REVA UNIVERSITY
Bengaluru, India

School of CSA

Bachelor of Computer Applications (BCA)

HANDBOOK
2019-2020

Rukmini Knowledge Park
Kattigenahalli, Yelahanka, Bengaluru – 560064
www.reva.edu.in

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMPUTER SCIENCE AND APPLICATIONS

Bachelor of Computer Applications (BCA)

HANDBOOK

2019

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bangalore - 560 064
Phone No: +91-080-46966966, Mob: 90211 90211

Rukmini Educational
Charitable Trust

www.reva.edu.in

CONTENTS

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 BCA 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 applications. 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 BCA 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 BCA 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 administers, 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 applications, IT, business management and so on.

The curriculum caters to and has relevence to local, reginal, natinal 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 BCA in REVA University will enjoythe curriculum, teaching and learning environment, the vast infrastructure and the experienced teachers involvement and guidance. We will strive to provide all needed comfort andcongenial 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 27thFebruary, 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 Censor 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, Nana 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 VikasYojana. 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, EMC^2, 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 classeseveryday 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 stake-holders; 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

Bachelor of Computer Applications (BCA)

Programme Overview

Computer is not new in the context. Advent of computer dated back thousands of years. It may be the fact that computational instruments named differently. But basic human understanding were absolutely centralized on the scope of utilizing technology for making human led operations more and more swift and soft. Abacus was one of such instrument. Use of abacus in counting and other basic mathematical operations were evident even in ancient India. Advancement in the systematized information flow recorded only after advent of modern computer. It influenced the human life to a greater extent. It also entered all the fields of human society.

With the opening up of vast number of career options that stand in front of the students, computer applications is an attractive career choice for the students. Thousands of computer applications are launched every day and each of them has something better than its previous version. It follows the concept of continuous improvement and also offers the developers a large market place to showcase their innovations. This means better commercials involved for every computer application that is sold and hence it also means that large corporations and software firms look for people with a strong background in the computer applications. The better the skill, better are the employment opportunities and better is the pay. Not only this, business opportunities in the field of computer application are vast and do not need a huge financial investment but high level technical skills. A person can utilise his skill set to create a business according to his own industry and make a career out of it.

Computer applications have set a benchmark in terms of innovation and development making it an industry with constant growth and evolution. Technology is advancing at the speed of light and with the advent of bullet trains, super-fast connectivity and artificial intelligence, it has opened up several sub categories to be explored and worked on. This is one of the major factors which makes computer applications such a diverse and futuristic industry. The level of innovation that we see every day is constantly evolving the field and has opened a lot other doors for scope of advancement and innovation. One thought leads to a million ideas and computer application is giving life to these ideas

The BCA program of REVA University has been designed tocreate motivated, enthusiastic, and creative thinking graduates to fill the roles as computer algorithm developers, computer programmers, computer application developers, teachers, scientists, professionals and administrators.

Indian economy is experiencing an upward growth right from the beginning of 21st century except for a short stint during the mid of present decade necessitating well qualified science graduates to work as teachers, scientists, professionals and often administrators. At present more than 400 million youth are below 18 years of age and government is committed to increase the GER to 30% by 2020. The proposed BCA programme designed will act as a foundation and first degree to prepare computer programmers, software developers for various applications, teachers, scientists, professionals and administrators to meet the challenges of growing economy as well as to fulfill the growing aspirations of the youth.

The BCA programme at REVA University has been developed after a careful study of regional national and international market involving experts from premier institutions, universities industries and established business firms. The curriculum is outcome based and it imbibes 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. In addition, students are trained in communication skills and interdisciplinary topics 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 industry and research organizations makes this programme unique.

Programme Educational Objectives (PEOs)

The BCA programme is a foundation degree and helps to develop critical, analytical and problem solving skills at first level in computer applications. This foundation degree makes the graduates employable in IT industries, scientific organisations and also to assume administrative positions in various types of organisations. Further acquisition of higher level degrees help the graduates to pursue a career in academics or scientific organisations as a researchers and teacher in higher education institutions.

The Programme Educational Objectives are to prepare the students to:

PEO-1	Be skilled Computer Application Developers, Algorithm developers, Computer Programmers and to operate various commercial software tools to solve scientific and business problems
PEO-2	Adopt lifelong learning philosophy for continuous improvement and acquire higher degrees to act as scientists in research establishments or business administrators or act as administrators in public, private and government organisations.
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
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

Program Outcomes (POs)

PO 1: Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of computer science with specialization in computer Applications that form a part of under graduate programme BCA-Bachelor of Computer Applications.

PO 2: Scientific reasoning: Ability to analyze, and understand concepts in computer science, critically evaluate ideas, logical reasoning and experiences in programming, algorithm development and application development.

PO 3: Problem solving: Capacity to extrapolate and apply competencies to solve different kinds of non-familiar problems, such as design Algorithms, develop computer programs for specific applications and operate commercially available software tools for solving scientific and business related 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 Applications**.

PO 5: Research-related skills: Ability to recognize cause-and-effect relationships, define problems, analyze, interpret and draw conclusions from data.

PO 6: Ethics: Conduct as a responsible citizen by recognizing different value systems and understand the **moral dimensions** of decisions, and **accept responsibility** 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. Assimilate technological expertise with practical skills in various fields of computer applications.
2. Use existing algorithms to develop software applications and operate on various software tools for solving scientific and business problems.
3. Provide computer based solutions for real time problems through software applications.

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF COMPUTER SCIENCE AND APPLICATIONS

Bachelor of Computer Applications (BCA) Program
Scheme of Instruction and Detailed Syllabus - 2018 Batch

FIRST SEMESTER

Sl. No	Code	Title	HC/SC/FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1.	B18CA1011	Language –I: Kannada	FC	2	1	0	3	4
	B18CA1012	Language –I: Hindi	FC					
	B18CA1013	Language –I: Additional English	FC					
2.	B18CA1020	Communicative English – I	FC	2	1	0	3	4
3.	B18CA1030	Basic Mathematics	HC	4	0	0	4	4
4.	B18CA1040	Digital Logic and Computer Architecture	HC	2	1	0	3	4
5.	B18CA1050	Problem solving using C	HC	2	1	0	3	4
6.	B18CA1060	Environmental Studies	FC	2	0	0	2	2
Practical Courses								
7.	B18CA1070	C Programming Lab	HC	0	0	2	2	4
8.	B18CA1080	Digital Logic Lab	HC	0	0	2	2	4
Total				**14**	**4**	**4**	**22**	**30**

SECOND SEMESTER

Sl. No	Code	Title	HC/SC/FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1.	B18CA2011	Language –II: Kannada	FC	2	1	0	3	4
	B18CA2012	Language –II: Hindi	FC					
	B18CA2013	Language –II: Additional English	FC					
2.	B18CA2020	Communicative English – II	FC	2	1	0	3	4
3.	B18CA2030	Probability and Statistics	HC	4	0	0	4	4
4.	B18CA2040	Data Structures using C	HC	2	1	0	3	4
5.	B18CA2050	Object Oriented Programming using C++	HC	2	1	0	3	4
6.	B18CA2060	Indian Constitution & Professional Ethics	FC	2	0	0	2	2
7.	B18CA2070	Sports/Yoga/Music/Dance/Theatre	RULO	0	0	2	2	4
Practical Courses								
8.	B18CA2080	Data Structures Lab	HC	0	0	2	2	4
9.	B18CA2090	C++ Programming Lab	HC	0	0	2	2	4
Total				**14**	**4**	**6**	**24**	**32**

THIRD SEMESTER

Sl. No	Code	Title	HC /SC /FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1.	B18CA3010	Design & Analysis of Algorithms	HC	4	0	0	4	4
2.	B18CA3020	Computer Networks	HC	4	0	0	4	4
3.	B18CA3030	Java Programming	HC	2	1	0	3	4
4.	B18CA3040	Relational Database Management System	HC	2	1	0	3	4
5.	B18CA3050	System Software	HC	4	0	0	4	4
6.	B18CA3061	E-Commerce	SC	2	0	1	3	4
	B18CA3062	Principles of Accountancy						
	B18CA3063	Enterprise Resource Planning						
7.	B18CA3070	Soft Skills Training	RULO	2	0	0	2	2
Practical Courses								
8.	B18CA3080	Java programming Lab	HC	0	0	2	2	4
9.	B18CA3090	RDBMS Lab	HC	0	0	2	2	4
Total				**20**	**2**	**5**	**27**	**34**

FOURTH SEMESTER

Sl. No	Code	Title	HC/SC/FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1.	B18CA4010	Data Mining & Data Warehousing	HC	4	0	0	4	4
2.	B18CA4020	Software Engineering	HC	4	0	0	4	4
3.	B18CA4030	Operating Systems with Linux	HC	2	1	0	3	4
4.	B18CA4040	Python Programming	HC	2	1	0	3	4
5.	B18CA4051	Mobile Computing	SC	2	1	0	3	4
	B18CA4052	Computer Graphics						
	B18CA4053	Artificial Intelligence						
6.	B18CA4061	Cloud Computing	SC	2	1	0	3	4
	B18CA4062	Advanced Computer Networks						
	B18CA4063	Software Project Management						
7.	B18CA4070	Soft Skills Training	RULO	2	0	0	2	2
Practical Courses								
8.	B18CA4080	Linux Lab	HC	0	0	2	2	4
9.	B18CA4090	Python Programming Lab	HC	0	0	2	2	4
Total				**18**	**4**	**4**	**26**	**34**

FIFTH SEMESTER

Sl. No	Code	Title	HC/SC/FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1.	B18CA5010	OOAD Using UML	HC	4	0	0	4	4
2.	B18CA5020	.NET Programming using C#	HC	2	1	0	3	4
3.	B18CA5030	Web Technology	HC	2	1	0	3	4
4.	B18CA5041	Mobile App Development	SC	2	0	1	3	4
	B18CA5042	Computer Animation						
	B18CA5043	Machine Learning						
5.	B18CA5051	Software Testing & Quality Assurance	SC	2	1	0	3	4
	B18CA5052	Network Administration						
	B18CA5053	Cyber Security						
6.	B18CA5060	**Open Elective** - Fundamentals of Computer Programming & Office Automation	**OE**	**4**	**0**	**0**	**4**	**4**
7.	B18CA5070	Soft Skills Training	RULO	2	0	0	2	2
Practical Courses								
8.	B18CA5080	.NET Programming Lab	HC	0	0	2	2	4
9.	B18CA5090	Web Technology Lab	HC	0	0	2	2	4
Total				**18**	**3**	**5**	**26**	**34**

SIXTH SEMESTER

Sl. No	Code	Title	HC/SC/FC	Credit Pattern			Credits	Working Hrs
				L	T	P		
1	B18CA6011	Data Analytics using R	SC	2	0	1	3	4
	B18CA6012	Advanced Web Technologies						
2	B18CA6021	Internet Of Things	SC	2	1	0	3	4
	B18CA6022	Digital Marketing						
3	B18CA6030	Skill Development Program	RULO	2	0	0	2	2
4.	B18CA6040	MOOC/ Swayam	RULO	2	0	0	2	2
5.	B18CA6050	Project Work	HC	0	3	6	9	18
Total				**8**	**4**	**7**	**19**	**30**

CREDIT SUMMARY

Semester	Credits
First	22
Second	24
Third	27
Fourth	26
Fifth	26
Sixth	19
Total	**144**

Bachelor of Computer Applications (BCA) Program

Detailed Syllabus
(Effective from the Academic Year 2018-19)

FIRST SEMESTER

B18CA1011	KANNADA- I (Language)	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Outline:
ಭಾಷೆಯನ್ನು ಮಾತನಾಡುವ ಬರೆಯುವ ಕೌಶಲ್ಯ, ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸ್ಥೂಲವಾಗಿ ಪರಿಚಯಿಸುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸ ಹಾಗು 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 ಹಾಗು ನಾಟಕ ಸಾಹಿತ್ಯವನ್ನು ಪಠ್ಯವನ್ನಾಗಿ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡು, ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸದಭಿರುಚಿಯನ್ನು ಮೂಡಿಸಲಾಗುತ್ತದೆ. ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯ ಜೊತೆಗೆ ವ್ಯಕ್ತಿತ್ವ ವಿಕಸನದ 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.

Learning Outcomes:
ಜನಪದ, ಪ್ರಾಚೀನ, ಮಧ್ಯಕಾಲೀನದ ವಿವಿಧ ಪ್ರಕಾರದ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ಸಣ್ಣಕಥೆಗಳು ಹಾಗು ನಾಟಕ ಸಾಹಿತ್ಯ ಕಲಿಕೆಯ ಮೂಲಕ ಕಾಲದ ಸ್ಥಿತ್ಯಂತರಗಳನ್ನು ಅದರ ಒಳನೋಟಗಳನ್ನು ಬೆಳೆಸುತ್ತದೆ.

- ಸಾಮಾಜಿಕ, ರಾಜಕೀಯ, ಧಾರ್ಮಿಕ, ಸಾಂಸ್ಕೃತಿಕ ಹಾಗೂ ಲಿಂಗಸಂಬಂಧಿ ವಿಚಾರಗಳೆಡೆ ಗಮನ ಹರಿಸುವುದರೊಂದಿಗೆ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಚರ್ಚಾ ಮನೋಭಾವವು ಬೆಳೆಯುತ್ತದೆ.
- ಜೀವನದಲ್ಲಿ ಬರುವ ಅಭಿಪ್ರಾಯ ಬೇಧಗಳು, ಸಮಸ್ಯೆಗಳನ್ನು ಆಧುನಿಕ ಸಂದರ್ಭದಲ್ಲಿ ಮಾನವೀಯತೆಯೊಂದಿಗೆ ನಿರ್ವಹಿಸುವಂತೆ ಪ್ರೇರೇಪಿಸುತ್ತದೆ.
- ಉತ್ತಮ ಸಂವಹನ ಕಲೆಯನ್ನು ಬೆಳೆಸುವ ಉದ್ದೇಶವನ್ನು ಈಡೇರಿಸುತ್ತದೆ.

RU/BOS/A&H/KAN/MAR 2017

COURSE CONTENT/ SYLLABUS

Unit	Description	Evaluation Pattern	Topics		Teaching Hours
I	ಜನಪದ/ಪ್ರಾಚೀನ/ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯ	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	1. ಕೆರೆಗೆ ಹಾರ 2. ನಳಕೂಬರನ ಪ್ರಸಂಗ 3. ವಚನಗಳು 4. ಇಳೆಯಾಂಡ ಗುಡಿಮಾರನ ರಗಳೆ	ಜನಪದ ಗೀತೆ ನಾಗಚಂದ್ರ ಬಸವಣ್ಣ ಹರಿಹರ	**12 Hours**
II	ಮಧ್ಯಕಾಲೀನ ಕಾವ್ಯ	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	5. ಸೀತಾ ಪರಿತ್ಯಾಗ 6. ಕೌರವೇಂದ್ರನ ಪಡೆಗೆ ಹಬ್ಬವ ಮಾಡುವೆನು 7. ಕುಲ ಕುಲವೆಂದು 8. ತತ್ವ ಪದ	ಲಕ್ಷ್ಮೀಶ ಕುಮಾರವ್ಯಾಸ ಕನಕದಾಸರು ಶಿಶುನಾಳ ಶರೀಫ	
III	ಸಣ್ಣ ಕಥೆಗಳು	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	9. ಸಲ್ಲಾಪ 10. ವೆಂಕಟಶಾಮಿಯ ಪ್ರಣಯ 11. ನಾಲ್ಕು ಮೊಳ ಭೂಮಿ 12. ಸಂಬಂಧ	ಮುದ್ದಣ್ಣ ಮಾಸ್ತಿ ಚದುರಂಗ ಶ್ರೀ ಕೃಷ್ಣ ಆಲನಹಳ್ಳಿ	**12 Hours**
IV	ನಾಟಕ	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	13. ಜಲಗಾರ	ಕುವೆಂಪು	**12 Hours**

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. ನಾರಾಯಣ ಪಿ.ವಿ, ಚಂಪೂ ಕವಿಗಳು, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
6. ಕಾಳೇಗೌಡ ನಾಗವಾರ, ತ್ರಿಪದಿ, ರಗಳೆ ಮತ್ತು ಜಾನಪದ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
7. ಸಂ. ವೆನಗಲ್ ರಾಮ ರಾವ್ ಮತ್ತು ಪಾನ್ಯಂ ಸುಂದರ ಶಾಸ್ತ್ರೀ, ಪುರಾಣ ನಾಮ ಚೂಡಾಮಣಿ, ಪ್ರಕಾಶಕರು ಪ್ರಸಾರಾಂಗ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ. 2010
8. ಡಾ. ಚಿದಾನಂದ ಮೂರ್ತಿ, ವಚನ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013

RU/BOS/A&H/KAN/MAR 2017

9. ಸಂ ಮರುಳಸಿದ್ದಪ್ಪ ಕೆ, ನಾಗರಾಜ ಕಿ.ರಂ. ವಚನ ಕಮ್ಮಟ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2016
10. ಮರುಳಸಿದ್ದಪ್ಪ ಕೆ, ಷಟ್ಪದಿ ಸಾಹಿತ್ಯ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2010
11. ಸಂ. ಸೇತುರಾಮ ರಾವ್ ಅ.ರಾ., ಶ್ರೀ ಲಕ್ಷ್ಮೀಶನ ಜೈಮಿನಿ ಭಾರತ(ಮೂಲ–ತಾತ್ಪರ್ಯ–ಸಚಿತ್ರ), ಪ್ರಕಾಶಕರು ಕಾಮಧೇನು ಪುಸ್ತಕ ಭವನ, ಬೆಂಗಳೂರು. 2010
12. ಸಂ. ಸೇತುರಾಮ ರಾವ್ ಅ.ರಾ., ಶಿಶುನಾಳ ಶರೀಫರ ನೂರಾರು ತತ್ವಪದಗಳು, ಪ್ರಕಾಶಕರು ಕಾಮಧೇನು ಪುಸ್ತಕ ಭವನ, ಬೆಂಗಳೂರು. 2007
13. ಸಂ. ಜಿ.ಎಸ್.ಭಟ್., ಕುಮಾರವ್ಯಾಸನ ಕರ್ಣಾಟ ಭಾರತ ಕಥಾಮಂಜರಿ ಪ್ರವೇಶ, ಪ್ರಕಾಶಕರು ಅಕ್ಷರ ಪ್ರಕಾಶನ, ಹೆಗ್ಗೋಡು, ಸಾಗರ. 2006
14. ರಂಜಾನ್ ದರ್ಗಾ, ಶರಣರ ಸಮಗ್ರ ಕ್ರಾಂತಿ, ಪ್ರಕಾಶಕರು. ಲೋಹಿಯಾ ಪ್ರಕಾಶನ, ಬಳ್ಳಾರಿ. 2015
15. ಕೀರ್ತನಾಥ ಕುರ್ತಕೋಟಿ, ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ, ಪ್ರಕಾಶಕರು ಕುರ್ತಕೋಟಿ ಮೆಮೋರಿಯಲ್ ಟ್ರಸ್ಟ್, ಧಾರವಾಡ. 2009
16. ಶಾಮರಾಯ ತ.ಸು., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ತಳುಕಿನ ವೆಂಕಣ್ಣಯ್ಯ ಸ್ಮಾರಕ ಗ್ರಂಥಮಾಲೆ, ಮೈಸೂರು –2014
17. ಶಿವರುದ್ರಪ್ಪ ಜಿ.ಎಸ್. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಮೀಕ್ಷೆ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013

B18CA1012	HINDI-I (Language)	L	T	P	C
Duration:60 Hours		2	1	0	3

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 समझाने 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 पद्दतियाँ एवं विचारधाराओं का व्याख्यान करने में सक्षम बन सकता है |

अध्ययन विषय सूची / पाठ्यक्रम

इकाई – I: कहानी, एकांकी **अध्यापन अवधियाँ :** 12 hrs.

1. कहानी – मनोवृत्ति – प्रेमचंद
2. कहानी – जिजीविषा – अज्ञेय
3. एकांकी – अंधेर नगरी – भारतेंदु हरिश्चन्द्र

इकाई – II: कहानी, व्यंग्य रचना **अध्यापन अवधियाँ :** 12 hrs.

4. कहानी –उपहार – मोपासा
5. व्यंग्य रचना - सदाचार का तावीज – हरिशंकर परसाई

इकाई – III: कहानी, संस्मरण **अध्यापन अवधियाँ :** 12 hrs.

6. कहानी – तीसरी बेटी के नाम – सुधा अरोड़ा
7. कहानी - धूप का एक टुकड़ा - निर्मल वर्मा
8. संस्मरण- प्रसाद :जैसा मैंने पाया - अमृतलाल नागर

इकाई – IV: अनुवाद, निबंध **अध्यापन अवधियाँ :** 12 hrs.

अनुवाद : अंग्रेज़ी – हिन्दी
निबंध: भारत की वैज्ञानिक प्रगति,कंप्यूटर: आज की आवश्यकता , स्वच्छ भारत अभियान,पर्यावरण- संरक्षण |

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

B18CA1013	ADDITIONAL ENGLISH – I (Language)	L	T	P	C
Duration:60Hours		2	1	0	3

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:

- To equip students with the ability to acquire the functional use of language in context.
- To motivate the students to explore and critique issues related to society and Ethics.
- 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 shall 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 Contents:

Unit	Description	Topics	Teaching Hours
I	**Values & Ethics**	**Literature:** Rabindranath Tagore - Where the Mind is Without Fear	**12 Hours**

		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	
II	**Natural & Supernatural**	**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	**12 Hours**
III	**Travel & Adventure**	**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	**12 Hours**
IV	**Success Stories**	**Literature:** Emily Dickinson – Success is Counted Sweetest Rupert Brooke – Success Dr. Martin Luther King - I Have a Dream	**12 Hours**

		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.

B18CA1020	COMMUNICATIVE ENGLISH – I	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- To attune young minds to concerns and issues which have a broad and wide scope of use and application to life.
- To acquire a functional use of language in context.
- To equip students to deliver formal and informal oral presentations to a variety of audiences in multiple contexts
- To enable students to construct effective written message in various formats and styles.
- To inculcate the habit of reading and writing leading to effective and efficient communication.

Course Outcomes:

On completion of the course, learners shall be able to:

- Demonstrate ethical and political responsibilities in taking cognizance of issues relating to society, environment and media.
- Develop a process oriented approach to writing.
- Make use of grammatical skills developed during the course aptly.
- Utilize the target language effectively to focus on interpersonal skills and develop a good command over the language.

Course Contents:

Unit	Description	Topics	Teaching Hours
I	**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	**12 Hours**

II	**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	**12 Hours**
III	**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	**12 Hours**
IV	**Communication Skills**	**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: 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.

B18CA1030	BASIC MATHEMATICS	L	T	P	C
Duration:60 Hours		4	0	0	4

Course Obiectives:

- Impart students with an understanding of matrices and determinants, differential calculus, vectors, set theory and functions
- Enable them to work on problems relative any aspect of matrices, determinants etc
- Equip students to solve given problems using set theory concepts.

Course Outcomes:

On completion of the course, learners shall be able to:

- Compute with the characteristic polynomial, eigenvectors and eigenvalues as well as the algebraic multiplicities of an eigenvalue and solve systems of linear equations by use of the matrix
- Recognize, apply and interpret multiple representations differentiate among diverse cultures through the history of mathematics and solve applied problems by using differentiation
- Represent vectors analytically and geometrically, and compute dot and cross products for presentations of lines and planes, critical thinking to arrive at conclusions from Venn Diagrams, syllogistic forms and prove elementary results involving sets
- Demonstrate the ability to apply analytical and theoretical skills to model and solve mathematical problems.

Course Content:

UNIT I **15 Hours**

Matrices and Determinants: Matrices-Definition, types of matrices, addition, subtraction, scalar multiplication and multiplication of matrices. Determinants: Definition, properties of determinants, minors, cofactors, Adjoint of a matrix, Cayley Hamilton theorem(without proof), Eigen values and Eigen vectors, inverse of a matrix using Cayley Hamilton simultaneous equations using Cramer's rule and matrix inversion method.

UNIT II **15 Hours**

Differential Calculus: Limits and continuity: Introduction-Real valued functions- limit of a function, algebra of limits, continuity of a function and points of discontinuity. Differentiation: Derivatives, algebra of derivatives, chain rule, derivatives of composite function, logarithmic and exponential differentiation, and successive differentiation (second order).

UNIT III **15 Hours**

Vectors: Definition of a vector and scalar, vector addition, dot and cross product, projection of a vector, area of parallelogram, area of triangle, scalar triple product, volume of a parallelepiped, co-planarity of three vectors, vector triple product.

UNIT IV **15 Hours**

Set Theory: Introduction, definition and concepts, representation of sets, finite sets, infinite sets, set operators- union, intersection differences, symmetric differences, complement, Cartesian products - basic set identities, de-morgan's law, cardinality, and results related to all set operators. Relations, types of relations, equivalence relation, equivalence classes, partition of a set, matrix representation of binary relation. Functions: onto, one-one, into, inverse functions, composition of a functions and inverse of compositions.

Text Books:

1. Grimaldi, Ralph P, "Discrete and Combinational Mathematics", Pearson Education, Singapore, 2003.
2. Rao, G. Shanker, "Mathematics for Computer Science", Kalyani Publishers, New Delhi, 1999.
3. Thomas and Finney, "Calculus with Analytical Geometry", Narosa Publishing House, 6th edition, 1998.
4. S Narayan and T K Manicavachogam Pillai, "Calculus"- Vol I and Vol II, S.V.Publishers, 2009 Edition.

Reference Book:

1. K.D. Joshi : "Foundations of Discrete Mathematics", 1989 edition, Wiley Eastern Ltd.,

B18CA1040	DIGITAL LOGIC AND COMPUTER ARCHITECTURE	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- Enable students to acquire basic knowledge of digital logic levels and application of
- Impart knowledge of understanding digital electronics circuits.
- Equip with the skill of performing analysis and design of various digital electronic circuits.

Course Outcomes:

On completion of the course, learners shall be able to:

- Understand and explain the fundamental concepts, techniques used in Digital electronics and examine the structure of various number systems and it's Application in digital design.
- Comprehend the basic gates, define and design the digital logic circuits.
- Analyze and design various combinational and sequential Logic Circuits.
- Identify and demonstrate the basic operational concepts of computer system.

Course Contents:

UNIT I **15 Hours**

Introduction to Digital Electronics, Number systems, Operations and codes: What is Digital circuit, where are digital circuits are used, why use digital circuits. Decimal numbers, Binary numbers, Decimal-to-Binary conversion, Binary Arithmetic, 1's and 2's Complements of Binary Numbers, signed numbers, Arithmetic operations with signed numbers, Hexadecimal Numbers, Octal numbers, Binary Coded Decimal(BCD), Digital Codes.

UNIT II **15 Hours**

Logic Gates, Boolean Algebra and Logic Simplification: The Inverter, the AND Gate, the OR gate, the NAND Gate, the NOR Gate, the Exclusive-OR and Exclusive-NOR Gates, Basics of Digital Integrated Circuits.Boolean Operations and Expressions, Laws and Rules of Boolean Algebra, DE Morgan's Theorems, Boolean Analysis of Logic Circuits, Simplification Using Boolean Algebra, Standard Forms of Boolean Expressions, Boolean Expressions and Truth Tables, The Karnaugh Map, karnaugh Map SOP Minimization, POS Minimization.

UNIT III **15 Hours**

Combinational Logic, Sequential Logic, Registers: Combinational Logic: Introduction, Design Procedure, Adders, sub tractors. Sequential Logic: Introduction, Flip-Flops. Registers: Introduction, Registers, and Shift Registers.

UNIT IV **15 Hours**

Basic Structure of Computers and the Memory System: Computer types, Functional Units, Basic Operational Concepts, Bus Structures, and Performance. Some Basic Concepts, Semiconductor RAM Memories and Read-Only Memories.

Text Books:

1. Tokheim "Digital Electronics Principles and Applications", 6th Edition, McGraw-Hill, 2014. Chapter 1 (1.1, 1.2, 1.3).
2. Thomos L. Floyd, "Digital Fundamentals", Tenth Edition, Pearson, 2015.Chapters (2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10 and 2.11), Chapters (3.1 to 3.7) and (4.1 to 4.9).
3. M. Morris Mano " Digital Logic and Computer Design", Pearson, 2013. Chapters (4.1 to 4.4, 6.1 to 6.2 and 7.1 to 7.3).

4. Hamacher, Vranesic and Zaky, “Computer Organization”, Fifth Edition, Tata Mcgraw-Hill, 2015.Chapters (1.1, 1.2, 1.3, 1.4 and 1.6), Chapters (5.1 to 5.3)

Reference Books:

1. Digital Electronics: An Introduction To Theory And Practice By William Gothman, Second Edition, PHI Publisher, 2015.
2. Digital Electronics by John Morris, Fifth Edition, 2016.
3. Fundamentals of Digital Circuits by Anand Kumar, Fourth Edition, 2014.
4. Digital Electronics Principles And Integrated Circuits by Anil K. Maini, second Edition, 2013.
5. Computer Organization and Design by David A. Patterson, John L. Hennessy, Fifth Edition, Morgan Kaufmann.

B18CA1050	PROBLEM SOLVING USING C	L	T	P	C
Duration: 60 Hours		2	1	0	3

Course Objectives:

- Explain the basic programming concepts.
- Illustrate the importance of Algorithm to write the Program (in small steps).
- Describe how a good program design can reduce coding and debugging time.
- Explain the concepts of Files for application data maintenance
- Equip with detailed understanding of control statements, function and arrays.
- Illustrate the use of pointers and Strings.

Course Outcomes:

On completion of the course, learners shall be able to:

- Design Algorithms and Flowcharts to solve real world problems.
- List various data types and operators and develop programs to evaluate arithmetic Expressions and mathematical functions.
- Identify the suitable control statements and implement the solution for any problem.
- Design programs to handle list of data and strings using arrays.
- Apply the categories of user defined functions to implement the concept of modularity also implement program using Structures and Unions.
- Explore pointers in implementing programs, especially in memory management and file handling.
-

Course Contents:

UNIT I **15 Hours**

Computer Problem-Solving& Fundamental Algorithms: Computer Basics, Introduction To Computer Problem-Solving, Fundamental Algorithms: Introduction, Exchanging the Values of Two variables, Counting, Summation of a Set of Numbers, Factorial Computation, Generation of the Fibonacci Sequence.

Basics Of C Programming: Overview of C: History of C, Importance of C, Basic Structure of C Programs, Constants, Variables and Data Types-: Introduction, Character Set, C Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Declaration of Storage Class, Assigning Values to Variables .

UNIT II **15 Hours**

Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators. **Structured Constructs:** Decision Making and Branching, Decision Making and Looping.

UNIT III **15 Hours**

Arrays & Functions: Arrays: Introduction, One-Dimensional Arrays, Initialization of One-Dimensional Arrays, Two Dimensional Arrays, Initializing Two Dimensional Arrays, Multi Dimensional Arrays, Character Arrays and Strings: Introduction, Declaring and Initializing String Variables, Reading Strings from Screen, Writing Strings to Screen, String-Handling Functions.

User-Defined Functions: Introduction, Need for User defined Functions-Elements of User defined Functions, Definition of Functions, Return Values and their types, Function Calls, Function Declaration, Category of Functions, No arguments and No return values, Arguments but No return values, Arguments with return values, No arguments but returns a value, Recursion.

UNIT IV **15 Hours**

User Defined Data Types: Structures and Unions :Introduction, Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Copying and Comparing Structure Variables, Operations on Individual Members, Arrays of Structures, Arrays with Structures, Structures within Structures, Unions. Introduction to Pointers: Introduction and Understanding pointers, Accessing the address of a variable, Declaring pointer variables, Initialization of pointer variables, Accessing a variable through its pointer. File Management in C: Introduction, Defining and Opening a File, Closing a File, Input/ Output Operations on Files

Text Books:

1. V. Rajaraman, NeeharikaAdabala, "Fundamentals of Computers", 6th Edition, PHI, 2015. (Chapter 1)
2. R.F Dromey, "How to Solve it by Computer" Pearson, Fourteenth Impression, 2013. (Chapter 1 & 2)
3. E. Balaguruswamy, "Programming in ANSI C", 3rd edition, McGraw Hill Education, 2006.

(Chapter 1 to 12).

Reference Books:

1. Mahapatra, "Thinking in C", PHI Publications, 1998.
2. YashwantKanetkar, "Let Us C", 13th Edition, PHP, 2013.
3. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education, 6th Impression, 2009.
4. Anami, Angadi, and Manvi, "Computer Concepts and C Programming – A Holistic approach", PHI -2008.

B18CA1060	ENVIRONMENTAL STUDIES	L	T	P	C
Duration: 60 Hours		2	0	0	2

Course Objectives:

- To familiarize students with environmental issues as how to conserve, preserve and protect our Environment.

Course Outcomes:

On completion of this course the students shall be able to:

- Analyze the environmental conditions and protect it.
- Observe the role of individual, government and NGO in environmental protection.
- Search for new renewable energy resources with high efficiency through active research.
- Analyze the ecological imbalances and protect it.
- List the causes of environmental pollution & find ways to overcome them.
- Design pollution controlled products.

Course Content:

UNIT I **10 Hours**

Introduction: Multidisciplinary nature of environmental studies – Definition -Scope and importance-Need for public awareness.

UNIT II **15 Hours**

Natural Resources: Renewable and non-renewable -Problems associated - Forest resources-Water resources-Mineral resources-Food resources-Energy resources-Land resources and their conservation.

UNIT III **15 Hours**

Environmental Pollution: Definition- Causes - Effects and control measures of air - Water-Soil-Marine-Noise-Thermal -Nuclear pollutions -Solid waste management-Prevention of pollution.

UNIT IV **20 Hours**

Social Issues and the Environment: Unsustainable to sustainable development, Environmental ethics, Climate changes, global warming, Wildlife protection act, Public awareness,- Human Population and the Environment- Population growth - Population explosion - Human rights - Value education - Role of information technology in environment and human health - HIV/Aids -Women and child welfare.

Text Books:

1. Desai R.G, "Environmental studies", Himalaya Pub. House.
2. Agarwal, K.C, "Environmental Biology", Nidi Publ. Ltd. Bikaner, 2001.
3. Bharucha Erach, "The Biodiversity of India", Mapin Publishing Pvt. Ltd.,
4. Jadhav, H & Bhosale V.M., "Environmental Protection and Laws", Himalaya Pub. House, Delhi. 1995
5. Rao M N. & Datta, A.K., "Waste Water treatment", Oxford & IBH Publ. 1987.

B18CA1070	C PROGRAMMING LAB	L	T	P	C
Duration:30 Hours		0	0	2	2

Course Objectives:

- Advance structured and procedural programming understating and to improve C programming Skills.
- Provide students with understanding of code organization and functional hierarchical decomposition with using complex data types

Course Outcomes:

- Understanding a functional hierarchical code organization.
- Define and manage data structures based on problem subject domain.
- Use textual information, characters and strings.
- Work with arrays of complex objects.
- Illustrate the concept of object thinking within the framework of functional model and functional hierarchical code organization.
- Identify and troubleshoot the possible errors during program execution.

Course Contents:

PART –A

1. Write a C program to exchange the values of two variables.
2. Write a C program to check whether the given integer is odd or even.
3. Write a C program to find the largest of three numbers.
4. Write a C program to find the area of a circle.
5. Write a C program to simulate a simple calculator using switch case statement.
6. Write a C program to compute the factorial of a number.
7. Write a C program to find the sum of 'N' natural numbers.
8. Write a C program to generate and display the first 'N' Fibonacci numbers.

PART-B

1. Write a C program to solve the roots of quadratic equation.
2. Write a C program to reverse a given integer.
3. Write a C program to sort 'N' numbers.
4. Write a C program to search a given number from an array.
5. Write a C program to add two numbers using function.
6. Write a C program to define a structure 'STUDENT'. Also read and display 'N' student details.
7. Write a C Program to read and write character using file.

B18CA1080	DIGITAL LOGIC LAB	L	T	P	C
Duration: 30 Hours		0	0	2	2

Course Objectives:

1. Acquire the basic knowledge of digital logic levels and application of
2. Impart the knowledge to understand digital electronics circuits.
3. Perform the analysis and design of various digital electronic circuits.

Course Outcomes:

1. Perform conversions among different number systems, became familiar with basic logic gates.
2. Use Boolean algebra and simplify simple Boolean functions by using basic Boolean properties.

3. Design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.
4. Illustrate the design of sequential Circuits such as Flip-Flops, Registers, and Counters.
5. Perform the analysis and design of Complex Digital Electronic Circuits.

Course Content:

PART – A

1. Study of Logic Gates–AND, OR, NOT, NAND, NOR, XOR (Using respective ICs)
2. Realization of AND, OR and NOT gates using Universal Gates.
3. Design and Realization of Half Adder / Sub tractor using NAND Gates.
4. Design and Realization of Full Adder using Logic Gates.
5. Design and Realization of 4 bit Adder / Sub tractor using IC 7483.
6. Design and Realization of BCD Adder using IC 7483.
7. Realizations of J-K flip flop using IC 7400 and 7410.
8. Realization of T and D flip flop using IC 7476.
9. Implementation of PIPO Shift Registers using flip flops. (IC 7476).
10. Design and implementation of odd and even parity checker Generator using IC 74180.

PART – B

1. PC Hardware lab - Components of PC, Assembling and installation.
2. Install and configure nfs server
3. Configure nfs client and work on mount points
4. Work on Linux desktop interface
5. Configure DNS server
6. Install and configure web server

SECOND SEMESTER

B18CA2011	KANNADA – II (Language)	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Outline:
ಭಾಷೆಯನ್ನು ಮಾತನಾಡುವ ಬರೆಯುವ ಕೌಶಲ್ಯ, ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸ್ಥೂಲವಾಗಿ ಪರಿಚಯಿಸುವ ಮೂಲಕ ವಿದ್ಯಾರ್ಥಿಗಳ ವ್ಯಕ್ತಿತ್ವ ವಿಕಾಸ ಹಾಗು 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 ಹಾಗು ಕಿರು ಕಾದಂಬರಿಯನ್ನು ಪಠ್ಯವನ್ನಾಗಿ ಆಯ್ಕೆ ಮಾಡಿಕೊಂಡು, ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಸಾಹಿತ್ಯದ ಬಗ್ಗೆ ಸದಭಿರುಚಿಯನ್ನು ಮೂಡಿಸಲಾಗುತ್ತದೆ. ಸಾಂಸ್ಕೃತಿಕ ತಿಳುವಳಿಕೆಯ ಜೊತೆಗೆ ವ್ಯಕ್ತಿತ್ವ ವಿಕಸನದ ಕಡೆಗೆ ಗಮನ ನೀಡಲಾಗುತ್ತದೆ.

RU/BOS/A&H/KAN/MAR 2017

- 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.

Learning Outcomes:
ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಪ್ರಕಾರಗಳಾದ ನವೋದಯ–ನವ್ಯ–ನವ್ಯೋತ್ತರ ಕಾವ್ಯಗಳು, ಹೊಸಗನ್ನಡದ ವಿವಿಧ ಲೇಖನಗಳು, ವ್ಯವಹಾರ ಪತ್ರಲೇಖನ ಹಾಗು ಕಿರು ಕಾದಂಬರಿ ಸಾಹಿತ್ಯದ 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/ SYLLABUS

Unit	Description	Evaluation Pattern	Topics		Teaching Hours
I	ನವೋದಯ–ನವ್ಯ ಕವಿತೆಗಳು	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	1. ನನ್ನ ನಲ್ಲ 2. ಒಂದಿರುಳು ಕನಸಿನಲಿ 3. ಶ್ರೀ ರಾಮನವಮಿಯ ದಿವಸ 4. ಅಮ್ಮ ಆಚಾರ ನಾನು	ಮಧುರ ಚನ್ನ ಕೆ.ಎಸ್.ನ ಗೋಪಾಲಕೃಷ್ಣ ಅಡಿಗ ನಿಸಾರ್ ಅಹಮದ್.	**12 Hours**
II	ನವ್ಯ–ನವ್ಯೋತ್ತರ ಕವಿತೆಗಳು	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	5. ಕಲ್ಲಿಗು ಗೊತ್ತಿರುವ ಕತೆ 6. ಗಾಂಧೀ ಸ್ಮರಣೆ 7. ಚಂದಿರ ಕನ್ನಡಿ ಮತ್ತು ರೊಟ್ಟಿ 8. ಪ್ರಶ್ನಿಸಲಿಲ್ಲವೇಕೆ	ಸತ್ಯಾನಂದ ಪಾತ್ರೋಟ ಚಂದ್ರಶೇಖರ ಪಾಟೀಲ ಅರವಿಂದ ಮಲಗತ್ತಿ ಕೆ. ಶರೀಫ	**12 Hours**
III	ಲೇಖನಗಳು	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	9. ಮಾಧ್ಯಮ ಸಂಸ್ಕೃತಿ 10. ನನಗೊಂದು ಕನಸಿದೆ 11. ಭಾಷಾ ವೈವಿಧ್ಯವನ್ನೇಕೆ ಕಾಯ್ದುಕೊಳ್ಳಬೇಕು	ವ್ಯಾಸರಾಯ ಬಲ್ಲಾಳ ಮಾರ್ಟಿನ್ ಲೂಥರ್ ಕಿಂಗ್ ಕೆ.ವಿ.ನಾರಾಯಣ	**12 Hours**
			12. ಅಭ್ಯರ್ಥನ ಪತ್ರಗಳು	ವಾಣಿಜ್ಯ ಲೇಖನ ಪಠ್ಯದಿಂದ	
IV	ಕಾದಂಬರಿ	**25 Marks** ಟಿಪ್ಪಣಿ, ಸಂಕ್ಷಿಪ್ತ ಹಾಗು ವಿವರಣಾತ್ಮಕ ಪ್ರಶ್ನೆಗಳು	13. ಒಡಲಾಳ	ದೇವನೂರು ಮಹಾದೇವ	**12 Hours**

ಪರಾಮರ್ಶನ ಗ್ರಂಥಗಳು :

1. ಮುಗಳಿ ರಂ.ಶ್ರೀ., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ಗೀತಾ ಬುಕ್ ಹೌಸ್, ಮೈಸೂರು. 2014
2. ಸೀಮಾತೀತ ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ ಸಂಪುಟ 1,2,3,4,5 ಮತ್ತು 6, ಕುವೆಂಪು ಕನ್ನಡ ಅಧ್ಯಯನ ಸಂಸ್ಥೆ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು. 2014
3. ಡಾ. ಅರವಿಂದ ಮಾಲಗತ್ತಿ, ಸಾಹಿತ್ಯ ಸಂಸ್ಕೃತಿ ಮತ್ತು ದಲಿತ ಪ್ರಜ್ಞೆ, ಪ್ರಕಾಶಕರು ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್ತು, ಬೆಂಗಳೂರು. 2014
4. ಡಾ. ಈ.ಎಸ್. ಆಮೂರ, ಕನ್ನಡ ಕಥನ ಸಾಹಿತ್ಯ : ಕಾದಂಬರಿ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2016
5. ದೇಶಪಾಂಡೆ ಎಸ್.ಎಲ್., ಬೇಂದ್ರೆ ಶರೀಫರ ಕಾವ್ಯಾಯಾನ, ಪ್ರಕಾಶಕರು ದೇಸಿ ಪುಸ್ತಕ, ಬೆಂಗಳೂರು. 2013
6. ಕೀರ್ತನಾಥ ಕುರ್ತಕೋಟಿ, ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಗಾತಿ, ಪ್ರಕಾಶಕರು ಕುರ್ತಕೋಟಿ ಮೆಮೋರಿಯಲ್ ಟ್ರಸ್ಟ್, ಧಾರವಾಡ. 2009
7. ಶಾಮರಾಯ ತ.ಸು., ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ, ಪ್ರಕಾಶಕರು ತಳುಕಿನ ವೆಂಕಣ್ಣಯ್ಯ ಸ್ಮಾರಕ ಗ್ರಂಥಮಾಲೆ, ಮೈಸೂರು –2014
8. ಸಂ. ಡಾ! ಸಿ. ಆರ್. ಚಂದ್ರಶೇಖರ್, ಮುಂದಾಳುತನದ ಲಕ್ಷಣಗಳನ್ನು ಬೆಳೆಸಿಕೊಳ್ಳುವುದು ಹೇಗೆ?, ಪ್ರಕಾಶಕರು ನವಕರ್ನಾಟಕ ಪಬ್ಲಿಕೇಷನ್ಸ್ ಪ್ರೈವೆಟ್ ಲಿಮಿಟೆಡ್. 2010
9. ಆಧುನಿಕ ಕನ್ನಡ ಕಾವ್ಯ ಭಾಗ–2, ಕುವೆಂಪು ಕನ್ನಡ ಅಧ್ಯಯನ ಸಂಸ್ಥೆ, ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಮೈಸೂರು. 2004
10. ಶಿವರುದ್ರಪ್ಪ ಜಿ.ಎಸ್. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಸಮೀಕ್ಷೆ, ಪ್ರಕಾಶಕರು ಸ್ವಪ್ನ ಬುಕ್ ಹೌಸ್, ಬೆಂಗಳೂರು. 2013

B18CA2012	HINDI – II (Language)	L	T	P	C
Duration:60 Hours		2	1	0	3

अध्ययन विषय सूची / पाठ्यक्रम

इकाई I: प्राचीन कविता, आधुनिक कविता **अध्यापन अवधियाँ :** 12 hrs.

1.कबीर के दोहे
2.कविता- ताज – सुमित्रानंदन पन्त
3.कविता - संध्या सुन्दरी – निराला

इकाई II: मध्यकालीन कविता, आधुनिक कविता **अध्यापन अवधियाँ :** 12 hrs.

4. रैदास के दोहे
5.कविता- जाग तुझको दूर जाना- महादेवी वर्मा
6.कविता – तुलना - दुष्यंत कुमार

इकाई III: मध्यकालीन कविता, आधुनिक कविता **अध्यापन अवधियाँ :** 12 hrs.

7. तुलसीदास के पद
8.कविता –सत्य - नागार्जुन
9.कविता - सहर्ष स्वीकार है – मुक्तिबोध

इकाई IV : अनुवाद, संक्षेपण **अध्यापन अवधियाँ :** 12 hrs.

अनुवाद : हिन्दी – अंग्रेजी (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

B18CA2013	ADDITIONAL ENGLISH –II (Language)	L	T	P	C
Duration:60 Hours		2	1	0	3

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.

Course Outcomes:

On completion of the course, learners shall 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 Contents:

Unit	Description	Topics	Teaching Hours
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	**12 Hours**
II	**Voices from the Margin**	**Literature:** TadeuszRozewicz – Pigtail JyotiLanjewar – Mother SowvendraShekharHansda – The Adivasi Will Not Dance	**12 Hours**

		Harriet Jacobs – Excerpt from *Incidents in the Life of a Slave Girl* **Language:** Prefix and Suffix	
III	**Women & Society**	**Literature:** Kamala Das – An Introduction UshaNavrathnaram – To Mother Rabindranath Tagore – The Exercise Book Jamaica Kincaid – Girl **Writing Skills:** Dialogue Writing	**12 Hours**
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	**12 Hours**

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. Prabhat Prakashan, 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. Dixson, 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.

B18CA2020	COMMUNICATIVE ENGLISH – II	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- To attune young minds to concerns and issues which have a broad and wide scope of use and application to life.
- To acquire a functional use of language in context.
- To equip students to deliver formal and informal oral presentations to a variety of audiences in multiple contexts
- To enable students to construct effective written message in various formats and styles.
- 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:

- Demonstrate ethical and political responsibilities in taking cognizance of issues relating to society, environment and media.
- Develop a process oriented approach to writing.
- Make use of grammatical skills developed during the course aptly.
- Utilize the target language effectively to focus on interpersonal skills and develop a good command over the language.

Course Content:

Unit	Description	Topics	Teaching Hours
I	**Language Acquisition**	**Remedial Grammar:** Questions & Negatives; Questions Tags **Writing Skills:** Email Writing **Activities:** Group Discussions **Literature:** Alphonse Daudet - The Last Lesson	**12 Hours**
II	**Persuasive Skills**	**Remedial Grammar:** Past Simple & Past Perfect **Writing Skills:** Report Writing **Activities:** Book & Movie Reviews **Literature:** Lord Alfred Tennyson - Ulysses	**12 Hours**
III	**Cognitive Skills**	**Remedial Grammar:** Present & Past Passive; Conditionals **Writing Skills:** Creative Writing **Activities:** Role Plays **Literature:** O. Henry – The Gift of the Magi	**12 Hours**
IV	**Employability Skills**	**Remedial Grammar:** Reported Speech; Idioms **Writing Skills:** Cover Letter & CV	**12 Hours**

		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.

B18CA2030	**PROBABILITY AND STATISTICS**	**L**	**T**	**P**	**C**
Duration:60 Hours		**4**	**0**	**0**	**4**

Course Objectives:

- Impart basics of probability & statistics
- Acquaint students with various statistical methods.
- Acquaint students with the knowledge of quantitative techniques.

Course Outcomes:

On completion of the course, learners shall be able to:

- Organize, present and interpret statistical data, both numerically and graphically, Create quantitative models to solve real world problems in appropriate contexts
- Compute and interpret the coefficient of Skewness, Correlation and Regression" for bivariate data
- Recognize the role of and application of probability theory, descriptive and inferential statistics in many different fields

- Illustrate and apply the concepts of discrete and continuous random variables, the discrete and continuous probability distributions. Frame problems using multiple mathematical and statistical representations of relevant structures and relationships and solve using standard techniques

Course Content:

UNIT I **15 Hours**

Introduction: Meaning of Statistics and its definition-Functions-Scope/Characteristics-limitations. Collection of data-Classification of data, preparation of frequency distribution and tabulation of data. Diagrammatic representation of bar and pie diagrams, Graphical representation of median and mode by - histograms, smoothed frequency curve, frequency polygon, Cumulative frequency curves (ogives). Measure of Central Tendency- - Arithmetic Mean (Average), Partition values– Median, quartiles, deciles, percentile and Mode and its applications.

UNIT II **15 Hours**

Measures of Dispersion, and Skewness: Methods of Dispersion Range, Quartile deviation, Mean deviations: Standard deviations and Coefficient of Variation and its applications.

Measure of skewness: Meaning, uses and problems on Karl Pearson's coefficient of skewness and Bowley's co-efficient of skewness and its applications.

UNIT III **15 Hours**

Probability: Random experiments, trial, sample space, events. Approaches to probability- classical, empirical, subjective and axiomatic. Theorems on probabilities of events- Addition rules of probability. Conditional probability, independence of events and multiplication rule of probability. Bayes theorem (no proof any theorem) and its applications.

UNIT IV **15 Hours**

Random variables and Expectations: Definition, Random Variable, Discrete and continuous random variables, Distribution function probability mass and density function problems. Mathematical expectation, discrete random variable and its problems.

Text Books:

1. Gupta S.C and Kapoor V.K, "Fundamentals of Mathematical Statistics", Sultan Chand and sons, (2001).
2. Freund J.E., "Mathematical Statistics", Prentice hall, (2001).

References Books:

1. Berenson and Levine, "Basic Business Statistics", Prentice- Hall India (1996, 6thedition)
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. Montogomery 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.

B18CA2040	DATA STRUCTURES USING C	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- Assess how the choice of data structures and algorithm design methods.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Write programs using function-oriented design principles.
- Solve problems using data structures such as linear lists, stacks, queues, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.

Course Outcomes:

On completion of the course, learners shall be able to:

- Design or select an appropriate data structures for a particular problem
- Choose the appropriate data structure and design the algorithms and application methods on various data structures.
- Apply their knowledge of data structures in writing more efficient programs in a programming language
- Develop Applications using Linear and Non-Linear Data Structures.

Course Content:

UNIT I **15 Hours**

Basics of Data Structures: Data Structures, Classifications (Primitive & Non Primitive), Data structure Operations, Review of Arrays-Inserting and deleting operations, String operations, Structures, Unions, Pointers and Dynamic Memory Allocation Functions.

UNIT II **15 Hours**

Linear Data Structures: Stack: Definition, Array representation, Linked list representation, Operations, Recursion, Towers of Hanoi, Applications of stack (Infix to postfix conversion, evaluation of expression). **Queue**: Definition, Array representation, Linked list representation, Operations, Applications; Types of queues: Simple queue, Circular queue, Double ended queue, Priority queue.

UNIT III **15 Hours**

Linked List: Definition, Singly linked list: Representation in memory, Traversing, Insertion, Deletion and Searching; Memory allocation; Garbage collection; Doubly linked list; Header linked list; Circular linked list. **Searching**: Linear and binary search. **Sorting:** Insertion, Selection, Bubble, Quick, Merge. **Hashing**: Hash table organizations, Hashing Functions, Static and Dynamic Hashing.

UNIT IV **15 Hours**

Non Linear Data Structures: Need for non-linear structures, Trees and its representation, Binary Tree, types of Binary Trees, Binary tree traversals , applications of trees , Binary Search Tree, Introduction to Graph, Graph Traversal Techniques.

Text Books:

1. Ashok N Kamthane, "Introduction to Data Structures in C", Pearson Education (S) Pvt Ltd., New Delhi: 2005. (Chapter 1 to 11)
2. YedidyahLangsam and Moshe J. Augenstein and Aaron M Tenanbanum, "Data Structures Uisng C and C++", 2nd Edition, Pearson Education Asia, 2002. (Chapter 1 to 8)

Reference Books:

1. Jean-Paul Tremblay and Paul G Sorenson, "An Introduction to Data Structures with Applications", Second Edition, Tata McGraw-Hill Publishing Company Lt., New Delhi: 1995.
2. Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan (2008), Fundamentals of Data Structure in C, 2nd Edition, University Press, India.
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education.
4. E. Balaguruswamy, "Data Structures using C", McGraw Hill Edition India Pvt. Ltd, 2013

B18CA2050	OBJECT ORIENTED PROGRAMMING USING C++	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- Impart knowledge of object oriented programming concepts and implement them in C++.
- Enable to differentiate procedure oriented and object-oriented concepts.
- Equip with the knowledge of concept of Inheritance so that learner understands the need of inheritance.
- Explain the importance of data hiding in object oriented programming.

Course Outcomes:

On completion of the course, learners shall be able to:

- Analyze the different Programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology
- Identify and Model real world objects and map it into programming objects for a legacy system
- Explore the polymorphism , generalization and specialization relationship and solve problem using various OO methodology
- Analyze and Interpretation of run time binding and solve run time errors and generalize solution to the problem using generic programming approach

Course Content:

UNIT I **15 Hours**

Introduction : Procedure Languages, definition of OOP, Basic concept of OOP, Object, Class, Data Abstraction, Data Encapsulation, Data Hiding, Reusability, Inheritance, Polymorphism, Overloading, Dynamic binding and Message passing. **C++ Features:** Basic data types-The iostream class, C++ Comments, C++ Keywords, Variable declaration, The Const Qualifier. Manipulators, The scope resolution operator, new & delete operators.**Functions:** Simple Functions, Function declaration, calling the function, function definition, passing argument to functions, returning value from function, passing constants, Variables, pass by value; pass by reference, inline function, overloaded functions, default arguments, return statements.

UNIT II **15 Hours**

Objects & Classes: Classes & Objects, Class Declaration, Class members, Data Members, Member functions, Class member visibility, private, public, protected. Constructors and Types of Constructors, Overloaded Constructor, Objects as arguments, returning objects from functions, Destructors, Array of objects. **Friend function:** Friends for functional notation, friend classes, the pointer; Accessing Member Data with this, using this for returning values.

UNIT III **15 Hours**

Operator Overloading: Overloading unary operator: Operator Keyword, Operator arguments, Operator return. Overloading **binary operator:** Arithmetic operators, comparison operator. **Inheritance**: Derived Class & Base Class: Specifying the Derived class accessing Base class members, the protected access specifier, **Types of inheritance**: Single inheritance, Multiple inheritance, Multilevel inheritance, Hybrid inheritance, public and private inheritance, Overriding member functions.

UNIT IV **15 Hours**

Virtual functions: Normal member function accessed with pointers, Virtual member functions

accessed with pointers, Dynamic binding, pure virtual functions. **Templates & Exception Handling**: Introduction, Templates, Class Templates, function templates, Member function templates, Template arguments, Exception Handling.

Text Books:

1. Lafore Robert, "Object Oriented Programming in Turbo C++", Galgotia Publications, 2012. (Unit I)
2. E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill Publications, 2011.(Unit II,III &IV)

Reference Books:

1. HerbertSchildt, "C++: The Complete Reference" Osborne McGraw-Hill, Third edition, 1998.
2. P. B. Kotur, "Object Oriented Programming with C++" Eight Edition.

B18CA2060	INDIAN CONSTITUTION & PROFESSIONAL ETHICS	L	T	P	C
Duration:30 Hours		2	0	0	2

Course Objectives:

- To impart knowledge on Constitution of India.
- To facilitate the understanding of Fundamental Rights, Duties and other Rights which is been given by our law.
- To facilitate the understanding of Constitution perspective and make them face the world as a bonafide citizen.
- To attain knowledge about ethics and also know about professional ethics.
- Explore ethical standards followed by different companies.

Course Outcomes:

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

- Explain the Indian constitutional provisions and follow them.
- Demonstrate the fundamental rights and human rights.
- Explain the duties and more importantly practice them in a right way.
- 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.
- Demonstrate professional ethics and know about etiquettes about it.

Course Content:

UNIT-I **10 Hours**

Constitution of India: Making of Indian Constitution, features of Indian Constitution, Preamble to the Constitution of India, Fundamental Rights under Part III, Rights to Equality, Right to Freedom, Right against Exploitation, Rights to Freedom of Religion, Cultural and Educational Rights, Constitutional Remedies. Fundamental Duties of the Citizen, Significance and Characteristics. Elements of National Significance, National Flag, National Anthem, National Emblem.

UNIT -II **10 Hours**

Legislature and Executive: Organs of the Government; Legislature, Executive and Judiciary. Union and State Executives: President, Vice President, Prime Minister, Cabinet, Governor, Council of Ministers, Electoral process, Election Commission.

UNIT-III **06 Hours**

Judiciary: Supreme Court of Indian, High Court, Right to Information Act 2005, Consumer Protection- Consumer Rights- Caveat Emptor and Caveat Venditor.

UNIT-IV **06 Hours**

Professional Ethics: Definition Scope and need of Ethics for professional, Personal Ethics and Business Ethics, Ethical Standards, Duties of Employers and Employees. Due Care theory, Environmental Ethics, Ethical Code of Conduct in ethics. Best Ethical Companies in India and Abroad; Corporate Social Responsibilities, Code of Conduct and Ethical Excellence.

Text Books:

1. M V Pylee, An introduction to Constitution of India
2. M Govindarajan, S Natarajan, V S Senthil Kumar, Engineering Ethics.
3. Dr.Durga Das Basu, Introduction to constitution of India

B18CA2070	SPORTS/ YOGA/MUSIC/DANCE/THEATRE	L	T	P	C
Duration:30Hours		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.

- 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, Veerabadrasana, 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. 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. Court marking, Rules and their interpretations

C. FOOTBALL

Course Objectives:

- To learn the rules, fundamental skills, and strategies of football.
- To develop skills in passing, receiving, controlling the ball, dribbling, and 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

1. Football: Introduction
2. Kicks- Inside kick, Instep kick, Outer instep kick, Lofted kick, Chipping, Volley, Half Volley
3. 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

D. 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:

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.

C. 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 I

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 II

Sound and Movement: Awareness of creating sound patterns, voice modulations, rhythm in speech and diaologues. Understanding the rhythm and patterns of movements like walking, framing, shaping, primitive and animal movements.

UNIT III

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 IV

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.

C. 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 I

An introduction to Indian classical dance forms: Bharatanatyam, Kuchipudi, Mohiniyattam.

UNIT II

Learning of Fundamentals: Exercises and Adavus- I (Bharathanatyam , Kuchipudi, Mohiniyattam).

UNIT III

Adavus –II (Bharathanatyam , Kuchipudi, Mohiniyattam)

UNIT IV

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

D. 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 I

1. Introduction to Musical Instruments
2. Percussion Instruments
3. Mridangam and its History

UNIT II

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 III

1. Tisra Jaathi
2. Khanda Jaathi
3. Misra jaathi
4. Sankeerna Jaathi

UNIT IV

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.

B18CA2080	DATA STRUCTURES LAB	L	T	P	C
Duration:30Hours		0	0	2	2

Course Objectives:

- To impart knowledge of efficient storage mechanisms of data for an easy access.
- To design and implementation of various basic and advanced data structures.
- To explain various techniques for representation of the data in the real world.
- To develop application using data structures.
- To equip with the concept of protection and management of data.

Course Outcomes:

On completion of the course, learners shall be able to:

- Choose appropriate data structure as applied to specified problem definition.
- Perform operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- Apply concepts learned in various domains like DBMS, compiler construction etc.
- Use linear and non - linear data structures like stacks, queues, linked list etc.

Course Content:

PART - A

1. Write a menu driven C program to perform the following string operations without using string functions: (i) String Length (ii) String Concatenation
2. Write a C program to search for an element in an array using Binary search
3. Write a C program to sort a list of N elements using Selection Sort Algorithm.
4. Write a C program to demonstrate Queue using Linked List.
5. Write a C program to demonstrate the working of stack using linked list.
6. Write a C program for Towers of Hanoi problem.
7. Write a C program to find GCD of two numbers using recursion
8. Write a C program to convert infix arithmetic expression to post fix expression.
9. Write a C program to simulate the working of Circular Queue using an array.
10. Write a C program to create and traverse a binary search tree.

PART – B

Programs may be decided by External and Internal examiners.

B18CA2090	C++ PROGRAMMING LAB	L	T	P	C
Duration:30Hours		0	0	2	2

Course Objectives:

- To familiarize students with object - oriented concepts and their implementation in C++.
- To facilitate students with the skills required to solve problems using object oriented concepts
- To impart the knowledge required to write code with good coding practices.

Course Outcomes:

On successful completion of the course, students will be able to:

- Explain the process of writing, compiling and executing programs in C++ using appropriate predefined functions in C++ .
- Implement the object oriented concepts in developing application using C++.
- Develop applications in C++ using the understanding of Inheritance and polymorphism.
- Use exception handling while developing a C++ application.
- Illustrate stream I/O, Files and usage of the available classes to handle stream objects in C++ language.
- Develop complex applications by identifying the appropriate features of object oriented programming to solve real world problems using C++

Course Content:

PART-A

1. An electricity board charges the following rates to domestic users to discourage large consumption of energy:
   For the first 100 units – Rs.2 per unit
   For the first 200 units – Rs.4 per unit
   For the first 300 units – Rs. 6 per unit
   All users are charged a minimum of Rs. 50.00. If the total amount is more than Rs. 1000.00 then an additional surcharge of 15% is added.
   Write a program to read the names of users and number of units consumed and print out the charges with names.

2. Define a class to represent a bank account. Include the following members:
   Data members:
   1. Name of the depositor.
   2. Account number.
   3. Type of account.
   4. Balance amount in the account.
   Member functions:
   1. To assign initial values.
   2. To deposit an amount.
   3. To withdraw an amount after checking the balance.
   4. To display the name and balance.
   Write a main program to test the program.
3. Write a program to swap numbers using friend function.
4. Write a program to calculate area and circumference of circle using inline function
5. Write a program to perform addition of two matrices using operator overloading.
6. Write a program to find sum of complex number using operator overloading and friend function.
7. Write a Program to find the area and volume of respective figures using function overloading.
8. Write a program to find factorial of number using function overloading.
9. Write a program to create a student report using inheritance technique.
10. Write a program to find the maximum of two numbers using template.

PART – B

Programs may be decided by External and Internal examiners.

THIRD SEMESTER

B18CA3010	DESIGN & ANALYSIS OF ALGORITHMS	L	T	P	C
Duration:60 Hours		4	0	0	4

Course Objectives:

- Analyze the asymptotic performance, prove the correctness and analyze the running time of the basic algorithms.
- Design algorithms using the dynamic programming, greedy method and recite algorithms that employ this strategy.
- Demonstrate Tree and graph traversal techniques.
- Evaluation of Backtracking algorithms.

Course Outcomes:

On Successful Completion of the course, the students will be able to:

- Analyze the fundamental principles underlying algorithm analysis and design and be able to apply them in specific instances
- Validate algorithms asymptotically and compute the performance analysis of algorithms with the same functionality.
- Design an efficient algorithm and realize essentiality of the different techniques such as divide-and conquer, dynamic programming and the greedy methods and many of its applications
- Implement various algorithms on graph data structures, including finding the minimum spanning tree and shortest path.

Course Contents:

UNIT I **15 Hours**

Introduction and Divide & Conquer technique: Definition of algorithm, Characteristics of algorithm, Important problem types, Fundamentals of Algorithmic Problem Solving using flow chart, Different methods to find the GCD of two integers, Order of Growth, Basic efficiency classes, Asymptotic Notations, Time and space complexity of an algorithms. **Divide and Conquer**: General Method, Binary Search, Merge Sort and Quick Sort.

UNIT II **15 Hours**

Greedy Method: General method, Fractional Knapsack Problem, Job Sequencing with deadline, Spanning trees, Minimum cost spanning trees: Prim's algorithm, Kruskal's Algorithm, Single Source Shortest Paths problems-Dijkstra's algorithm.

UNIT III **15 Hours**

Dynamic Programming: Introduction to Graphs, Types of graphs, Representation of graphs, Terms related to graph, General Method, Multi stage Graphs, Warshall's Algorithm for Transitive Closure, All pair ShortestPaths,0/1–knapsack, Flow Shop Scheduling.

UNIT IV **15 Hours**

Traversal techniques for Trees: Binary Tree, Properties of Binary Tree, Types of Binary Tree, Binary Tree Traversal Techniques: Pre-order traversal, In-order traversal and post-order traversal. Search techniques for graphs: Breadth First Search (BFS), Depth First Search (DFS).

Backtracking: General method, 4-Queens Problem, Sum of Subset Problem, Graph Coloring, Hamiltonian Circuit Problem.

Text Books:

1. SaraBaase, Allen Van Gelder, "Computer Algorithms, Introduction to design and Analysis", 3rd edition Pearson Publication, 2006 (Chapters 4, 5, 7, 8 and 9).
2. Horowitz E, Sahani S, Rajasekharan S, "Fundamentals of Computer Algorithms", Galgotia Publication 2005(Chapters 1, 3- 6 and 7).
3. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Fundamentals of Computer algorithm", 2005 (Chapters 1, 3, 4, 5, 6 and 7).

Reference Books:

1. A. M Padma Reddy, "Design and Analysis of Algorithms", Sri nandi Publications, 2017(Chapters 1-9).
2. Srikanth S, "Design and Analysis of Algorithms", Skyward Publishers, 2015 (Chapter 1-8).
3. Chitra Ravi, "Design and Analysis of Algorithms", Subhas Publishers, 2015 (Chapter 1-8).

B18CA3020	COMPUTER NETWORKS	L	T	P	C
Duration:60Hours		4	0	0	4

Course Objectives:

- Identify the different components and their respective roles in a communication System
- Design an enterprise network employing the common LAN technologies and be able to evaluate the advantages and disadvantages
- Describe the importance and functions of the OSI layers Physical, data link, network and transport layer

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Master the fundamentals of data communications and networks by gaining knowledge of data transmission concepts and its applications
- Understand the operation of physical layer techniques and data link layer design issues
- Learn the algorithms used to design communication networks.
- Understand the principles of transport layer protocols and application layer concepts.

Course Content:

UNIT I **15 Hours**

Introduction: Uses of computer networks, Network Hardware, Network Software, Reference Models, Network Standardization.**The Physical Layer:** Guided Transmission Media, Wireless Transmission, and Digital modulation and multiplexing, Switching: Circuit switching, packet switching. Mobile telephone system.

UNIT II **15 Hours**

The Data Link Layer: Data link layer design issues, Error Detection and Correction, Sliding window protocol, Example Data link protocols. MAC sub layer: channel allocation problem, Multiple Access Protocols, Ethernet, Wireless LANs, data link layer switching.

UNIT III **15 Hours**

The Network Layer: Network layer design issues, Routing algorithms, Congestion control algorithms, Quality of Service, The network layer in the internet.

UNIT IV **15 Hours**

Transport Layer: Elements of Transport protocols, UDP, TCP, Performance issues.
Application Layer: Domain Name system, Electronic Mail, WWW.

Text Books:

1. Andrew S Tanenbaim, David J Wetherall "Computer Networks", Pearson Education, 5th Edition, Elsevier Inc, 2014. (Chapter-1, 2, 3, 4, 5, 6, 7)

Reference Books:

1. Prakash C Guptha, "Data Communications and computer Network", Second Edition, PHI learning Pvt Ltd, Nov 2014.
2. BehrouzFerouzan, "Introduction to Data Communication & Networking" 5th Edition, McGraw Hill Education Pvt Ltd 2013

3. Larry &Peterson & Bruce S Davis, “Computer networks-A System Approach”, 5th Edition, Elsevier Inc, 2014.

B18CA3030	JAVA PROGRAMMING	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Relate the fundamentals of programming concepts such as variables, conditional and iterative execution, methods, etc.
- Explore the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be able to use the Java SDK environment to create, debug and run simple Java programs.

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Knowledge of the structure and model of the Java programming language, using fundamentals and existed functionality of java programming (knowledge).
- Identify and formulate the members of the Java class. Use the Java programming language for solving various programming technologies (understanding).
- Evaluate user requirements for software functionality (required to decide whether the Java programming language can meet user requirements) and Develop software using techniques and functionalities available in the Java programming language, (application, analysis).
- As a responsible student in the society with ethical values, propose the use of certain technologies by implementing them in the Java programming language to solve the given problem for the betterment of society. (Synthesis).
- Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (Evaluation).

Course Content:

UNIT I **15 Hours**

Introduction to Java: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java Environment. Overview of JAVA Language: Introduction, Java Program structure, Java Tokens, Java Statements, Java Virtual Machine, Command Line Arguments, Constants, Variables, and Data Types Scope of variables, Type Casting, Operators and Expressions; Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type conversion and associability, Mathematical Functions. Decision Making and Branching: Decision Making Statement and Looping: while, do, for Statement.

UNIT II **15 Hours**

Classes, Arrays, Strings and Vectors: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One – dimensional Arrays, Creating an Array, Two– dimensional Arrays,Strings,Vectors,Wrapper Classes.

UNIT III **15 Hours**

Interfaces, Packages, and Multithreaded Programming: Interfaces: Multiple inheritance, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables. Packages: Putting Classes together, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface.

UNIT IV **15 Hours**

Managing Exceptions, Applet Programming: Managing Errors and Exception: Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging. Applet Programming: How Applets Differ from Applications, Preparing to Write Applets, Applet Life Cycle, Creating Executable applet, Applet Tag, Adding Applet to HTML File, running the Applet, More about Applet Tag, Passing Parameters to Applet, Aligning the Display, More HTML Tags, Getting Input from User.

Text Books:

1. E Balaguruswamy,"Programming with JAVA" , A Primer, TMH, Fourth Edition 2010.
2. Herbert Schildt, Dale Skrien, "Java Fundamentals, A comprehensive Introduction" ,Tata McGraw Hill Edition, 2013.(Chapters:1,2,3,4,5,6,7,8,9,10,11,12,13,15,22,23,24,25,26)

Reference Books:

1. Hari Mohan Pandey, "Java Programming", Pearson Education, 2012.
2. KoGenT, "Java 6 Programming, Black Book", Dream tech Press, 2012.

B18CA3040	RELATIONAL DATABASE MANAGEMENT SYSTEM	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- To introduce the basic concepts in Database Systems and Relational Databases.
- To expose the students to the steps in building E-R Diagrams and Normalization.
- To train the students in the practical skills using Oracle9i software to develop and alter tables.
- To equip the students with skills to manipulate tables using updation, deletion and arithmetic operations.
- To provide the basic understanding to group data using built-in functions and join multiple tables.

Course Outcomes:

Upon Completion of the course, the students will be able to,

- Relate all basic terminologies in Database Systems and Relational Databases.
- Demonstrate E-R Diagrams and performing Normalization.
- Use Oracle9i software to develop and alter tables, and to manipulate tables using Update, delete and arithmetic operations.
- Illustrate the basic understanding of grouping data using built-in functions and join multiple
- Tables.

Course Content:

UNIT I **15 Hours**

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Databases Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrator.**Relational Model:** Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

UNIT II **15 Hours**

Database Design: Overview, Entity-Relationship Model, Constraints, Removing Redundant Attributes, E-R Diagrams, Reduction to Relational Schemas, E-R Design Issues, and Extended E-R Features.**Relational Database Design:** Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Functional-Dependency Theory, algorithms for Decomposition, Decomposition using Multi valued Dependencies, More Normal Forms.

UNIT III **15 Hours**

Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus. **Oracle Tables:** DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

UNIT IV **15 Hours**

Working with Table: Data Management and Retrieval: DML –adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. **Functions and Grouping:** Built-in functions – Grouping Data. Multiple Tables: Join – Set operations.

Text Books:

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concepts", 6th Edition, McGraw Hill. (Units 1 and 2).
2. Nilesh Shah, "Database Systems Using Oracle", 2nd edition, PHI. (Units 3 and 4)

Reference Books:

1. Arun Majumdar & Pritimoy Bhattacharya, "Database Management Systems", 2007, TMH.
2. Gerald V. Post, "Database Management Systems", 3rd edition, TMH.

B18CA3050	SYSTEM SOFTWARE	L	T	P	C
Duration:60Hours		4	0	0	4

Course Objectives:

- Relate how programs run in user space and how the interact with the OS.
- Illustrate the basics of system programs like editors,, assembler, linker, loader, interpreter and debugger.
- Describe the various concepts of assemblers and macro processors.
- Demonstrate how linker and loader create an executable program from an object module created by assembler and compiler.
- List various editors and debugging techniques.

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Understand the fundamental concepts of computer system and explain the features of SIC / SIC-XE machine architecture.
- Explain the algorithm and data structures of loaders and linkers and analyze their design.
- Explain the design of text editors and analyze interactive debugging systems.
- Explore macro processor functions and analyze programs written for software tools MASM Macro Processor, ANSI C Macro Processor.

Course Content:

UNIT I **15 Hours**

Machine Architecture and Assemblers: Introduction, System Software and Machine Architecture, Simplified Instructional Computer (SIC) – SIC Machine Architecture, SIC/XE Machine Architecture, SIC Programming Examples. Basic Assembler Function - A Simple SIC Assembler, Assembler Algorithm and Data Structures, Machine Dependent Assembler Features - Instruction Formats & Addressing Modes, Program Relocation.

UNIT II **15 Hours**

Loaders and Linkers : Basic Loader Functions - Design of an Absolute Loader, A Simple Bootstrap Loader, Machine-Dependent Loader Features – Relocation, Program Linking, Algorithm and Data Structures for a Linking Loader;Machine-Independent Loader Features - Automatic Library Search, Loader Options, Loader Design Options - Linkage Editor, Dynamic Linkage, Bootstrap Loaders.

UNIT III **15 Hours**

Editors and Debugging Systems: Text Editors - Overview of Editing Process, User Interface, Editor Structure, Interactive Debugging Systems - Debugging Functions and Capabilities, Relationship With Other Parts Of The System, User-Interface Criteria.

UNIT IV **15 Hours**

Macro Processor : Basic Macro Processor Functions - Macro Definitions and Expansion, Macro Processor Algorithm and Data Structures, Machine-Independent Macro Processor Features - Concatenation of Macro Parameters, Generation of Unique Labels, Conditional Macro Expansion, Keyword Macro Parameters, Macro Processor Design Options - Recursive Macro Expansion, General-Purpose Macro Processors, Macro Processing Within Language Translators, Implementation Examples - MASM Macro Processor, ANSI C Macro Processor.

Text Books:

1. Leland L Beck, “System Software”, 3rd Edition, Addison-Wesley, 1997. (CH 1, CH 2, CH3, CH 7,CH 4).
2. John R Levine, Tony Mason and Doug Brown, “ Lex and Yacc”, O'Reilly, SPD,1998.

Reference Books:

1. D.M.Dhamdhere, "System Programming and Operating Systems", 2nd Edition, TataMcGraw - Hill, 1999.

B18CA3061	E- COMMERCE	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

- Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.
- Provide analytical tools to understand opportunities in unserved or underserved New Economy markets.
- Provide a fundamental understanding of the different types and key components on business models in the New Economy.
- Provide guiding principles behind the design and strategy of the customer web interface.
- Provide insights on how to implement strategy in the New Economy.

Course Outcomes:

On successful completion of the course, the students will be able to:

- To define and understand the basic concepts and technologies used in the field of E-Commerce and various types of E-commerce. (Level 1)
- To understand different types of payment methods and models of e-retailing. (level 2)
- To identify the different Business intelligence models and e-services to the market using web enabled services. (level 3)
- To understand the importance of web advertising, web development methodologies. and analyse the effectiveness of e-commerce sites. (Level 2)

Course Content:

UNIT I **10 Hours**

Introduction: Electronic Commerce and physical commerce, The DIGITAL phenomenon, Different types of Ecommerce, examples, E-Commerce scenarios, Advantages of E-Commerce, Myths about E-commerce. **Technologies (Fundamentals):** Internet and WWW, web system architecture, URL, An overview of the internet, overview of HTTP, HTTP.

UNIT II **11 Hours**

Internet payment systems: Characteristics of payment systems, 4C payment methods, SET protocol for credit card payment, E –Cash, E-Check, Micropayment system, Overview of smart card, MONDEX. **Consumer oriented E-Commerce:** Traditional retailing and e-retailing, Benefits of e-retailing, Key success factors, Models of e-retailing, Features of e-retailing.

UNIT III **10 Hours**

Business oriented E- Commerce: Features of B2B e-commerce, Business models, Integration.
E-Services: Categories of e-services, Web-enables services, Matchmaking services.

UNIT IV **14 Hours**

Web advertising and web publishing: Traditional versus internet advertising, Internet advertising techniques and strategies, Business models for advertising and their revenue streams, Pricing model and measurement of the effectiveness of advertisements, Web publishing-goals and criteria, web site development methodologies, logical design of the user interface I-abstract user interface object, logical design of the user interface-II flow of interaction, Usability testing and quality assurance, Web presence and visibility.

Text Books:

1. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, "E-Commerce, fundamentals and Applications" by, WILEY Edition.(Chapters: 01, 02, 10 to 14).

Reference Books:

1. Ravi Kalakota, Andrew B. Whinston, "Frontiers of Electronic Commerce", Pearson Education, 2009.
2. S.Jaiswal, Galgotia, "E-Commerce", revised edition, 2008.

B18CA3062	PRINCIPLES OF ACCOUNTANCY	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

The objective of this paper is to help students to acquire conceptual knowledge of the financial accounting and to impart skills for recording various kinds of business transactions by using Tally Software.

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Understand the accounting concepts, principles to apply fundamental knowledge of accounting to identify and record the various types of business transactions to evaluate and communicate with various users effectively.
- Analyze the business transactions effectively to prepare the financial statements in accordance with Generally Accepted Accounting Principles.
- Understand to record various types of business entries in the Tally ERP 9 accounting tool to create various types of vouchers, do adjustment entries, and prepare financial statements, etc.
- Acquire required skills to analyze the business concepts to interpret the financial position of a business firm as Tally data entry operator.

Course Content:

UNIT I **15 Hours**

Theoretical Framework: meaning, Definition and scope of Accounting; Accounting principles-concepts and convention-Accounting Life Cycle (ALC)- Classification of Accounts -Capital and Revenue transactions- capital and revenue expenditures, capital and revenue receipts- Meaning and definitions of different terms used in Accounting-Users of Accounting Information- Different Systems of Accounting- Types of business organizations – Sole-Traders, Partnerships, Corporations (Limited Liability companies), Cooperatives, Non-Profit Organizations..(Theory)

UNIT II **15 Hours**

Accounting Process: From recording of a business transaction to preparation of final accounts including adjustments.(Theory and Problems).

UNIT III **15 Hours**

Tally: Features and importance of Tally –Tally accounting – Components of gateway of tally – Creation of a company – Creating, displaying and altering single or multiple ledgers – Accounting vouchers – Display of financial statements. **Tally Inventory:** Inventory masters – Configuration – Creating, displaying and altering single and multiple stock groups – Stock categories – Units of measure – Stock godowns – Stock items and inventory vouchers – Display of inventory reports. (Theory and Problems)

UNIT IV **15 Hours**

Pay Roll: Payroll process in Tally – Payroll information – Pay head creation – Calculation types – Pay roll vouchers – Preparation of pay roll reports. **Tally TDS:** Configuration – Creation of ledgers and vouchers for deductions, payments, deposits, and advances – TDS reports.

Text Books:

1. Maheshwari, S.N. and S. K. Maheshwari, “Financial Accounting”, Vikas Publishing House, New Delhi.
2. Nadhani, A.K. and Nadhani, K.K, “Implementing Tally ERP.9”, BPB publications, New Delhi.
3. Kiran Kumar, K, “Tally 9”, Laasya Publishers, Hyderabad

B18CA3063	ENTERPRISE RESOURCE PLANNING	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

- Build an understanding of the fundamental concepts of ERP systems, their architecture, and working of different modules in ERP.
- Learn various components of an application software that help computerize functioning of an enterprise such as sales, materials, production, financial , customer relationship AND supply chain modules.
- Provide a contemporary and forward - looking on the theory and practice of Enterprise Resource Planning Technology.
- Develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth.
- Prepare the students technological competitive and make them ready to self - upgrade with the higher technical skills.

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Describe the fundamentals of Enterprise software, express ideas its role in integrating business functions and analyze the strategic options for ERP identification and adoption.
- Design the ERP implementation strategies using ERP tools to solve problems in different areas.
- Interpret different modules of ERP applications, analyse and discover new Methodologies.
- Predict the future directions and trends in ERP that adheres to business principles and values.

Course Content:

UNIT I **15 Hours**

Introduction to ERP: Enterprise an Overview – Introduction to ERP - Basic ERP concepts – Justifying ERP investments - Risks of ERP- Benefits of ERP.

UNIT II **15 Hours**

ERP Technology: ERP and Related Technologies – Business Intelligence – E-Commerce and E-Business - Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Supply Chain Management – Customer Relationship Management.

UNIT III **15 Hours**

ERP Implementation: Implementation Challenges, Implementation Strategies, Implementation Life Cycle, Implementation Methodologies, Project Management and Monitoring, Post Implementation activities. **ERP Business modules & Market:** Business Modules of an ERP Package, Finance, Manufacturing, Human Resource, Quality Management, Marketing, Sales, Distribution and Service. ERP Marketplace and Marketplace Dynamics, SAP AG, Oracle Corporation, PeopleSoft.

UNIT IV **15 Hours**

ERP Present and Future: Turbo Charge the ERP System, Enterprise Application Integration, ERP , Internet and WWW - ERP II – ERP and Total Quality Management - Future directions and Trends in ERP.

Text Books:

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, 1999.(Part I to III, V to VII)

Reference Books:

1. Joseph A Brady, Ellen F Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning", Thomson Learning, 2001.
2. Vinod Kumar Garg and N.K .Venkata Krishnan, "Enterprise Resource Planning - concepts and Planning", Prentice Hall, 1998.
3. Jose Antonio Fernandz, " The SAP R /3 Hand book", Tata McGraw Hill

B18CA3070	Soft Skills Training	L	T	P	C
Duration:30Hours		2	0	0	2

Note: The students will have to undergo Skill Development course being conducted by Training and Placement cell of the University.

B18CA3080	JAVA PROGRAMMING LAB	L	T	P	C
Duration: 30Hours		0	0	2	2

Part - A

1. Write a program to find factorial of list of number reading input as command line argument.
2. Write a program to display all prime numbers between two limits.
3. Write a program to sort list of elements in ascending and descending order and show the exception handling.

4. Write a program to implement Rhombus pattern reading the limit form user.
5. Write a program to implement all string operations.
6. Write a program to find area of geometrical figures using method.
7. Write a program to implement constructor overloading by passing different number of parameter of different types. .
8. Write a program to calculate bonus for different departments using method overriding.

Part - B

1. Write a program to implement mouse events.
2. Write a program to implement keyboard events.
3. Write a Applet program to demonstrate Applet Skelton.
4 Write a simple program that sets foreground and background colors and outputs a string.
5. Write a java program to demonstrate creation and importing packages.
6. Write a java program to demonstrate Interface concept in java.
7. Write a java program to demonstrate of creating new thread and starts running.
8. Demonstrate multiple thread concepts in java with help of program.
9. Implement program to handle Exceptions in java programming.

B18CA3090	RDBMS LAB	L	T	P	C
Duration:30Hours		0	0	2	2

Practical List - 1

1. Create the following Tables and Insert the below data.

Salesmen

SNUM	SNAME	CITY	COMMISSION
1001	Piyush	London	12 %
1002	Sejal	Surat	13 %
1004	Miti	London	11 %
1007	Rajesh	Baroda	15 %

1003 Anand New Delhi 10 %

SNUM : A unique number assigned to each salesman.

SNAME : The name of salesman.

CITY : The location of salesmen.

COMMISSION: The Salesmen's commission on orders.

Customers

CNUM	CNAME	CITY	RATING	SNUM
2001	Harsh	London	100	1001
2002	Gita	Rome	200	1003
2003	Lalit	Surat	200	1002
2004	Govind	Bombay	300	1002
2006	Chirag	London	100	1001
2008	Chinmay	Surat	300	1007
2007	Pratik	Rome	100	1004

CNUM : A unique number assigned to each customer.
CNAME: The name of the customer.

CITY : The location of the customer.

RATING: A level of preference indicator given to this customer.

SNUM : The number of salesman assigned to this customer.

Orders

ONUM	AMOUNT	ODATE	CNUM	SNUM
3001	18.69	10/03/97	2008	1007
3003	767.19	10/03/97	2001	1001
3002	1900.10	10/03/97	2007	1004
3005	5160.45	10/03/97	2003	1002
3006	1098.16	10/03/97	2008	1007
3009	1713.23	10/04/97	2002	1003
3007	75.75	10/04/97	2004	1002
3008	4723.00	10/05/97	2006	1001

3010	1309.95	10/06/97	2004	1002
3011	9891.88	10/06/97	2006	1001

ONUM : A unique number assigned to each order.
AMOUNT: The amount of an order.

ODATE: The date of an order.

CNUM : The number of customer making the order.

SNUM : The number of salesman credited with the sale.

Practical List - 2

1. Alter salesman table by setting snum as primary key.
2. Alter customer table by setting cnum as primary key.
3. Alter orders table by setting onum as primary key.
4. Alter orders table by adding snum and cnum as foreign keys
5. Alter customer table by adding snum as foreign keys
6. Insert any five records in customers table.
7. Update the name of the customer in the customers table from Lalit to Girish
8. Remove all orders from customer Chirag from the orders table.

Practical List - 3

1. Produce the order no, amount and date of all orders.
2. Give all the information about all the customers with salesman number 1001.
3. Display the following information in the order of city, sname,snum and commission.
4. List of rating followed by the name of each customer in Surat.
5. List of all orders for more than Rs. 1000.
6. List all customers whose names begins with letter 'A' to 'G'.
7. List of names and cities of all salesmen in London with commission above 10%.
8. List all customers excluding those with rating <= 100 unless they are located in Rome.
9. List all orders for more than Rs.1000 except the orders of snum<1006 of 10/03/97.

10. List all orders with zero or NULL amount.

Practical List - 4

1. Display cnum, cname, city from customer details table.
2. Display all snum without duplicates from all orders.
3. Display names and commissions of all salespeople in London.
4. All customers who were either located in Rome or had a rating above 200.
5. All customers with NULL values in city column.
6. All orders taken on Oct 3Rd and Oct 4th 1997.
7. Largest order taken by each salesperson with order value more than $3000.
8. Select each customer's smallest order.
9. Count the number of salespeople currently listing orders in the order table.
10. All customers serviced by Piyush or Miti.

Practical List - 5

Solve the following using PL/SQL Block.

1. Reverse of a Number
2. Factorial of a number
3. Write a PL/SQL to update the rate field by 20% more than the current rate in inventory table which has the following fields: Prono, ProName and Rate. After updating the table a new field (Alter) called for Number of item and place for values for the new field without using PL/SQL block.
4. Write a PL/SQL to split the student table into two tables based on result (One table for ―Pass‖ and another for ―Fail‖). Use cursor for handling records of student table. Assume necessary fields and create a student details table.

FOURTH SEMESTER

B18CA4010	DATA MINING & DATA WAREHOUSING	L	T	P	C
Duration:60Hours		4	0	0	4

Course Objectives:

- Relate data Mining principles and techniques and introduce Data Mining as a cutting edge business intelligence.
- Discover interesting patterns, to analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- Identify Applications and Trends of Data mining.
- Expose the students to the concepts of Data Warehousing Architecture and Implementation.

Course Outcomes:

After Completion of the course, the students will be able to,

- Discover and measure interesting patterns from different kinds of databases (Level 3).
- Evolve Multidimensional Intelligent model from typical system (Level 4).
- Discover the knowledge imbibed in the high dimensional system (Level 1).
- Evaluate various mining techniques on complex data objects Level 4).

Course Content:

UNIT I **15 Hours**

Data Mining–Introduction - Basic data mining tasks – data mining versus knowledge discovery in databases – Data mining issues – Data mining metrics – Social implications of data mining – Data mining from a database perspective. **Data Mining Techniques:** Introduction – A Statistical Perspective on data mining – Similarity Measures – Decision Trees.

UNIT II **15 Hours**

Classification: Introduction – Issues in Classification - Statistical – based algorithms - Distance – based algorithms – Decision tree - based algorithms.**Clustering:** Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms: Agglomerative Algorithms – Divisive Algorithms - Partitioned Algorithms: Minimum Spanning Tree – Squared Error Clustering algorithm – K-Means Clustering – Nearest neighbor algorithm.

UNIT III **15 Hours**

Association Rules: Introduction - Large item sets - Basic algorithms: Apriori algorithm –Advanced Association Rules Techniques – Measuring the quality of rules. **Data Mining Applications:** Data Mining for Financial Data Analysis - Data Mining for the Retail Industry - Data Mining for the Telecommunication Industry - Data Mining for Intrusion Detection.

UNIT IV **15 Hours**

Data Warehouse Basic Concepts : What is a Data Warehouse – Differences between operational database systems and Data Warehouses – Multi-tiered Architecture – Data Warehouse models – Extraction, Transformation and Loading – Metadata repository.

Data Warehouse Modeling: Data Cube and OLAP – Data cube: A Multidimensional Data model – Schemas for multidimensional data models – Dimensions: The role of concept hierarchies – Measures: Their categorization and computation – Typical OLAP operations.

Text Books:

1. Margaret H. Dunham, "DATA MINING INTRODUCTORY AND ADVANCED TOPICS", Pearson education, 2003. (Units 1, 2 and 3)
2. Jiawei Han, Micheline Kamber & Jian Pei, "DATA MINING CONCEPTS AND TECHNIQUES", Morgan Kaufmaan Publishers, 2011. (Unit 3 and 4)

Reference Books:

1. ArunK.Pujari, "DATA MINING TECHNIQUES", Universities Press (India) Pvt. Ltd., 2003.
2. Alex Berson, Stephen J. Smith, "DATA WAREHOUSING, DATA MINING & OLAP", TMCH, 2001.
3. G. K. Gupta, "INTRODUCTION TO DATA MINING WITH CASE STUDIES", Easter Economy Edition, Prentice Hall of India, 2006.
4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "INTRODUCTION TO DATA MINING", Pearson Education, 2007.

B18CA4020	SOFTWARE ENGINEERING	L	T	P	C
Duration:60Hours		4	0	0	4

Course Objectives:

- To classify the various Software Process Models.
- To analyze a given problem and identify requirements.
- To design a software using standard software engineering techniques.
- To apply well defined software testing strategies to produce quality software.

Course Outcomes:

After the completion of the course the student will be able to:

- To define and understand the concepts, technologies used in the field of software engineering and various types of Models in software engineering.
- To explain and analyze the different types of requirements which are gathered and model them based on various methods which are available.
- To apply and identify the solutions through domain knowledge using the different design concepts which are available.
- To understand, analyze, apply the software tools used for software quality assurance and software testing.

Course Content:

UNIT I **15 Hours**

Introduction: The Nature of Software, Software Engineering, the Software Process, and Process Models: A Generic Process Model: Defining a Framework Activity, Identifying a Task Set. Process Assessment and Improvement, Perspective Process Models: The Waterfall Model, Incremental Process Model, Evolutionary Process Models.Agile Development: What is Agility? Agility and the Cost of Change, Agile Process: Agility Principles, Human Factors, Extreme Programming (XP), Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic System Development Method(DSDM), Crystal, Feature Driven Development(FDD).

UNIT II **15 Hours**

Requirements Modeling: Understanding Requirements: SRS Template (Example Case Study) ,Developing Use Case, Requirements Modeling: Requirements Analysis, Scenario Based Methods, UML Models That Supplement the Use Case, Class-Based Methods, Behavior, Flow oriented models – DFD's and Web/Mobile Apps.

UNIT III **15 Hours**

Design Concepts: Design Concepts: The Design Process, Design Concepts, The Design Model, User Interface Design: The Golden Rules, User Interface Design Patterns. WebApp Design: Design Goals, A design pyramid for web app, WebApp interface design.

UNIT IV **15 Hours**

Software Quality Assurance and Software Testing: Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics, Six Sigma for Software Engineering, Software Reliability.
Software Testing: Humans and Errors, Bugs, Faults and Failures, Purpose of Software Testing, Testing Techniques, Types of Testing, Basic Concepts and definitions. Testing life Cycle, Software Testing Verification and Validation Techniques, Static Testing, Testing Tool: Introduction, Automation Testing Framework, Types of automation tools, Case Study, Test Planning.

Text Books:

1. Roger S. Pressman, "SOFTWARE ENGINEERING, A PRACTITIONER'S APPROACH", 7th Edition, McGRAW-HILL Publication, 2010. (Unit I – IV) (Chapters: 1, 2, 3, 5, 6, 7, 8, 11, 13, 16)
2. Sandeep Desai, Abhishek Srivastava,"SOFTWARE TESTING : A PRACTICAL APPROACH", 2nd Edition, PHI Learning Pvt Ltd, 2016 (Unit IV –Software Testing) (Chapters: 1, 2, 3, 4, 6, 7)

Reference Books:

1. Ian Somerville,"SOFTWARE ENGINEERING", 9th edition, Pearson education.
2. Stephen Schach, "SOFTWARE ENGINEERING", 7th ed, McGraw-Hill, 2007.

Case Study for SRS:

The railway reservation system functions as follows;

1. The passenger is required to fill in a reservation form giving detail of his journey. The counter clerk ensures whether the place is available. If so, entries arc made in i register, tickets are prepared, amount is computed and cash is accepted. A booking statement is prepared in triplicate format from the reservation register. One copy of it is retained as office copy; the other is pasted on compartment and third is passed on to the train conductor. Besides booking statement, cash statement is prepared at the end of each shift.
2. Prepare SRS and system specification for above system.

B18CA4030	OPERATING SYSTEMS WITH LINUX	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- Enabling Knowledge: the operation, implementation and performance of modern operating systems, and the relative merits and suitability of each for complex user applications
- Critical Analysis: Ability to compare, contrast, and evaluate the key trade-offs between multiple approaches to operating system design, and identify appropriate design choices when solving real-world problems
- Expose the design of the LINUX operating system.
- Illustrate various commands of the LINUX OS.
- Demonstrate the different types of filters used in LINUX.

Course Outcomes:

On completion of this course, students will be able to

- Identify the basic principles adopted in the design of modern operating systems.
- Explain the objectives and functions of modern operating systems.
- Describe how computing resources are used by application software and managed by system software.
- Analyze, Design and interpret the concepts of shell programming.

Course Content:

UNIT I **15 Hours**

Introduction: Batch Systems, Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems, Operating System Structures, Components & Services, System calls,. **Process Management:** Process Concept, Process Scheduling, Threads, Inter process communication, CPU Scheduling Criteria, Scheduling algorithm, Multiple Processor Scheduling,. The Critical Section Problem, Synchronization hardware, Semaphores, Classical problems of synchronization

UNIT II **15 Hours**

Dead locks – system model, Characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock,. Memory Management: Logical and Physical address space, Swapping, Contiguous allocation, Paging, Segmentation, Virtual memory-Demand paging and its performance, Page replacement algorithms, Allocation of frames.

UNIT III **15 Hours**

Introduction and Interacting with shell and Desktop to Linux: Introduction and Installing of Red Hat and Ubuntu Linux Operating System, History, salient features, Linux system architecture, Linux command format, Linux internal and external commands, Directory commands, File related commands, Disk related commands, general utilities. shell types, shell command line processing, shell script features, executing a shell script, system and user-defined variables, expr command, read and echo statement, command substitution, escape sequence characters, shell script arguments, positional parameters, test command, file test, string test, numeric test.

UNIT IV **15 Hours**

Basic Linux Administration : Conditional Control Structures-if statement, case statement Looping Control Structure-while, until, for, statements. Jumping Control Structures – break, continue, and exit. Special Tools and Utilities: Filters, Stream editor SED and AWK, Linux System Communication: Introduction, write, read, wall commands, sending and handling mails. System Administration: Roles of a System Administrator,

Text Books:

1. Abraham Silberschatz and Peter Baer Galvin, "OPERATING SYSTEM CONCEPTS", 8th Edition, Pearson Education, 2002. [chapter : 1,2,3,4,5,6,7,8,]
2. M.G.Venkateshmurthy, "INTRODUCTION TO UNIX & SHELL PROGRAMMING", First Edition, Pearson Education, 2004. [chapter 8,9,12]
3. Richard Petersen, "THE COMPLETE REFERENCE LINUX " sixth Edition Petersen Tata McGraw Hill [chapter 1]
4. Kernighan B W & Robert B, "THE UNIX PROGRAMMING ENVIRONMENT".

Reference Books:

1. H.M.Deitel, "OPERATING SYSTEMS", Pearson Learning Solutions, 3rd Edition, 2003.
2. William Stallings, "OPERATING SYSTEMS", 6th Edition, Pearson Education, 2010.
3. Sumithaba Das, "UNIX: CONCEPTS AND APPLICATIONS"
4. ArchanaVerma, "UNIX AND SHELL PROGRAMMING", Firewall Media.

B18CA4040	PYTHON PROGRAMMING	L	T	P	C
Duration:60 Hours		2	1	0	3

Course Objectives:

- Define the implementation of python language
- Identify various features in python
- Solve the given problem using the syntactical structures of python language.

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Understand the Basic Terminologies used in python programming
- Comprehend Branching and Looping statements in Python Programming
- Apply the concept of Functions in Problem solving.
- Implement the concepts of Classes, Objects & Inheritance

Course Content:

UNIT I **15 Hours**

Introduction to Python: Introduction of python, origin, Programming Basics and Strings, Numbers and Operators, Variables Names for Values, Program Files, Directories ,Changing Data Through Names**,** Copying Data**,** Accessing a Tuple Through Another Tuple.

UNIT II **15 Hours**

Decision making in Python: Making Decisions: Comparing Values for Sameness, Comparing Values for Difference, More Than or Equal, Less Than or Equal**,** Reversing True and False, Repetition, Handling Errors**.**

UNIT III **15 Hours**

Functions in Python: Functions: Grouping Code under a Name, Describing a Function in the Function**,** Layers of Functions

UNIT IV **15 Hours**

Classes and Objects in Python: Classes and Objects: What is an Object, Defining a Class, Creating an Object from the Class, Objects and their Scope, Inheritance, Overriding a method, Writing simple programs using classes and object sin Python.

Text Books:

1. Bill Lubanovic, "Introducing Python", Oriely Publications, 1st Edition, (chapters 1-6).
2. Michael Dawson, "Python Programming for absolute beginners", Course Technology-A part of CENGAGE Learning, 3rd Edition.

B18CA4051	MOBILE COMPUTING	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Identify the basic concepts of mobile computing.
- Familiar with the network protocol stack.
- Illustrate the basics of mobile telecommunication system.
- Exposed to Ad-Hoc networks.
- Explore about different mobile platforms and application development.

Course Outcomes:

At the end of the course, the student should be able to:

- Explain the basics of mobile Computing
- Describe the functionality of Mobile IP and Transport Layer
- Classify different types of mobile telecommunication systems
- Demonstrate the Adhoc networks concepts and its routing protocols
- Make use of mobile operating systems in developing mobile applications

Course Content:

UNIT I **15Hours**

Introduction: Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

UNIT II **15Hour**

Mobile Internet Protocol And Transport Layer: Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP-Adaptation of TCP Window – Improvement in TCP Performance.

UNIT III **15Hour**

Mobile Ad Hoc Networks: A Few Basics Concepts, How is an Ad Hoc Network Set Up without the Infrastructure Support- Why is Routing in a MANET a Complex Task? -Battery Basics - Characteristics of Mobile Ad Hoc Networks (MANETs) - MANET Operational Constraints - Applications of MANETs- MANET Design Issues- Routing - Essentials of Traditional Routing Protocols, Link State Protocols (LSP) -Distance Vector (DV) Protocols -Routing in MANETs: A Few Basic Concepts, Routing in MANETs vs. Routing in Traditional Networks- A Classification of Unicast MANET Routing Protocols - Features of MANET Routing Protocols -Security Issues in a MANET.

UNIT IV **15Hour**

Mobile Platforms And Applications: Basic Concepts, Mobile Device Operating Systems – Special Constrains & Requirements, A survey of Commercial Mobile Operating Systems –windows mobile, palm OS, Symbian,iOS, Android, BlackBerry, OS for Sensor Networks.

Text Book:

1. Prasant Kumar Pattnaik, Rajib Mall, "FUNDAMENTALS OF MOBILE COMPUTING", PHI Learning Pvt. Ltd, New Delhi – 2012.(unit 1 to 4)

Reference Books:

1. Jochen H. Schller, "MOBILE COMMUNICATIONS", Second Edition, Pearson Education, New Delhi, 2007.
2. Dharma PrakashAgarval, Qing and AnZeng, "INTRODUCTION TO WIRELESS AND MOBILE SYSTEMS", Thomson Asia Pvt Ltd, 2005.
3. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "PRINCIPLES OF MOBILE COMPUTING", Springer, 2003.
4. William.C.Y.Lee,"MOBILE CELLULAR TELECOMMUNICATIONS-ANALOG AND DIGITAL SYSTEMS", Second Edition, Tata McGraw Hill Edition ,2006.
5. C.K.Toh, "ADHOC MOBILE WIRELESS NETWORKS", First Edition, Pearson Education, 2002.
6. Android Developers : http://developer.android.com/index.html

B18CA4052	COMPUTER GRAPHICS	L	T	P	C
Duration:60hours		2	1	0	3

Course Objectives:

- Explain the procedure to design of graphics systems for Two Dimensional and Three dimensional graphics with their transformation, viewing and clipping techniques
- Provide a comprehensive introduction to computer graphics with applications
- Illustrate both graphics hardware and graphics software
- Introduces 3D graphics display methods and object representation.

Course Outcomes:

- Recall basic algebra using mathematics and conceptualize the basics of computer graphics, analyze different graphics systems and applications of computer graphics
- Implement and analyze various algorithms for creating geometric primitives and construct novel and complex geometric shapes
- Compare and Apply various basic geometric transformations on graphics objects and their application in composite form and Extract scene with different clipping
- Explore projections and visible surface detection techniques for display of 3D

Course Content:

UNIT I **15 Hours**

A Survey of Computer Graphics, Overview of Graphics Systems: Video Display Devices, Refresh Cathode-Ray Tubes, Raster-Scan Displays, Random Scan Displays, Color CRT Monitors, Input Devices. Output Primitives: Points and Lines, Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Circle-Generating Algorithms, Properties of Circles, Midpoint Circle Algorithm.

UNIT II **15 Hours**

Two Dimensional Geometric Transformations:BasicTransformation, Matrix Representations and Homogeneous co-ordinates- Composite Transformations, Other Transformations

UNIT III **15Hours**

Two Dimensional Viewing& Clipping: The Viewing Pipeline- Viewing Coordinate Reference Frame, Window-to-Viewport Coordinate Transformation, Clipping Operations, Point Clipping, Line Clipping: Cohen-Sutherland Line Clipping, Polygon Clipping: Sutherland-Hodgeman Polygon Clipping, Curve Clipping, Text Clipping, Exterior Clipping

UNIT IV: **15Hours**

Three Dimensional Graphics: Three Dimensional Concepts: Three Dimensional Display Methods, Three Dimensional Object Representations: Polygon Surfaces, Polygon Tables, Plane Equations, Polygon Meshes, Bezier Curves and Surfaces, Octrees. Three Dimensional Geometric and Modeling Transformations

Text Book:

1. Donald Hearn & M. Pauline Baker, "COMPUTERGRAPHICS CVERSION", Second Edition, Pearson, 2013 (Chapter 1, 2,3,5,6,9,10& 11)

Reference Books:

1. YeshwantKanetkar, "GRAPHICS UNDERC", BPB publications, 2003.
2. J.D. Foley, A.V.Dam, S.K. Feiner & J.F. Hughes, "COMPUTERGRAPHICS", Addison Wesley ,1996
3. Cooley, "THEESSENCEOFCOMPUTERGRAPHICS", Prentice Hall, 2000.

B18CA4053	ARTIFICIAL INTELLIGENCE	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Relate the Artificial Intelligence principles and techniques
- Introduce the facts and concepts of cognitive science by computational model and their applications
- Explore problem-solving paradigms, search methodologies and learning algorithms
- Develop intelligent systems by assembling solutions to concrete computational problems.
- Explore the role of knowledge representation, problem solving, and learning in intelligent-system engineering.

Course Outcomes:

On successful completion of this module, students should be able to:

- Apply knowledge of computing and mathematics appropriate to the discipline
- Analyze a problem, identify and define the computing requirements appropriate to its solution
- Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- Design efficient algorithm to achieve optimized solution in complex situation
- Apply heuristic methodologies in state-space problems
- Characterize various ways to represent the environmental knowledge and to infer from it.

Course Content:

UNIT I **15 Hours**

Artificial Intelligence: Definition**,** AI Problems-Task Domains of Artificial Intelligence; The Underlying Assumption - Physical Symbol System Hypothesis; AI technique - Knowledge properties, Knowledge Representation.**Problems, Problem Spaces and Search:** Steps in building a System; Production Systems; Control Strategies-Requirements of a good control strategy; Problem Characteristics; Production System Characteristics; Issues in the Design of Search programs.**Heuristic search techniques:** Generate-and-test, Hill Climbing-Simple Hill Climbing, Best First Search, Constraints satisfactions.

UNIT II **15 Hours**

Planning: Components of a Planning System, Goal Stacks Planning - A very Simple Blocks World Problem; Reactive Systems; Other Planning techniques.**Knowledge Representation:** Introduction, Definition, Importance, Representation and Mappings-mappings between facts and representations, Representation of Facts; Approaches to Knowledge Representation-Properties, Types of Knowledge; Issues in Knowledge Representation-Important Attributes, Relationship among Attributes.

UNIT III **15 Hours**

Symbolic Reasoning under Uncertainty: Introduction to Non monotonic Reasoning; Logics for Non monotonic Reasoning-Default Reasoning and Minimalist Reasoning; **Learning:** Introduction, Different methods of Learning – Rote Learning, Inductive Learning, Reinforcement Learning, Unsupervised Learning, Supervised Learning, Analogy – Derivational and Transformational; **Expert Systems**: Introduction, Rule based and Knowledge based, knowledge acquisition, Maintenance and Manipulations.

UNIT IV **15 Hours**

Parallel and Distributed AI: Psychological modeling; Parallelism in Reasoning Systems; Distributed Reasoning Systems

Prolog: Introduction; Converting English to Prolog Facts and Rules; Goals; Prolog Terminology; Variables; Control Structures; Arithmetic Operators; Matching in Prolog; Backtracking; Recursion.

LISP: Introduction, Syntax and Numeric Functions, Basic List Manipulation Functions, Functions, Predicates and Conditionals Input, Output and Local variables, Iteration and Recursion, Property List and Arrays.

Text Books:

1. Elaine Rich, Kevin Knight, Shivashankar B Nair, ”Artificial Intelligence”, 3rd Edition, Tata McGraw Hill, 2013 – (Chapter 1 to 7 and Chapter 13 to 17).
2. Dan W. Patterson, “ Introduction to Artifiial Intelligence and Expert Systems”, Prentice Hall of India, 2006 – (Chapter 4,5,6 and 11).

Reference Books:

1. Jean-Louis Ermine, ”Expert Systems : Theory and Practice”, Prentice Hall of India, 1995
2. Stuart Russel, Peter Norvig, “Artificial Intelligence: A Modern Approach”, 3rd Pearson 3rd edition 2013.

B18CA4061	CLOUD COMPUTING	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Introduce the broad perceptive of cloud architecture and model
- Explain the concept of Virtualization and design of cloud Services
- Identify and familiar with the lead players in cloud.
- Explain the features of cloud simulator
- Apply different cloud programming model as per need.
- Design the trusted cloud Computing system

Course Outcomes:

- 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 **15 Hours**

Fundamentals of Cloud Computing: 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.

UNIT II **15 Hours**

Fundamental concept and Models: Basics of Virtualization, Characteristics of virtualized environments, Taxonomy of virtualization techniques, - Types of Virtualization, Virtualization and cloud computing.

UNIT III **15 Hours**

Cloud Infrastructure Mechanisms and Architecture: 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 Open Stack, Aneka.

UNIT IV **15 Hours**

Cloud Applications and parallel programming paradigms: Scientific applications, Healthcare: ECG analysis in the cloud, Biology: protein structure prediction, Geo science: satellite image processing, Business and consumer applications, CRM and ERP, Social networking, media applications. Open cloud platforms AWS, Distributed file systems (HDFS) and the cloud, Cloud storage systems, Introduction to NoSQL databases. Programming Models: Map Reduce.

Text Book:

1. RajkumarBuyya, Christian Vechiolla, ThamaraiSelvi, "MASTERING CLOUD COMPUTING", Elsevier publications, 2013, USA. Unit 1: Chapter 1,Unit 2: Chapter 3,5.1, Unit 3:Chapter 4, Unit 4:Chapter 8.1,9.1,and 10.

Reference Books:

1. Rajkumar Buyya, James Broberg, Andrzejgoscinski, "CLOUD COMPUTING: PRINCIPLES AND PARADIGMS**",** Wiley, India.
2. Kai Hwang, Geoffrey C Fox, Jack G Dungaree, "DISTRIBUTED AND CLOUD COMPUTING FROM PARALLELPROCESSING TO THE INTERNET OF THINGS", Morgan Kaufmann Publishers, 2012.
3. Thomas Erl, Zaigham,Mahmood, Ricardo Puttini, "CLOUD COMPUTING:CONCEPTS, TECHNOLOGY & ARCHITECTURE", Prentice Hall/Pearson.

B18CA4062	**ADVANCED COMPUTER NETWORKS**	**L**	**T**	**P**	**C**
Duration:60Hours		**2**	**1**	**0**	**3**

Course Objectives:

- Identify and work on different routing protocols
- Propose knowledge of Internetworking
- Describe different types of routing mechanisms
- Describe the Transport layer protocols and its functionality.
- Understand motivation, parameters and Functions of Quality of service.

Course Outcomes:

- Expose the fundamentals of data communications and networks by gaining knowledge of data transmission concepts.
- Analyze the computer network with suitable network protocols and routing algorithms.
- Analyze different routing protocols and traffic engineering methods deployed in networking.

Course Content:

UNIT I **15Hours**

Transmission Networks : Introduction, PDH Networks, SONET/SDH Networks, DWDM Network, Wireless Transmission: Wireless media, Wireless Systems, Spread Spectrum Technology.

UNIT II **15 Hours**

Routing and Internet Protocol: Routing, Static routing, Dynamic routing, Distance Vector Routing Algorithm, Link State Routing, Open Shortest Path First Routing protocol.
Address types of the TCP/IP stack, IP Address format, IPv4 Packet Format, Hierarchical Addressing, Sub netting, ICMP, IPv6.

UNIT III **15Hours**

End-To-End Protocols: Simple De-multiplexer (UDP), Reliable Byte Stream (TCP), Remote Procedure Call, Congestion Control and Resource Allocation-Issues in Resource Allocation, Queuing Disciplines, TCP Congestion Control.

UNIT IV **15 Hours**

Quality Of Service: Motivation for QoS, Parameters, Functions required for supporting QoS, Traffic Control, Leaky Bucket algorithm, Token Bucket Algorithm, Explicit Congestion Notification (ECN), Resource Reservation Protocol(RSVP).

Text Books:

1. Natalia Olifer, Victor Olifer, "COMPUTER NETWORKS", First Edition, John Wiley, 2015. UNIT-1: Chapter 10, 11
2. Larry & Peterson & Bruce S Davis, "COMPUTER NETWORKS-A SYSTEM APPROACH", 5th Edition, Elsevier Inc, 2014. Chapter 4, 5, 6.
3. Prakash C Guptha, "DATA COMMUNICATIONS AND COMPUTER NETWORK", Second Edition, PHI learning Pvt Ltd, Nov 2014. Chapter 23.

Reference Books:

1. BehrouzFerouzan "INTRODUCTION TO DATA COMMUNICATION &NETWORKING", 5th Edition, McGraw Hill Education Pvt Ltd 2013

2. Andrew S Tanenbaim, "COMPUTER NETWORKS", Pearson Education, 5th Edition, Elsevier Inc, 2014.

B18CA4063	SOFTWARE PROJECT MANAGEMENT	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Relate the fundamental principles of Software Project management & also have a good knowledge of responsibilities of project manager and to handle the various projects.
- Familiar with the different methods and techniques used for project management.
- Knowledge on the issues and challenges faced while doing the Software project Management.
- Identify the reasons for the software projects failures and how that failure probability can be reduced effectively.
- Plan the Project Scheduling, Tracking, Risk analysis, Quality management.
- Estimate the Project Cost using different techniques.

Course Outcomes:

- Knowledge about convention software management and analyse, evaluate software economics problem.
- Explain and Design the life cycle phases with respect to aritifacts and model based software architecture.
- Analyze the different work flow of the process and interpret iterative process planning design and applying it to specific project.
- Evaluate Process automation and apply automation to project environment to solve the problem.

Course Content:

UNIT I **15 Hours**

Conventional Software Management: The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software Economics, pragmatic software cost estimation. **The old way and the new:** The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

UNIT II **15 Hours**

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts,

programmatic artifacts. **Model based software architectures:** A Management perspective and technical perspective.

UNIT III **15 Hours**

Work Flows of the process: Software process workflows, Iteration workflows. **Checkpoints of the Process:** Major Mile Stones, Minor Milestones, Periodic status assessments. **Iterative Process Planning:** Work breakdown structures, Planning guidelines, The Cost and Schedule Estimating Process, The Iteration planning process, Pragmatic planning. **Project Organizations and Responsibilities:** Line-of-Business Organizations, Project Organizations and Evolution of Organizations.

UNIT IV **15 Hours**

Process Automation: Automation Building Blocks, the Project Environment. **Project Control and Process instrumentation:** The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation.

Text Book:

1. Walker Royce,"SOFTWARE PROJECT MANAGEMENT- A UNIFIED FRAME WORK", Pearson Education, 2013. (Chapters: 01, 02, 04 to 13)

Reference Books:

1. Bob Hughes, Mike Cotterell & Rajib Mall, "SOFTWARE PROJECT MANAGEMENT", FIFTH Edition, Tata McGraw Hill, 2016.
2. Ramesh, Gopalaswamy, "MANAGING GLOBAL PROJECTS", Tata McGraw Hill, 2001.

B18CA4070	SOFT SKILLS TRAINING	L	T	P	C
Duration:30Hours		2	0	0	2

Note: The students will have to undergo Skill Development course being conducted by Training and Placement cell of the University.

B18CA4080	LINUX LAB	L	T	P	C
Duration:30Hours		0	0	2	2

Course Content:

PART A

Write Shell programs for the following:

1. To count the number of characters in a given string
2. To find whether the given year is leap year or not
3. To check whether a given number is even or odd
4. To find the factorial of a given number.
5. To count the number of vowels and consonants in a given string.
6. To print all prime numbers between m and n (m<n).
7. To check whether a given string is a palindrome or not.
8. To generate the Fibonacci series.
9. To find the sum of series of n numbers.
10. To find the maximum and minimum from the list of given n numbers .

PART B

1. Write a Shell script to perform basic arithmetic operations.
2. Write a shell script that displays all the files in the current directory.
3. To write a shell script that creates a file and compresses it.
4. Write a script to convert the contents of a given file from uppercase to lowercase and also count the number of lines, words and characters of the resultant file.
5. Write a shell script to find the reverse of a given number.
6. Write a shell script to find the sum of digits of a given number.

B18CA4090	PYTHON PROGRAMMING LAB	L	T	P	C
Duration:30 Hours		0	0	2	2

Course Contents:

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

1. Design Jumble Game. Enjoy Playing it.
2. Design Guess My Number Game. Check if you are able to guess the correct Number.

FIFTH SEMESTER

B18CA5010	OOAD USING UML	L	T	P	C
Duration:60Hours		4	0	0	4

Course Objectives:

- Introduce the concept of Object-oriented design
- Acquire knowledge of Basic UML Concepts, Life Cycle of Object oriented Development, Modeling Concepts
- Produce conceptual models for solving operational problems in software and IT Environment using UML
- Analyze the development of Object Oriented Software models

Course Outcomes:

- To understand the object-based view of systems and inculcate necessary skills to handle complexity in software design.
- Ability to analyze and model software specifications.
- Ability to abstract object-based models for generic software systems.
- Ability to deliver robust software components.

Course Content:

UNIT I **15 Hours**

Modeling Concepts & Class Modeling: Introduction to OO development, OO themes; Evidence for usefulness of OO development; OO modeling history, Modeling as Design Technique: Modeling; abstraction; The three models. Object and class concepts; Link and associations concepts; Generalization and inheritance; A sample class model; Navigation of class models; Practical tips. Advanced object and class concepts; Association ends; N-array associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived data; Packages;

UNIT II **15 Hours**

State Modeling and Interaction Modeling: State Modeling: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Practical tips. Advanced State Modeling: Nested state diagrams; Nested states; Signal generalization; Concurrency; A sample state model; Relation of class and state models; Interaction Modeling: Use case models; Sequence models; Activity models. Use case relationships; Procedural sequence models; Special constructs for activity models

UNIT III **15 Hours**

System Conception and Analysis: System Conception: Devising a system concept; elaborating a concept; preparing a problem statement. Overview of analysis; Domain class model; Domain state model; Domain interaction model; Iterating the analysis. Application Analysis: Application interaction model; Application class model; Application state model; adding operations.

UNIT IV **15 Hours**

System Design and Class Design: Overview of system design; Estimating performance; Making a reuse plan; Breaking a system in to sub-systems; Identifying concurrency; Allocation of sub-systems; Management of data storage; Handling global resources; Choosing a software control strategy; Handling boundary conditions Class Design: Overview of class design; Bridging the gap; Realizing use cases; Designing algorithms; Recording downwards, Refactoring; Design optimization; Reification of behavior.

Text Books:

1. Michael Blaha, James Rumbaugh, "OBJECT-ORIENTED MODELING AND DESIGN WITH UML",2nd Edition, Pearson Education / PHI, 2005. (Chapters 1 to 9, 11 to 14.10,15.1 to 15.8)
2. Frank Buschmann, RegineMeunier, Hans Rohnert, Peter Sommerlad, Michael Stal, "PATTERN-ORIENTEDSOFTWARE ARCHITECTURE, A SYSTEM OF PATTERNS", Volume 1, John Wiley and Sons, 2006. (Chapters 1, 2.4, 3)

Reference Books:

1. Grady Booch, "OBJECT-ORIENTED ANALYSIS AND DESIGN WITH APPLICATIONS", 3rd Edition, Pearson,2007.
2. Mark Priestley, "PRACTICAL OBJECT-ORIENTED DESIGN WITH UML", 2nd Edition, Tata McGraw-Hill, 2003.
3. K. Barclay, J. Savage, "OBJECT-ORIENTED DESIGN WITH UML AND JAVA", Elsevier, 2008.
4. Booch, G, Rumbaugh, J and Jacobson, I, "THE UNIFIED MODELING LANGUAGE USER GUIDE", 2 nd Edition, Pearson, 2005.
5. E. Gamma, R. Helm, R. Johnson, J. Vlissides, "DESIGN PATTERNS-ELEMENTS OF REUSABLE OBJECT- ORIENTED SOFTWARE", Addison-Wesley, 1995.
6. Michael R Blaha, James R Rumbaugh, "OBJECT ORIENTED MODELING AND DESIGN WITH UML", 2nd Edition, Prentice Hall, 2004

B18CA5020	.NET PROGRAMMING USING C#	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Knowledge about different Object Oriented Features.
- Identify disconnected architecture of .Net.

Course Outcomes:

- Define the procedure to minimize code repetition.
- Illustrate to Comment code where appropriate.
- Debug an application using breakpoints and Try/Catch/Finally blocks.
- Incorporate .NET Framework classes into a C#.NET application

Course Content:

UNIT I **15 Hours**

Introduction: Introduction to .Net, Two tier and Three tier client server model, .Net Architecture, Features of .Net, Advantages of .Net, .Net Framework, CLR, CTS, CLS, Assemblies, Memory management issues – Garbage Collector and collection process, Exception Handling, Code Access Security

UNIT II **15 Hours**

C# Languages Fundamentals: Need of c# ,C# pre-processor Directives , Features of C# , Creating a Simple c# Console Application, Identifiers and keywords , Data Types ,Variables and Constants Value type and reference types ,Boxing and un boxing types , Iterators Constructs ,Control flow constructs Arrays , C# Enumerations.

UNIT III **15 Hours**

Object- oriented Programming with C#: Namespaces, Class and objects, using this keyword, creating array of objects, defining partial Classes and Methods,Properties,Constructors and Destructors Static classes and static method, static variables Encapsulations using properties ,Inheritances ,Interface, Exception Handling

UNIT IV **15 Hours**

Graphical User interface with Windows Forms: Event Handling Control properties and layout labels, Textboxes ,buttons, Group boxes and panels , checkboxes and radio button, Tooltips, List Box and Combo Box ,Group boxes Mouse-Even handling, Keyboard –Event Handling ,Understanding ADO.NET and Creating Connection string.

Text Books:

1. BlackBook,"NET4.0 Programming(6-in-1)", Kogent Learning Solution Inc, Wiely-Dream Tech Press [chapter 1,10,11,12,19]
2. PaulDeitel and Harvey Deitel, "C#2010 for Programmers",4th Edition, Pearson Education.

B18CA5030	WEB TECHNOLOGY	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Describe rich internet applications that use most recent client-side programming technologies.
- Apply client-side validations using Java Script.
- Capture core technical skills necessary for a complete understanding of front-end web development, including HTML5 and CSS, JavaScript, DOM.

Course Outcomes:

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

- Apply different elements of html in webpage
- Classify functionality of internet and web system
- Analyze various properties of CSS in HTML
- Demonstrate form controls in HTML and pattern matching using regular expressions
- Construct events handlings in JavaScript
- Analyses dynamic documents with JavaScript

Course Content:

UNIT I **15 Hours**

Fundamentals of Web: Fundamentals of Web: A Brief Introduction to the Internet, The World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators, Multipurpose Internet Mail Extensions, The Hypertext Transfer Protocol.**Introduction to XHTML**: Basic Syntax, Standard

XHTML Document Structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Forms, Syntactic Differences between HTML and XHTML.

UNIT II **15 Hours**

CSS & Basics of JavaScript: CSS: Levels of Style Sheets, Style Specification Formats, Selector Forms, Property Value Forms, Font Properties, List Properties, Color, Alignment of Text, The Box Model, Background Images, The and Tags, Conflict Resolution.**The Basics of JavaScript:** Overview of JavaScript, Object Orientation and JavaScript, General Syntactic Characteristics, Primitives Operations and Expressions

UNIT III **15Hours**

JavaScript and XHTML Documents JavaScript: Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Pattern Matching Using Regular Expressions, Errors in Scripts.**XHTML Documents:** The JavaScript Execution Environment, The Document Object Model, Element Access in JavaScript, Events and Event Handling.

UNIT IV **15 Hours**

Event Handling & Dynamic Documents with Java Script Event Handling: Handling Events from Body Elements, Handling Events from Button Elements, Handling Events from Text Box and Password Elements, The DOM 2 Event Model.**Dynamic Documents with JavaScript:** Introduction, Positioning Elements, Moving Elements, Element Visibility, Changing Colors and Fonts, Dynamic Content, Stacking Elements, Locating the Mouse Cursor, Reacting to a Mouse Click, Slow Movement of Elements.

Text Books:

1. Robert W Sebesta, "PROGRAMMING THE WORLD WIDE WEB", 5th Edition, Pearson Education, 2008**.** (Chapters: 1, 2, 3, 4, 5 and 6)

Reference Books:

1. M.Deitel, P.J.Deitel, A.B.Goldberg, "INTERNET & WORLD WIDE WEB HOW TO PROGRAM", 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates, "WEB PROGRAMMING BUILDING INTERNET APPLICATIONS",3rd Edition, Wiley India, 2006. 3. XueBai et al, "The Web Warrior Guide to Web Programming", Thomson, 2003.
3. Sklar, "THE WEB WARRIOR GUIDE TO WEB DESIGN TECHNOLOGIES", 1st Edition, Cengage Learning India.

B18CA5041	MOBILE APP DEVELOPMENT	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Learn to setup Android application development environment
- Illustrate user interfaces for interacting with apps and triggering actions
- Interpret tasks used in handling multiple activities
- Identify options to save persistent application data

Course Outcomes:

On completion of this course students will be able to:

- To define and understand the concepts, tools used in the developing android applications.
- To Design and develop different types of widgets used in Android Studio.
- To understand, analyze, apply the various tools used for adding extra features to Android Application and make it interactive.
- To apply and identify the solutions through domain knowledge of database and to store data using shared preferences and SQLite.

Course Content:

UNIT I **15 Hours**

Basic Android Concepts Introduction to Android - History of android ,The Open Handset Alliance, Android SDK installation ,Android SDK & their codenames , Advantages of android ,The Android O/S Architecture, Over view of IDE for Android application, What is AVD , How to launch and start the AVD (android virtual device) Managing Application Resources - What are resources, resource value types, storing different resource values types (string, string arrays, Boolean, colors, integer, animation, & menus) Android Application Components - Activities & its life cycle , Services & its life cycle, Broadcast receiver, Content provider, Intents, shutting down component , Android Manifest File in detail ,Use of Intent Filter.

UNIT II **15Hours**

Widgets – User Interface Elements: Form Widgets – Text View, basic Button, Toggle Button, Check Box, Checked Text View, Radio Buttons, Radio Group, Spinner Control, Date Picker, Time Picker , Chronometer, Progress bar, Rating bar, Option menu, Image View Text Fields - Various type of Text Fields (Plain text, Password Text, Numeric Text, Email Text, Phone Text, Multiline Text etc

) Working with various type of dialog - Simple dialog, alert dialog, character picker dialog, date picker dialog, progress dialog , List Dialog, Custom Dialog Toast – (Custom Toast)

UNIT III **15 Hours**

Features of Android: Styles and Themes - Basic Styles & Themes in XML layout Various Layouts - What is layout, Layouts common attribute, Types of Layout (Linear layout, Relative layout, Table layout , Frame layout ,Tab layout) Using Data-Driven Containers - List View, Grid View, and Gallery View (Using the Array Adapter) App widgets - What is app widget, Use of App Widgets, Creating app widget configuration activity

UNIT IV **15 Hours**

Data Storage : Introduction to data storage - Introduction to various storage options available in android system Working with Application Preferences - Creating Private and Shared Preferences, Manipulating with Shared Preferences, Read/Write Data on the Android File System [Internal Storage] Storing Structured Data Using SQLite Databases - Creating a SQLite Database, Creating Tables and Other SQLite Schema Objects, Creating, Updating, and Deleting Database Records, Querying SQLite Databases, Working with Cursors, Closing and Deleting a SQLite Database

Text Book:

1. Rick rogers, John Lombardo, "ANDROID APPLICATION DEVELOPMENT", -O"Reilly (unit 1 & 2)
2. Reto Meier Wrox, "PROFESSIONAL ANDROID 2 APPLICATION DEVELOPMENT" (unit 4)

Reference Books:

1. Lauren Darcey and Shane Conder, "ANDROID WIRELESS APPLICATION DEVELOPMENT", Pearson Education, 2nd edition.
2. ByWei-MengLee, "BEGINNING ANDROID APPLICATION DEVELOPMENT", Wrox Publication.
3. Frank Ableson, Charlie Collins and RobiSen, "UNLOCKING ANDROID DEVELOPER"SGUIDE", Manning Publication Co.

MOBILE APP DEVELOPMENT LAB

1. Display Hello World
2. Add two Edit Text. When a number is entered in Edit Text 1, the square of that number should be displayed in Edit Text 2.
3. Add an Edit Text and a button. When the button is clicked, the text inputted in Edit Text should be retrieved and displayed back to the user.
4. Add two Edit Text and a button. When the button is clicked, the text inputted in Edit Text 1 should be retrieved and displayed in EditText2.
5. Program a calculator

6. Create applications to include Action Bar, Menus, Dialogs and Notifications
7. Create a user login form and registration form. First time users have to register through the registration form and the details should be stored in the database. Then they can login using the login page.

B18CA5042	COMPUTER ANIMATION	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

At the end of this course the learner is expected:

- Visualize the sequence of animation process
- Apply different filters and tools of adobe photoshop to enhance the quality of an image
- Design and develop an animation using selection and transformation tools of flash software
- Apply the action buttons and action frames of flash for creating small movie clips

Course Outcomes:

- Utilize several Flash tools and tactics learned throughout the course to produce an interactive flash based website.
- Demonstrate the ability to effectively utilize the timeline and motion between affects to produce animation

Course Content:

UNIT I **15 Hours**

Animation and Photoshop: Basic Concepts, Specification of Animations, Methods of Controlling Animation, Display of Animation, Transmission of Animation, Virtual Reality Modeling Language, PHOTOSHOP: Fundamentals ,Opening and Importing Images ,Resolution ,Models and Color Spaces ,Layers. PAINTING PIXELS: The Painting Tools, Erasing, Fills, Type. SELECTION AND ALLIED OPERATIONS: Marquee selection and cropping, Lasso Selection, Paths ,Combining and Transforming Selections.

UNIT II **15 Hours**

Adjustments &Retouching And Effects And Filters: Tonal Adjustment, Color Adjustments, Retouching By Hand, Blurring and Sharpening, Special Effects and Distortion, Layer Effects and Layer Styles.

UNIT III **15Hours**

Flash: Animation with Interacting, Basic Concepts, Drawing, Lines and Shapes, Strokes and Fill, Shapes and Brushes, Selection ,Transformation and Reshaping ,Importing Artwork and Manipulating

Images. ANIMATION: Animating One Frame at a Time, Motion Tweening, Symbols and Instances, Shape Tweening, Sound.

UNIT IV **15Hours**

Actions: Buttons, Button action, Frame Action, Action and Movie Clip Symbols, Actions, Browsers and Networks, Beyond the Basic Actions. FLASH MX275: Interface Elements, Panels, Tools, Layer Folders, Accessibility, Video User Interface Components, Changing the Appearance of Components.

Text Books:

1. Nigel Chapman and Jenny Chapman, "PRACTICAL MULTIMEDIA". Wiley ,Dream Tech Pvt. Ltd, 2nd Ed., 2003
2. Ralf Steinmetz, KlaraNarstedt, "MULTIMEDIA FUNDAMENTALS", Media Coding and Content Processing, 2nd Edition, Pearson Education, 2007.(chapter:6)

Reference Books:

1. Thiagharajan and Anbumani, "FLASH MX 2004", Tata McGraw Hill, New Delhi.
2. Laurie Ulrich Fuller and Robert C. Fuller, "PHOTOSHOP CS3 BIBLE", Willey India Pvt. Ltd.

ANIMATION LAB

1. Design a poster with images and text using Photoshop
2. Overlap multiple images with different opacities using concept of layers using Photoshop
3. Demonstrate different selection tools by applying on a image using Photoshop
4. Demonstrate different filters using Photoshop
5. Create a gif file using Photoshop
6. Create an animation using flash for growing moon
7. Create an animation using flash for with two balls
8. Procedure to create an animation with the following features. WELCOME * Letters should appear one by one * The fill color of The text should change to a different color after the display of the full word
9. Procedure To Create An Animated Cursor Using Start drag ("Ss", True); Mouse.Hide()
10. Design A Visiting Card Containing At least One Graphic And T

B18CA5043	MACHINE LEARNING	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

- Describes the basic components of Machine Learning with concepts of Python
- Differentiates 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:

- Understand the fundamental concepts and theories of Machine Learning
- Analyze and Apply techniques of Supervised machine learning and solve the real world problems
- Interpret and Apply Unsupervised Machine Learning algorithms for specific problems.
- Understand the Reinforcement Learning Technique and Understand Q Learning.

Course Content:

UNIT I **15 Hours**

Introduction: 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, Support Vector Machines (SVM) Algorithms. Neural Networks (deep learning), 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 and agglomerative clustering, comparison of 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 Algorithm, relations ship to dynamic programming, discussions on Case studies

Text Books:

1. Andreas C Muller & Sarah Guidp, "Introduction of Machine Learning with Python", O'Reilly & Shroff publishers. Chapters 1, 2 and 3.
2. Tom M Mitchell, "Machine Learning", McGraw Hill Education publication – 2013. Chapter 13.
3. Peter Flach, "Machine Learning: The Art and Science of algorithms", Cambridge University Press, Chapter 12.

References Books:

1. Ethem Alpaydin, "Machine Learning", PHI learning private limited. Chapter 1, 7, 16, 18, 19
2. David barber and Bayesian, "Reasoning and Machine Learning", Cambridge University Press. Chapter 13, 15
3. Olivier Chapelle, Bernhard Sch¨olkopf and Alexander Zien, "Semi-Supervised Learning", MIT Press Cambridge
4. Trevor Hastie, Robert Tibshirani and Jerome Friedman, "The Elements of Statistical Learning", Springer 2017 publication.

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

B18CA5051	SOFTWARE TESTING& QUALITYASSURANCE	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Explain the concepts and process of testing activates that occur within the process.
- Describe the various Testing Technique and Design different type of Test cases.
- Characterize the look and feel and usage aspects of Usability and Accessibility Testing.
- Analyze the different perspective of test metrics and measurements.

Course Outcomes:

- Knowledge about testing principles and analyze, evaluate software Development life cycle models.
- Explain and Design the test case for black box, white box and integration testing
- Analyze system, acceptance, performance testing and interpret these test cases to a particular problem.
- Evaluate software quality maturity models and apply capability maturity model for a particular project.

Course Content:

UNIT I **15 Hours**

Principles of Testing: Context of testing in producing software, The complete car, Dijkstra's Doctrine, A test in time!, The act and the Saint, Test the Tests first, The pesticide paradox, The convoy and the Rags, The policemen on the Bridge, The ends of the Pendulum, Men in Black, Automation Syndrome.**Software Development Life Cycle Models:**Phases of Software Project, Quality , Quality Assurance and Quality Control, Testing, Verification and validation, Process models to represent different phases, Life cycle models.

UNIT II **15 Hours**

White Box Testing- Static Testing, Structural Testing, Challenges in white box testing.

Black Box Testing: Introduction, How to do black box testing?**Integration Testing:** Introduction, Integration testing as a type of Testing, Integration testing as a phase of Testing, Scenario Testing.

UNIT III **15 Hours**

System and Acceptance Testing: Overview, Functional Vs Non-Functional Testing, Functional System Testing, Non-Functional Testing, Acceptance Testing.**Performance Testing:** Introduction, Factors Governing Performance Testing, Methodology for Performance Testing, Tools for performance testing, Process for performance testing.

UNIT IV **15 Hours**

Software Quality, Maturity Models: Five views of software quality, McCall's quality and criteria, ISO 9126 Quality characteristics, ISO 9000:2000 Software Quality Standards.**Maturity Models:**The basic idea in Software Process, Capability Maturity Model, Test Process Improvement, Testing Maturity Model.

Text Books:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "SOFTWARE TESTING - PRINCIPLES AND PRACTICES", Pearson India Education, 2016.Chapters 01 to 07
2. KshirasagaraNaik, Priyadarshi Tripathy, "SOFTWARE TESTING AND QUALITY ASSURANCE", Wiley India 2012.(Chapters 17 &18)

Reference Books:

1. Mauro Pezze, Michael Young, "SOFTWARE TESTING AND ANALYSIS- PROCESS, PRINCIPLES AND TECHNIQUES", Wiley India, 2012.
2. M.G.Limaye, "SOFTWARE TESTING-PRINCIPELS, TECHNIQUES AND TOOLS" – McGraw Hill, 2009.

B18CA5052	NETWORK ADMINISTRATION	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Develop and Applying technology in an environment
- Describe the working of local area network (LAN) technologies for wired and wireless networks as well as analyze the working of virtual LANs and different networking devices, Network administration models, Network management technologies,
- Construct and use routing tables for datagram forwarding and study the different categories of Internet routing protocols
- Describe the responsibilities of the different layers of TCP/IP protocol stack as well as the use of different fields in the packet headers corresponding to these layers
- Explain the different classes of IP addresses, Setting up the DNS name service, Setting up a WWW server, E-mail configuration.

Course Outcomes:

On successful completion of the course students will be able to:

- Understand the role of operating systems and computer networks in information technology applications within organizations.
- Understand the appropriate use of networking hardware and software
- Install, configure, and maintain an operating system and applications software on a personal computer
- Select hardware and software components, build, configure, and maintain a computer network.

Course Content:

UNIT I **15 Hours**

Introduction: Network and system administration, Applying technology in an environment, The human role in systems , Discipline, challenges, Common practice and good practice System Administration, Network Infrastructure, Operating Systems, File systems, IPv4 Networks, Address space in IPv4, Host identities and name services. Common network sharing models, Local network orientation and analysis

UNIT II **15 Hours**

User management: Issues, User registration, Account policy, Login environment, User support services, Controlling user resources, online user services, Ethical conduct of administrators and users, Computer usage policy

UNIT III **15 Hours**

Network-level services: Network administration models, Network management technologies, The Internet, Getting traffic to its destination, Alternative network transport and connection technologies, IP routing and forwarding.

UNIT IV **15 Hours**

Application-level services: Proxies and agents, installing a new service, setting up the DNS name service, Setting up a WWW server, E-mail configuration.

Text Book:

1. Mark Burgess, "PRINCIPLES OF NETWORK AND SYSTEM ADMINISTRATION" 2nd Edition, John Wiley Chapter 1, 2, 3, 5, 10, 9.

B18CA5053	CYBER SECURITY	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Explain security concepts, Ethics in Network Security.
- Identify security threats, and the security services and mechanisms to counter them
- Comprehend and apply relevant cryptographic techniques
- Comprehend security services and mechanisms in the network protocol stack
- Illustrate the integrity and authentication process
- Familiarize various cyber threats, attacks, vulnerabilities and defensive mechanisms

Course Outcomes:

- Understand the fundamental concepts of cyber security and explain the encryption process using cryptographic algorithms.
- Apply software tools and technology to analyze, design and develop applications that can solve real life problems.
- Explain the concept of cybercrime , analyze cyber offenses using logical reasoning according to Indian ITA 2000
- Analyze security tools and methods, interpret legal perspective and explore Indian IT Act to understand the values and ethics to be followed by cyber experts.

Course Content:

UNIT I **15 Hours**

Security and Cryptography: Security Trends, Security Services, Security attacks, Security mechanisms, A Model for Network security. A short History of Cryptography, Cryptographic techniques, Symmetric and asymmetric key algorithm, Cryptography Tools, Attacks on Cryptosystems.

UNIT II **15 Hours**

Security Technology: Physical design; Firewalls; Protecting Remote Connections, Intrusion Detection Systems (IDS), Honey Pots, Honey Nets.

UNIT III **12 Hours**

Cybercrime and cyber offenses: Introduction to Cybercrime and Laws Introduction, Cybercrime: Definition and Origins of the word, Cybercrime and information Security, Cybercriminals, Classifications of Cybercrimes, Cybercrime and the Indian ITA 2000, A Global Perspective on

Cybercrimes, Cyber offenses: How Criminals Plan the Attacks,· Social Engineering, Cyber talking, Cyber cafe and Cybercrimes, Bot nets: The Fuel for Cybercrime, Attack Vector, Cloud Computing

UNIT IV **18 Hours**

Tools and Methods: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, identity theft.

Cybercrimes and Cyber security: The Legal Perspectives, Cybercrime and the Legal Landscape around the World, Why Do We Need Cyberlaws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment.

Text Books:

1. Nina Godbole, SunitBelapur, "CYBER SECURITY UNDERSTANDING CYBER CRIMES, COMPUTER FORENSICS AND LEGAL PERSPECTIVES", Wiley India Publications, April, 2011.
2. Robert Jones, "INTERNET FORENSICS: USING DIGITAL EVIDENCE TO SOLVE COMPUTER CRIME", O'Reilly Media, October, 2005.
3. Michael E. Whitman and Herbert J. Mattord,"PRINCIPLES OF INFORMATION SECURITY", 2nd Edition, Thomson, 2005.
4. William Stallings,"NETWORK SECURITY ESSENTIALS: APPLICATIONS AND STANDARDS", Pearson Education, 2000.

Reference Books:

1. Marjie T. Britz, "COMPUTER FORENSICS AND CYBER CRIME: AN INTRODUCTION" – Pearson Education.
2. Chwan-Hwa (John) Wu,J. David Irwin, "INTRODUCTION TO COMPUTER NETWORKS AND CYBER SECURITY" - CRC Press
3. Bill Nelson, Amelia Phillips, Christopher Steuart, "GUIDE TO COMPUTER FORENSICS AND INVESTIGATIONS" Cengage Learning.

OPEN ELECTIVE

B18CA5060	FUNDAMENTALS OF COMPUTER PROGRAMMING & OFFICE AUTOMATION	L	T	P	C
Duration:60Hours		4	0	0	4

Course Objectives:

- To understand how to use software packages in day to day activities
- Learn the essential and use of internet

Course Outcomes:

On successful completion of the course the students will be able to do the following:

- Describe the basic concepts of computer to solve real world problems and analyze different parts of computer
- Analyse and interpret the different features, structures, and accessories of windows.
- Acquiring the basic knowledge for the various formatting techniques of a document and to provide in-depth training in use of creating spreadsheet packages to solve real world problems.
- Design the presentations for real world ideas and to understand the operations and tools of Internet.

Course Content:

UNIT I **15 Hours**

Fundamentals of computer: Overview Of a Computer, Functional Components of a computer (Working of each unit), Evolution Of Computers, Generations Of Computers, Classification Of Computers, Applications Of Computers. **Hardware:** Block diagram of computer, Input and Output devices, Memory and storages devices, Different ports and its uses, Different type of printers

UNIT II **15 Hours**

Operating system (Windows XP): Windows concepts, Features, Windows Structure, Desktop, Task bar, Start Menu, My Computer, Recycle Bin, Windows Accessories, calculator, Notepad, Paint, Word pad, Character Map, Windows Explorer, Entertainment, Installation of Hardware and Software, Using scanner, system tools, communication, sharing information between computers.

UNIT III **15 Hours**

Word Processing: Typing, Editing, Proofing & Reviewing, Formatting Text & Paragraphs, Automatic Formatting and Styles, Working with Tables, Graphics and Frames, Mail Merge, Automating Your Work & printing Documents. **Excel Spreadsheet:** Working & Editing In Workbooks, Creating Formats & Links, Formatting a Worksheet& creating graphic objects, Creating Charts (Graphs), formatting and analyzing data, Organizing Data in a List (Data Management), Sharing & Importing Data, Printing.

UNIT IV **15 Hours**

PowerPoint Presentations: Getting started in PowerPoint, Creating a presentation, Creating & editing slides, Previewing a slide show, Adding picture & graph, Adding sound & video, Adding auto shape, Animating objects. **Introduction to Internet:** Intranet tools: E-mail: Anatomy of e-mail, e-mail address, finding e-mail address, adding signature, attaching files, opening attachments, managing e-mail account, Webmail.

Text Book:

1. Archana Kumar," Computer Basics with Office Automation", I.K. International Publishing House Pvt. Limited, 2010

B18CA5070	SOFT SKILLS TRAINING	L	T	P	C
Duration:30Hours		2	0	0	2

Note: The students will have to undergo Skill Development course being conducted by Training and Placement cell of the University.

B18CA5080	.NET PROGRAMMING LAB	L	T	P	C
Duration: 30Hours		0	0	2	2

Course Contents:

PART-A

1. Solve simple problems using the fundamental syntax and semantics of the C# programming language
2. Write a Program in C# to demonstrate Command line arguments processing.
3. Write a program in c# to implement stack operations
4. Write C# programs that use selection (if, switch, conditional operator)
5. Write C# programs that use loops (while, do while, for)
6. Write a program to reverse a given string using C#
7. Write C# programs that use one-dimensional arrays
8. Apply simple searching and sorting algorithms
9. Write a Program in C# to find the second largest element in single dimensional arrays.
10. Write programs in C# to demonstrate boxing and unBoxing
11. Write simple object oriented programs using objects and classes

PART B

1. Develop graphical user interfaces for C# programs using GUI components such as labels, buttons, text boxes, radio button and check boxes
2. Use the C# event-handling model to respond to events arising from the GUI components

B18CA5090	WEB TECHNOLOGY LAB	L	T	P	C
Duration: 30Hours		0	0	2	2

Course Content:

PART-A

1. Create a web page to display the course syllabus.
2. Design student details in first page and result in next page, link both pages using hyper links.
3. Create a web page for class time table
4. Develop a web page with 2 or more images, move images in different directions and write hyper link to any one image.
5. Create a web page to display the following content using list tag.
6. General Aviation
    1. Single Engine Aircraft
        a. Tail Wheel
        b. Tricycle
    2. Dual Engine Aircraft
        i. Wing Mounted
        ii. Push Pull Mounted

Commercial Aviation

I. Dual Engine

Wing Mounted

Push Pull Mounted

II. Tri Engine

Third Engine

Second Engine

1. Design login page and validate it using JavaScript
2. Develop a HTML Form which accepts two numbers. Write JavaScript code to execute arithmetic operations and displays the result.
3. Create a student form and write JavaScript code to count the number of elements used in the form.

PART-B

1. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
2. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
3. Develop web page with one text box and Write a JavaScript code to convert the text entered in textbox to upper case.

4. Create a web page using two image files, which switch between one another as the mouse pointer moves over the images. Use the on Mouse Over and on Mouse Out
5. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.
6. Create a HTML form with 3 Textboxes. Write JavaScript code to validate input for numbers, alphabets, alphanumeric and verify that all 3 textboxes has been filled.
7. Write a user-defined function in JavaScript to find sum of N Numbers
8. Write a JavaScript code to find factorial of a number using recursive function

SIXTH SEMESTER

B18CA6011	DATA ANALYTICS USING R	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

- Introduce students to the basics of Big Data and Big Data Analytics.
- Equip the students with the concepts of storing Big Data using Hadoop Distributed File System.
- To provide the students with the foundation ofBig Data analysis using Map Reduce.
- To expose students to data analytics features using R.

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Explain the terminologies and concepts in Big Data Analytics.
- Design the data structure and store data in Hadoop Distributed File System.
- Execute Big Data analysis using Map Reduce.
- Perform simple Data Analytics using R.

Course Content:

UNIT I **15 Hours**

Introduction To Big Data: Types of Digital Data, Introduction to Big Data, Elements of Big Data (Facts, capabilities, benefits, where it is used), Big Data Analytics, How to analyze Big Data, History of Big Data, Big Data in the real world (Myths, Challenges, Future), Big Data Management.

UNIT II **15 Hours**

Hadoop and HDFS (Hadoop Distributed File System): Introduction and History of Hadoop, Hadoop Echo System, The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

UNIT III **15 Hours**

Map Reduce; Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT IV **15 Hours**

Data Analytics with R: Take your first steps with R, data types, missing values, basics of R syntax, The R workspace, Vectors, System- and user-defined objects, Matrices, Lists, Functions, Statistics methodology, Factors and Data frames, Basic Graphics.

Text Books:

1. Tom White "Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.

Reference Books:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw-Hill/Osborne Media (2013), Oracle press.
4. AnandRajaraman and Jefrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.

R PROGRAMMING LAB

Course Content :

PART A

1. Program to get Input from the user and find the factorials
2. Program to Print Fibonacci Sequence
3. Program to create customized Vector Sequence
4. Program to Perform Arithmetic Operations
5. Program to pick the random samples
6. Program to find min and max in the vector sequence
7. Program to Remove the missing Values in the vector sequence
8. Program to sort the vector in the reverse direction
9. Program to find out the class of a vector in the Sequence
10. Program to insert a vector in the Sequence

PART B

1. Program to perform t test
2. Program to perform ANOVA operations
3. Program to import data from Excel, SPSS to Plot Bar, Pie and Histograms.

B18CA6012	ADVANCED WEB TECHNOLOGIES	L	T	P	C
Duration:60Hours		2	0	1	3

Course Objectives:

- Review the need of Angular JS
- Discuss the perl scripting and concepts of server programming by using PHP
- Differentiate use of AJAX objects over normal HTML objects

Course Outcomes:

Upon Completion of the course, the students will be able to:

- Construct Angular views and templates by implementing expressions and built-in directives
- Design server webpage by using perl scripting
- Describe a server side webpage by using PHP
- Apply AJAX objects over normal HTML objects
- Develop a server side scripting by using SOAP architecture

Course Content:

UNIT I **15 Hours**

Introduction to XML: Introduction to XML: Introduction, The Syntax of XML, XML Document Structure, Document Type Definitions, Namespaces, XML Schemas, Displaying Raw XML Documents, Displaying, XML Documents with CSS. XSLT Style Sheets, XML Processors, Web Services

UNIT II **15 Hours**

Introduction to PHP: Introduction to PHP: Origins and Uses of PHP, Overview of PHP, General Syntactic Characteristics, Primitives Operations and Expressions, Output, Control Statements, Arrays, Functions, Pattern Matching, Form Handling.

Database Access through the Web: Relational Databases, An Introduction to the Structured Query Language, Database Access with PHP and MySQL.

UNIT III **15 Hours**

Introduction to Ruby& Rails Introduction to Ruby: Origins and Uses of Ruby, Scalar Types and Their Operations, Simple Input and Output, Control Statements, Fundamentals of Arrays, Hashes, Methods, Classes, Blocks and Iterators, Pattern Matching.

Introduction to Rails: Overview of Rails, Document Requests.

UNIT IV **15 Hours**

Angular JS: Angular JS: Introduction, Client – Side Templates, Model View Controller(MVC), Data Binding, Dependency Injection, Directives, Examples. Anatomy of an Angular JS Application, Invoking Angular, Model View Controller, Templates and Data Binding, Organizing Dependencies with Modules, Formatting Data with Filters, Changing Views with Routes and $location, Talking to Servers, Changing the DOM with Directives Validating User Input.

Text Books:

1. Robert W Sebesta, "PROGRAMMING THE WORLD WIDE WEB", 6th Edition, Pearson Education, 2008**.** (Chapters: 7, 9, 10, 13, 14 and 15)
2. Brad Green &ShyamSeshadri, "ANGULAR JS", O'ReillyPublications,2015. (Chapter 1 &2)

Reference Books:

1. M.Deitel, P.J.Deitel, A.B.Goldberg, "INTERNET & WORLD WIDE WEB HOW TO PROGRAM", 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates, "WEB PROGRAMMING BUILDING INTERNET APPLICATIONS", 3rd Edition, Wiley India, 2006.
3. XueBai, "THE WEB WARRIOR GUIDE TO WEB PROGRAMMING", Thomson, 2003.
4. Sklar, "THE WEB WARRIOR GUIDE TO WEB DESIGN TECHNOLOGIES", 1st Edition, Cengage Learning India.

ADVANCED WEB TECHNOLOGIES LAB

PART - A

1. Write a Perl Script which counts the words in a given file
2. Using PHP and My SQL develop a program to accept book information viz. isbn, title, authors, edition and publisher from a web page and store the information in a database, search for a book with the title and display the search results with proper headings.
3. Create a registration form using PHP which contains name, email, contact no, address and gender, display the details in other server page when user clicks the submit button.
4. Create a program to order product by customer using PHP and store the details in My SQL Database.
5. Develop a web application for Student Admission System using PHP & MySQL database.

PART – B

Design a simple server side web pages using PHP and MYSQL by following the constraints listed below

- Should be minimum of three pages
- Create database and store details in database
- Java script can be used for client scripting and php can be used for server side scripting.

B18CA6021	INTERNET OF THINGS	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Discuss the basics of Microcontroller & Microprocessor
- 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:

- Create the IoT applications with the help of IoT enabled Technologies
- Sketch protocols for IoT Applications
- Analyze low-power devices equipped with sensing, computation, and wireless communication capabilities.
- Develop the operating systems, radio communication, networking protocols, using Methodologies of IoT

Course Content:

UNIT I **15 Hours**

Microprocessors and microcontroller Introduction : Microprocessors and microcontroller, Introduction, Microprocessors and Microcontrollers, RISC & CISC CPU Architectures, Harvard & Von-Neumann CPU architecture, Computer software. The 8051 Architecture: Introduction, Architecture of 8051, Pin diagram of 8051, Memory organization, External Memory interfacing, stacks.

UNIT II **15 Hours**

Introduction to Internet of Things : 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.

UNIT III **15 Hours**

Domain Specific IoTs: Introduction, Home Automation, Smart Lighting, Smart Appliances, Intrusion Detection, Smoke/Gas Detectors, Cities, Smart Parking, Smart Lighting, Smart Roads,

Structural Health Monitoring, Surveillance, Emergency Response, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle

UNIT IV **15 Hours**

Developing Internet of Things: 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.

Text Books:

1. Godse, Atul P. "MICROPROCESSORS & MICROCONTROLLERS", Technical publications, 2008.
2. Vijay Madisetti, ArshdeepBahga "INTERNET OF THINGS-AN HANDS ON APPROACH", 2014 (chapter 1, 2, 5, 6, 7).

Reference Books:

1. CunoPfister,"GETTING STARTED WITH THE INTERNET OF THINGS", OReilly, 2011.
2. FrancisDaCosta, Rethinking,"INTERNET OF THINGS", Apress Open Edition, 2013
3. Adrian McEwen, Hakim Cassimally, "DESIGN OF INTERNET OF THINGS", 2014 John Wiley and Sons, Ltd.

B18CA6022	DIGITAL MARKETING	L	T	P	C
Duration:60Hours		2	1	0	3

Course Objectives:

- Develop industry background knowledge to knowledgeably navigate Internet Marketing topics including online advertising, search, social media, and online privacy.
- Evaluate an experiment quantitatively and qualitatively to measure the effectiveness of business decisions and online advertising effectiveness in particular.
- Design and implement an experiment.
- 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.
- Use a publishing platform to build a web presence with integrated data collection and links to social media.

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 **15Hours**

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 **15Hours**

Email Marketing: An Introduction, Data—Email Marketing Process, Design and Content, Delivery, Discovery.**Mobile Marketing:** An Introduction, Opportunity, Optimize, Advertise, Analyze.

UNIT IV **15Hours**

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.

B18CA6030	SKILL DEVELOPMENT PROGRAM	L	T	P	C
Duration:30Hours		2	0	0	2

Note: The students will have to undergo Skill Development course being conducted by Training and Placement cell of the University.

B18CA6040	MOOC/ SWAYAM	L	T	P	C
Duration: 30Hours		2	0	0	2

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.

B18CA6050	PROJECT WORK	L	T	P	C
Duration:90Hours		0	3	6	9

MESSAGE TO THE STUDENTS

The Bachelor of Computer Applications (BCA) programme prepares the students to take up positions as Programmers, Systems Analysts, Systems Designers in the field related to computer science and information technology. We had therefore imparted the comprehensive knowledge covering the skills and core areas of computer science courses with equal emphasis on the theory and practice in BCA programme.

The BCA students are encouraged to involve themselves completely on the project work in their final semester. It is advised to students to develop their project for solving problems of software industry or any research organization. Doing this will give more exposure to handle real life problems of project development.

This project work is kept in BCA program to give you opportunity to develop quality software solution. During the development of the project you should involve in all the stages of the software development life cycle (SDLC) like requirements analysis, systems design, software development/coding, testing and documentation, with an overall emphasis on the development of reliable software systems. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, and develops good understanding of SDLC.

Students should take this project work very seriously. Project should be taken as an opportunity to develop software, which gives exposure to SDLC.Topics selected, should be complex and large enough to justify as a BCA project. The project should be genuine and original in nature and should not be copied from anywhere else.

GUIDELINES FOR PROJECT FORMULATION

TYPE OF PROJECT

As majority of the students are expected to work out a real life project in some industry/research and development laboratories/educational institutions/software companies, it is suggested that the project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution. Students are encouraged to work in the areas listed at the end. However, it is not mandatory for a student to work on a real life project. The student can formulate a project problem with the help of Guide.

PROJECT PROPOSAL (SYNOPSIS)

The project proposal should be prepared in consultation with your guide. The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project work should compulsorily include the software development. The project proposal should contain complete details in the following form:

- Title of the Project
- Introduction and Objectives of the Project
- Project Category (RDBMS/OOPS/Networking/Multimedia/Artificial Intelligence/Expert Systems etc.)
- Analysis (DFDs at least up to second level , ER Diagrams/ Class Diagrams/ Database Design etc. as per the project requirements).
- A complete structure which includes: Number of modules and their description to provide an estimation of the student's effort on the project. Data Structures as per the project requirements for all the modules. Process Logic of each module. Testing process to be used. Reports generation (Mention tentative content of report)
- Tools / Platform, Hardware and Software Requirement specifications
- Are you doing this project for any Industry/Client? Mention Yes/No. If Yes, Mention the Name and Address of the Industry or Client
- Future scope and further enhancement of the project.

ITEMS TO BE INCLUDED IN THE PROJECT REPORT

The following items should be included in the Project Report:

The project report must contain the following:

1. Introduction Objectives
2. Tools/Environment Used
3. Analysis Document (This should include SRS in proper structure based on Software Engineering concepts, E-R diagrams/Class diagrams/any related diagrams (if the former are not applicable), Data flow diagrams/other similar diagrams (if the former is not applicable), Data dictionary).
4. Design Document (Modularization details, Data integrity & constraints including database design, Procedural design, User interface design) Program code (Complete code (well indented)/Detailed specification instead of code*, Comments & Description. The program code should always be developed in such a way that it includes complete error handling, passing of parameters as required, placement of procedure/function statements as needed.)
5. Testing (Test case designs are to be included separately for Unit testing, Integration testing, System testing; Reports of the outcome of Unit testing, Integration testing, System testing are to be included separately. Also, details of debugging and code improvement are to be included.)
6. Input and Output Screens

7. Limitations of the Project
8. Future Application of the Project
9. Bibliography

LIST OF BROAD AREAS OF APPLICATION AND RELATED TOOLS

FRONT END / GUI Tools:	Visual Basic, Power Builder, X-Windows (X/lib, X/motif, X/Intrinsic), Oracle Developer 2000, VC++, Jbuilder
RDBMS/BACK END:	Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
LANGUAGES:	C, C++, Java, VC++, C#, Python
SCRIPTING LANGUAGES:	PERL, SHELL Scripts (UNIX), TcL/TK
RDBMS/BACK END:	Oracle, Ingres, Sybase, Progress, SQL Plus, Versant, MY SQL, SQL Server, DB2
INTERNET TECHNOLOGIES:	Java script, VB Script, Perl & CGI script, HTML, Java, Active X, RMI, CORBA, SWING, JSP, ASP, XML, EJB, Java Beans, Java Servlets, UML, CSS, VB.Net, J2EE.
OPERATING SYSTEMS:	WINDOWS 95/98/2000/ME, WINDOWS NT, UNIX, LINUX, WINDOWS XP, DOS
APPLICATIONS:	Financial/ Manufacturing/ Multimedia/ Computer Graphics/ Instructional Design/ Database Management System/ Internet/ Intranet/ Computer NetworkingCommunication Software/E-Commerce/ ERP / MRP/ TCP/IP Internals/ Routing protocols/ Socket Programming/ Implementation of Switches & Routers

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 Application is not only 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 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.

DO'S AND DON'T'S

DO'S

1. Maintain discipline and respect the rules and regulations of the university
2. Be regular and punctual to classes
3. Study regularly and submit assignments on time
4. Be respectful to your Teaches/friends and hostel staff/management.
5. Read the notice board (both at your college and the hostel) regularly.
6. Utilize your Personal Computer for educational purpose only.
7. Follow the code of conduct.
8. Visit Health Center on the campus whenever you are unwell.
9. Be security conscious and take care of your valuables especially Cash, Mobile Phones, Laptop and other valuables.
10. Carry your valuables along with you whenever you proceed on leave/vacation.
11. Use electric appliances, lights and water optimally.
12. Keep the campus clean and hygienic.
13. Use decent dressing.

DON'TS

1. Ragging inside / outside the campus.
2. Possession of Fire arms and daggers etc.
3. Use of Alcohols, Toxic drugs, sheesha, gutkha and hashish/heroin etc.
4. Use of Crackers, explosives and ammunition etc.
5. Smoking and keeping any kind of such items.
6. Misusing college & hostel premises/facilities for activities other than studies.
7. Playing loud music in the room which may disturb studies of colleagues / neighbors.
8. Making noise and raising slogans.
9. Keeping electrical appliances, other than authorized ones.
10. Involvement in politics, ethnic, sectarian and other undesirable activities.
11. Proxy in any manner.
12. Use of mobiles in the academic areas.

Note: 1. Rules are revised / reviewed as and when required.

2. Healthy suggestions are welcome for betterment of Institution

Programme Regulations

Students will be provided with programme regulations which deals about credt structure, teaching and Learning processes, Assessment, Re-examination, Degree awarding requirements

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

1. **Teaching and Learning Process:**

   The teaching & 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. **Courses of Study and Credits**
   a. The study of various subjects in BCA degree program is grouped under various courses. Each of these courses carries credits which are based on the number of hours of teaching and learning.
   b. 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 or a three hour session of T / P amounts to 2 credits** over a period of one Semester of 16 weeks for teaching-learning process.
   c. **The total duration of a semester is 20 weeks inclusive of semester-end examination.**
   d. **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.

e. The total credits earned by a student at the end of the semester upon successfully completing the course are L + T + P. **The credit pattern of the course is indicated as L: T: P**

Different C**ourses of Study** are labeled and defined as follows:

a. 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) Foundation Course, (ii) Hard Core Course, and (iii) Soft Core Course.

b. 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. These would include basic courses in Languages, courses of study prescribed by the University.

c. 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.

d. 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.

e. O**pen 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 O**pen Elective Course.**

f. Project Work / Dissertation:

Project work / Dissertation work is a special course involving application of knowledge in solving / analyzing /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 Minor Project work may be a hard core or a Soft Core as decided by the BOS / concerned. But the Major Project shall be Hard Core.

3. Scheme, Duration and Medium of Instructions:

3.1. The BCA Degree program is of 6 semesters - 3 years duration. A candidate can avail a maximum of 12 semesters - 6 years as per double duration norm, in one stretch to complete the BCA, including blank semesters, if any. 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.

3.2. The medium of instruction shall be English.

4. Credits and Credit Distribution

4.1. A candidate has to earn 120 credits for successful completion of Three Year BCA degree with the distribution of credits for different courses as decided by the Board of Studies.

4.2. 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 **Foundation Course(FC), Hard Core(HC) or Soft Core(SC) or Open Elective(OE)**.

4.3**.** A candidate can enroll for a maximum of 30 credits and a minimum of 20 credits per Semester. However he / she may not successfully earn a maximum of 30 credits per semester. This maximum of 30 credits does not include the credits of courses carried forward by a candidate.

4.4. Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to VI semester and complete successfully 120 credits in 6 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.

5. 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 120 credits for the Three Year BCA Degree program.

6. **Add on Proficiency Diploma:**

6.1 To acquire **Add on Proficiency Diploma,** a candidate can opt to complete a minimum of 18 extra credits either in the same discipline /subject or in different discipline / subject in excess to 120 credits for the Three Year BCA Degree program.

6.2. The A**dd on Proficiency Certification / Diploma** so issued to the candidate contains the courses studied and grades earned.

7. Scheme of Assessment & Evaluation

7.1. The Scheme of Assessment and Evaluation will have two parts, namely;

i. Internal Assessment (IA); and
ii. Semester End Examination

7.2. Assessment and Evaluation of each Course shall be for 100 marks. The Internal Assessment and Semester End Examination of UG non engineering programs and PG programs shall carry 50 marks each (i.e., 50 marks internal assessment; 50 marks semester end examination).

7. 3. The 50 marks of Internal Assessment shall comprise of:

Internal Test	=	30 marks
Assignments	=	10 marks
Presentations / Quizzes / Case studies	=	10 marks

7.4. There shall be two internal tests conducted as per the schedule given below. The students have to attend all the two tests compulsorily.

- 1st test for 15 marks at the end of 8th week of the beginning of the Semester; and
- 2nd test for 15 marks at the end of the 16th week of the beginning of the Semester; and

7.5. The coverage of syllabus for the said three tests shall be as under:

- For the 1st test syllabus shall be 1st and 2nd unit of the course;
- For the 2nd test it shall be 3rd and 4th unit;

7.6. The Semester End Examination for 50 marks shall be held during 18th and 19th week of the beginning of the semester and **the syllabus for the semester end examination shall be entire 4 units**.

7.7. The **duration of the internal test shall be 75 minutes and for semester end examination the duration shall be 3 hours.**

Summary of Continuous Assessment and Evaluation Schedule

Type of Assessment	Period	Syllabus	Marks	Activity
First Test	8th Week	1st and 2nd Units	15	Consolidation of 1st and 2nd Unit
Allocation of Topics for Assignments	-	First Unit and second unit		Instructional process and Continuous Assessment
Submission of Assignments	-	First Unit and second unit	5	Instructional process and Continuous Assessment
Presentations / Quizzes/Case studies	-	First Unit and second unit	5	Instructional process and Continuous Assessment
Second Test	16th Week	Third unit and Fourth unit	15	Consolidation of 3rd and 4th Unit
Allocation of Topic for 2nd Assignment	-	2nd half of second unit and 3rd Unit		Instructional process and Continuous Assessment
Submission of Assignments	-	2nd half of second unit and 3rd Unit	5	Instructional process and Continuous Assessment
Presentations / Quizzes / Case studies	-	2nd half of second unit and 3rd Unit	5	Instructional process and Continuous Assessment
Semester End Practical Examination	17th Week	Entire syllabus	50	Conduct of Semester - end Practical Exams
Preparation for Semester–End Exam	16th & 17th Week	Entire Syllabus		Revision and preparation for semester–end exam

Semester End Theory Examination	18th Week & 19th Week	Entire Syllabus	50	Evaluation and Tabulation
	End of 20th Week			Notification of Final Grades

Note:

- Examination and Evaluation shall take place concurrently and Final Grades shall be announced latest by 5 days after completion of the examination.
- Practical examination wherever applicable shall be conducted after 2nd 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

8.0. Evaluation of Practical's and Minor Project / Major Project / Dissertation

8.1.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.

8.2 The 50 marks meant for continuous assessment of the performance in carrying out practical's 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**

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**

8.3. The duration for semester-end practical examination shall be decided by the concerned School Board.

8.4 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:

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%.

9.1 Provision to Carry Forward the Failed Subjects / Courses:

A student who has failed in a given number of courses in odd and even semesters shall move to next semester of immediate succeeding year and final year of the study. However, he / she shall have to clear all the courses of all semesters within the double duration, i. e., within six years of admission of the first semester failing which the student has to re-register to the entire program.

9.2 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 and he / she shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

b) 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.

10. Attendance Requirement:

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

10.2 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.

10.3Any 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 examination and such student shall seek re-admission as provided above.

10.4 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 examination, and subsequently a notification pertaining to the above will be brought out by the Director of the School before the commencement of examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

11. 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.

b. 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.

12. Grade Card and Grade Point:

a. **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).

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

c. **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	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=[(IA)+M] secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of the course. G is the grade and GP is the grade point.

i. 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 :

$$\mathbf{SGPA\ (Si) = \sum(Ci \times Gi) / \sum Ci}$$

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.

ii. Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (144) for MCA degree is calculated taking into account all the courses undergone by a student over all the semesters of a program i. e.,

$$\mathbf{CGPA = \sum(Ci \times Si) / \sum Ci}$$

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.

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 8.11 x 10 = 81.10

12.1 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 >= 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
CGPA <4	-	F	Fail	-

Overall percentage=10*CGPA

12.2 Provision for Appeal

If a candidate is not satisfied with the evaluation, 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.

LIST OF FACULTY MEMBERS

SL. No	Name	Designation	Phone Number	Email ID
1	Dr. S. Senthil	Director& Professor	8884750100	dir.csa@reva.edu.in
2	Dr. M Vinayaka Murthy	Professor	9448809443	mvinayakamurthy@reva.edu.in
3	Prof. K Vijayalakshmi	Assoc Prof	9740388711	kvijayalakshmi@reva.edu.in
4	Dr. Rajeev Ranjan	Assoc Prof	9108898284	rajeevranjan@reva.edu.in
5	Dr. D Revina Rebecca	Assoc Prof	9886517277	revinarebecca@reva.edu.in
6	Dr. Kavitha	Assoc Prof	9591704008	kavitha@reva.edu.in
7	Prof. Lokesh C K	Asst. Prof	9448295877	lokeshck@reva.edu.in
8	Dr.ThirunavukkarasuV	Asst. Prof	9487221719	thirunavukkarasu.v@reva.edu.in
9	Dr.Arul Kumar V	Asst. Prof	8903680533	arulkumar.v@reva.edu.in
10	Dr. M Jayakameswaraiah	Asst. Prof	9441653580	jayakameswaraiah.m@reva.edu.in
11	Dr. Raghavi K Bhujang	Asst. Prof	9886394833	raghavi.bhujang@reva.edu.in
12	Prof. Sasikala G	Asst. Prof	7259176911	sasikalag@reva.edu.in
13	Prof. Ravi Dandu	Asst. Prof	9379772672	ravi_d@reva.edu.in
14	Prof. R Pinaka Pani	Asst. Prof	9972254146	pinakapanir@reva.edu.in
15	Prof. Ranganathappa M	Asst. Prof	9035623235	ranganathappam@reva.edu.in
16	Prof. Vijaya Kumar H	Asst. Prof	9663887148	vijayakumarh@reva.edu.in
17	Prof. Vijayalaxmi. P. Chiniwar	Asst. Prof	9611345300	chiniwarvijaya@reva.edu.in
18	Prof. Deepa B G	Asst. Prof	8105095047	deepabg@reva.edu.in
19	Prof. Vidya S	Asst. Prof	9902989134	vidyas@reva.edu.in
20	Prof. Manjushree M	Asst. Prof	9620036036	manjusreem@reva.edu.in
21	Prof. Krishnamurthy R	Asst. Prof	9480050433	krishnamurthyr@reva.edu.in
22	Prof. Varish P V	Asst. Prof	9880279894	varishpv@reva.edu.in
23	Prof. Mohamed Abdul Khader Jailani	Asst. Prof	9790521466	mohamadjilani@reva.edu.in
24	Prof. Shreetha Bhat	Asst. Prof	9743002419	shreethabhat@reva.edu.in
25	Prof. Shobhana Saxena	Asst. Prof	9341261151	shobhanasaxena@reva.edu.in
26	Prof. Sinduja K. M	Asst. Prof	7026999042	sinduja.km@reva.edu.in

27	Prof. P Sree Lakshmi	Asst. Prof	9731068437	p.sreelakshmi@reva.edu.in
28	Prof. Surekha S M	Asst. Prof	9591891989	surekhasmuzumdar@reva.edu.in
29	Prof. Sneha N	Asst. Prof	9538589009	sneha.n@reva.edu.in
30	Prof. Ms. Sushma K V	Asst. Prof	9945145620	sushma.kv@reva.edu.in
31	Prof. Bhargavi V	Asst. Prof	9441631921	bhargavi.v@reva.edu.in
32	Prof.Francis Densil Raj V	Asst. Prof	9443300963	francisdensilrajv@reva.edu.in
33	Prof.A. Amutha	Asst. Prof	9964730295	amutha.a@reva.edu.in
34	Prof.Dalvin Vinoth Kumar Aron	Asst. Prof	9952533606	dalvinvinothkumar.a@reva.edu.in
35	Prof.Vinay G	Asst. Prof	8123703400	vinay.g@reva.edu.in
36	Prof.Arugudi Petaiah Bhuvaneswari	Asst. Prof	8985530595	bhuvaneswari.ap@reva.edu.in