Content:**Unit -1:****12 hrs**

X-ray Crystallography: Crystalline state, Reference axes, Lattices, two dimensional lattices, Three-dimensional lattices, equation of a plane, derivation of Miller indices, Reciprocal lattice, symmetry operations, Two and three dimensional point groups, choice of unit cell, Bravais lattices and crystal systems, Screw and glide operations, Space groups, analysis of the space group symbol. Structure and Atomic scattering factor (qualitative), Diffraction of X-rays by crystals: Bragg equations, Laue equations, Equivalence of Laue and Bragg equations,.

Unit - 2:**12 hrs**

Experimental techniques: Diffraction by single crystal, Laue, Weissenberg and Powder methods.

Electron and neutron diffraction: Basic principles, Differences between them and X-ray diffraction. Applications (qualitative).

Crystal growth: Crystal growth from melt: Bridgmann and Czochralski methods and zone refining techniques: any two methods.

Liquid crystals: Morphology, The smectic (A-H), nematic and cholesteric phases, Birefringence, Orientational order and its determination in the case of nematic liquid crystals.

Unit -3:**12 hrs**

Magnetic properties of solids: Diamagnetism and its origin, Expression for diamagnetic susceptibility, Paramagnetism, Quantum theory of Paramagnetism, Brillouin function, Ferromagnetism, Curie-Weiss law, Spontaneous magnetization and its variation with temperature, Ferromagnetic domains, Antiferromagnetism, Susceptibility below and above Neel's temperature.

Superconductivity: Experimental facts, Meissner effect, Qualitative ideas of the theory of superconductivity, Type I and type II superconductors, Phenomenological theory, London equations, High frequency behavior, Thermodynamics of superconductors, Entropy and Specific heat in the superconducting state.

Unit - 4:**12 hrs**

Semiconductors: Intrinsic Semiconductors, Crystal structure and bonding, Expressions for carrier concentrations, Fermi energy, electrical conductivity and energy gap in the case of intrinsic semiconductors, Extrinsic Semiconductors; impurity states and ionization energy of donors, Carrier concentrations and their temperature variation, Qualitative explanation of the variation of Fermi energy with temperature and impurity concentration in the case of impurity semiconductors.

Reference Books:

1. Stout G.H. and Jensen L.H., X-ray structure determination, MacMillan, USA, 1989.
2. Ladd M.F.C. and Palmer R.A., Structure determination by X-ray crystallography, Plenum Press, USA, 2003.
3. Buerger M.J., Elementary crystallography, Academic Press, London.
4. Dekker A.J., Solid state physics, Prentice Hall, 1985.
5. Kittel C., Introduction to solid state physics, 7th Edn., John Wiley, New York, 1996.
6. McKelvey J.P., Solid state and semiconductor physics, 2nd Edn., Harper and Row, USA, 1966.
7. Streetman B.G., Solid state electronic devices, 2nd Edn., Prentice-Hall of India, New Delhi, 1983.
8. De Gennes P.G. and Prost J., The physics of liquid crystals, 2nd Edn., Clarendon Press, Oxford, 1998.

9. Wahab M.A., Solid state physics, Narosa Publishing House, New Delhi, 1999.
10. Azaroff L.V., Introduction to solids, McGraw-Hill Inc, USA, 1960.
11. Pillai S.O., Solid state physics, New Age International Publications, 2002.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2040	ATOMIC AND MOLECULAR PHYSICS	HC	3	1	0	4	5

Course Objectives:

1. To develop a basic understanding of physics of atoms and molecules: definitions, units, laws and rules.
2. to gain an ability of basic problems analyzing and solving in physics of atoms and molecules
3. to realize a role and practical application of physics of atoms and molecules in the modern world

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Analyze the concepts of atomic models, spectra of one and two valance electron atoms.
2. Analyze the behaviour of atoms in external applied electric and magnetic field.
3. Differentiate rotational, vibrational, electronic and Raman spectra of molecules.
4. Describe electron spin and their spectroscopic applications.
5. Formulate and solve the problems related to different spectroscopic systems.

Course Content:

Unit – 1:

12 hrs

Atomic Physics: Brief review of early atomic models of Bohr and Sommerfeld. One electron atom: Quantum states, Atomic orbitals, spectrum of hydrogen, Rydberg Atoms (brief treatment), Relativistic corrections to spectra of alkali atoms: Spin-orbit interaction and fine structure in alkali spectra. Lamb shift in hydrogen (qualitative Discussion only).

Unit – 2:

12 hrs

Two electron atom: Ortho and Para states and role of Pauli principle, level schemes of two electron atoms. Perturbations in the spectra of one and two electron atoms: Zeeman effect, Paschen- Back effect, Stark effect in hydrogen spectra. Hyperfine interactions and 21cm line of hydrogen. Many electron atoms: Central field approximation. LS and JJ coupling schemes, Multiplet splitting and Lande interval rule.

Unit – 3:

Molecular Physics A: Brief treatment of chemical bonds: covalent, ionic, Vanderwaal's interactions. The Born-Oppenheimer approximation (qualitative treatment), diatomic molecule as a rigid rotator, rotational spectra of rigid and non-rigid rotator, intensities of rotational lines. Microwave spectroscopy-principle and technique Types of rotors: Eigen values of Linear, Symmetric top, Asymmetric top and Spherical top molecules. Raman spectroscopy: Theory of Raman effect, experimental techniques, rotational Raman spectra of diatomic and linear polyatomic molecules.

12 hrs**Unit – 4:**

Molecular Physics B: Diatomic molecule as a simple harmonic oscillator, anharmonicity, Morse potential curves, vibrating rotator: energy levels and vibration spectra, PQR branches in rovibronic spectra, experimental technique and IR spectrometer. Comparison of vibration and Raman spectra.

Electronic spectra of diatomic molecules: Vibrational structure, rotational structure in electronic spectra, intensity of vibrational lines in electronic spectra, Frank-Condon principle, dissociation and pre-dissociation, fluorescence and phosphorescence.

12hrs**Reference Books:**

1. Introduction to Atomic spectra- H.E.White.
2. Fundamentals of molecular spectroscopy, C B Banwell.
3. Spectroscopy Vol I, II & III, Walkere and Straughen.
4. Physics of atoms and molecules, Bransden and Joachain, (2nd Edition) Pearson Education, 2004.
5. Fundamentals of Molecular Spectroscopy, Banwell and Mccash, Tata McGraw Hill, 1998.
6. Modern Spectroscopy, J.M. Hollas, John Wiley, 1998.
7. Molecular Quantum Mechanics, P.W. Atkins and R.S. Friedman. Third Edition, Oxford Press(Indian Edition), 2004.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2051	ELECTRONICS-I (DIGITAL ELECTRONICS)	SC	2	1	0	3	4

Course Objectives:

1. To understand number systems and codes and their application to digital circuits.
2. To gain knowledge of Boolean algebra, Karnaugh maps and its application to the design and characterization of digital circuits.
3. To know the mathematical characteristics of logic gates.
4. To design and analyze a given combinational or sequential circuit using Boolean Algebra as a tool to simplify and design logic circuits.
5. To understand the logic design of programmable devices, including PLDs

6. To design various synchronous & Asynchronous counters and Universal Shift Registers.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Translate from one number system to its equivalent other number system and perform its arithmetic operations.
2. Explain TTL and CMOS construction, working, characteristics and applications.
3. Explain the use of implementation of logic circuits.
4. Draw the logic circuits by simplifying Boolean expressions using theorems, laws and K-map.
5. Analyse the operation of Combinational and Sequential logic circuits.
6. Explain DAC and ADC, types, specifications and applications.

Course Content:**Unit 1:****12hrs**

Number Systems and Logic families: Decimal, Binary, octal, and hexa-decimal number systems, binary arithmetic. Number base conversion, Complements Codes: Binary code, excess-3 code, gray code, error detection and correction codes. Positive logic and Negative Logic, AND, OR, NOT, NAND, NOR, X-OR GATE, INHIBIT CIRCUIT, Application relevant information, electrical characteristics.

Unit 2:**12hrs**

Boolean operations and expressions: Introduction, Logic Operators, Postulates and theorems, properties – Product of Sums and Sum of Products – Karnaugh Map method – Two, three, four, five variable K-maps, Converting Boolean expressions to Logic and Vice versa, NAND and NOR implementation – Don't-Care conditions – The tabulation method.

Unit 3:**12hrs**

Combinational and Sequential circuits: Half and full Adder – Half and full Subtractor – Binary parallel adder – BCD Adder, Decimal adder – Magnitude comparator – Encoders & Decoders – Multiplexers – De-multiplexer Latches, Flip-flops, SR, JK- Flip-flop, JK Master-Slave, D, T flip-flops, counters, synchronous and asynchronous counters, ripple counters, registers, shift registers, timing sequences.

Unit 4:**12hrs**

A/D and D/A conversion circuits: Introduction, Digital to Analog Converters D/A converter Specifications, Types of D/A converters, Mode of Operation, BCD Input D/A converter, Integrated Circuit D/A Converters, D/A converter Applications, A/D converters, A/D Converter Specifications,

A/D Converter Technology, Types of A/D converters, Integrated Circuit A/D Converters, A/D converter Applications

Basics of microprocessor and microcontroller: Architecture of 8085, Architecture of 8051.

Reference Books:

1. John F. Wakerly, —Digital Designl 4 thedition,Pearson/PHI,2008.
2. John, M Yarbrough, —Digital Logic application and designl, Thomson Learning, 2006.
3. Charles H, Roth, —Fundamentals of Logic Designl, Thomson Learning, 2013.
4. Donald P, Leach and Albert Paul Malvino, —Digital Principles and Applicationsl, 6th edition, TMH, 2006.
5. Thomas L. Floyd, — Digital Fundamentalsl, 10th Edition, Pearson Education Inc, 2011
6. Donald D, Givone, —Digital Principles and Design‘, TMH, 2003.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2052	CONDENSED MATTER PHYSICS - I	SC	2	1	0	3	4

Course Objectives: To familiarized students with:

1. Defects, types of defects and how defects are formed.
2. Luminescence and its mechanism.
3. Lattice formation and deformation, energy band structure and classification of materials based on energy gap.
4. Preparation of thin films and study of their structural characteristics.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Analyse defects in crystals.
2. Illustrate Photoconductivity, Luminescence- fluorescence, Phosphorescence, Thermoluminescence, Photoluminescence, Electroluminescence; Mechanisms.
3. Analyse Short range order- Long range order.
4. Design semiconductor devices.

Course Content:

Unit -1:

12 hrs

Disordered systems: Point defects-shallow impurity states in semiconductors-Localized lattice vibrational states in solids-Vacancies, interstitials in ionic crystals- Color centers in ionic crystals- Types of Color centers- methods of production-mechanism - Characteristic absorption bands, Properties of Color centers- Models and Applications. Photoconductivity, Luminescence- fluorescence, Phosphorescence- Thermoluminescence, Photoluminescence, Electroluminescence; Mechanisms. Imperfections in crystals, Mechanism of plastic deformation in solids, Stress and strain fields of screw and edge dislocations, Elastic energy of dislocations.

Unit – 2:

12 hrs

Disorder in Condensed Matter : Introduction- Short range order- Long range order- Ordered lattice- Disordered lattice- Compositional. disorder- Topological disorder-Magnetic disorder-Localized states- Anderson Model- Density of states, Concept of glass- Glass transition- Atomic correlation function and structural description of glasses and liquids, Amorphous semiconductors: Classification, band structure- electronic conduction- Optical absorption-Switching. Transport in disordered lattices- Transport in extended states, Fixed range and variable range hopping- conductivity in impurity bands and in amorphous semiconductors-Applications.

Unit – 3:

12 hrs

Semiconductors: Structure of typical semiconductors- Fermi energy expression in Intrinsic and extrinsic semiconductors- its variation with temperature and impurity concentration- Law of mass action- Charge neutrality equation- mobility- diffusion- generation- recombination of Carriers in Semiconductors- Conductivity equation- carrier Life time- Haynes-Shockley experiment- Hall effect in semiconductors- Determination of Hall coefficient in intrinsic, n-type and p-type semiconductors.

Unit – 4:

12 hrs

Films and Surfaces: Thin films Methods of preparation: Thermal evaporation- sputtering- DC, AC, diode, triode, magnetron, ion beam sputtering, Laser and electron beam evaporation technique, Chemical vapor deposition, Characterization of thin films- film thickness: optical methods- interferometry- Fizeau fringes- FECO Method. Mechanical techniques- Stylus method-weight measurement and crystal oscillators. Structural characterization Scanning electron microscopy, Transmission Electron

microscopy and Atomic Force Microscopy. Mechanical properties- Internal stress and strain analysis. Electrical properties of thin films- Measurement of resistivity by four probe method, thin film resistors (Conduction in metal and non metallic films) Magnetic properties- film size effect on MS- films for memory devices.

Reference Books:

1. Solid State Physics, A. J. Dekker, McMillan India Ltd, 2003.
2. Luminescence of Solids, D. R. Vij, Plenum Press, 1998.
3. Elementary dislocation theory, J. Weertman and J.R. Weertman, New York ; Macmillan 1964
4. Crystallography Applied to Solid State Physics, Verma and Srivastava, 2nd Edition. New age International publishers, 2001.
5. Introduction to Solid State Physics, C. Kittel, 7th Edition, John Wiley and Sons 1996.
6. Thin Film phenomenon, K.L. Chopra, McGraw Hill Book Company, 1969.
7. Introduction to solid state theory, Otfried Madelung, Springer series. 1996.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2053	MATERIAL SCIENCE –I	SC	2	1	0	3	4

Course Objectives:

1. To focus on the structural, electronic and magnetic properties of metals, alloys, super conductors, semi-conductors and dielectric materials.
2. To discuss and understand various applications of the above materials in different fields.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Explain the Structure, types of metals and alloys.
2. Analyze the effect of doping and mobility of charge carriers in semiconductors.
3. Analyze the concept of dielectrics and magnetic materials phenomena.
4. Analyze the Properties of Magnetic Materials based on resonance and spin configurations.

Course Content:

Unit - 1:

12 hrs

Metals: Review of free electron theory and Fermi distribution function, Structure and types of metals, Electronic properties of metals- electrical and thermal conductivity, Widemann- Franz law, temperature and impurity effects. Heat capacity of metals- debye_s model of specific heat-contribution of free

electrons to heat capacity- dispersion relation- acoustic and optical modes-thermal expansion- an harmonic interactions, Galvanomagnetic effects in metals.

Alloys: Solid solutions - substitutional and interstitial. Hume Rothery rules. Super lattice- long range order theory. Diffusion in alloys- Darkens equation. Some special alloys-ferrous and nonferrous, super alloys.

Unit - 2:

12 hrs

Semiconductors: Review of band theory of solids, direct and indirect band gaps, charge carrier in intrinsic semiconductor. Extrinsic semiconductor- effect of doping and mobility of charge carriers, Methods of doping- alloying, diffusion and ion implantation, Preparation of semiconductor single crystals.

Superconductivity: Superconducting tunneling phenomena, AC and DC Josephson effect, Applications- Superconducting magnets.

SQUID. HTS superconductors - materials preparation and structure.

Unit - 3:

12 hrs

Dielectrics and Ferroelectrics

Dielectrics: Review of dielectric polarization- internal field and macroscopic field. The Complex dielectric constant-dielectric losses and relaxation time-Debye equations- Theory of electronic polarization and optical absorption. Dielectric function» LST Relationship, dielectric breakdown-general applications of dielectric materials. Ferroelectrics Piezoelectric, pyroelectric and ferroelectric materials- transducer and detector applications, Classification of ferroelectrics. Ferro electricity in KDP and barium titanate- order—disorder and displacement theories. Thermodynamics of ferroelectric phase transitions.

Unit - 4:

12 hrs

Magnetic Materials and Magnetic Resonance:

Magnetic Materials: Review of dia, para and ferro- magnetic materials, Spontaneous Magnetization— temperature dependence- gyromagnetic experiments. Origin of Ferromagnetic domains- anisotropy of magnetostriction and Bloch wall energies. Antiferromagnetic and ferrimagnetism- Sublattice model~ Neel's theory, Neutron Diffraction in magnetic structure analysis, Hard and soft magnetic materials- areas of Their application.

Magnetic Resonance: Elements of theory of nuclear magnetic resonance (NMR)-rate of energy absorption- spin lattice and spin-spin relaxation- Bloch equations, Principles of ESR, NOR and Mossbauer techniques, applications.

Reference Books:

1. Introduction to Properties of Materials — D. Rosenthal and R M Asimov, East West (1974).
2. Elements of Materials Science and Engineering- L H Van Vlack, Addison Wesley (1975).
3. Introduction to solid state Physics, C. Kittel, Wiley Eastern (1993).
4. Solid State Physics, A. J. Dekker, Mc Milan India (2005).
5. Introduction to solids, L V Azaroff , Mc Graw Hill (1977).
6. Electronic Materials, S. Muraka , Academic Press (1989).
7. Superconductivity and Superconducting Materials- A. V. Narlikar and S. N. Ekbote , South Asian Publications (1983).
8. Semiconductor Physics- P S Kireev, Mir Publishers (1975).
9. Solid State and semiconductor Physics, John Mckelvey, Harper and Low (1969).
10. Modern Magnetism- L F Bates, Cambridge University Press(1963).
11. Electronic Properties of Materials Ver, Hummel, Springer lag (1985).
12. Physics of dielectric Materials- I3 Tareev, Mir Publishers (1979).
13. Magnetic Resonance- C P Slichter , Harper and Row (1985).
14. NQR Spectroscopy, SSP Suppl. I T P Das and E. L. Hahn, Academic Press (1957).
15. Mossbauer Effect and its Applications, V G Bhide, Tata McGraw Hill (1973).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PH2060	YOGA / SPORTS / MUSIC / DANCE/ THEATRE	RULO	0	0	2	2	3

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

- To prepare the students for the integration of their physical, mental and spiritual faculties;
- To enable the students to maintain good health;
- To practice mental hygiene and to attain higher level of consciousness;
- To possess emotional stability, self control and concentration; and
- To inculcate among students self discipline, moral and ethical values.

Course Outcomes:

On completion of the course learners will be able to:

- Practice yoga for strength, flexibility, and relaxation.
- Learn techniques for increasing concentration and decreasing anxiety
- Become self disciplined and self-controlled
- Improve physical fitness and perform better in studies
- Gain self confidence to face the challenges in the society with commitment to serve the society

Course Contents

Unit-I:

Yoga: Introduction, Tips from Sage Patanjali's Yoga Sutras
Surya Namaskara:- 10 counts,12 counts,16 counts

Unit-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Ardha Matsyendrasana, Suptavajrasana, Paschimottasana, Bakasana, Simhasana, Shirasasana.
Asanas: Standing- Tadasana, Trikonasana, Parshwa konasana, Veerabhadrasana, Parivrutta trikonasana.

Unit-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana, Shalabhasana.
Asanas: Supine Position- Sarvangasana, Sethubandha sarvangasana, Halasana, Karnapeedasana.
Mudras- Dhyana mudra, Chinmaya mudra, Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:- Ujjayi, Nadi Shodhana, Anuloma – Viloma, Basthrika, Bhramari, Sheethali
Dhyana & its types, Competition format, Rules and their interpretations

B. SPORTS (VOLLEYBALL)

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of volleyball.
2. To develop skills in passing, setting, serving, spiking, and blocking.
3. To learn basic offensive and defensive patterns of play.
4. To develop a positive attitude towards volleyball as a lifetime sport and to improve physical fitness through participation in volleyball.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with volleyball.
2. Apply these skills while playing volleyball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:**Unit-I**

Introduction about Volleyball
Players Stance, Receiving and passing
The Volley (Overhead pass), The Dig (Underhand pass), Service Reception

Unit-II

Service- Under Arm Service, Tennis Service, Side Arm Spin Service, Round Arm Service, High spin service, Asian serve / American serve (floating)

- Setting the ball- Set for attack, Back set, Jump set

Unit-III

Smash/Spike- Straight smash, Body turn smash, Wrist outward smash, Wrist inward smash,
Block- Single block, Double block, Three-man block,
Rolls- Overhead pass & back rolling, One hand underhand pass with side rolling, Forward dive

Unit-IV

Attack Combination, Defense Systems, Libero play,
Court marking, Rules and their interpretations and Duties of officials

C. SPORTS (BASKETBALL)**Course Objectives:**

1. To learn the rules, fundamental skills, and strategies of Basketball
2. To develop technical skills in passing, in ball handling, individual offense, individual defense, rebounding, screen, team offense, team defense and fast break.
3. To learn basic offensive and defensive strategies of play.
4. To develop a positive attitude towards Basketball as a lifetime sport and to improve physical fitness through participation in Basketball.
5. To develop positive understanding and appreciation of the basketball game.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with basketball.
2. Apply these skills while playing basketball and exhibit improved performance
3. Improve physical fitness and practice positive personal and lifestyle.
4. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Contents:**Unit-I**

- Basketball: Introduction
- Grip; Player stance- Triple threat stance and Ball handling exercises
- Passing (Two hand/one hand)- Chest pass, Bounce Pass, Over head pass, Underhand pass, Hook Pass, Behind the back pass, Baseball pass, Side arm pass and passing in running.
- Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.

Unit-II

- Dribbling- How to start dribble, How to stop dribble, High / Low dribble with variations
- Shooting- Layup shot and its variations, One hand set shot, One hand jump shot, Free throw, Hook shot, Tip-in shot.
- Stopping- Stride/Scoot, Pivoting and Faking /Feinting footwork.

Unit-III

- Rebounding- Defensive rebound, Offensive rebound, Box out, Rebound Organization.
- Individual Defensive- Guarding the man with the ball and without the ball.
- Offensive drills, Fast break drills, Team Defense/Offense, Team Tactics

Unit-IV

- Court marking, Rules and their interpretations

D. SPORTS (FOOTBALL)

Course Objectives:

1. To learn the rules, fundamental skills, and strategies of football.
2. To develop skills in passing, receiving, controlling the ball, dribbling, shielding, shooting, tackling, beating a defender and heading in football.
3. To learn basic offensive and defensive patterns of play
4. To use different parts of the body in utilizing the above skills while playing football
5. To develop a positive attitude towards football as a lifetime sport and to improve physical fitness through participation in football.

Course Outcomes:

On completion of the course learners will be able to:

1. Learn basic skills and knowledge associated with football.
2. Apply these skills while playing football and exhibit improved performance
3. Use the knowledge and understanding to perform, refine and adapt the above skills and related skills with precision, accuracy, fluency and clarity in any situation.
4. Improve physical fitness and practice positive personal and lifestyle.
5. Gain an understanding of the value of sports in attaining wellness, maintaining good health and developing spirit of teamwork.

Course Content:

Unit-I

Football: Introduction

Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley

Trapping- Trapping rolling the ball, Trapping bouncing ball with sole

Unit-II

- Dribbling- With instep and outer instep of the foot.
- Heading- From standing, running and jumping.
- Feinting- With the lower limb and upper part of the body.

Unit-III

- Tackling- Simple tackling, Slide tackling.
- Throw-in- Standing and Sliding
- Goal Keeping- Collection of balls, Ball clearance, throwing and deflecting.

Unit-IV

- Ground marking, Rules and their interpretations

E. SPORTS (TRACK AND FIELD)

Course Objectives:

1. To teach students the skilled techniques in sprints, relay running, hurdles, long jump, high jump, and shot put and practice them.
2. To develop competence among students in demonstrating all the techniques covered in the course.
3. To make students understand some of the scientific and empirical principles and their rationale underlying the development of skilled performance.
4. To inculcate among students the habit of team work and cooperative learning and develop competence in detecting / correcting technique errors.
5. To develop a positive attitude towards sports in general and athletics in particular and to improve physical fitness through participation in various athletic games / sports activities.

Course Outcomes:

On completion of the course learners will be able to:

1. Display competencies in executing basic techniques and skills associated with select track and field events.
2. Develop basic skills and techniques to improve one's running posture and take-off position for different jumps.
3. Learn regular practice of select track and field events and improve physical fitness
4. Appreciate track and field events by applying sports science knowledge to explain the execution of the events.

Course Content:

Unit-I

Athletics: Introduction

Track Events - Steeple Chase, Race Walking, Middle and Long distance races

Race walking - Technique, Faults and Officiating.

Middle and Long distance races – Technique and Training

Unit-II

Jumping Events - High Jump and Triple Jump: Basic Skills and techniques

High Jump - Straddle Roll & Flop Technique, Approach, Take-off, Technique in the air,

Clearance over the bar & Landing

Triple Jump – Hop, Step and Jump Technique, Approach, Take-off & Landing

Unit-III

Throwing Events - Discus Throw and Hammer Throw: Basic Skills and techniques
Discus Throw - Standing and Rotatory techniques, Grip, Stance, Rotation Technique, Power stance, Release and Reverse (Follow through)
Hammer Throw - Grip, Swings, Rotation foot work, Release and Follow through

Unit-IV

Rules, Officiating and Marking - Ground / Sector Marking, Interpretation of Rules.

Reference Books

(Athletics Part-I and Athletics Part-II)

1. Arthur E. Ellison (ed) (1994). Athletic Training and Sports Medicine.
2. Ballisteros, J.M. (1998). Hurdles Basic Coaching Manual, IAAF.
3. Bosen K.O. (1993). Teaching Athletics Skills and Technique.
4. Bosen K.O. (1990). Study Material on Hurdles for the Regular Course Students.
5. Doherty K. (1995). Track and Field Omni book.
6. Martin, David E. Peter N. Coe (1991). Training Distance Runner.
7. Howard S. (1981). Science of Track and Field Athletics.
8. Briggs Graeme (1987). -Track and field coaching Manual, Australian Track and Field Coaches Association. Rothmans Foundation National Sports Division.
9. Carr, Gerry (1999). —Fundamentals of Track and Field. Track Athletics 1 Title G.V. 1060 5.e. 368.
10. I.A.A.F. Level-II (2001). Text Book on Jumping Event.
11. Jarver, Jesse (1987). -The Jumps, Track and Field Coaching Manual Australia.

F. DRAMATICS

Pre-requisites: Students with background in Theatre Arts/ Keen interest in Dramatics.

Course Objectives:

- To imbibe the acting skills.
- To understand the broader applications of theatre studies in allied arts forms.
- To be able to use body language for better communication.
- Students shall also be able to understand voice modulation and Navarasas.

Course Outcomes:

On successful completion of this course, students should be able to:

- Freely express improvisation in non-verbal communication.
- Shall hone good acting skills and be able to emote better.
- Be able to put up a theatre act and play a key role.
- Be able to differentiate good acting and understand the importance of good lyrics, stage crafting, music, dance, costume and lighting.

Course Content:

UNIT – 1

Working on Body:

Body and its analysis. Understanding physical abilities (Anga, Pratyanga and Upanga). Challenges of the body. Using body as metaphor and language. The class's bodies as a collective, an ensemble, a collaborative team.

UNIT – 2

Sound and Movement:

Awareness of creating sound patterns, voice modulations, rhythm in speech and dialogues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT – 3

Characterization and Improvisation:

Observation of people around. Getting into the role and living it. Developing a character from establishment (pace and rhythm). Improvisation techniques of body and mind.

UNIT – 4

Group work and Production:

Develop a theme, concept or a play and include all the theatre skills, stage craft, costuming and put up an act. Choosing theme and characters.

Reference Books:

1. All about Theatre – Off stage – Chris Hogget.
2. Rangadalli Anataranga – K V Subbanna
3. The Indian Theatre – Hemendranath Das Gupta.
4. A Practical handbook for an Actor – Milisa Bruder, ee Milchel Cohn, Madeleine Oliek et al, Zigler Publisher.

G. INDIAN CLASSICAL DANCE FORMS (Bharathanatyam, Kuchipudi ,Mohiniyattam)

Prerequisites: Background of classical dance training or any other dance forms.

Note: Non-classical dancers can also join.

Course Objectives:

- To develop an understanding about the Indian classical dance forms and its universal application.
- To be able to understand the fine nuances of Classical dance.
- To understand the importance of health through Indian classical dance, strengthen the body capacity.
- To understand mythology and its characters in Indian classical dance form through lessons of Abhinaya.

Course Outcomes:

- To be able to identify and appreciate the classical dance forms.
- To be able to execute basics of Adavus with finesse.
- To be able to express through abhinaya.
- To be able to perform to perform the fundamentals in the chosen dance form.

Course Content:

Unit 1

An introduction to Indian classical dance forms: Bharatanatyam, Kuchipudi, Mohiniyattam.

Unit 2

Learning of Fundamentals: Exercises and Adavus- I (Bharathanatyam , Kuchipudi, Mohiniyattam).

Unit 3

Adavus –II (Bharathanatyam , Kuchipudi, Mohiniyattam)

Unit 4

Learn a basic composition in the chosen dance form.

Reference Books:

1. Indian classical dance forms –U S Krishna Rao,U K Chandrabhaga Devi
2. Classical Dances –Sonal Mansingh, Avinash Parischa
3. Kuchipudi – Sunil Kothari
4. Bharatanatyam An in depth study- Saroja vydyanathan
5. Mohiniyattam – Bharathi Shivaji

H. PERCUSSION INSTRUMENT (TABLA AND MRIDANGAM)

Pre-requisites: Students with background in Percussion instruments and knowledge of Rhythm/ Keen interest in studying Mridagam / Tabala.

Course Objectives:

- To understand the Rhythmology.
- To understand the importance of Laya, Taala.
- To be able to understand the fine finger techniques of playing the instrument.

Course Outcomes:

On successful completion of this course, students should be able to:

- To be able to set instrument to Sruthi.
- To be able to play the fundamentals on instrument.
- To be able to learn and perform a particular taala.

Course Content:**UNIT 1**

Introduction to Musical Instruments, Percussion Instruments
Mridangam and its History

UNIT 2

Introduction to Tala System, Definitions of 5 jaathis and their recitation
Adi Talam and its various forms, Definitions and recitation of different gathis

UNIT 3

Tisra Jaathi, Khanda Jaathi, Misra jaathi, Sankeerna Jaathi

UNIT 4

Learning of Jathi Formation, Basic jathis, Jathis for Dance forms
Some Basic Definitions of Korvai, Teermanam etc.,

Reference Books:

1. Mridangam- An Indian Classical Percussion Drum – Shreejyanthi Gopal
2. Theory and practice of Tabala – Sadanand Naimpally.

3. Theory and practice of Mridangam – Dharmala Rama Murthy
4. The Art of the Indian Tabala – Srdjan Beronja.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2070	SKILL DEVELOPMENT	RULO	0	0	2	2	3

Note: The students will have to undergo Skill Development course being conducted by Training and Placement cell of the University.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M18PH2080	GENERAL PHYSICS LAB - II (PRACTICAL)	HC	0	0	3	3	5

Course Objectives:

1. To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop and fabricate engineering and technical equipments.
2. Design of circuits using new technology and latest components and to develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.

Course Outcomes:

On Successful completion of this course, students shall be able to:

1. Infer the result of related experiments.
2. Employ the different tools and techniques to get the data/readings related to the experiments.
3. Explore the fundamental physics behind many scientific discoveries through hands on experience.

List of Experiments:

1. Determination of wave length and difference in wavelengths of D_1 and D_2 lines using Michelson interferometer.
2. Active low pass and high pass filter using op-amp.
3. Determination of Fermi Energy of given conductor/semiconductor.
4. Determination of end point energy of half value methods or absorption energy by GM counter

5. Determination of Ferroelectric phase transition and verification Curie Weis law.
6. Measurement of thickness of thin wire using Laser source.
7. Determination of size of the particles using laser by diffraction halos method.
8. Determination of velocity of ultrasonic waves in liquid.
9. Determination of Red berg using hydrogen spectrum.
10. Verification of photoelectric equation and determination photonic work function and Planck's constant.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH2090	ATOMIC AND MOLECULAR PHYSICS (PRACTICAL)	HC	0	0	3	3	5

Course Objectives:

1. To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop and fabricate engineering and technical equipments.
2. Design of circuits using new technology and latest components and to develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Verify the spectroscopic phenomenon of physics through experimentation.
2. Infer results of the experiments connected with interaction of electric and magnetic fields with atoms and molecules.
3. Distinguish the band, line and Raman spectrum through the experimentation.

THIRD SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3010	ELECTRODYNAMICS	HC	2	1	0	3	4

Course Objective:

1. To introduce students the principles and applications of Electrostatics, Magneto-statics, Electrodynamics and Electromagnetic waves.

Course Outcomes:

On the successful completion of this course, the student shall be able to:

1. Apply reasoning skills to model and solve problems related to electrostatics
2. Formulate problems within magnetostatics and stationary current distributions and solve.
3. Demonstrate the understanding of Faraday's laws and Maxwell's equations and physics concepts in Electrodynamics.
4. Derive expressions for the energy both for the electrostatic and magneto-static fields by using Poynting's theorem and Maxwell's equations.
5. Analysis and explain wave guides and Electromagnetic radiation by using concepts of electrostatics, magneto statics and Maxwell's equations.
6. Communicate scientific information in electrostatics, magneto statics, electrodynamics and electromagnetic radiation in oral, written, and graphical formats.

Course Content:

Unit -1:

12 hrs

Electrostatics: Divergence and curl of electrostatic field, Gauss law in integral and differential forms, Poisson and Laplace equations, Boundary conditions and uniqueness theorem, electrostatic potential energy and energy density of a continuous charge distribution, Multipole expansion of the potential and energy of a localized charge distribution, monopole and dipole terms, electric field of a dipole, dipole-dipole interaction, Electrostatic fields in matter, polarization, macroscopic field equations, electrostatic energy in dielectric media.

Unit - 2:**12 hrs**

Magnetostatics: Current density, continuity equation, magnetic field of a steady current, the divergence and curl of \mathbf{B} , Ampere's law, magnetic vector potential, multipole expansion of vector potential of a localized current distribution, magnetic moment, Torques and forces on magnetic dipoles, effect of a magnetic field on atomic orbits, Magnetic fields in matter, macroscopic equations, magneto static boundary conditions, magnetic scalar potential, Energy in the magnetic field.

Unit -3:**12 hrs**

Electrodynamics: Faraday law of induction, displacement current, Maxwell's equations, Vector and scalar potentials, Gauge transformations, Lorentz gauge, Coulomb gauge, Poynting's theorem and conservation of energy and momentum for a system of charged particles and electromagnetic fields.

Electromagnetic Waves: Plane waves in non-conducting and conducting medium, skin depth, Linear and circular polarizations, Reflection and refraction of plane waves at a plane interface, total internal reflection, reflection from a surface of a metal., fresnel's law

Unit 4:**12 hrs**

Wave guides: Fields at the surface and within a conductor, cylindrical cavities and wave guides, modes in rectangular wave guide

Electromagnetic radiation: Retarded Potentials. Radiation from an oscillating dipole, liner antenna, Lenard-Wiechert potentials, potentials for a charge in uniform motion, power radiated by an accelerated charge at low velocities, Larmor's formula , radiation from a charged particle with collinear velocity and acceleration, Bremsstrahlung radiation, radiation from a charged particle moving in a circular orbit, cyclotron and synchrotron radiation.

Plasma Physics: Plasma behavior in magnetic field, plasma as a conducting fluid-magneto hydrodynamics, magnetic confinement-Pinch effect.

Reference Books:

1. Classical Electrodynamics: J.D.Jackson , Wiley Eastern Ltd., Bangalore (1978)
2. Introduction to Electrodynamics: D.J.Griffiths, Prentice Hall of India, Ltd., New Delhi (1995).
2. Electro magnetics: B.B. Laud. Wiley Eastern Ltd., Bangalore (1987)
3. Classical Electromagnetic Radiation: J.B. Marion, Academic press, NewYork (1968).
4. Classical Electrodynamics; S P Puri, Tata McGraw –Hill Publishing Company Ltd., New Delhi, (1990).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3020	NANOSCIENCE AND TECHNOLOGY	HC	2	1	0	3	4

Course Objectives:

1. To understand the fundamental concepts behind nanoscience and nanotechnology.
2. To familiarize with various processing techniques available for synthesis of nanostructure materials.
3. To acquire the knowledge of various nanomaterial characterization methods.
4. To get familiarized with the various analytical techniques.
5. To understand the properties of nanomaterials.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Analyze the fundamental principles of nanotechnology and apply to different applications
2. Apply physics concepts to the nano-scale and non-continuum domain.
3. Demonstrate state-of-the-art nano-fabrication methods to prepare nano particles
4. Evaluate processing conditions to functional nanomaterials
5. Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems.

Course Content:

Unit – 1:

12 hrs

NANOSCALE SYSTEMS: Length, energy, and time scales - Quantum confinement of electrons in semiconductor nanostructures: Quantum confinement in 3D, 2D, 1D and zero dimensional structures - Size effect and properties of nanostructures- Landauer Buttiker formalism for conduction in confined geometries - Top down and Bottom up approach.

Unit - 2:

12 hrs

QUANTUM DOTS: Excitons and excitonic Bohr radius – difference between nanoparticles and quantum dots - Preparation through colloidal methods - Epitaxial methods- MOCVD and MBE growth of quantum dots - current-voltage characteristics - magneto tunneling measurements - spectroscopy of

Quantum Dots: Absorption and emission spectra - photo luminescence spectrum - optical spectroscopy - linear and nonlinear optical spectroscopy.

Unit – 3

12 hrs

SYNTHESIS OF NANOSTRUCTURE MATERIALS:

Gas phase condensation – Vacuum deposition -Physical vapor deposition (PVD) - chemical vapor deposition (CVD) – laser ablation- Sol-Gel- Ball milling –Electro deposition- electroless deposition – spray pyrolysis – plasma based synthesis process (PSP) - hydrothermal synthesis.

Unit – 4:

12 hrs

NANOTECHNOLOGY APPLICATIONS: Applications of nanoparticles, quantum dots, nanotubes and nanowires for nanodevice fabrication – Single electron transistors, coulomb blockade effects in ultrasmall metallic tunnel junctions - nanoparticles based solar cells and quantum dots based white LEDs – CNT based transistors – principle of dip pen lithography.

Reference Books:

1. —Nanotechnology| G. Timp. Editor, AIP press, Springer-Verlag, New York, 1999
2. —Nanostructured materials and nanotechnology“, Concise Edition, Editor:- Hari Singh Nalwa; Academic Press, USA (2002).
3. —Hand book of Nanostructured Materials and Technology“, Vol.1-5, Editor:- Hari Singh Nalwa; Academic Press, USA (2000).
4. —Hand book of Nanoscience, Engineering and Technology (The Electrical Engineering handbook series), Kluwer Publishers, 2002.
5. —Sol-Gel Science|, C.J. Brinker and G.W. Scherrer, Academic Press, Boston (1994).
6. Nanoscale characterization of surfaces & interfaces, N John Dinardo, Weinheim Cambridge: Wiley-VCH, 2nd ed., 2000.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3030	NUCLEAR AND PARTICLE PHYSICS	HC	2	1	0	3	4

Course Objectives:

- To study the general properties of nucleus.
- To study the nuclear forces and nuclear reactions.
- To introduce the concept of elementary particles.

Course Outcomes:

On successful completion of this course, the student shall be able to:

- Explain various types of nuclear reactions
- Construct nuclear and semi-conductor detectors
- Apply various models to study nuclear decay
- Apply basic laws of particle physics and macroscopic physics phenomena in determination of particle properties and properties of processes in the subatomic world

Course Content:

Unit -1:

12 hrs

Interaction of charged particles: energy loss of heavy charged particles in matter, Bethe-Bloch formula, energy loss of fast electrons, Bremstrahlung.

Interaction of gamma rays: photo electric, Compton, and pair production processes. Gamma ray attenuation- attenuation coefficients, absorber, mass thickness, cross sections.

Nuclear reactions: cross section for a nuclear reaction, Differential cross section, Q-value of reaction, threshold energy, Direct and compound nuclear mechanisms, Bohr's independence hypothesis and experimental verification.

Nuclear fission: energy released in fission, neutron cycle in a thermal reactor and four factor formula.

Unit – 2:

12 hrs

Nuclear forces: characteristics of nuclear forces, short range, saturation, charge independence and exchange characteristics, Ground state of deuteron, Relation between the range and the depth of the potential using square well potential, Yukawa's theory of nuclear forces (qualitative only)

Nuclear detectors: scintillation detectors- NaI(Tl), plastic scintillation- scintillation spectrometer.

Semiconductor detectors: Surface barrier detectors, Li ion drift detectors, relation between applied voltage and the depletion region in junction detectors, counter telescopes, particle identification, and position sensitive detector.

Unit – 3:

12 hrs

Nuclear models and nuclear decay:

Liquid drop model: Semiempirical mass formula, stability of nuclei against beta decay, mass parabola.

Fermi gas model: Kinetic energy for the ground state, asymmetry energy, Potential depth.

Shell model: evidence for magic numbers, prediction of energy levels in an infinite square well potential, spin orbit interaction, prediction of ground state spin parity and magnetic moment of odd nuclei, Schmidt limit.

Beta decay: Fermi's theory of beta decay, curie plots and ft values, selection rules.

Gamma decay: Multi polarity of gamma rays, selection rules, internal conversion (qualitative only).

Unit – 4:

12 hrs

Elementary particle physics: types of interactions between elementary particles, hadrons and leptons, detection of neutrinos.

Symmetries and conservation laws: conservation of energy, momentum, angular momentum, charge and isospin, parity symmetry, violation of parity in weak interactions, lepton number conservation, lepton family and three generations of neutrinos. Conjugation symmetry, CP violation in weak interactions.

Strange particles, conservation of strangeness in strong interactions, Baryon number conservation, Gell-Mann Nishijima formula, eight fold way (qualitative only), Quark model, quark content of baryons and mesons, color degree of freedom, standard model (qualitative only).

Reference Books:

1. Introduction to Nuclear Physics H. Enge: Addison Wesley, 1971.
2. Atomic and Nuclear Physics, S. N. Goshal vol II 2000.
3. Introductory Nuclear Physics Kenneth S. Krane: John Wiley and Sons, 1987.
4. The Atomic Nucleus Evans R.D. : Tata Mc. Graw hill, 1955.
5. Nuclear Physics, R R Roy and Nigam: Wiley-eastern Ltd 1983.
6. Nuclear physics an introduction, S.B. Patel: New age international (P) limited 2000.
7. Radiation Detection and Measurements, G.F. Knoll: 3rd edition, John Wiley and sons, 2000.
8. Nuclear Radiation Detectors, S.S. Kapoor and V.S Ramamurthy: Wiley and sons. Introduction to High Energy Physics D.H. Perkins: Addison Wesley, London, 2000.
9. Introduction to Elementary Particles, D.Griffiths: John Wiley 1984.
10. Nuclear Interactions, S.de Benedetti: John Wiley, New York, 1964.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3041	ELECTRONICS - II (ELECTRONIC COMMUNICATION SYSTEMS)	SC	3	1	0	4	5

Course Objectives:

1. To understand the fundamental concepts of communication systems.
2. To understand and compare different analog modulation schemes.
3. To understand and compare different digital modulation schemes.
4. To understand the design tradeoffs and performance of communications systems.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Analyze the working of amplitude and frequency modulated communication systems.
2. Analyze various modulation schemes in digital communication system
3. Distinguish between Analog and Digital Communication system and analyze various sampling methods and its reconstruction.
4. Construct various channel coding and decoding schemes such as Hadamard code, Hamming code, Cyclic Codes, Convolution coding

Course Content:

Analog communication systems

Unit 1:

AM Transmitters and Receivers: Generation of AM, low level and high-level modulation, comparison of levels, AM transmitter block diagram, DSB S/C modulator. AM Receiver: Tuned radio frequency (TRF) receiver. Super heterodyne receiver, RF section and characteristics, mixers, frequency changing and tracking, IF rejection and IF amplifiers. Detection and automatic gain control (AGC), AM receiver characteristics.

Unit 2:

FM Transmitters and Receivers FM Transmitters: Basic requirements and generation of FM, FM Modulation methods: Direct methods, Variable capacitor Modulator, Varactor Diode Modulator, FET Reactance Modulator, Transistor Reactance Modulator, Pre-emphasis, Direct FM modulator, FM Receivers: Limiters, single and double-tuned demodulators, balanced slope detector, Foster-Seely or

Phase Discriminator, De-emphasis, ratio Detector, Block diagram of FM Receivers, RF Amplifiers, FM Receiver characteristics.

Digital communication systems

Unit 3:

Analog to Digital Conversion Noisy communications channels, Sampling Theorem, low pass signals and band pass signals, pulse Amplitude modulation, channel bandwidth for a PAM signal, Natural sampling, Flat top sampling, signal recovery & holding, Quantization of signal, Quantization error, pulse code modulation (PCM), Delta Modulation, adaptive delta modulation. Digital Modulation Techniques: Binary phase shift keying, differential phase shift keying, differential encoded PSK, QPSK, Quadrature Amplitude shift keying (QASK) Binary frequency shift keying.

Unit 4:

Information Coding and Decoding: Coding for error detection and correction, Block coding – coding, anticoding, Hadamard code, hamming code, Cyclic Codes, Convolution coding and decoding, Shannon Fano and Hoffman Codes.

Reference Books:

1. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe. TMH, 2007 3rd Edition.
2. Principles of Communication Systems - Simon Haykin. John Wiley, 2r" Edition,
3. Electronics & Communication System - George Kennedy and Bernard Davis, 4th Edition TMH 2009
4. Analog Communications- KN Hari Bhat & Ganesh Rao, Pearson Publications, 2nd Edition 2008.
5. Communication Systems Second Edition - R.P. Singh. SP Sapre, TMH, 2007.
6. Communication Systems by Simon Haykins John Wiley & Sons, 4th Edition.
7. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004
8. Communication Systems – B.P. Lathi, BS Publication, 2004.
9. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
10. Electronic Communication Systems – Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
11. Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
12. Analog and Digital Communication – K. Sam Shanmugam, Willey ,2005
13. Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.
14. Lathi -Modern Digital and Analog Communication Systems,|| Oxford University Press.

15. B. Sklar, —Digital Communications: Fundamentals and Applications,| Pearson Education.
16. S. Haykin, —Digital Communication,| John Willey.
17. R.P. Singh and S.D. Sapre, —Communication Systems: Analog and Digital,| Tata McGraw-Hill.
18. T. Schilling, —Principles of Communication Systems,| TMH.
19. A.B. Carlson, —Communication Systems,| TMH.
20. G. Kennedy, —Electronic Communication Systems,| TMH.
21. Digital Communications - John G. Proakis . Masoud salehi – 5th Edition, McGraw-Hill, 2008.
22. Digital Communication - Simon Haykin, Jon Wiley, 2005.
23. Digital Communications - Ian A. Glover, Peter M. Grant, Edition, Pearson Edu., 2008.
24. Communication Systems-B.P. Lathi, BS Publication, 2006.
25. Principles of communication systems - Herbert Taub. Donald L Schiling, Goutam Sana, 3rd Edition,Mc.Graw-Hill, 2008.
26. Digital and Analog Communicator Systems - Sam Shanmugam, John Wiley, 2005.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3042	CONDENSED MATTER PHYSICS –II	SC	3	1	0	4	5

Course Objectives:

The course is to understand the basic knowledge on magnetic, dielectric and electric properties of material, types of magnetic and dielectric materials and their applications.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Differentiate types of magnetic materials.
2. Analyze ESR and EPR spectral data.
3. Understand classical and quantum theory of dielectrics.
4. Classify ferroelectric crystals.

Course Content:

Unit - 1:

12 hrs

Ferromagnetism : Review of Weiss theory of ferromagnetism, its successes and failures, Heisenberg exchange interaction, exchange integral, exchange energy, Ising model, Spin waves (one dimensional case only), quantization of spin waves and magnons, density of modes, thermal excitation of magnons

and Bloch $T^{3/2}$ law, specific heat using spin wave theory. Band theory of ferromagnetism. Ferromagnetic domains, hysteresis curve, magneto crystalline anisotropy energy, Bloch wall.

Ant ferromagnetism: Characteristic property of anti ferromagnetic substance, Neutron diffraction experiment. Two sub-lattice model molecular field theory of anti ferromagnetism, Neel temperature, Susceptibility below and above Neel temperature.

Ferrimagnetism: Ferrimagnetic order, ferrites, Curie temperature and susceptibility of ferrimagnets.

Unit - 2:

12 hrs

Magnetic Resonance : Basic principles of paramagnetic resonance, spin-spin and spin–lattice relaxation, susceptibility in a.c. magnetic field power absorption, equations of Bloch, steady state solutions, determination of g-factor, line width and spin –lattice relaxation time, paramagnetic resonance and nuclear magnetic resonance. Effect of crystal field on energy levels of magnetic ions (qualitative). Spin- Hamiltonian, zero field splitting.

Unit - 3:

12 hrs

Dielectrics: Review of basic formulae, dielectric constant and polarizability, local field, Clausius-Mossotti relation, polarization catastrophe. Sources of polarizability, Dipolar polarizability: dipolar dispersion, Debye’s equations, dielectric loss, dipolar polarization in solids, dielectric relaxation. Ionic polarizability. Electronic polarizability: classical treatment, quantum theory, interband transitions in solids.

Unit - 4:

12 hrs

Ferroelectrics: General properties of ferroelectrics, classification and properties of representative ferroelectric crystals, dipole theory of ferroelectricity, dielectric constant near Curie temperature, microscopic source of ferroelectricity, Lydane –Sachs-Teller relation and its implications, thermodynamics of ferroelectric phase transition, ferroelectric domains, Piezoelectricity and its applications.

Reference Books:

1. The Physical Principles of Magnetism : A. H. Morrish, John Wiley & sons, New York (1965)
2. Solid State Physics : A. J. Dekker, Macmillan India Ltd., Bangalore (1981)
3. Introduction to Solid State Physics : 5th Edn C. Kittel, Wiley Eastern Ltd., Bangalore (1976)

4. Elementary Solid State Physics : M. A. Omar, Addison-Wesley Pvt. Ltd., New Delhi (2000)
5. Introduction to Magnetic Resonance: A. Carrington and A. D. Mclachlan, Harper & Row, New York, (1967).
6. Elements of Solid State Physics (2nd Ed): J.P. Srivastava, PHI Learning Pvt. Ltd., New Delhi (2009).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3043	MATERIAL SCIENCE - II	SC	3	1	0	4	5

Course Objectives:

This course provides the knowledge about the processing, characterization and testing of Polymers, ceramics and glass materials.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Synthesize the polymers, ceramics and glasses.
2. Explain the applications of composite material related to polymers, ceramics and glasses
3. Analyze the Properties of polymers, ceramics and glasses
4. Analyze the defects and inabilities of polymers, ceramics and glasses for industrial applications.

Course Content:

Unit-1:

12 hrs

Elements of Polymer Science: Monomers- Polymers- Classification of polymers Synthesis of polymers- chain polymerization, step Polymerization, industrial polymerization methods. Average molecular weight-weight, number and viscosity, size of polymer molecule. Microstructure of polymers- chemical, geometric, random alternating, block and graft polymers, stereo regular polymers. Phase transition- polymer melting and glass transition; polymer crystallinity- degree of crystallinity, crystallization and stereo isomerism. Processing of Plastic Materials- inoculating- compression, injection blow, extrusion, spinning.

Unit-2:**12 hrs**

Ceramics and Glasses: Ceramics and their structure- Silicate structure, Preparation-Forming and thermal treatments, Classification of ceramics- traditional and engineering. Dielectric, ferroelectric and piezoelectric properties of ceramics with specific examples, Ceramic magnets, Mechanical properties- strength, toughness. Fatigue failure, abrasion. Basic refractory materials.

Glasses: Preparation and structure, Types of glasses- borates silicate, oxide, metallic and semiconducting glasses; tempered glass and chemically strengthened glass.

Unit-3:**12 hrs**

Composite Materials: General Introduction, matrix Materials- polymer, metals, ceramics, Reinforcing materials- fibers, particles. Concrete-concrete making materials, structure, composition. properties and applications. Polymer-concrete composites, fabrication, structure, interface, properties, applications of polymer matrix composites, metal matrix composites, ceramic matrix composites and carbon fiber composites, wood-plastic composites, dispersion strengthened. Particle reinforced, fiber and laminate reinforced composites with fabrication, interface, properties and applications.

Unit-4:**12 hrs**

Testing of Materials: Mechanical Testing - Universal Testing Machine. Hardness- Brinell, Vicker and Rockwell, impact testing and Fatigue Testing. Optical Microscopy- Metallurgical Microscopes-sample preparation and grain size Measurements. Electron microscopy-Transmission microscopy (TEM), scanning microscopy (SEM)- principle, sample preparation techniques and applications. non Destructive Testing- Ultrasonic Testing, X-ray radiography. Neutron radiography.

Reference Books:

1. Textbook of Polymer Science. **Fred. W. Billmeyer** John Wiley & Sons, Inc. (1984)
2. Polymer Science, **V.R. Gowariker, N. V. Vistrwanathan, Jayadev Shreedhar**, Wiley Eastern (1937)
3. Electronic properties of Materials- **Rolf E. Hummel, Springer Verlag**, Springer Verlag (1985)
4. Foundations of Materials Science and Engineering- **William F. Smith**, McGraw Hill international Editions, (1988)
5. Elements of Materials Science and Engineering. Lawrence **H. Van Vlack**, Addison Wesley (1975)
6. Introduction to Ceramics- **W D Kingery, H K Bower and U R Uhlman**, John Wiley (1960)
7. Ultrasonic **B. Carlin**, Mc. Graw Hill (1950).
8. Principles of Neutron Radiography- **N D Tyufyakav and A S Shtan**, Amerind Publishers (1979)
9. Applied X-rays- **George L Clark**, Mc. Graw Hill, (1955)
10. Testing of Metallic Materials— **AVK Suryanarayan**, Prentice Hall India, (1990)
11. Physical Metallurgy Part I, **R W Cahn and P Haasen** (Ed), North.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3051	ELECTRONICS - III (LINEAR INTEGRATED CIRCUITS)	SC	3	1	0	4	5

Course Objectives:

1. To analyze and design various applications using Op-amp.
2. To design and construct waveform generation circuits.
3. To design timer, analog and digital circuits using op-amps.
4. To design combinational logic circuits using digital ICs.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Differentiate between an ideal and practical characteristics of op-amp.
2. Explain the frequency response of an opamp compensator networks.
3. Analyze linear applications of op-amp circuits such as integrator, differentiator log and antilog networks.
4. Analyze the basic function of comparators and convertors using OPAMP.

Course Content:

Unit – 1:

12 hrs

THE PRACTICAL OP-AMP (741): Input offset voltage, input bias current, input offset current. Total output offset voltage, thermal drift, error voltage, variation of OP-AMP parameter with temperature & supply voltage. Supply voltage rejection ration (SVRR), CMRR-Measurement of OP-AMP parameters.

Unit - 2:

12 hrs

FREQUENCY RESPONSE OF AN OP-AMP: Frequency response compensator networks. Frequency response of internally compensated OP-AMP & non-compensated OP-AMP, High frequency OP-AMP equivalent circuit, open loop voltage gain as a function of frequency. Slew rate, causes of slew rates and its effects in application.

Unit - 3:

12 hrs

OPERATIONAL AMPLIFIER CONFIGURATIONS & LINEAR APPLICATION:

Open loop OP-AMP configurations- The differential amplifier, inverting amplifier, non-inverting amplifier, negative feedback configurations - inverting and non-inverting amplifiers, voltage followers

& high input impedance configuration, differential amplifiers, closed loop frequency response & circuit stability, single supply operation of OP-AMP, summing, scaling and averaging amplifier, voltage to current & current to voltage converters, integrators & differentiators, logarithmic & anti logarithmic amplifiers.

Unit – 4:

12 hrs

COMPARATORS & CONVERTERS: Basic comparator & its characteristics, zero crossing detector, voltage limiters, clippers & clampers, small signal half wave & full wave rectifiers, absolute value detectors, sample and hold circuit.

Reference Books:

1. OP-AMP and linear integrated circuits 2nd edition, PLHI by Ramakant A. Gayakwad.
2. Design with operation amplifiers and Analog Integrated circuits by Sergei Franco.
3. Integrated Electronics: Analog and Digital circuits & system by Millman & Halkias.
4. Linear Integrated Circuits by D.R. Chaudhary (WEL).

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3052	CONDENSED MATTER PHYSICS - III	SC	3	1	0	4	5

Course Objectives:

1. Structural analysis is the first step in the characterization of any material.
2. The atomic structure of a material depends on the method of synthesis and on various parameters involved in the technique.
3. This course will introduce the fundamental concepts of crystal structure and to understand the diffraction principle and use of X-rays.
4. To understand the symmetry and space groups.
5. To know about lattice representation and reciprocal lattices.
6. To determine and analyze the crystal structure using x-ray diffraction.

Course Outcomes: On successful completion of this course, the student shall be able to:

- 1) Illustrate reciprocal lattice.
- 2) Understand the theoretical framework like symmetry and space groups.
- 3) Illustrate different X-ray analysis methods
- 4) Characterize the crystal using X-ray diffraction experiments.

Course Content:

Unit -1: **12 hrs**

Reciprocal lattice: Elementary considerations, graphical construction, vector algebraic discussion, relation between direct and reciprocal cells, interpretation of Bragg's law using reciprocal lattice concept, general spacing formula, transformation equations and their importance.

Unit - 2: **12 hrs**

The Laue method: Reciprocal lattice construction, instrumentation, flat plate cameras, front reflection region, appearance of photographs, back reflection region, appearance of photographs. Rotating crystal methods: Reciprocal lattice construction, instrumentation, cylindrical camera, mounting and adjustment of crystal, interpretation of photographs, unit cell determination, indexing procedure.

Unit - 3: **12 hrs**

Moving film methods: Weissenberg method, reciprocal lattice construction for zero level and higher levels, indexing procedure, interpretation of photographs. Single crystal diffractometer: Reciprocal lattice construction, parafocussing and goniometry, intensity measurements.

Unit - 4: **12 hrs**

Powder method: X-ray powder photographic methods, instrumentation, diffraction geometry, measurement of Bragg angles and interplanar spacings, index of powder patterns, analytical and graphical methods, precise lattice parameter determination, characteristics of powder pattern lines, application to identification of solid solution and phase changes, line broadening and particle size measurements, interpretation of powder photographs of unknown system, powder diffractometer and applications.

Reference Books:

1. Elements of X-ray Crystallography, L.V. Azaroff: McGraw Hill, New York, 1968.
2. An introduction to Crystallography, Michael M Wooffen: Cambridge University Press, 1997
3. Crystal growth Processes and methods, Santhana Raghavan and Ramaswamy: KRU Publications, Kumbakonam.
4. Crystallography for solid state physics, Verma and Srivastava: New age international Ltd. 1997.
5. Solid State Physics, Charles Kittel: Wiley Eastern, 1984.
6. X-ray crystallography, M.J.Burger: John Wiley, New York, 1952.
7. Crystalline Solids, Duncan M and C. Mike: Nelson, London, 1973.
8. The powder method in X-ray cryst. L.V. Azaroff and M.J.Burger: McGraw Hill, 1958.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3053	MATERIAL SCIENCE - III	SC	3	1	0	4	5

Course Objectives:

This course provides the knowledge about the optical, dielectric and mechanical properties of materials. Effect of structure of materials on the properties is also discussed in detail.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Characterize optical and dielectric properties of metals & non-metals through the spectroscopic techniques.
2. Analyze the properties like Luminescence and photoconductivity of metals & non-metals.
3. Design the metals and non-metals having the properties of stress & strain, elasticity, Plastic deformation.
4. Explain the effect of temperature on the properties of metals and alloys.
5. Explain to use the techniques of measurements & instruments.

Course Content:

Unit-1:

12hrs

Optical and dielectric properties of materials: Theory of electronic polarization and optical absorption, ionic polarization, orientationl polarization. Optical phonon model in an ionic crystal; Interaction of electromagnetic waves with optical modes, polarization, Dispersion curves of transverse optical (TO) phonon and optical photon in a diatomic ionic crystal, LST relation; Metal-insulator transition. UV-VIS, IR, FTIR and Raman spectroscopy. Optical properties of metals & nonmetals.

Unit -2:

12 hrs

Electrical properties of crystalline, nanocrystalline and polymeric materials: Resistivity variation in metals, alloys, semiconductors and nanocrystalline materials, electrical conduction in ionic ceramics, clay materials and conducting polymers. Two-probe and four probe techniques, DC and AC conductivity measurements.

Mechanical Properties of metals and ceramics: Concepts of stress & strain, stress-strain behavior, elasticity, Plastic deformation, Hardness-Knoop & Vicker's hardness test and Advantages.

Unit - 3:**12 hrs**

Thermal properties of metals & alloys: Temperature effects on the intensities of Bragg reflections. Influence of temperature on diffraction of X-rays: Normal coordinates of lattice vibration and X-ray scattering from a vibrating lattice and origin of thermal diffuse spots. First order TDS. Debye-Waller factor. Debye's method of calculating isotropic temperature factor for a cubic crystal. DTA, TGA, DSC (Outline only). Annealing processes, mechanism of hardening. Quenching, thermal stresses.

Unit - 4:**12 hrs**

Structure - Property correlation, Correlation of structure with physical properties of materials, application of materials in different areas.

Basic concepts of measurements & instruments: Static characteristics of instruments, accuracy & precision, sensitivity, reproducibility, errors, Transducers, classification & selection criteria, principles of piezoelectric, photoelectric, thermoelectric transducers, resistance temperature transducers (RTD), Thermister, load cells, LVDT Electronic instruments for measurement, Digital voltmeter, principles of electronic multimeter, digital multimeter, Q-meter, Electronic LCR meter, Frequency & time interval counters.

Reference Books:

1. Introduction to Ceramics by W. D. Kingery, H. K. Bowen and D. R. Uhlmann, John Wiley & Sons.
2. Diffraction analysis of the microstructure of materials by E. J. Mittemeijere and P. Scardi, Springer
3. Materials Science & Engineering by William D. Callister, John Wiley & Sons, Inc.
4. Modern techniques of surface science by D. P. Woodruff & T. A. Delchar, Cambridge University Press.
5. X-ray spectroscopy by B. K. Agarwal, Springer-Verlag.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3060	ASTROPHYSICS	OE	3	1	0	4	5

Course Objectives:

1. To study the astrophysical universe, ranging from solar system objects through stars, to galaxies and the structure of the universe as a whole.
2. To understand the principles and methods of modern astrophysics.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Describe the laws that govern the astrophysical phenomena.
2. Explain the nature and properties of compact astrophysical objects.
3. Elaborate astrophysical observations and measurements.
4. Discuss the principles of formation of the Planets and Comets.

Course Content:

Unit -1:

12 hrs

Basic concepts of Astronomy:

Basic concepts of Astronomy: Co-ordinate system, Time system-Solar and Sidereal times, Apparent and Absolute magnitudes, Trigonometric Parallax, Atmospheric extinction, Optical telescopes and their characteristics, Modern Optical telescopes, Astronomical Instruments – Photometer, Photographic plates, Spectrographs, Charge Coupled Detector.

Unit – 2:

12 hrs

Stellar properties: Observational properties of stars – spectral and luminosity classification of stars- H-R Diagram, Saha Equation, , Star Formation - Jeans mass, Jeans Length and Free fall timescale, Main Sequence Evolution, Mass- luminosity relation, White Dwarfs – Chandrasekhar's Limit, Neutron Stars, Pulsars, Supernovae, Stellar Black holes.

Unit - 3:

12 hrs

Solar system: Overview of Sun, Solar Interior structure- Core, Radiative zone and Convective Zone, solar atmosphere-photosphere, Chromospheres, Properties of Interior planets and exterior planets satellites of planets, Kuiper Belt objects, Oort Cloud, Theories of formation of the solar system.

Unit – 4:

12 hrs

Stellar structure: Hydrostatic Equilibrium, Mass conservation, Luminosity gradient equation, Temperature gradient Equations, Lane – Emden equation for polytropic stars and its physical solution, estimates of central pressure and temperature, Radiation pressure, equation for generation and luminosity, equation of temperature gradient for radiative and convective equilibrium, Schwarzschild criterion, gas pressure and radiation pressure, Linear Model and its properties, Volt – Russell theorem, Zero age main sequence.

Reference Books:

1. Ostlie and Carroll: Introduction to Modern Astrophysics, Addison Wesley (II Edition), 1997
2. Kristian Rohl f : Tools of Radio Astronomy, Springer
3. John D. Krauss : Radio Astronomy, II Edition, Signet.
4. F. Shu : The Physical Universe, University So Press, 1987.
5. M. Schwarzschild : Structure and Evolution of Stars, Dover.
6. R. Kippenhahn and Weigert A.: Stellar Structure and Evolution, Spinger Verlag, 1990.
7. C.J. Hansen and Kawaler S.D.: Stellar Interiors: Physical Principles, Structure and Evolution, Spinger Verlag, 1994.
8. M. S. Longair: High Energy Astrophysics, CUP.
9. Kitchin C R : Stars, Nebulae and the Interstellar Medium, Taylor and Francis Group, 1987.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PH3070	GENERAL PHYSICS LAB –III (PRACTICAL)	HC	0	0	3	3	5

Course Objectives:

1. To introduce the basic concepts of physics through hands on experience and impart experimental skill to students

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Conduct the experiments related to different Physics laws and theories.
2. Employ the different tools and techniques to get the data/readings related to the experiments.
3. Verify the fundamental physics behind many scientific discoveries through hands on experimentation.

Course Content:**LIST OF EXPERIMENTS:**

1. Hall effect experiment: Determination of Hall co-efficient and charge carrier density.
2. Divergence of laser beam
3. Verification of Mallu's law.
4. Experiments with lasers and reflection grating.
5. To photograph the spectra of Fe (standard) and Cu arc using CDS spectrograph and to determine the wavelengths of Cu spectrum using Hartman formula.

6. Fresnel's law verification
7. Determination of Numerical aperture in an optical cable.
8. Laser light attenuation in an optical cable.
9. Refractive index of liquids/solids using laser light.
10. Diffraction of laser light through two closely spaced circular apertures.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3081	ELECTRONICS LAB (PRACITICAL)	SC	0	0	3	3	5

Course Objectives:

The study of this course aims to:

1. Provide a strong foundation on Linear Circuits.
2. Familiarize students with applications of various IC's.
3. Have a broad coverage in the field that is relevant for engineers to design linear circuits using Op-amps.
4. Familiarize the conversion of data from Analog to Digital and Digital to Analog.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Analyze the functioning of basic electronic circuits of AM and FM modulation and demodulation through experimentation using discrete electronic components.
2. Verify sampling theorem by experiment.
3. Verify different modulation and demodulation techniques through experimentation.
4. Draw the outputs of various angle modulation and demodulation systems
5. Verify the outputs of ASK, FSK, PSK circuits.

Course Content:

List of Experiments:

Analog and Digital communication lab

1. Amplitude modulation and demodulation.
2. DSB SC modulation and demodulation.
3. SSB SC modulation and demodulation.
4. Frequency modulation and demodulation.
5. Pre Emphasis-De Emphasis circuits.
6. Verification of sampling theorem.
7. PAM generation and reconstruction.

8. PWM AND PPM: generation and reconstruction
9. Delta and Adaptive delta modulation.
10. TDM of two band limited signals.
11. ASK generation and detection.
12. FSK generation and detection.
13. PSK generation and detection.
14. Line coding and decoding.

LIC Lab:

1. OP-AMP as square wave generator.
2. Schmitt trigger.
3. Voltage regulator
4. UJT relaxation oscillator
5. OP-AMP as active integrator and differentiator.
6. Design and test the operation of 4 Bit DAC using R-2R ladder network and OP-AMP MA741.
7. Design a second order Butterworth active low pass filter and high pass filter.
8. Design Schmitt trigger and test the circuit for the given values of UTP and LTP using OP-AMP MA741.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH3082	CONDENSED MATTER PHYSICS LAB (PRACTCAL)	SC	0	0	3	3	5

Course Objectives:

1. To make the student familiarize with the basics of materials.
2. To enable the student to explore the concepts involved in the X-ray diffraction.
3. To make the student understand the basic concepts in absorption and Infrared spectroscopy.
4. To allow the student to understand the fundamentals of Hysteresis.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Identify the phase and phase purity of the crystal.
2. Determine particle size, stress and strain using PXRD.
3. Analyse of Thermoluminescence glow curve using ORIGIN software.
4. Determine of Curie temperature using B-H curve of a Ferromagnetic material (both hard and soft).
5. Calibrate of electromagnet and magnetic susceptibility determination of magnetic salts (MnSO₄,

MnCl₂) by Quincke's method.

6. Study I-V characteristics of any given materials.

Course Content:

LIST OF EXPERIMENTS:

1. Analysing and determining the lattice parameters (h k l) values of FCC crystals by X-ray powder Diffractogram data.
2. Analysing and determining the lattice parameters (h k l) values of BCC crystals by X-ray powder Diffractogram data.
3. Determination of particle size, stress and strain using PXRD data.
4. Synthesis of metal nanoparticles by solution combustion technique.
5. Determination of Reitveld refinement parameter using full proof suit software.
6. Determination of energy gap by using absorption spectra.
7. Analysis and estimation of kinetic parameters of Thermoluminescence glow curves.
8. Determination of Curie temperature using B-H curve of a Ferromagnetic material (both hard and soft).
9. Estimation of CIE coordinates of nanophosphors samples.
10. Study of I-V characteristics of semiconducting material by using Kithely source meter.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PH3083	MATERIAL SCIENCE LAB (PRACTICAL)	SC	0	0	3	3	5

Course Objectives:

1. To make the student familiarize with the basics of materials science.
2. To enable the student to explore the concepts involved in the X-ray diffraction.
3. To make the student understand the basic concepts in absorption and Infrared spectroscopy.
4. To allow the student to understand the fundamentals of Hall Effect and Hysteresis.

Course Outcomes:

On successful completion of this course, the student shall be able to:

1. Demonstrate different experimental techniques.
2. Experiment with X – ray diffractometer to determination the phase of the nano materials.
3. Analyze the thermoluminescence glow curves of different phosphor materials
4. Test I-V properties of thin films through experiment.

Course Content:

LIST OF EXPERIMENTS:

1. Synthesis of nanomaterial by solution combustion technique.
2. Synthesis of metal nanoparticles by sonochemical method.
3. Determination of particle size and lattice strain of an unknown powder specimen applying Scherer Equation.
4. Determination of energy gap by using absorption spectra (UV-visible spectrometer).
5. Analysis and estimation of kinetic parameters of Thermo luminescence glow curves.
6. B-H curve of a Ferromagnetic material (both hard and soft).
7. Study of I-V characteristics of given material by Keithley instrument.
8. Analysis of single crystal rotation photograph.
9. Study of PL spectrum and determination of CIE coordinate values of nanophosphors samples.
10. Determination of lattice parameters values of FCC crystals by X-ray powder Diffractogram data.

FOURTH SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH4010	MAJOR PROJECT	HC	0	0	10	10	20

Course Objective:

To carry out the research under the guidance of supervisor and in the process learn the techniques of research.

Course Outcomes:

On successful completion of the project, the student shall be able to:

1. Familiarize with literature search
2. Conduct the experiments related to research and formulate computational techniques
3. Interpret the scientific data.
4. Write report and defend the research findings.

Project:

Each student will choose the topic of research particularly from any area of soft cores studied and work under the guidance of allocated faculty member. The project shall preferably be application oriented or industry need based that could be useful to the society. In case of industry need base project the student may opt co-supervisor from the concerned industry. The student will have to make a preliminary survey of research done in broad area of his/her area of interest and decide on the topic in consultation with his/her supervisor(s). The project work floated should be completed within 16 weeks and project report has to be submitted within the stipulated date by the University/ within 18 weeks whichever is earlier. The student has to meet the concerned supervisor(s) frequently to seek guidance and also to produce the progress of the work being carried out. The student should also submit progress report during 5th week and 10th week of the beginning of the semester and final draft report with findings by 15th week. After the completion of the project the student shall submit project report in the form of dissertation on a specified date by the School.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M19PH4020	MOOC/SWAYAM/ INTERNSHIP	RULO	0	0	4	4	4

Note: Students shall choose to take up any online course of four credits as guided by the school or shall have to undergo internship of four weeks duration, the details of which are provided here under.

MOOC/SWAYAM:

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses.

A student shall register and successfully complete any of the courses available on SWAYAM.

Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University.

Internship: Minimum of four weeks duration internship should be carried out by the student either in industry or in an R&D organization, including educational institutes with excellent research culture. In case, if a student is unable to secure internship either in industry or in an R&D organization, a project may be carried out within the university. The student is expected to submit a formal report at the end of the internship programme. The student shall be awarded the marks for internship based on the (a) presentation and (b) comprehensive viva by the panel of examiners constituted by the school.

Career Development and Placement

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Physics is knowledge in the subject, but also the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career. The School of Applied sciences also has emphasised subject based skill

training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

LIST OF FACULTY MEMBERS

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10 YEARS
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RECOGNITION
20 YEARS OF
ACADEMIC
EXCELLENCE



REVA
UNIVERSITY
Bengaluru, India

SCHOOL OF PERFORMING ARTS

Master of Performing Arts

(MPA) Program

2019 - 2021



REVA
UNIVERSITY

Bengaluru, India

SCHOOL OF PERFORMING ARTS

Master of Performing Arts (MPA) Program

Hand Book

2019

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Rukmini Educational
Charitable Trust www.reva.edu.in

Chancellor's Message

“Education is the most powerful weapon which you can use to change the world.”

- N



There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when ‘intellectual gratification’ has become indispensable. Information is easily attainable for the soul that is curious enough to go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University to empower every learner who chooses to enter our portals. Driven by our founding philosophy of ‘Knowledge is Power’, we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect and immense potential. All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I’m always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, both educational and extra-curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said ‘A University should be a place of light, of liberty and of learning’. Centuries later this dictum still inspires me and I believe, it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

The last two decades have seen a remarkable growth in higher education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened up several options as well as created multiple challenges. India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.



A strong believer and practitioner of the dictum “Knowledge is Power”, REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on a sprawling 45 acres of green campus, this ‘temple of learning’ has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studies of various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts of great think-tanks - a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centers” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. S. Y. Kulkarni
Vice-Chancellor, REVA University

DIRECTORS MESSAGE

The freedom that students are getting to choose their careers now is much broader than ever before. Unconventional career choice is the new way, and the Gen Y is all about wonderful creativity. School of Performing Arts, aims to benchmark itself in the area of Music, Dance and Theatre courses from the Diploma to Research level degrees. Indian tradition in which Music and Dance plays a pivotal role is a major attraction and a focus of study for not only Indians but westerners too, for, one finds it very scientific and vast area for inter-disciplinary research activities. Department is well equipped to meet the traditional and modern needs of both Indian and foreign nationals. The performing wing of the school shall aim to churn out the most sought after performers and especially thinking dancers. The syllabi is world class and prepares students not just as performers but also in the areas like research, Art Management, Personality development, soft skills, Music, Nattuvangam, Theatre studies and other allied art forms, apart from bringing in internationally acclaimed artistes for workshops, guest lectures and interactive sessions. The field work and Dissertation makes the course rigorous and unparalleled.

The curriculum caters to and has relevance to local, regional, national, global development's needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional, ethics, gender, human values, environment & sustainability.

I take this as my privilege to welcome the artistes and connoisseurs to come and explore the finer aspects and unexplored world of Performing Arts at REVA University

Dr. Vidya Kumari S
Director, School of Performing Arts

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RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. Rukmini Educational Charitable Trust (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjaynagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals and is sustained by the people who derive their motivation from the founders. The Chairman of the Trust is Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the DivyaSree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognised by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The University is a Member of Association of Indian Universities, New Delhi. The main objective of the University is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University located in between Kempegowda International Airport and Bangalore city, has a sprawling green campus spread over 45 acres of land and equipped with state-of-the-art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned library and central computer centre, the well planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 27 Post Graduate Degree programs, 29 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 18 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the

experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Sensor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Vibration Energies, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor and Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a

Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC², VMware, SAP, Apollo etc, to facilitate student exchange and teacher-scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. As a part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is '**Life Time Achievement Award**' to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the "**Founders' Day Celebration**" of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "REVA Life Time Achievement Award" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced "**REVA Award of Excellence**" in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidaaya, - Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga class everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Within short span of time, REVA University has been recognized as a fast growing university imparting quality higher education to the youth of the country and received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia's Greatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by Assocham India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-

200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

ABOUT SCHOOL OF PERFORMING ARTS

India proudly treasures the rich heritage and culture which is unparalleled and incomparable to any in the world. Indian arts play a pivotal role and Performing Arts stands as testimony to the richness of this country's cultural legacy. The Performing Arts, comprising of Music, Dance and Theater, are in demand as career choices, like never before. REVA-SPA offers unique, challenging Performing Arts programmes which prepares artistes for the future. The aim of these courses is to bring in a holistic view to the performing arts' education system in India. The School of Performing Arts offers courses like Certificate, Diploma, BAPaEP (Triple degree in Performing Arts, English literature and Psychology), MPA (Masters of Performing Arts) and Ph. D programs. Our Syllabus is world class and bench-marked. The SPA is in the beautiful campus of REVA University - which has received the 'Best Campus' and the 'Best upcoming University' awards. Being the institutional member of International Dance Council (CID), the official member partner of UNESCO, the School of Performing Arts is now concentrating on collaborating with universities abroad for short term and semester exchange programs and on introducing Indian Performing Arts to the foreign students. Internationally acclaimed artistes visit the campus often as visiting faculty members and guest lecturers to interact with students. The performing wing at the School of Performing Arts has performing opportunities all over the country and abroad. Students can expect to become thinking, professional artistes. The seminars, workshops, guest classes are intended make them ready to face the world of Arts that is an amalgamation of a spectrum of experiences and choices.

USP of Programs run by School of Performing Arts:

- Full-time dedicated and highly experienced dance and music faculty members.
- Exclusively dedicated floor for School of Performing Arts in the Rukmini Knowledge Park campus.
- Well-equipped library with hand picked books and Sanskrit Volumes on treatises in Dance, Music and Theatre along with News Papers, Journals, Magazines, Books, e-resources etc., on Performing Arts.
- Audio and Video Facility in all the classrooms.
- Aesthetically designed and acoustically planned classrooms with Modern German Dance flooring for injury free dancing.
- World Renowned artists as Visiting Lecturers and Adjunct Faculty.
- World renowned Artists for lecture demonstratins and Workshops under "Kala Gnana", monthly series conducted in the School of Performing Arts for the benefit of Students.
- Gazebos for conducting classes on campus which not only provides additional space to the Performing Arts' studentsbut also acclimatizes students from other schools with the traditional art forms and traditional teaching methods
- Training and exposure to Research and Publications where students are trained by their mentors on presenting their research papers in confereneces and seminars. They are also trained to publish research papers in reputed journals in India and across the globe.

- Certification and training programs for CBSE UGC NET exam. Training in Sanskrit, Telugu and Kannada as part of the curriculum. Language Labs
- Well-equipped Psychology Labs
- Well-planned and challenging syllabus.
- Performing opportunities at prestigious Festivals in India and Abroad as part of the Performing wing of the School of Performing Arts.
- State-of-the-Art facilities for Locker rooms, Changing rooms and Green rooms.
- Mandatory Mentor and Mentee sessions by faculty members every week for the benefit of the students.
- Dedicated auditoriums with International-standard sound and lighting system.
- Global program with an opportunity to pursue a short term or a semester in one of our partnered Universities in USA, Europe etc.,
- Opportunity to also participate in Inter-University competitions at State, National and International levels.
- Dedicated Skill Development Cell that focusses on career-oriented Programs exclusively for Performing Arts' students.
- Special Training in Allied forms like Stage-Craft, Sound System, Lighting, Make-up, Costumes etc.
- Annual Field Trips for the students along with faculty members to historically significant places particularly related to the performing arts.
- Mandatory Internship Programs for UG and PG Students.

VISION

The School of Performing Arts aims to be a Centre of Excellence in Performing Arts through high-quality education, research, innovation, creativity, extension and collaboration and to prepare students to be great performers and innovators and create a global village of peace and prosperity by spreading the message of Indian culture and tradition.

MISSION

- To impart holistic performing arts education by matching contemporary world requirements with traditional pedagogical techniques.
- Attract and develop talented and committed human resources and provide an environment conducive to research, innovation and team spirit.
- Develop and effectively utilise excellent infrastructural facilities; facilitate effective interaction among faculty and students with other schools and promote inter disciplinary learning and research environment.
- Practice and promote high standards of professional artistry with ethics and enrich the personality traits of students to become great performers coupled with moral values.

- Foster networking with alumni, artists and art institutions across the world and other stakeholders and spread the message of Indian culture and tradition for global peace and prosperity.

ADVISORY BOARD

SL No.	Name
1.	Dr. S Ramaswamy, Professor[Retd] Bangalore University, Bangalore
2.	Dr. V. S. Sreedhara, Professor of English , NLSUI, Bangalore
3	Dr. Shivalinga Swamy, Associate Professor and HoD of English, Tumkur University, Tumkur
4.	Dr. Etienne Rassendren, Professor, Dept of English, St Joseph's College[Auto], Bangalore
5	Dr. C. P. Ravichandra, Professor, Dept of English, Mysore University, Mysore
6	Dr. Rajendra Chenni, Professor. Dept of English, Kuvempu University, Shimogga
7	Prof. S. Narayanan, Professor [Retd], Kongadiappa College, Doddabalapura

“Education is the manifestation of the perfection already in man”

- Swami Vivekananda

The ladder of success is best climbed by stepping on the rungs of opportunity.

- Ayn Rand

I think of science fiction as being part of the great river of imaginative fiction that has flowed through English literature, probably for 400 or 500 years, well predating modern science.

- [J. G. Ballard](#)

Literature adds to reality, it does not simply describe it. It enriches the necessary competencies that daily life requires and provides; and in this respect, it irrigates the deserts that our lives have already become.

- [C. S. Lewis](#)

Literature is the art of discovering something extraordinary about ordinary people, and saying with ordinary words something extraordinary.

- [Boris Pasternak](#)

Master of Performing Arts (MPA) Program

Programme Overview

Performing Arts discipline deals with human life and human experience qualitatively. Humanities investigates how do human beings behave? Why do they behave this way? How do human beings interact with each other? How do human beings interpret the world around them? And what kind of political, social and cultural institutions do they form?

The field of humanities include Modern languages, Classical languages, Linguistics, Literature, History, Jurisprudence, Philosophy, Archaeology, Comparative religion, Ethics, History, criticism and theory of the arts, Performing Arts, Journalism, Psychology, Political science and such subject areas.

Theatre, music, dance, and other kinds of performances are present in all human cultures. The history of music and dance date back to pre-historic times. In India, religion, philosophy and myth cannot be divorced from their art forms. Dance, Drama and music are tied inextricably to ceremony of any kind. Bharatnatyam, Kathakali, Kathak, Manipuri, Odissi, Kuchipudi, Sattriya, Mohiniyattam are some of the classical Dance forms of India. Similarly, the classical music forms of India are Hindustani Classical Music and Carnatic Classical Music, in addition, there are hundreds of regional music forms and there are many musical instruments to compose and play music. Koodiyattam, Yakshagana, Swang, Bhand Paather, Ankiya Naat Bhaona, Tamasha, Therukoothu, Jatra are some of theatre forms of India. In addition, there are puppet forms. They all adhere to the canons of classical dance laid down in the Natya Shastra, a second century C.E. text ascribed to the sage Bharata, to whom it was supposedly revealed by the Creator, Brahma.

Performing arts in India and its practitioners are referred to as being part of the “entertainment industry.” This indicates a paradigm shift in the manner in which the arts is being viewed by society. The message apparent by the shift is that the audience now expects that the Arts must entertain in the manner defined by the entertainment industry, and they must form part of an organized industry. The performing arts industry in India reached INR236 billion in 2012 and is expected to witness a CAGR of 2.5% over 2012—2018 to reach INR275 billion in 2018. The industry will primarily be driven by new and innovative forms of fund raising by theater and dance groups and a growing demand for Indian culture at an international level.

At present more than 400 million youth are below 18 years of age and they have varied aspirations. A significant number of them would like to work in entertainment industry.

In this context, a Post Graduate Program in Performing Arts offered by **REVA UNIVERSITY** is relevant to meet the future human resources requirement of Entertainment Industry and also safe guard Indian tradition and culture.

Programme Educational Objectives (PEOs)

This Post- Graduate programme of 4 semesters in Performing Arts is to ensure that the student learns the subject of dance, music and other forms of performing arts in their specialized field both theoretically and practically. It is to ensure the overall holistic development of the dancer and performer. Being a dancer in today's competitive World is not travelling around and performing, but also about the communication skills that are required and the technical knowledge in their respective subject that one must possess to make them stand out in the crowd. This programme would instill in them an enthusiasm to teach the subject, ensure that they become professional performers, and trigger in them the inquisitiveness to be Research Scholars for their Doctoral Thesis in the future

The Programme Educational Objectives are to prepare the students to:

1. Perform as Dancers/Musicians/Actors in entertainment sector
2. Work as creative directors, choreographers, producers of art and entertainment programmes
3. To work as managers, academicians, administrator or entrepreneurs with strong ethics and communication skills
4. Pursue higher education and research in reputed institutes at national and international level
5. Aware of environmental, legal Issues, cultural and constitutional obligations
6. Adopt lifelong learning for continuous improvement

Programme Outcomes (POs)

This MPA programme ensures the students to gain knowledge both in the theory and the practical aspects of Indian Classical Dance of their specialization. The courses and the examinations in each semester make them well equipped to take Dance at the Research level for their Doctoral pursuance in future.

After undergoing this programme, a student will be able to:

1. Perform as an artist, particularly as a Dancer
2. Act as a Choreographer
3. Write drama and act
4. Use modern technologies for enhancing the performance of entertainment industry
5. Direct and produce relevant products for entertainment industry
6. be qualified Teachers and Practitioners in the chosen field of dance
7. Choose appropriate online programmes for further learning, participate in seminars and conferences
8. Manage information, develop technical reports and make presentations
9. Lead a team to successfully complete a project and communicate across teams and set up his/her own enterprise
10. Conduct himself / herself as a responsible citizen

Program Specific Outcomes (PSO)

After successful completion of the program, the graduates shall be able to:

1. Visualise, Create, Design and Critically Analyse dance, music and theatreprojects
2. Apply appropriate performing arts techniques and produce high quality productions and expressions of art
2. Use higher order critical, analytical skills to solve a new problem in multi-disciplinary and inter-disciplinary fields of Performing Arts.

MPA (Master of Performing Arts) Program
Scheme of Instruction
(Effective from Academic Year 2019-20)

Sl. No	CourseCode	CourseTitle	Course Type	CreditPatternandCredit Value				No. of Hrs
				L	T	P	Total	
FIRSTSEMESTER								
1	M19PA1010	DanceHistory	HC	4	0	0	4	4
2	M19PA1020	Natyashastra - Theory	HC	4	0	0	4	4
3	M19PA1031	Practical–1 (P1) Fundamentals–Kuchipudi- (Adugulu,Jathulu,Vinayaka Kouthvam,Jathiswaram	SC					
4	M19PA1032	Practical–1 (P1) Fundamentals– Bharatanatyam (Adavus,Ta ala , AlarippuandPushpanjali)	SC	0	0	3	3	6
5	M19PA1033	Practical–1 (P1) Fundamentalals-Mohiniyattam (Adavus, Jathiswara, Cholkettu)	SC					
6	M19PA1034	Practical–1 (P1) Fundamentalals-Odissi Chauka, Tribhanga Movements and Mangalacharan	SC					
7	M19PA1041	Practical–2 (P2) Kuchipudi Items– Poorvarangam, Shabdham,Ramadasu/Annamachary	SC					
8	M19PA1042	Practical–2 (P2) Bharatanatyam Items-Shabdham,Kriti andJathiswaram	SC	0	0	3	3	6
9	M19PA1043	Practical–2 (P2) Mohiniyattam Items– Padam, Ganesha Stuthi, Shlokas (HLD)	SC					
10	M19PA1044	Practical–2 (P2) Odissi Pallavi, Batu Nritya	SC					
11	M19PA1045	Practical–2 (P2) Kathak Ladi, Paramelu, Natavari Tukda, Kavith, That, Gatanikas	SC					
12	M19PA1051	Practical–3 (P3)Kuchipudi Items– Tyagaraja Keerthana,Swarajathi, Shloka (AD)	SC					
13	M19PA1052	Practical–3 (P3)Bharatanatyam Items-Devarnama, Thillana and Shloka (AD)	SC	0	0	3	3	6

14	M19PA1053	Practical–3 (P3) Mohiniyattam Items– Bhajan, thillana, Shloka (AD)	SC					
15	M19PA1054	Practical–3 (P3) Odissi Shloka, Odiya Abhinaya, Shiva Panchaka	SC					
16	M19PA1060	Music 1- Sarale and Jantai, Dance Pieces Taught by Teachers	HC	0	0	2	2	4
17	M19PA1070	Sports / Yoga / Dance / Music / Theatre	RULO	0	0	2	2	4
		TotalCredits	-	8	0	13	21	34
SECONDSEMESTER								
1	M19PA2010	ArtHistoryandChoreography	HC	4	0	0	4	4
2	M19PA2020	Traditional theatres of India and Western Ballet	HC	4	0	0	4	4
2	M19PA2031	Practical–4 (P4)-Kuchipudi- Tarangam,Kriti,Thillana	SC					
3	M19PA2032	Practical–4 (P4)Bharatanatyam Adavus in Panch Jathi, Kautvam, and Jathiswaram	SC	0	0	4	4	8
4	M19PA2033	Practical–4 (P4)– Mohiniyattam Items - Padavarnam, Thillana	SC					
5	M19PA2034	Practical–4 (P4) Odissi Mangalacharan (advanced), Abhinaya for Sanskrit Kavya	SC					
6	M19PA2041	Practical–5 (P5)Kuchipudi Items- Bhamakalapam Part 1	SC					
7	M19PA2042	Practical–5 (P5) Bharatanatyam Items - Pada	SC	0	0	4	4	8
8	M19PA2043	Practical–5 (P5) Mohiniyattam Items - Saptham, padam, thillana	SC					
9	M19PA2044	Practical–5 (P5) Odissi Pallavi (advanced), Ashtapadi, Moksha	SC					
10	M19PA2050	Practical–6 (P6)	HC	0	0	3	3	6

11	M19PA2070	Music 2 – Alankaras and Dance pieces Taught by Teacher	HC	0	0	2	2	4
12	M19PA2080	MOOC / SWAYAM	RULO	0	0	2	2	-
		TotalCredits	-	8	0	15	23	34

THIRD SEMESTER

1	M19PA3010	AestheticsinDance, Astanayika and Navarasa	HC	4	0	0	4	4
2	M19PA3020	ResearchMethodology	HC	4	0	0	4	4
3	M19PA3030	Desi TraditionsMedieval texts on Dance	HC	4	0	0	4	4
4	M19PA3040	Practical–7 (P7) Concert paper	HC	0	0	4	4	2
5	M19PA3041	Practical–8 (P8)KuchipudiBhamak alapam- Part	SC	0	0	3	3	6
6	M19PA3042	Practical–8 (P8) Bharatanatyam Items-SwarajatiVarnam, Thillana						
7	M19PA3043	Practical–8 (P8) Mohiniyattam Items–Varnam, Shloka						
8	M19PA3044	Practical–8 (P8) Odissi Hamsadhvani Pallavi, Navarasa						
9	M19PA3051	Practical–9 (P9) Kuchipudi (Ashtapadi,Javali, 15 Karanas)	SC	0	0	3	3	6
10	M19PA3052	Practical–9 (P9) Bharatanatyam (Ashtapadi,Javali, 15 Karanas)						
11	M19PA3053	Practical–9 (P9) Mohiniyattam (Ashtapadi,Javali, 15 Karanas)						
12	M19PA3054	Practical–9 (P9) Odissi Nayika Avastha Bheda						
13	M19PA3060	Music 3- Dance Pieces Taught by Teachers	HC	0	0	2	2	4
14	M19PA3071	Classical Dance	OE	0	0	2	2	4
15	M19PA3072	Music						
16	M19PA3073	Dramatics						
		Total Credits		12	0	14	26	34

FOURTH SEMESTER

1	M19PA4010	Dance and music in temples	HC	4	0	0	4	4
2	M19PA4020	Dance writing and Biographies	HC	4	0	0	4	4
3	M19PA4031	Practical–10 (P10)- Kuchipudi Tharangam, Shabdham/Pravesh Dharu	SC	0	0	4	4	8
4	M19PA4032	Practical–10 (P10) Bharatanatyam Mallari, Daru Varnam and Kavadi						

5	M19PA4033	Practical–10 (P10)Mohiniyattam (Ashtapadi, keertanam)						
6	M19PA4034	Practical–10 (P10) Odissi Vilahari Pallavi, Odiya/Kannada						
7	M19PA4041	Practical–11 (P11) Kuchipudi Taala and Nattuvangam						
8	M19PA4042	Practical–11 (P11) Bharatanatyam Taala and Nattuvangam	SC	0	0	4	4	8
9	M19PA4043	Practical–11 (P11) Mohiniyattam Taala and Nattuvangam						
10	M19PA4044	Practical–11 (P11) Odissi Tala, Matra, Laya						
11	M19PA4050	Practical – 12 (P12)GroupChoreography –	HC	0	0	4	4	8
12	M19PA4060	FieldTrip &Dissertation	HC	0	0	6	6	-
13	M19PA4070	Music 4- Dance Pieces Taught by Teachers	HC	0	0	2	2	4
		Total Credits	-	8	0	20	28	36
		Total Credits for Four Semesters		36	0	60	98	138

Distribution of Credits Based on L: T: P

Semester	L	T	P	Total
I	8	0	13	21
II	8	0	15	23
III	12	0	14	26
IV	8	0	20	28
Total	36	0	62	98

Distribution of Credits Based on Type of Courses

Semester	HC	SC	OE	RULO	FC	CC	TOTAL
I	10	9	-	2	-	-	21
II	13	8	-	2	-	-	23
III	18	6	2	-	-	-	26
IV	20	8	-	-	-	-	28
Total	61	31	2	4	-	-	98

HC=Hard Core; SC=Soft Core; OE=Open Elective; RULO= REVA Unique Learning Offerings;

FC=Foundation Course; CC=Core Course.

MPA (Master of Performing Arts) Program
Detailed Syllabus
(effective from Academic Year 2019-20)

SEMESTER-I

Course Code	Course Title	Course Type	L	T	P	C
M18PA1010	DANCE HISTORY	HC	4	0	0	4

Course Objectives:

- To enable the dancers/artist of School of Performing Arts to gain knowledge in the history and the Development of Dance from a bird's eye view.
- To impart knowledge on World history of dance, history of Indian dance traditions.
- To understand dance as a form of human cultural expression.
- To inculcate the habit of reading and writing Dance and Art Papers, Journals, Blogs, Articles and Reviews for their academic betterment.

Course Outcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensively and communicate with the World the History of Dance.
- To be able to place a specific dance form in the appropriate social, political, or historical context
- Students would be able to apply critical thinking skills to the understanding of a particular form of dance
- To be able to write Research papers in their chosen field of Dance with a strong base of history knowledge that help them to analyse the great and rich cultural and dance heritage of our country.

Course Contents:

UNIT	DESCRIPTION	TOPICS
1	Evolution of Dance	1. Definitions of Dance 2. Dance in Stone, Bronze and Iron Age periods 3. Dances in Vedic period 4. Dance in today's scenario
2	Brief History of Indian dance	1. Dance during Vedic period 2. Dance during ancient, medieval and modern period 3. Dance

3	Sources of Dance	1. Primary Sources: Literary, Inscriptional, Monumental, Architectural, Archaeological, Paintings and manuscripts 2. Secondary sources
4	Contribution of Dynasties and	1. Dynasty origin and reigns: Genealogy, Key Emperors, Patronage to art, Trade and socioeconomic strategies, Downfall, Architecture of the dynasties

Course outline: This is a 4 credit course designed to help the learner gain a deeper understanding of the Natyashastra and the Indian dramaturgy at large, which will be not only beneficial for his/her professional competence but also contribute towards his/her subject and cultural development.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1020	Natyashastra and Performing Arts	HC	4	0	0	4	4

Course Objectives:

1. To help the student understand the multiple values of Natyashastra.
2. To develop a cultural understanding in the student to sharpen his/hersocial skills.
3. To ensure a gradual development of literary interest in the student.
4. To make the students understand the importance of the text Natyashastra in the arena of Performing Arts
5. To make the students learn the basics of the Natyashastra and the fundamentals of the different Units in it.
6. To enable them to understand the importance and contribution of traditional theatres of India. The dance, music and drama tradition that was

Course Outcomes:

On completion of the course, learners will be able to:

1. Demonstrate a deep understanding of the natyashastra and its importance.
2. Develop a constructive understanding of the cultural dimensions of this treatise. Make use of his understanding to become an aesthetician of tomorrow.

3. At the end of the course the students would be in a position to understand the importance and the greatness of the text Natya Sastra

4. The Students would not only understand the values propounded in Natyashastra but would also try to implement them in their practical and theoretical learning

Course Content:

UNIT I	Introduction to Natya Sastra	1. Introduction to Natya Sastra—the encyclopedia on Dramaturgy and its history 2. Natyotpathi—the evolution of Natya
UNIT II	11 aspects of Natya Sastra—a detailed study	1. Rasa 2. Bhava 3. Abhinaya 4. Dharmi 5. Vritthi 6. Pravritthi 7. Sidhi 8. Swara 9. Atodyam 10. Ganam 11. Rangam
UNIT III	Traditional Theatres of South India and Dasaropakas	1. Kudiattam, Krishnattam, Nangiarkuthu, Chakkyar Kuthu, Khyal, Teerukuthu, Nautanki, Tamasha, Bhavai, Jatra, Bayalata, Burrakatha, Chhau, Yakshaganam, Bhagavatha Mela, 2. Ten forms of Drama by Dhananjaya
UNIT IV	Natya Sastra in the Modern World	1. Marga and Desi 2. Indian Classical Dance Forms 3. Carnatic and Hindustani Music 4. Modern Indian theatre. 5. Discovery of Natya Sastra in 19 th century 6. Different works on Natya Sastra from 19 th century

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
M18PA1031	Practical-1 (P1) Fundamentals-Kuchipudi- (Adugulu, Jathulu, Vinayaka Kouthvam, Jathiswaram)	SC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows

- To help the dancer to become more flexible and strengthens the body muscles before dance
- To enable the dancer to have a strong foundation in kuchipudidance style.
- To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
- To teach the students the Dances in dance and also the technical aspects of the item which include taala, music and literature.

Course Outcomes:

On completion of the course learners will be able to:

- Attain good flexibility, improved muscle tone and strength
- Perform the fundamentals efficiently.
- Perform the dances flawlessly with good techniques.
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future

CourseContent:

1	Exercise and Adavus	Exercise Adavus 1 st half
2	Adavus second Half Jathis	Second half adavus Chathurasra jathis 1 st to 5
3	Kuchipudi jathis Vinayakakouthvam	6 jathis from second half Vinayaka kouthvam
4	Jathiswaram	Jathiswaram Singing and tala of the Dances in the syllabus

CourseObjectives:

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1032	Practical–1 (P1) Fundamentals– Bharatanatyam (Adavus, Taala, Alarippuand Pushpanjali)	SC	0	0	3	3	6

- Toenablethedancers/artistesofSchoolofPerformingArtshaveastrongfoundation inthebasicsandfundamentals Adavus to get firm foundation to excel in the Nritha part of the practicalaspectsoftheBharatanatyam.

- To have rhythm or Taal in body is necessary for a good dancer and the 2nd unit will help to perfect students to know the basics of Taal, panchajathi.
- Alarippu is the first dance piece which students are going to learn after excel in the Adavus. This is the piece where student can prove their strength in dance in 3rd unit.
- Pushpanjali the invocatory piece of the Bharatanatyam Dance repertoire. Student will learn the tradition welcome format of the God, Musicians and Rasikas for the success performance in the Unit 4.
- To teach students the Dances in dance and also the technical aspects of the Dances which include taal, music, literature and the spiritual and philosophical depths in it.

Course Outcomes:

On completion of the course learners will be able to:

- Perform the fundamentals and the Dances that they have learned. Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future.
- Students will be able to perform adavus effortlessly.
- Students will recite Suladhi Sapta Tala as well as 35 Tala with proper kriya.
- Students will be able to perform Alarippu.
- Students will be able to perform Pushpanjali.

Course Contents:

UNIT	Description	Topics
1	Fundamentals of adavus	1. Basic exercises in standing, sitting, running, stretching and sleeping postures 2. Taddadavu 3. Natadavu 4. Paraval Adavu 5. Kudduthumettadavu 6. Mettadavu 7. Mandiadavu 8. Teerumana Adavu 9. Tataithamadavu 10. Kathiadavu
2	Fundamentals of Taala	11. Panch Jaathi-s 12. Adavus in Panchajathi 13. Sapta Taala 14. Basic 35 Taala
3	Fundamental Dance Pieces-1	15. Alaripu (khanda / sankeerna jaathi)
4	Fundamental Dance Pieces-2	16. Pushpanjali (Adi)

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1033	Practical–1 (P1) Fundamentals– Mohiniyattam (Adavus, Jathiswara, Chokettu)	SC	0	0	3	3	6

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancer to have a strong foundation in Mohiniyattam style.
- To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.
- To understand the moolahasthas used in Mohiniyattam

Course Outcomes:

On completion of the course learners will be able to:

- Perform the fundamentals
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- A good understanding about the hasthas according to Hasthalalshanadeepika

Course Contents:

1	Adavus	Exercise Chuzippukal Adavus	Direct method
2	Cholkettu	Cholkettu	Direct method
3	Jathiswaram	Jathiswara	Direct method
4	Hasthaslakshanadeepika Hastha	Jathiswaram Singing and tala of the Dances in the syllabus	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1034	Practical–1 (P1) Fundamentalals of Odissi Chauka, Tribhanga Movements and Mangalacharan, Saraswati vardana	SC	0	0	3	3	6

Course Objectives:

1. To enable the dancers/artisteses of School of Performing Arts to have a strong foundation in the basics and fundamentals in the practical and performing aspects of the Odissi dance form that they are specializing.
2. To teach students the beginning dances of Odissi repertoire and also the technical aspects involved.
3. To teach them the fundamentals of rhythmic and musical elements in this dance form
4. To make them understand the literature aspect and the spiritual and philosophical depths in it.

Course Outcomes:

On completion of the course learners will be able to:

1. Perform the fundamentals of this dance form confidently
2. To perform the Dances with technical that they have learned.
3. Will be able to understand the intricacies in choreographing such Dances in future. further teach the dances and also
4. Comprehensive understanding of the dances they have learnt.

Course Contents:

UNIT	Description	Topics
1	Basic movements-1	1. Chauka and Tribhanga Movements
2	Basic movements-2	2. Mangalacharan
3	Dance-1	3. Saraswati vandana
4	Dance-2	4. Bols and singing of the Dances

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs. / Wk
M19PA1041	Practical – 2 (P2) – Kuchipudi Dances– Poorvarangam, Shabdham,Ramadasu / Annammacharya Keertana	SC	0	0	3	3	6

Course Objective:

1. To teach the students the important item in the Kuchipudi repertoire Brahmanjali
2. To teach the students a Shabdham in the Kuchipudi dance tradition.
3. To teach the students an Annammacharya Keerthana
4. To teach the students Nattuvangam for the Dances that they learn in this paper.

Course Outcomes:

1. The students would be able to perform Brahmanjali in Kuchipudi tradition.
2. The students would be able to perform a Shabdham in Kuchipudi tradition.
3. The students would be able to perform an Annammacharya Keerthana in Kuchipudi tradition.
4. The students would be able to do Nattuvangam for the Dances that they learn in this paper.

CourseContents:

UNIT	Description	Topics
1	Dances–1	1. Poorvarangam–1
2	Dances–1	2. Shabdham–1
3	Dances–1	3. Annam Acharya/Ramadasakeertana–1
4	Nattuvangam	4. NattuvangamfortheDanceslearnedinthe respectivesemester

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1042	Practical–2 (P2) Bharatanatyam Dances- Shabdham, Kriti and Jathiswaram	SC	0	0	3	3	6

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of jathiswara
- To ensure that students learn the various Dances in the Bharatanatyam Repertoire
- To understand the patterns of Thillana
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes

On completion of the course learners will be able to:

Understand the approach in the choreography of jathiswaram and shabdham

Perform the Dances that they have learned

Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future

Understand the intricacies of nrittta

CourseContents:

1	jathiswara	jathiswara	Direct method
2	Shabdham part 1	Shabdham	Direct method
3	Shabdham part 2	Shabdham	Direct method
4	thillana	Thillana	Direct method

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1043	Practical-2 (P2) Mohiniyattam Dances- Padam, Ganesha, Stuthi, Shlokas (HLD)	SC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows:

- To enable the dancer to understand the intricacies of mohiniyattampadam.
- To ensure that students learn the various Dances in the Mohiniyattam repertoire.
- To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.

Course Outcomes:

On completion of the course learners will be able to:

- Understand the various nuance of Mohiniyattam
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- A good understanding about the hasthas according to Hasthalalshanadeepika

Course Content:

1	Padam	Padam	Direct method
2	Ganesh sthuthi	Ganeshasthuthi 1	Direct method
3	Ganeshasthuthi	Ganeshasthuthi 2	Direct method
4	Sloka	Sloka	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1044	Practical–2 (P2) Odissi Pallavi-2, Batu Nritya	SC	0	0	3	3	6

Course Objectives:

1. To introduce students to the non-representational dance of Odissi. Batu Nritya is a pure dance with strong footwork.
2. Depiction of dance sculptures adorning temple walls, friezes, nritya mantapas.
3. Pallavi has its own softness (Lalitya) with graceful body movement
4. To enable students to understand and create intricate rhythmic patterns.

Course Outcomes:

On completion of the course, learners will be able to:

1. To perform dance sequences confidently with good stamina. Dance flawlessly with good technical elements. Learn wide range of movement vocabulary.
2. Knowledge about multitude of Odissi postures
3. Coordination of strong foot work with soft and graceful movements
4. Comprehensive knowledge of rhythmic pattern and singing

Course Contents:

UNIT	Description	Topic
1	Lasya oriented dance	Pallavi-1
2	Dance depicting beautiful temple dance sculptures	Batu Nritya
3	Lasya oriented dance	Pallavi -2
4	Rhythm and Music	Singing of above mentioned dances, recitation of bols and tala pattern

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1051	Practical–3 (P3) Kuchipudi Dances– Tyagaraja Keerthana, Swarajathi, Shloka (AD)	SC	0	0	3	3	6

CourseObjectives:

- To teach the students the fundamental and important shlokas of Abhinaya darpana
- To teach the students how to recite the shlokas by showing them through body gestures
- To teach the students a Tyagaraja Keerthana in Kuchipudi dance style
- To teach the students a Swarajathi in Kuchipudi dance style

CourseOutcomes:

- The students would be able to recite the shlokas of Abhinaya darpana
- The students would be able to render the shlokas while expressing them through bodily gestures
- The students would be able to dance, sing and perform for Tyagaraja Keerthana
- The students would be able to dance, sing and perform for Swarajathi in Kuchipudi Style

CourseContent:

UnitI	Shlokas from Abhinaya Darpana	1. Asamyutha hastas 2. Samyutha hastas 3. Asamyutha hasta viniyogas
UnitII	Tyagaraja Keerthana	1. Samyutha hastha viniyogas 2. Greeva bhedas, Shiro bhedas 3. Drishti bhedas and Bhru bhedas
UnitIII	Tyagaraja keerthana	1. Tyagaraja keerthana
UnitIV	Swarajathi	1. Swarajathi

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1052	Practical–3 (P3) Bharatanatyam Dances-Devarnama, Thillana and Shloka (AD)	SC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of Devarnama
- To ensure that students learn the various Dances in the Bharatanatyam repertoire.
- To enable the dancer to have a strong foundation in the knowledge of hasthas in different treatises
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes

On completion of the course learners will be able to:

- Understand the approach in the choreography of Devarnama
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- A good understanding about the hasthas according to Abhinayadarpana

Course Content:

1	Devarnama	Devarnama	Direct method
2	Thillana	Thillana	Direct method
3	Sloka 1	Sloka 1 st part	Direct method
4	Sloka 2	Sloka 2 nd part	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1053	Practical-3 (P3) Mohiniyattam Dances- Bhajan, thillana, Shloka (AD)	SC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of Bhajans
- To ensure that students learn the various Dances in the Mohiniyattam repertoire.
- To enable the dancer to have a strong foundation in the knowledge of hasthas in different treatises
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1054	Practical-3 (P3)Odissi Shloka, Odiya Abhinaya, Shiva Panchaka	SC	0	0	3	3	6

Course Objectives:

1. To empower Odissi learners with the knowledge of literature pertaining to their dance form.
2. Enables one to understand using of Mudra-s (hand gestures) and Bhangi-s (postures)
3. To give knowledge of the Puranas and narrating them in this particular dance form.
4. To impart the knowledge of singing for abhinaya oriented dances.

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach in the choreography of Bhajans
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- A good understanding about the hasthas according to Abhinayadarpana

Course Content:

UNIT	Description	Topics
1	Dance-1	Shlokas
2	Dance-2	Odiya Abhinaya
3	Dance-3	Shiva Panchaka
4	Rhythm and Music	Singing, recitation of bols tala pattern

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./Wk.
M19PA1060	Music-1 Sarale and Jantai, Dance Pieces taught by Teachers	HC	0	0	2	2	4

Course Objectives

- To make the students understand the nuances of the Carnatic Music.
- To make the students learn the basics in Carnatic music and to enable them to learn it in the practical way.
- To enable them to understand the technical terms in music.
- To increase the voice culture in different octaves

Course Outcomes

- Students will be strong in basic of music
- At the end of the course the students would be in a position to understand the nuances of the Carnatic Music
- The Students would not only understand the fundamentals and basics of the music but would also become a performer.
- The Students will be able to sing the dance item songs

Course Content:

UNIT I	Music Basics And voice culture	<ul style="list-style-type: none"> • Saralivarishakal • Madhyastayi varishakal
UNIT II	Music Basics And voice culture	<ul style="list-style-type: none"> • Jantivarishakal
UNIT III	Dance songs. Bharatanatyam/Kuchipudi/Mohiniyattam	<ul style="list-style-type: none"> • Vinayaka Kouthvam, Jathiswaram) Jathiswara, Cholkettu, Shabdham, • , Shloka (AD)
UNIT IV	Dance songs. Bharatanatyam/Kuchipudi/Mohiniyattam	<ul style="list-style-type: none"> • Devarnama, Thillana and Shloka (AD) • Bhajan, thillana • Ramadasu/Annamacharya Keertana, Tyagaraja Keerthana

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA1070	YOGA	RULO	0	0	2	2	4

Note: Music, Dance, and Theater courses are offered by the School of Performing Arts, whereas the Sports and Yoga courses are offered by the Department of Physical Education. The students have to choose any **ONE** of these courses.

A. YOGA FOR HEALTH

Course Objectives:

Following are the Course Objectives.

- Topreparethestudentsfortheintegrationoftheirphysical,mentalandspiritualfaculties;
- toenablethestudentstomaintaingoodhealth;
- Topracticementalhygieneandtoattainhigherlevelofconsciousness;
- topossemotionalstability,selfcontrolandconcentration;and
- Toinculcateamongstudentsselfdiscipline,moralandethicalvalues.

Course Outcomes:

Oncompletionofthecourselearnerswillbeableto:

- Practiceyogaforstrength,flexibility,andrelaxation.
- Learntechniquesforincreasingconcentrationanddecreasinganxiety
- Becomeselfdisciplinedandself-controlled
- Improvephysicalfitnessandperformbetterinstudies
- Gainselfconfidencetofacethechallengesinthesocietywithcommitmenttoservethe society

Course Content:

Unit-I:

Yoga: Introduction, **Surya Namaskara:** -12 counts

Unit-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana.

Asanas: Standing- Tadasana, Trikonasana, Parshwakonasana, Veerabhadrasana.

Unit-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana.

Asanas:SupinePosition-Sarvangasana, Halasana.

Mudras-Dhyanamudra,,Namastemudra,Nasikamudra

Unit-IV:

Pranayams:-Anuloma–Viloma,Basthrika,Bhramari.

Dhyana&itstypes:Competitionformat,Rulesandtheirinterpretations

SEMESTER-II

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2010	Art History and Choreography	HC	4	0	0	4	4

CourseObjectives:

- To enable the dancers/artistes of School of Performing Art to gain knowledge in the History and the Development of Dance and its choreography in a detailed way.
- To be able to choreograph their own Dances including the right amount of technicalities and understanding them from the Sastra point of view.

CourseOutcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensively and communicate with the World the History and the aspects of the Dance and its choreographic techniques.
- To be able to choreograph their own Dances including the right amount of technicalities and understanding them from the Sastra point of view.

CourseContents:

UNIT	DESCRIPTION	TOPICS
1	Evolution of Choreography	1. Definition of Choreography 2. History of Choreography 3. Principles and Objectives of Choreography 4. Bandhas in Natya Sastra
2	Subjects of Choreography	5. Selection of Subjects 6. Musical Treatment of Subjects 7. Past, present and future of Choreography
3	Dance Dramas and Film Choreography	8. Choreography in Indian Films 9. Choreography in Classical based films 10. Dancedrama Traditions of India.
4	Biographies	11. Biographies of famous Choreographers 12. Vedic period to modern age choreography

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2020	Traditional Theatres of India and Western Ballet	HC	4	0	0	4	4

Course Objectives:

To enable the dancers/artistes of School of Performing Arts to gain knowledge in the

- History and the development of traditional theatres of India from a bird's eye view.
- To provide the students a general understanding of all the four forms of abhinaya Indian traditional theatre forms.
- To help the students understand socio-cultural significance and values of Indian traditional theatre.
- To impart knowledge of the history and development of Western Ballet.

Course Outcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensibly and communicate with the World the History and development of traditional theatres of India and describe cohesively the salient features of traditional theatres of India.
- Understand the spatial significance of traditional theatres of India.
- Understand similarities and differences in techniques, presentation, sources and features.
- Learner will have a sound knowledge of the history and development of Western ballet.

Course Contents:

UNIT	Topics	Description
1	Introduction	Introduction to traditional theatres of India, their socio-cultural significance and values, Traditional theatre make-up, costume, properties, speech
2	Traditional theatres of India-1	Kudiyattam, Krishnattam, Nangiar kuthu, Chakkyar Kuthu, Khyal, Teerukuthu, Nautanki, Tamasha
3	Traditional theatres of India-2	Jatra, Bhavai, Bayalata, Burrakatha, Chhau, Yakshaganam, Bhagavatha Mela,
4	Western Ballet	History and development of Western Ballet

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2031	Practical-4 (P4)-Kuchipudi-Tarangam,Kriti,Thillana	SC	0	0	4	4	4

Course Objective:

1. To teach the students the important item in the Kuchipudi repertoire Tarangam.
2. To teach the students a kriti of any saint vaggeyakara
3. To teach the students a Thillana
4. To teach the students Nattuvangam for the Dances that they learn in this paper.

Course Outcomes:

1. The students would be able to perform Tarangam in Kuchipudi tradition.
2. The students would be able to perform a Kriti in Kuchipudi tradition.
3. The students would be able to perform a Thillana in Kuchipudi tradition.
4. The students would be able to do Nattuvangam for the Dances that they learn in this paper.

Course Content:

UNIT I	Tarangam
UNIT II	kriti
UNIT III	Thillana
UNIT IV	Nattuvangam

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2032	Practical-4 (P4)Bharatanatyam Adavus in Panch Jathi, Kautvam, and Jathiswaram	SC	0	0	4	4	8

CourseObjectives:

- To get strong advance technique in 1st set of fundamentals of Adavus in jathis to get firm foundation to excel in the Nritha part of the practical aspect of the Bharatanatyam.
- To get strong advance technique in 2nd set of fundamentals of Adavus in jathis to get firm foundation to excel in the Nritha part of the practical aspect of the Bharatanatyam.
- Kautvam, the dance piece where the students are going to learn to praise lord through words.
- Jathiswaram the pure nritha piece of the Bharatanatyam Dance repertoire. Students are going to learn to dance on jathi and swara.

CourseOutcomes:

On completion of the course learners will be able to:

- Students will be able to perform 1st set of adavus in Pancha jathi effortlessly.
- Students will be able to perform 2nd set of adavus in Pancha jathi effortlessly.
- Students will be able to perform Kautavam.
- Students will be able to perform Jathiswaram.

CourseContents:

UNIT	Description	Topics
1	Adavus in Pancha jathi Part 1	Basic exercises in standing, sitting, running, stretching and sleeping postures Taddadavu Natadavu 4. Paraval Adavu 5. Kuddittamettu Adavu
2	Adavus in Pancha jathi Part 2	Metta Adavu Mandi Adavu Teeramanam Adavu 9. Tat tai tam Adavu 10. Kathi Adavu
3	Fundamental Of Dance Pieces-1	11. Kautvam
4	Fundamental Dance Pieces-2	12. Jathiswaram

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2033	Practical-4 (P4)- Mohiniyattam Dances - Padavarnam, Thillana	SC	0	0	4	4	8

Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of varnam
- To ensure that students learn the various Dances in the Mohiniyattam repertoire.
- To enable the dancer to have a strong understanding about the characteristics of padavarna.
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach in the choreography of varnam
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- Complete one full repertoire in the Mohiniyattam style.

Course Content:

Unit	Topics	Description	
1	Padavarnam	Padavarnam Poorvangam	Direct method
2	Padavarnam	Padavarnam Utharangam	Direct method
3	Thillana	Thillana 1st part	Direct method
4	Thillana	Thillana 2ndpart	Direct method

Course Objectives:

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2034	Practical-4 (P4)Odissi Mangalacharan (advanced), Abhinaya for Sanskrit Kavya	SC	0	0	4	4	8

1. To enable the students to understand and learn the advanced dances and rhythmic patterns of Odissi.
2. To impart the knowledge of Sanskrit poetry
3. To be able to portray various characters from Purana-s and epics.
4. To develop a keen understanding of intricate tala patterns and music of Odissi dance.

CourseOutcomes:

Oncompletionofthecourselearnerswillbeableto:

1. To present advanced dances of Odissi efficiently and confidently on stage. Sound knowledge of complicated rhythmic patterns.
2. Understanding of aesthetics in Sanskrit poetry of Basics of all classical dance forms
3. Enhance the emotive capability of students.
4. To be able to enact Sanskrit poetry with better understanding

CourseContents:

UNIT	Description	Topic s
1	Dances-1	Mangalacharan –advanced- Part I
2	Dances-2	Mangalacharan –advanced- Part II
3	Dances-3	Abhinaya for Sanskrit Kavya
4	Rhythms and Singing	Recitation of Bols and Singing lessons

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2041	Practical-5 (P5)Kuchipudi Dances- Bhamakalapam Part 1	SC	0	0	4	4	8

Course Objectives:

1. To enable the dancers/artistes of School of Performing Arts have a strong foundation in the basics and fundamentals in the practical and performing aspects of the dance form that they are specializing.
2. To teach students Bhama Kalapam, a magnum opus of Kuchipudi dance form.
3. To teach students the Vachika aspects of the Kuchipudi dance tradition through Bhama Kalapam.
4. To teach students the Dances in dance and also the technical aspects of the Dances which include taalam, music, literature and the spiritual and philosophical depths in it.

Course Outcomes:

1. The students would be able to perform the Angikabhinaya of Kuchipudi with proper technique.
2. Perform the complete Bhama Kalapam that they have learned.
3. The students would be able to render the dialogues in Bhama Kalapam.
4. Will be able to further teach the whole dance drama and also understand the intricacies in choreographing such dance dramas in future.

Course Content:

Unit I

1. Poorvarangam
2. Satya Bhama Pravesha Daruvu
3. Rave Madhavi

Unit II

1. Samvada daruvu-1
2. Kandartham
3. Siggayanoyamma

Unit III

1. Madana Daruvu
2. Samvada daruvu – 2
3. Perichina pattucheeralu

Unit IV

1. Vadamela Pove
2. Satya Bhama Lekha

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2042	Practical-5 (P5) Bharatanatyam Dances - Pada Varnam and Padam	SC	0	0	4	4	8

CourseObjectives:

- To enable the dancers/artists of School of Performing Arts have a strong performing skills in the practical they are going to learn the most complicated piece from repertoire is Pada Varnam. In the first unit they will learn 1st part of the Varnam.
- In the second unit students will learn 2nd part of the Pada Varnam. Where the tempo of the dance piece and intricacy will increase.
- Students are going to learn Padam the abhinaya piece of the repertoire. Where student will learn the gestural language.
- In the Unit 4 students will learn nuances of the learned Dances that is Tala.

CourseOutcomes:

On completion of the course learners will be able to:

- Students will be able to perform 1st Part of the Pada Varanam.
- Students will be able to perform 2nd Part of the Pada Varanam.
- Students will be able to perform Abhinaya Dance piece Padam.
- Students will understand the nuances to better understanding of the dance pieces.

CourseContent:

UNIT	Description	Topics
1	Pada Varnam Part 1	1. Pada Varnam – half
2	Pada Varnam Part 2	2. Pada Varnam – other half
3	Padam	3. Padam
4	Taalam	4. Taala practice of all the jathi-s of Varnam

CourseCode	CourseTitle		L	T	P	C	Hrs./Wk.
M19PA2043	Practical-5 (P5) Mohiniyattam Dances - Satham, padam, thillana	SC	0	0	4	4	8

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of satham
- To ensure that students learn the various Dances in the Mohiniyattam repertoire.
- To enable the dancer to have a strong understanding about the varnam
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes

On completion of the course learners will be able to:

- Understand the approach in the choreography of satham
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- Different baanis in Mohiniyattam and their specialities

Course Content:

Unit	Topics	Description	
1	Satham	Satham part 1	Direct method
2	Satham	Satham part 2	Direct method
3	Padam	Padam	Direct method
4	Thillana	Thillana	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2044	Practical–5 (P5)Odissi Pallavi (advanced), Ashtapadi, Moksha	SC	0	0	4	4	8

Course Objectives:

1. To enable the students to get trained in advanced non-representational dance (nritta).
2. To impart the knowledge of Geeta Govinda kavya and dance, the significant part of Odissi dance repertoire.
3. To impart the practical awareness of Bhava, Rasa and aesthetics of dance.
4. To provide ample scope to the dancer for delineating an emotion through the expressive art of mime.

CourseOutcomes:

Oncompletionofthecourselearnerswillbeableto:

1. To perform non-representational dances of Odissi with technical perfection and efficiency.
2. Sound knowledge of Indian philosophy behind the mythological stories.
3. Better comprehension of spiritual and philosophical significance of Odissi

CourseContent:

UNIT	Description	Topics
1	Dances–1	Advanced Pallavi
2	Dances–2	Ashtapadi
3	Dances–3	Moksha
4	Bols and Songs	Rhythmic knowledge and singing of the dance sequences taught in this semester

Course Outline: Thisisa3creditcoursedesignedtohelpthelearnergainadeeperunderstanding ofthe movement elements of Natyashastra, the encyclopedia of Indian dance and dramaturgy. It will benotonlybeneficialforhis/her professional competencebutalsocontributetowardshis/her subject andculturaldevelopment.

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2050	Practical 6 (P6) Sthanaka, Cari-s and Karanas of Natyashastra Art	HC	3	0	0	3	6

CourseObjectives:

1. To impart an understanding of kinetics and kinesthetics of Natyashastra
2. To impart practical knowledge of fundamental movement elements of Natyashastra.
3. To develop an understanding of the movement vocabulary of ancient dance tradition of India.
4. To make the students understand the practical importance of the text Natyashastra in the arena of Performing Arts

Course Outcomes:

On completion of the course, learners will be able to:

1. Demonstrate a deeper understanding of the practical aspects of Natyashastra and its importance.
2. Develop a constructive understanding of the cultural dimensions of this treatise. Make use of this understanding to become an aesthetician of tomorrow.
3. At the end of the course, the students would be in a position to understand the difference in movement techniques of today's classical dances and the movements as described in Natyashastra
4. The students would not only understand the values propounded in Natyashastra but would also try to implement them in their practical learning

CourseContent:

UNIT I	Preliminary movements according to NS	1. Anga 2. Upanga 3. Pratyanga chalani- According to Sangita Ratnakara
UNIT II	Sthanaka-s, Bhoomi chari-s	1. Static postures- a) Purusha Sthanaka and b) Stree sthanaka Earthly Movements
UNIT III	Akasha chari-s Karanas-5	Aerial Movements as prescribed in Natyashastra First five karanas
UNIT IV	15 karanas and recitation of the shlokas	Karanas- 5 to 20 Training to recite the Lakshana shlokas of all the above movements

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2070	Music-2 – Alankaras and singing practise of dance pieces taught by teacher	HC	0	0	2	2	4

Course Objectives

- To make the students understand the nuances of the Carnatic Music.
- To make the students learn the basics in Carnatic music and to enable them to learn it in the practical way.
- To enable them to understand the technical terms in music.
- To teach them tala system of Carnatic Music

Course Outcomes

- At the end of the course the students would be in a position to understand the nuances of the Carnatic Music
- The Students would not only understand the fundamentals and basics of the music but would also become a performer .
- Students will be able to understand the technical terms in music.
- Will be ready to sing the dance songs

Course Content:

UNIT I	Music Tala and dance Music	<ul style="list-style-type: none"> • Alankarams • Tarangam, • Kriti,
UNIT II	Dance Music	<ul style="list-style-type: none"> • Kautvam, • Jathiswaram Thillana
UNIT III	Dance Music	<ul style="list-style-type: none"> • Padavarnam • Sapham
UNIT IV	Dance Music	<ul style="list-style-type: none"> • Bhamakalapam

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA2080	MOOC / SWAYAM	RULO	0	0	2	2	-

Note: Students will have to compulsorily study ONE Online Course of TWO credits on the advice of the School any time during the period of the program being studied and obtain credits which will be counted in the Second Semester and entered in the Credit Card of respective student.

MOOC/ SWAYAM:

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering OOC courses.

A student shall register and successfully complete any of the courses available on SWAYAM. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

SEMESTER-III

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3010	AestheticsinDance, Astanayika and Navarasa	HC	4	0	0	4	4

Course Objectives:

- To enable the dancers/artistes of School of Performing Arts to gain knowledge in the Aesthetics, Art appreciation, Navarasas and Ashtanayikas.
- To be able to choreograph their own compositions including the right amount of technicalities and understanding them from the Sastra point of view.
- To enable the dancers/artistes of School of Performing Arts have a strong foundation in Aesthetics-basic/aspects and learn the Aesthetic developments in Indian art history references from the textual traditions and Oral Traditions of Dance.
- The practical Assignments in correlation to the theoretical aspects to be practised in class as 'hands on experience'.
- To teach and inspire students with the works of great Aestheticians and their theories.
- To enable them to become competent dancers and make them realise the role of emotional thought process.
- To discuss the various allied art forms with reference to aesthetics and the knowledge of the same to become wholesome artistes.
- To discuss the emotional aspects and their expressional modes by studying Navarasas and Ashtanayikas.

Course Outcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensibly and communicate the Aesthetics theories and apply them practically as dancers.
- Choreograph own compositions including the right amount of technicalities and understanding them from the Sastra point of view.
- Learn the art of emoting theoretically and be equipped to apply practically with confidence.

Course Content:

UNIT 1	AESTHEITCS	1. ART APPRECIATION 2.DEFINING AESTHETICS 3. INDIAN AESTHETIC THEORIES- introduction 4 .NATYASASTRA AND AESTHETICS 5. AESTHETIC ASPECTS IN DETAIL- 6TH ,7TH AND 24TH CHAPTERS IN DETAIL
UNIT 2	AESTHETIC THEORIES BY VARIOUS AESTHETICIANS	BHATTANAYAKA BHATTA LOLLATA SANKUKA ABHINAVA GUPTA AND OTHERS.
UNIT 3	NAVARASAS	THE STUDY OF BASIC 9 EMOTIONS DETAILED STUDY AS EXPLAINED IN NATYASASTRA AND OTHER RELATED TEXTS
UNIT 4	ASHTANAYIKAS	THE STUDY OF ASHTANAYIKAS IN RELEVANT TREATISES

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3020	ResearchMethodology	HC	4	0	0	4	4

Course outline: This is an essential course for every Post Graduate programme which would further nurture their skills in the Arena of Research that they would pursue in future. In the field of Performing Arts, Academic Research is taking fast strides and the need for creating enthusiastic Researchers is the need of the hour. This course will enable to understand the various research methods involved and would give them an idea on how to proceed forward while doing Research not only for their Doctoral Thesis but also for their Post Graduate dissertation.

Course Objectives:**The overall objective of the Course is as follows:**

1. To enable the dancers/artistes of School of Performing Arts to gain knowledge in the Research and its allied aspects related to Dance.

2. To be able to deliver the theoretical aspects of Research that would help them in their Doctoral Thesis in future.
3. To be able to teach the students the different aspects that get into picture while doing a research in the field of Performing Arts.
4. To be able to explain the students the different types of Research methodology that would be useful for their research in dance.

Course Outcomes:

On completion of the course, learners will be able to:

1. Speak clearly, confidently, comprehensibly and communicate with the World the Research aspects of dance.
2. To be able to read research materials and write the research papers from the vast amount of Cultural knowledge that is available.
3. The students will be to critically think, identify the problem in the field Performing Arts and aware of appropriate methodology to solve the problem.
4. The students would be able to carry out Research in Performing Arts domain.

Course Contents:

UNIT	DESCRIPTION	TOPICS
1	Research Methodology: Foundations and Sources of data	1. Definitions 2. Literature Review 3. Primary Sources 4. Secondary Sources
2	Research Process	5. Selection of Subjects 6. Preparation of Synopsis 7. Research Work
3	Data Collection	8. Data Collection Methods - Observation - Experimentation - Survey 9. Tools for Data Collection - Questionnaire - Interview 10. Field Work 11. Data Processing and Analysis
4	Report Writing and Bibliography	12. Planning Report Writing 13. Research Report Format 14. Organisation of Report and Report Writing 15. Footnotes and Bibliography - Reference Books and Journals - Supportive Materials - Audio Visual equipment

Course outline: This is a 4 credit course designed to help the learner gain a deeper understanding of the evolution of Indian dance, which will be not only beneficial for his/her professional competence but also contribute towards his/her knowledge in the textual tradition.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3030	Desi Traditions and Medieval texts	HC	4	0	0	4	4

Course Objectives:

1. To help the students understand the evolution of Indian classical dances such as Marga and Desi
2. To make the students understand the importance of the texts in the arena of Performing Arts
3. To enable the students to understand the rich repository of textual tradition of dance in India.
4. To develop an understanding in the student regarding the linear continuity of tradition and to ensure a gradual development of research interest in the student.
5. The practical Assignments in correlation to the theoretical aspects to be practised in class as 'hands on experience'.
6. To enable them to understand the importance and contribution of traditional theatres of India. The dance, music and drama tradition that was

Course Outcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensibly and communicate with the world the evolutionary process of Indian dance.
- Understand the various developmental stages and transitions in Indian dance
- Clearly understand the aesthetics of both Marga and Desi traditions.
- Choreograph own compositions including the right amount of technicalities and understanding them from the Sastra point of view.

Course Content:

UNIT 1	The Desi tradition	1. Evolution of Indian dance. 2. Marga, desi and modern day classical dances of India
UNIT 2	Evolution of modern day classical dance traditions	Evolution of Kathak, Odissi and Mohiniattam, Bharatanatyam and Kuchipudi dances

UNIT 3	Medieval Texts on Dance-1	1. Manasollasa of Someshwara 2. Sangita Ratnakara of Sharngadeva 3. Nritta Ratnavali of Jayasenapathi 4. Nrityadhyaya of Ashokamalla 5. Nartana Nirnaya of Pandareeka Vittala 6. Sangeeta Saramrita of Tulaja
UNIT 4	Medieval Texts on Dance-2	1. Abhinaya Chandrika and 2. Natya Manorama 3. Balarama Bharata 4. Hasthalakshana Deepika

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3040	Practical – 7 (P7) Concert paper	HC	0	0	4	4	2

Concert Paper

This is a four credit paper which would help the student to understand the important skills of presentation techniques of dance in a full-fledged concert. In this paper dances have to be chosen from those taught in the previous semesters. Students are allowed to learn/perform different dances in addition to those taught in the previous semesters: for the performance, under the guidance of the faculty of the department.

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3041	Practical-8 (P8)KuchipudiBhamakalapam- Part 2, Tharangam	HC	0	0	3	3	6

Course Objectives:

The overall objective of the Course is as follows

- To help the dancer to become more flexible and strengthens the body muscles before dance
- To enable the dancer to have a strong foundation in kuchipudidance style.
- To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
- To teach the students the Dances in dance and also the technical aspects of the item which include taala, music and literature.

Course Outcomes:

On completion of the course learners will be able to:

- Attain good flexibility, improved muscle tone and strength
- Perform the fundamentals efficiently.
- Perform the dances flawlessly with good techniques.
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future

Course Content:

Unit	Topic	Description
1	Exercise and Adavus	Exercise Adavus 1st half
2	Adavus second Half Jathis	Second half adavus Chathurasra jathis 1st to 5
3	Kuchipudi jathis Vinayakakouthvam	6 jathis from second half Vinayaka kouthvam
4	Jathiswaram	Jathiswaram Singing and tala of the Dances in the syllabus

CourseCode	CourseTitle		L	T	P	C	Hrs./Wk.
M19PA3042	Practical–8 (P8) Bharatanatyam Dances-Swarajati Varnam, Thillana	SC	0	0	3	3	2

CourseObjectives:

- To enable the dancers/artists of School of Performing Arts have a strong foundation in the basics and fundamentals in the practical and performing aspects of the dance form that they are specializing.
- To teach students the Dances in dance and also the technical aspects of the Dances which include taal, music, literature and the spiritual and philosophical depths in it.

CourseOutcomes:

On completion of the course learners will be able to:

- Perform the fundamentals and the Dances that they have learned.
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future.

CourseContents:

UNIT	Description	Topics
1	Swarajathi Varnam Part 1	1.Swarajathi Varnam–half
2	Swarajathi Varnam Part 2	2. Swarajathi Varnam–other half
3	Thillana	3.Thillana
4	Taalam	4. Taala practice of all the jathi-s of Varnam

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3043	Practical-8 (P8) Mohiniyattam Dances– Varnam, Shloka	SC	0	0	3	3	6

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of varnam and sloka
- To ensure that students learn the various Dances in the Mohiniyattam repertoire.
- To enable the dancer to have a strong understanding about the characteristics of varnam.
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes

On completion of the course learners will be able to:

- Understand the approach in the choreography of varnam
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- Have a few solid traditional Dances in their repertoire

Course content:

Unit	Topics	Description	
1	Varnam	VarnamPart 1	Direct method
2	Varnam	VarnamPart 2	Direct method
3	Varnam	VarnamPart 3	Direct method
4	Sloka	Sloka	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3044	Practical-8 (P8) Odissi Hamsadhvani Pallavi, Navarasa Abhinaya	SC	0	0	3	3	6

Course Objectives:

1. Exhaustive and detailed analyses into the vast area of Navarasa or the nine emotions on a practical level.
2. Systematic practice of these nine rasas by the dancers, with the aim of improving their capacities for producing this aesthetical experience in the viewers.
3. To enable the dancers/artists of School of Performing Arts to have a strong foundation in the basics and fundamentals of the art of expression.
4. To impart knowledge of advanced techniques of this dance tradition.

Course Outcomes:

On completion of the course learners will be able to:

1. Perform and enact different situations leading to the realisation of the rasa.
2. To perform the dances that they have learned confidently and convincingly.
3. Will be efficiently able to further teach the dances and also understand the intricacies in choreographing such dances in future.
4. Comprehensive understanding of the dances they have learnt.

Course Contents:

UNIT	Description	Topics
1	Navarasa Abhinaya-1	1. Detailed and systematic approach to the art of expression through Navarasa abhinaya –Part I
2	Navarasa Abhinaya-2	2. Detailed and systematic approach to the art of expression through Navarasa abhinaya-Part II
3	Hamsadhvani Pallavi	3. Advanced nritta piece enables the dancer to create designs in space and time
4	Singing and recitation	4. Practice for singing and recitation of syllables

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3051	Practical– 9 (P9) Kuchipudi (Ashtapadi,Javali, 15 Karanas)	SC	0	0	3	3	6

Course Objectives:

The overall objective of the paper is as follows:

- To enable the dancer to understand the various nuances of Abhinaya in Ashtapadi and javali
- To enable the dancer to understand the abhinaya techniques
- To teach the students the Dances in dance and also the technical aspects of the item which include taalam, music, and literature.
- To ensure the dancer learn karanas.

Course Outcomes:

On completion of the course learners will be able to:

- Understand the different approach for Ashtapadi and Javali
- Understand and perform the abhinaya in a better way.
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future

Unit	Topics	Description
1	Ashtapadi	Ashtapadi 1 st half
2	Ashtapadi	Ashtapadi 2 nd half
3	Javali	Javali
4	Karanas first 15 marga karanas	The first 15 marga karanas

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3052	Practical– 9 (P9) Bharatanatyam (Ashtapadi,Javali, 15 Karanas)	SC	0	0	3	3	6

CourseObjectives:

1. To enable the students of School of Performing Arts to have a strong foundation in the abhinaya aspects of Bharatanatyam Dance.
2. To teach students the depth of the technicalities in dance through varied emotive aspects.
3. To enable students to understand the spiritual and philosophical values of such dances
4. To train the students in the kinetic and static elements of Natyashastra

CourseOutcomes:

On completion of the course learners will be able to:

1. Perform abhinaya pieces in an efficient manner.
2. Have a better understanding of the various abhinaya techniques.
3. Understand the spiritual depth of Ashtapadi
4. Perform 15 marga karanas with technical perfection

CourseContents:

UNIT	Description	Topics
1	Ashtapadi	Yahi madhava/ Radhika tava virahe
2	Javali	Kannada Javali
3	Marga karana	Sthanaka, cari training
4	15 Marga karana	15 karanas as propounded in Natyashastra

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3053	Practical– 9 (P9) Mohiniyattam (Ashtapadi,Javali, 15 Karanas)	SC	0	0	3	3	2

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the various abhinayaDances.
- To understand the various approach of abhinaya by learningAshtapadi and javali.
- To enable the dancer to understand the aspects of karanas and perform.
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach in the choreography ofAshtapadi and javali
- Understand and perform the 15 karanas.
- Perform the Dances they learned in the syllabus
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future

Course content:

Unit	Topics	Description	
1	Ashtapadi	Ashtapadi part 1	Direct method
2	Ashtapadi	Ashtapadi part 2	Direct method
3	Javali	Javali	Direct method
4	15 karanas	Karanas	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3054	Practical– 9 (P9) Odissi Nayika Avastha Bheda	SC	0	0	3	3	6

Course Objectives:

1. Exhaustive and detailed analyses into the Ashta nāyikā or eight types of heroines and their states (avastha) in relation to their hero on a practical level.
2. Systematic practice of ashta nayikas by the students, with the aim of improving their capacities to enact various characters and situations.
3. To enable them to have a strong foundation in the basics and fundamentals of the art of expression.
4. To impart knowledge of advanced techniques of abhinaya of Odissi dance tradition.

Course Outcomes:

On completion of the course learners will be able to:

1. Perform and enact different situations pertaining to ashta nayikas and related characters leading to the realisation of the rasa.
2. To perform the dances that they have learned confidently and convincingly.
3. Will be efficiently able to further teach the dances and also understand the intricacies in choreographing such dances in future.
4. Comprehensive understanding of the dances they have learnt.

Course Contents:

UNIT	Description	Topics
1	Ashtanayika-1	1. Detailed and systematic approach to Vasakasajja, Virahokantita, Swadheenbhartruka
2	Ashtanayika-2	2. Detailed and systematic approach to Kalahantarita, Khandita, Vipralabdha
3	Ashtanayika-3	3. Detailed and systematic approach to Proshitabhartruka, Abhisarika
4	Singing and recitation	4. Practice for singing

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3060	Music 3- Dance Pieces Taught by Teachers	HC	0	0	2	2	4

Course Objectives:

- To make the students learn the concept of dance music and to enable them to learn it in the practical way.
- To enable them to understand the different ways of sing dance music
- Enable them to sing dance music with nattuvangam
- Enable them to sing in bavas.

Course Outcomes

- The students will be able to analyze the melakartha division of venkatamaki
- Students will be able to understand and sing the sahitya along with the swara
- Will be able to sing dance music with nattuvangam
- Will ne able to sing dance music with bavas

Course Content:

Course Content	Topics	Description
UNIT I	Dance Music	<ul style="list-style-type: none"> • Bhamakalapam part 2 • Tharangam
UNIT II	Dance Music	<ul style="list-style-type: none"> • Swarajati varnam
UNIT III	Dance Music	<ul style="list-style-type: none"> • Astapathi
UNIT IV	Dance Music	<ul style="list-style-type: none"> • javali

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3071	Classical Dance	OE	0	0	2	2	4

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3072	Music	OE	0	0	2	2	4

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA3073	Dramatics	OE	0	0	2	2	4

SEMESTER-IV

Course Outline: This is a 4 credit course designed to help the learner gain a deeper understanding of the sculptural representation of dance in ancient and medieval temples, which will be not only beneficial for his/her professional competence but also contribute towards his/her knowledge in the textual tradition, oral tradition in relation to.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4010	Music and Dance in Temples	HC	4	0	0	4	4

Course Objectives:

1. To help students to understand the socio-religious, spiritual and religious facets of Indian Dance traditions with respect to temples
2. To make students understand the influence of music and dance in temple Architecture.
3. To enable the students to understand the rich repository of temple dance sculptures.
4. To develop an understanding in the student regarding the linear continuity of tradition and to ensure a gradual development of research interest in the student.

Course Outcomes:

On completion of the course learners will be able to:

1. Speak clearly, confidently, comprehensibly and communicate with the world the evolutionary process of Indian dance and sculptural tradition.
2. Understand the various developmental stages of Indian temples and evolution of sculptural representation of dance
3. Clearly understand the aesthetics of both Marga and Desi traditions through temple sculptures.
4. Close association between the textual tradition, performance tradition, sculptural tradition and the spiritual and philosophical depths associated with it.

Course Content:

UNIT 1	Introduction	1. Evolutionary stages of Indian temples. 2. Dravida, Nagara, Vesara temples
UNIT 2	Music and dance in temple Architecture	Role and importance of dance sculptures in temple architecture

UNIT 3	Dance sculptures in ancient temples	1. Iconography 2. Representation of dance in ancient temples 2. Angika, Vacika, Aharya and Satvika as reflected in dance sculptures
UNIT 4	Medieval temples	1. Evolution of dance sculptures 2. Representation of dance in temples built till 17 th century

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4020	Dance Writing and Biographies	HC	4	0	0	4	4

CourseObjectives:

- To enable the dancers/artists of School of Performing Art to gain knowledge in the History and the Development of Dance and its legends in a detailed way.
- To be able to choreograph their own Dances including the right amount of technicalities and understanding them from the Sastra point of view.

CourseOutcomes:

On completion of the course learners will be able to:

- Speak clearly, confidently, comprehensively and communicate with the World the History and the aspects of the Dance and its legends.
- To be able to write and understand about the legendary personalities and their works.

CourseContents:

UNIT	DESCRIPTION	TOPICS
1	Dance Criticism	1. Criticism 2. Newspaper articles
2	Essay writing	3. Theoretical writing 4. Essay writing
3	Western ballet	5. Origin of western ballet 6. Development of western ballet 7. South Indian dance Dramas
4	Biographies	8. Biographies of legendary Gurus and Performers

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4031	Practical-10 (P10)- Kuchipudi Tharangam, Shabdham/Pravesh Dharu	SC	0	0	4	4	8

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of Tharangam
- To ensure that students learn the various Dances in the Kuchipudi repertoire.
- To enable the dancer to have a strong foundation in the knowledge of format of pravesha Dharus
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach in the choreography of Tharangam
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- A good understanding about the Pravesha dhurus of Kuchipudi.

Course Content:

Unit	Topics	Description	
1	Tharangam part 1	Tharangam	Direct method
2	Tharangam part 2	Thillana	Direct method
3	Shabdham/ pravesha Dharu	Shabdham/ pravesha Dharu	Direct method
4	Shabdham/ pravesha Dharu	Shabdham/ pravesha Dharu	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4032	Practical–10 (P10) Bharatanatyam Mallari, Daru Varnam and Kavadi Chindu/ Folk Dance	SC	0	0	4	4	8

CourseObjectives:

- Toenablethedancers/artistesofSchoolofPerformingArtshaveastrongfoundationinthe basicsandfundamentalsinthepracticalandperformingaspectsofthedanceformthatthey arespecializing.
- Toteach students the Dances indance and also the technical aspects oftheDanceswhich includetaalam,music,literatureandthespiritualandphilosophicaldepthsinit.

CourseOutcomes:

Oncompletionofthecourselearnerswillbeableto:

- PerformthefundamentalsandtheDanceshattheyhavelearned.
- WillbeabletofurtherteachtheDancesandalsounderstandtheintricaciesinchoreographing suchDancesinfuture.

CourseContents:

UNIT	Description	Topics
1	Mallari	1. Mallari
2	Daru Varnam Part 1	2. Daru Varnam–half
3	Daru Varnam Part 2	3. Daru Varnam–otherhalf
4	Kavadi chidu/ Folk Dance	4. Kavadi chidu/ Folk Dance

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4033	Practical–10 (P10)Mohiniyattam (Ashtapadi, keertanam)	SC	0	0	4	4	8

Objectives: The overall objective of the Course is as follows:

- To enable the dancer to understand the choreography patterns of ashtapadi and keertanam.
- To ensure that students learn the various Dances in the Mohiniyattam repertoire.
- To enable the dancer to have a strong understanding about the various styles in Mohiniyattam
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach in the choreography of Ashtapadi
- Perform the Dances that they have learned
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
- Have a few solid traditional Dances in their repertoire

Course Content:

Unit	Topics	Description	
1	Ashtapadi	Varnam Part 1	Direct method
2	Ashtapadi	Varnam Part 2	Direct method
3	Keertanam	Varnam Part 3	Direct method
4	Keertanam	Sloka	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4034	Practical–10 (P10) Odissi Vilahari Pallavi, Odiya/Kannada Abhinaya, Kali stuti	SC	0	0	4	4	8

Course Objectives:

1. To enable the dancers/artists of School of Performing Arts to have a strong foundation in the basics and fundamentals of Odissi dance tradition.
2. To impart greater knowledge on the usage of movement patterns, gestures and abhinaya effectively and convincingly.
3. Understand the spiritual and philosophical depth while using various hasta mudras and complex movements in nritya pieces
4. Systematic practice of the emotive aspect of Odissi by the dancers, with the aim of improving their capacities for producing this aesthetical experience in the viewers.
5. To enable the dancers/artists of School of Performing Arts to have a strong foundation in the basics and fundamentals of the art of expression.

Course Outcomes:

On completion of the course learners will be able to:

1. Perform dances convincingly, confidently and efficiently
2. Enact different situations leading to the realisation of the rasa.
3. Will be able to further teach the dances and also understand the intricacies in choreographing such dances in future.
4. Comprehensive understanding of the dances they have learnt.
5. Gain the knowledge of advanced techniques of this dance tradition.

Course Contents:

UNIT	Description	Topics
1	Kali Stuti	1. Dance in praise of Goddess Kali
2	Vilahari Pallavi	2. Create designs in space and time through nritya piece
3	Kannada Abhinaya	3. Abhinaya piece set to Kannada composition
4	Singing and recitation	4. Practice for singing and recitation of syllables

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./Wk.
M19PA4041	Practical– 11 (P11) Kuchipudi Taala and Nattuvangam	SC	0	0	4	4	4

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancers/artistes of School of Performing Arts have a strong foundation in the basics and fundamentals in the nattuvangam of the Kuchipudi.
- To teach students the Dances in dance and also the technical aspects of the Dances which include taalam, music.
- To enable the dancer to have a strong foundation in the knowledge of format of Nattuvangam playing.
- To teach the students to do nattuvangam for the Dances that they have learned in their syllabus.

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach Nattuvangam of Kuchipudi.
- Do nattuvangam for Kuchipudi performances
- Take this as their profession.
- Will be able to further teach the Nattuvangam and also understand the intricacies in Nattuvangam.

Course Content:

Unit	Topics	Description	
1	Basics of Nattuvangam	Introduction	Direct method
2	Tala Dasa pranas Sapta tala and tala table	Tala Dasa pranas Sapta tala and tala table	Direct method
3	Nattuvangam for Adavus and basic Dances	Nattuvangam for Adavus and basic Dances	Direct method
4	Nattuvangam for Tharangam ,thillana	Nattuvangam for Tharangam	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4042	Practical– 11 (P11) Bharatanatyam Taala and Nattuvangam	SC	0	0	4	4	4

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancers/artistes of School of Performing Arts have a strong foundation in the basics and fundamentals in the nattuvangam of the Bharatanatyam.
- To teach students the Dances in dance and also the technical aspects of the Dances which include taalam, music.
- To enable the dancer to have a strong foundation in the knowledge of format of Nattuvangam playing.
- To teach the students to do nattuvangam for the Dances that they have learned in their syllabus.

Course Outcomes:

On completion of the course learners will be able to:

- Understand the approach Nattuvangam of Bharatanatyam.
- Do nattuvangam for Bharatanatyam performances
- Take this as their profession.
- Will be able to further teach the Nattuvangam and also understand the intricacies in Nattuvangam.

Course content:

Unit	Topics	Description	
1	Basics of Nattuvangam	Introduction	Direct method
2	Tala Dasa pranas Sapta tala and tala table	Tala Dasa pranas Sapta tala and tala table	Direct method
3	Nattuvangam for Adavus and basic Dances	Nattuvangam for Adavus and basic Dances	Direct method
4	Nattuvangam for Varnam ,thillana	Nattuvangam for Varnam	Direct method

CourseCode	CourseTitle		L	T	P	C	Hrs./Wk.
M19PA4043	Practical– 11 (P11) Mohiniyattam Taala and Nattuvangam	SC	0	0	4	4	4

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancers/artistes of School of Performing Arts have a strong foundation in the basics and fundamentals in the nattuvangam of the Mohiniyattam.
- To teach students the Dances in dance and also the technical aspects of the Dances which include taalam, music.
- To enable the dancer to have a strong foundation in the knowledge of format of Nattuvangam playing.
- To teach the students to do nattuvangam for the Dances that they have learned in their syllabus.

Course Outcomes

On completion of the course learners will be able to:

- Understand the approach Nattuvangam of Mohiniyattam.
- Do nattuvangam for Mohiniyattam performances
- Take this as their profession.
- Will be able to further teach the Nattuvangam and also understand the intricacies in Nattuvangam.

Course Content:

Unit	Topics	Description	Method of Teaching
1	Basics of Nattuvangam	Introduction	Direct method
2	Tala Dasa pranas Sapta tala and tala table	Tala Dasa pranas Sapta tala and tala table	Direct method
3	Nattuvangam for Adavus and basic Dances	Nattuvangam for Adavus and basic Dances	Direct method
4	Nattuvangam for Varnam ,thillana	Nattuvangam for Varnam and thillana	Direct method

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4044	Practical– 11 (P11) Odissi Tala, Matra, Laya	SC	0	0	4	4	4

Course Objectives: The overall objective of the Course is as follows:

- To enable the dancers/artistes of School of Performing Arts have a strong foundation in the basics and fundamentals of the art of reciting the bols of Odissi.
- To impart knowledge regarding the dances they have learnt in earlier semesters with a focus on rhythmic aspect, singing and other technical elements.
- To enable the dancer to have a strong foundation in the knowledge of format of rhythmic structure.
- To teach the students to recite bols for the dances that they have learnt in their syllabus.

Course Outcomes

On completion of the course learners will be able to:

- Understand the approach to the recitation of bols of Odissi.
- Conduct Odissi performances by reciting the bols
- Construct and weave rhythmic patterns creatively with the complete understanding of the rhythm and syllables.
- Will be able to further teach the dances and also understand the intricacies of structuring a dance piece.

Course Content:

Unit	Topics	Description
1	Introduction	Basics of tala, matra and laya
2	Tala Dasa pranas	Tala Dasa pranas Sapta tala and tala table
3	Pakawaj and rhythmic instruments	Recitation of bols for chauka, tribhanga and other movements
4	Recitation	Recitation of bols and singing

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4050	Practical – 12 (P12) GROUPCHOREOGRAPHY	HC	0	0	4	4	8

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4060	FIELDTRIP&DISSERTTION	HC	0	0	6	6	4

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
M19PA4070	Music 4(Fundamentals of Carnatic Music)	HC	0	0	2	2	4

Course Objectives:

- To make the students learn the concept of dance music and to enable them to learn it in the practical way.
- To enable them to understand the different ways of sing dance music
- Enable them to sing dance music with nattuvangam
- Enable them to sing in bavas.

Course Outcomes:

- The students will be able to analyze the melakarta division of venkatamaki
- Students will be able to understand and sing the sahitya along with the swara
- Will be able to sing dance music with nattuvangam
- Will ne able to sing dance music with bavas

Course Content:

Unit	Topics	Description
UNIT I	Dance Music	<ul style="list-style-type: none">• Tarangam• Shabdham• Praveshadaru
UNIT II	Dance Music	<ul style="list-style-type: none">• Mallari• Dharu Varnam
UNIT III	Dance Music	<ul style="list-style-type: none">• Astapadi• Keerthanam
UNIT IV	Dance Music	<ul style="list-style-type: none">• Kavadichintu

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full- fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Performing Arts is knowledge in the subject, but also the skill to do the job proficiently, team spirit and a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including

interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career. The School of Performing Arts also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. The students during their day to day studies are made to practice these skill techniques as these are inbuilt in the course curriculum. Concerned teachers also continuously guide and monitor the progress of students.

The University has also established University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana.

The University has also signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

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