REVA UNIVERSITY
Bengaluru, India

School of Computing and Information Technology

B.Tech. CSE
(Artificial Intelligence and Machine Learning)

2020-24 Batch

HANDBOOK

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Bengaluru, India

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

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B. Tech CSE (Artificial Intelligence and Machine Learning)

2020 - 2024 BATCH

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REVA University
Bengaluru - 560 064

Rukmini Educational
Charitable Trust

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Chancellor's Message

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

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

It is deemed virtuous to serve seekers of knowledge. 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 Honourable Chancellor, REVA University

Vice-Chancellor's Message

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

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

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

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

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have

helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of "Technology Incubation Centers" in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise. With firm faith in the saying, "Intelligence plus character –that is the goal of education" (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating "GLOBAL PROFESSIONALS".

Welcome to the portals of REVA University!

Dr. M. Dhanamjaya

Vice-Chancellor, REVA University

Director's Message

I congratulate and welcome all the students to the esteemed school of Computing and Information Technology (C & IT)). You are in the right campus to become a computer technocrat. The rising needs of automation in Industry 4.0 and improvising living standards have enabled rapid development of computer software and hardware technologies. Thus providing scope and opportunity to generate more human resources in the areas of computers and IT. The B.Tech, M.Tech and Ph.D programs offered in the school are designed to cater the requirements of industry and society. The curriculum is designed meticulously in association with persons from industries (TCS, CISCO, AMD, MPHASIS, etc.), academia and research organizations (IISc, IIIT, Florida University, Missouri S & T University, etc). The Curriculum caters to local, national, regional and global developmental needs. Maximum number of courses are integrated with cross cutting issues relevant to professional ethics, global needs, human values, environment and sustainability. The curriculum also focusses on skill development, innovation and entrepreneurship.

This handbook presents the B.Tech in CSE (Artificial Intelligence and Machine Learning) program curriculum. The program is of 4 years duration and split into 8 semesters. The courses are classified into foundation core, hard core, and soft core courses. Hard core courses represent fundamentals study requirements of ISE. Soft courses provide flexibility to students to choose the options among several courses as per the specialization, such as, Information Theory, Information Security, Information Communication and Information Systems. Theoretical foundations of engineering, science, and Information Science are taught in first two and half years. Later, advanced courses and recent technologies are introduced in subsequent semesters for pursuing specialization.

The important features of the B.Tech CSE (Artificial Intelligence and Machine Learning) are as follows:

1) Choice based course selection and teacher selection, 2) Studies in emerging areas like Machine Learning, Artificial Intelligence, Data Analytics, Cloud Computing, Python/R Programming, NLP, IoT and Cloud security, 3) Short and long duration Internships 4) Opportunity to pursue MOOC course as per the interest in foundation and soft core courses, 5) Attain global and skill certification as per the area of specialization, 6) Self-learning components, 7) Experiential, practice, practical, hackathons, and project based learning, 8) Mini projects and major projects with research orientation and publication, 9) Soft skills training and 10) Platform for exhibiting skills in cultural, sports and technical activities through clubs and societies.

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

Dr. Mallikarjun M Kodabagi
Director, Computing & Information Technology

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RUKMINI EDUCATIONAL CHARITABLE TRUST

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

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

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 7th February, 2013. The University is recognised by UGC under Sec 2 (f) and empowered under Sec.22 of the UGC Act, 1956 to award degrees in any branch of knowledge. The Programs of the University are approved by All India Council for Technical Education (AICTE), University Grants Commission (UGC), Bar Council of India (BCI), and Council of Architecture (COA) .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, auditoriums, seminar halls, custom-built teaching facilities, fully air-conditioned library and central computer centre, 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 26 Post Graduate Degree programs, 35 Undergraduate programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 494 Scholars pursuing research leading to PhD in 19 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis on knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing 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 importance 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, Big data analytics, Information Retrieval, VLSI and Embedded Systems, Wireless Sensor Networks, Artificial Intelligence, 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 Lighting, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo-electrochemical Hydrogen generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop much required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor and Dean, and supported by well experienced Trainers, Counsellors and Placement Officers. The University also has University-Industry Interaction (UIIC) and Skill Development Centre headed by a Senior Professor and Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs, Entrepreneurship activities, and IPR workshops. UIIC has established REVA NEST, an incubation centre for promoting start up industries.

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, University of California Berkeley, Arkansas State University, Columbia University, 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 I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **'Life Time Achievement Award'** to be awarded to successful personalities who have made mark in their field of work. This award is presented on occasion of the **"Founders' Day Celebration"** of REVA University on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "**REVA Life Time Achievement Award**" for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced "**REVA Award of Excellence"** in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

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

Within short span of time, REVA University has been recognised as a fast growing university imparting quality higher education to the youth of the country and received many awards, ranks, and accolades from various agencies, institutions at national and international level. These include: Asia's Greatest Brand and Leaders, by Asia One, National Award of Leadership Excellence, by ASSOCHAM India, Most promising University, by EPSI, Promising Upcoming Private University in the Country, by The Economic Times, Best University of India (South), by Dialogue India, Gold Brand by QS University Ranking, placed under 151-200 band by NIRF, 6TH Rank in the Super Excellence category by GHRDC, 6TH Rank in All India Law School Survey, ranked among Top 30 Best B Schools by Business World, India's Best Law Institution by Careers 360, to mention a few.

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 THE SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

The school has a rich blend of experienced and committed faculty who are well-qualified in various aspects of computing and information technology apart from the numerous state-of-the-art digital classrooms and laboratories having modern computing equipment. The School offers four full-time undergraduate programs, B.Tech in Computer Science and Engineering (Artificial Intelligence and Machine Learning), B.Tech in Computer Science and Information Technology, B.Tech in Computer Science and Systems Engineering, B.Tech in Information Science and Engineering and the following two postgraduate programs: M.Tech in Artificial Intelligence and M.Tech in Cyber security. In addition, the school has a research centre in which students can conduct cutting edge research leading to a Ph.D degree.

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

School Vision

To produce excellent quality technologists and researchers of global standards in computing and Information technology who have potential to contribute to the development of the nation and the society with their expertise, skills, innovative problem-solving abilities, strong moral and ethical values.

School Mission

- To create state of the art computing labs infrastructure and research facilities in information technology.
- To provide student-centric learning environment in Computing and Information technology through innovative pedagogy and education reforms.
- To encourage research, innovation and entrepreneurship in computing and information technology through industry/academia collaborations and extension activities
- Organize programs through club activities for knowledge enhancement in thrust areas of information technology.
- To enhance leadership qualities among the youth and enrich personality traits, promote patriotism, moral and ethical values.

Quality Policy

The school of Computing and Information Technology is committed to excellence through following policies.

1. Impart quality education by providing state of art curriculum, experimental learning, and state of the art labs.
2. Enhance skill set of faculty members through faculty development programs and interaction with academia and industries.
3. Inculcate the competency in software/hardware design and programming through co-curricular activities like Hackathon, Project exhibition, Internship and Entrepreneurship Programe.
4. Provide soft skill and skill development training for personality development and better placement.
5. Promote innovation and research culture among students and support faculty members for better research and development activity.

MEMBERS OF BOARD OF STUDIES

Sl. No.	Name		Correspondence Address
1	**Dr. Mallikarjun M Kodabagi** Professor and Director School of Computing and Information Technology	Chairperson	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
2	**Dr. Vishwanath R Hulipalled** Professor School of C&IT	Member	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
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6.	**Sreenivasa Ramanujam Kanduri** Academic Relationship Manager, TCS	Member (Industry Expert)	Academic Relationship Manager, Tata Consultancy Services, Bangalore.
7.	**Dr. Sundar K S** Associate Vice-President & Head, IMS Academy at Infosys	Member (Industry Expert)	Associate Vice-President & Head, IMS Academy at Infosys, Mysore
8.	**Dr. Ramabrahmam Gunturi** Consultant, TCS	Industry Expert	Tata Consultancy Services, Hyderabad.
9.	**Dr. S. A. Angadi** Professor, School of CSE,VTU	Academic Expert	Professor, School of CSE Visvesvaraya, Belagavi
10.	**Dr. Bharati Arakeri** Professor**,** School of CSE BMSIT, Bangalore.	Academic Expert	Professor**,** School of CSE BMSIT, Bangalore
11.	**Abhishek Revanna Swamy** Associate Project Manager, Robert Bosch	Alumni-Member	Associate Project Manager, Robert Bosch, Bangalore
12.	**Prasad Chitta** Solution Architect, TCS Bangalore	Member (Industry Expert)	Solution Architect, TCS, Bangalore

B. Tech in CSE (Artificial Intelligence and Machine Learning)

Program Overview

Artificial Intelligence and Machine Learning (AI & ML) encompasses a variety of topics that relates to computation, like development of algorithms, analysis of algorithms, programming languages, Information retrieval, Information analysis, software design and computer hardware. Information Science & Engineering has roots in electrical engineering, mathematics, and linguistics. In the past Information Science was taught as part of mathematics or engineering departments and in the last 3 decades it has emerged as a separate engineering field. In the present information era (Knowledge era) Information Science & Engineering will see an exponential growth as the future machines work on Data Analytics.

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

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

The career opportunities for Artificial Intelligence and Machine Learning graduates are plenty and growing. Programming and software development, information systems operation and management, data science, information retrieval, big data analytics, telecommunications and networking, Machine Learning development, computer science research, web and Internet, graphics and multimedia, training and support, and computer industry specialists are some of the opportunities the graduates find.

The School of Computing and Information Technology at REVA UNIVERSITY offers B. Tech. in CSE (Artificial

Intelligence and Machine Learning) program to create motivated, innovative, creative thinking graduates to fill ICT positions across sectors who can conceptualize, design, analyze, and develop ICT applications to meet the modern day requirements.

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

This program involves various courses which are related to computation, like design and analysis of algorithms, computer programming languages, software design, Information Theory, IoT and Smart Sensors, Agile Software Engineering and DevOps, Big Data and Hadoop, Python for Data Analysis, Machine Learning and Information Science, Cloud Computing, Computer Vision, Business Intelligence, Information Retrieval, Management Information Systems, AI and Agents, Fuzzy Logic and Systems, Data Analytics Using "R", Multi Media Systems, Introduction to Drones. Block Chain Technology, Swarm Intelligence, Software Defined Networks and NFV, Natural Language Processing, Augmented and Virtual Reality, Robotic Process Automation, Deep Learning and Reinforcement Learning, UI/UX Design, Cyber Forensics. This program also has courses such as electrical and electronics engineering, applied sciences and linguistics. This specialization is proposed to enable students to design software to solve problems in industry and engineering that require computers.

Program Educational Objectives (PEO's)

After few years of graduation, the graduates of B. Tech Computer Science & Engineering (AI & ML) will:

- **PEO-1:** Demonstrate technical skills, competency in AI & ML and exhibit team management capability with proper communication in a job environment.

- **PEO-2:** Support the growth of economy of a country by starting enterprise with a lifelong learning attitude

- **PEO-3:** Carry out research in the advanced areas of AI & ML and address the basic needs of the society.

Program Outcomes (PO's)

On successful completion of the program, the graduates of B. Tech in CSE (Artificial Intelligence and Machine Learning) program will be able to:

- **PO-1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals for the solution of complex problems in Computer Science and Engineering.

- **PO-2: Problem analysis:** Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.
- **PO-3: Design/development of solutions:** Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4: Conduct investigations of complex problems:** Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO-8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- **PO-9: Individual and team work:** Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
- **PO-10: Communication:** Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.
- **PO-11: Project management and finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.
- **PO-12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's)

On successful completion of the program, the graduates of B. Tech in CSE (Artificial Intelligence and Machine Learning) program will be able to:

- **PSO-1:** Demonstrate the knowledge of human cognition, Artificial Intelligence, Machine Learning and data engineering for designing intelligent systems.
- **PSO-2:** Apply computational knowledge and project development skills to provide innovative solutions.
- **PSO-3:** Use tools and techniques to solve problems in AI & ML.

REVA University Academic Regulations

B. Tech Degree Programs

(Applicable for the programs offered from 2020-21 Batch)

(Framed as per the provisions under Section 35 (ii), Section 7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

Title and Commencement:

These Regulations shall be called "REVA University Academic Regulations – B. Tech., Degree Program 2020-21 Batch subject to amendments from time to time by the Academic Council on recommendation of respective Board of Studies and approval of Board of Management

These Regulations shall come into force from the date of assent of the Chancellor.

The Programs:

These regulations cover the following B. Tech, Degree programs of REVA University offered during 2020-21.

B. Tech in:

Bioelectronics Engineering
Civil Engineering
Computer Science and Engineering
Computer Science and Information Technology
Computer Science and Systems Engineering
Computer Science and Engineering (AI and ML)
Electrical and Electronics Engineering
Electrical and Computer Engineering
Electronics and Communication Engineering
Electronics and Computer Engineering
Information Science and Engineering
Mechanical Engineering
Mechatronics Engineering

Duration and Medium of Instructions:

Duration: The duration of the B. Tech degree program shall be FOUR years comprising of EIGHT Semesters. A candidate can avail a maximum of 16 semesters - 8 years as per double duration norm, in one stretch to complete B. Tech degree, 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.

The medium of instruction shall be English.

Definitions:

Course: "Course" means a subject, either theory or practical or both, listed under a program; Example: "Fluid Mechanics" in B. Tech Civil Engineering program, Engineering Thermodynamics in B. Tech., Mechanical program are examples of courses to be studied under respective programs.

Every course offered will have three components associated with the teaching-learning process of the course, namely:

L	Lecture
T	Tutorial
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 / Project Based Learning or Course end Project/Self Study/ Online courses from listed portals that equip students to acquire the much required skill component.

4.2 Classification of Courses

Courses offered are classified as: Core Courses, Open Elective Courses, Project work/Dissertation

Core Course: A course which should compulsorily be studied by a candidate choosing a particular program of study

Foundation Course: The foundation Course is a mandatory course which should be completed successfully as a part of graduate degree program irrespective of the program of study

Hard Core Course (HC) simply core course: 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

Soft Core Course (SC) (also known as **Professional Elective Course**)

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.

Open Elective Course (OE):

An elective course chosen generally from other discipline / subject, with an intention to seek exposure to the basics of subjects other than the main discipline the student is studying is called an Open Elective Course

Project Work / Dissertation:

Project work / Dissertation work is a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problems to solve a multivariable or complex engineering problems. The project will be conducted in two phases, phase-I (7th Semester), Consists of literature survey, problem identification, formulation and methodology. In Phase-II (8th Semester) student should complete the project work by designing or creating an innovative process or development of product as an outcome. A project work carrying TWO, FOUR or SIX credits is called Minor Project work / Dissertation. A project work of SIX, EIGHT, or TEN, 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.

"Program" means the academic program leading to a Degree, Post Graduate Degree, Post Graduate Diploma Degree or such other degrees instituted and introduced in REVA University.

Eligibility for Admission:

5.1. The eligibility criteria for admission to B. Tech Program of 4 years (8 Semesters) is given below:

Sl. No.	Program	Duration	Eligibility
1	Bachelor of Technology (B. Tech)	4 Years (8 Semesters)	Passed 10+2 examination with Physics and Mathematics as compulsory subjects, along with any one of the following subjects, namely, Chemistry, Bio-Technology, Computer Science, Biology, Electronics and Technical Vocational subject Obtained at least 45% marks (40% in case of candidate belonging to SC/ST category) in the above subjects taken together.
2	Bachelor of Technology (B. Tech)	Lateral entry to second year	(A) Passed Diploma examination from an AICTE approved Institution with at least 45% marks (40% in case of candidates belonging to SC/ST category) in appropriate branch of Engineering / Technology. (B) Passed B. Sc Degree from a recognized University as defined by UGC, with at least 45% marks (40% in case of candidates belonging to SC/ST category) and passed XII standard with mathematics as a subject. (C) Provided that in case of students belonging to B. Sc. Stream, shall clear the subjects of Engineering Graphics / Engineering Drawing and Engineering Mechanics of the first year Engineering program along with the second year subjects.

			(D) Provided further that, the students belonging to B. Sc. Stream shall be considered only after filling the seats in this category with students belonging to the Diploma stream. (E) Provided further that student, who have passed Diploma in Engineering & Technology from an AICTE approved Institution or B. Sc., Degree from a recognized University as defined by UGC, shall also be eligible for admission to the first year Engineering Degree courses subject to vacancies in the first year class in case the vacancies at lateral entry are exhausted. However, the admissions shall be based strictly on the eligibility criteria as mentioned in A, B, D, and E above.
3	Bachelor of Technology (B. Tech)	Lateral entry to fourth year (final year)	(F) Any candidate with genuine reason from any University / Institution in the country upon credit transfer could be considered for lateral admission to the respective semester in the concerned branch of study, provided he/she fulfils the University requirements.
5	B. Tech. in Bioelectronics		Pass in PUC /10+2 examination with Physics, Biology/Biotechnology as compulsory along with at least one of the Chemistry/Mathematics / Computer Science / Electronics obtained minimum 45% marks (40% in case of candidates belonging to SC / ST category) in the above subjects taken together of any board recognized by the respective State Government / Central Government / Union Territories or any other qualification recognized as equivalent there to.

Provided further that the eligibility criteria are subject to revision by the Government Statutory Bodies, such as AICTE, UGC from time to time.

Courses of Study and Credits

Each course of study is assigned with certain credit value

Each semester is for a total duration of 20 weeks out of which 16 weeks dedicated for teaching and learning and the remaining 4 weeks for final examination, evaluation and announcement of results

The credit hours defined as below

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.

Credit = 13 credit hours spread over 16 weeks or spread over the semester

The total duration of a semester is 20 weeks inclusive of semester-end examination.

The following table describes credit pattern

Table -2: Credit Pattern					
Lectures (L)	Tutorials (T)	Practice (P)	Credits (L:T:P)	Total Credits	Total Contact Hours
4	2	0	4:1:0	5	6
3	2	0	3:1:0	4	5
3	0	2	3:0:1	4	5
2	2	2	2:1:1	4	6
0	0	6	0:0:3	3	6
4	0	0	4:0:0	4	4

The concerned BoS will choose the convenient Credit Pattern for every course based on size and nature of the course

Different Courses of Study:
Different Courses of Study are labeled as follows:
Core Course (CC)
Foundation Course (FC)
Hard Core Course (HC)
Soft Core Course (SC)
Open Elective Course (OE)
Project Work / Dissertation:

A project work carrying TWO, FOUR or SIX credits is called Minor Project work / Dissertation. A project work of EIGHT, TEN, TWELVE or SIXTEEN credits is called Major Project work / Dissertation. A Project work may be a hard core or a Soft Core as decided by the BoS / concerned.

These are defined under Section 4 of these regulations.

Credits and Credit Distribution

A candidate has to earn 160 credits for successful completion of B. Tech degree with the distribution of credits for different courses as given in table below:

Course Type	Credits (Range)
	For B. Tech Degree (8 Semesters)
Foundation Core Course	A minimum of 06 but not exceeding 12
Hard Core Course	A minimum of 118 but not exceeding 121
Soft Core Course	A minimum of 15 but not exceeding 21
Open Elective	A minimum of 04 but not exceeding 12

8.2. 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), Open Elective (OE).

8.3. Every course including project work, practical work, field work, self-study elective should be entitled as Foundation Course (FC), Hard Core (HC) or Soft Core (SC) or Open Elective (OE) or Core Course (CC) by the BoS concerned. However, following shall be the Foundation Courses with credits mentioned against them, common to all branches of study.

Sl. No.	Course Title	Number of Credits
Foundation Courses		
1	English for Technical Communication / Communication Skills	2
2	Environmental Studies / Environmental Science	2
3	Indian Constitution and Professional Ethics	2
4	MOOC / Internship /Soft Skill Training	6-15

8.4. The concerned BOS shall specify the desired Program Educational Objectives, Program Outcomes, Program Specific Outcomes and Course Outcomes while preparing the curriculum of a particular program.

8.5. A candidate can enrol for a maximum of 28 credits and a minimum of 19 credits per Semester. However he / she may not successfully earn a maximum of 28 credits per semester. This maximum of 28 credits does not include the credits of courses carried forward by a candidate.

Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to VIII semester and complete successfully 160 credits in 8 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.

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 160 credits for the B. Tech Degree program.

Add on Proficiency Diploma / Minor degree/ Honor Degree:

To acquire Add on Proficiency Diploma/ Minor degree/ Honor Degree:, 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 160 credits for the B. Tech Degree program.

The Add on Proficiency Certification / Diploma/ Minor degree/ Honor Degree: so issued to the candidate contains the courses studied and grades earned.

Assessment and Evaluation

The Scheme of Assessment will have two parts, namely;

Internal Assessment (IA); and

Semester End Examination (SEE)

Assessment and Evaluation of each Course shall be for 100 marks. The Internal Assessment (IA) and Semester End Examination (SEE) of UG Engineering programs shall carry 50:50 marks respectively (i.e., 50 marks internal assessment; 50 marks semester end examination).

The 50 marks of internal assessment shall comprise of:

Internal Test	30 marks
Assignments / Seminars / Model Making / Integrated Lab / Project Based Learning / Quizzes etc.	20 marks

There shall be two Internal Tests conducted as per the schedule announced below. The Students' shall attend both the Tests compulsorily.

1st test is conducted for 15 marks during 6th week of the Semester;

2nd test is conducted for 15 marks during 12th week of the of the Semester;

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

Question paper of the 1st test should be based on first 40 %of the total syllabus;

Question paper of the 2nd test should be based on second 40 %of the total syllabus;

An assignment must be designed to cover the last 20% of the Syllabus

There shall be one Assignment / Project Based Learning / Field Visit / Quiz test carrying 20 marks covering the last 20% of the Syllabus

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

A test paper is set for a maximum of 30 marks to be answered in 1 hour duration. A test paper can have 4 main questions. Each main question is set for 10 marks. The main question can have 2-3 sub questions all totalling 10 marks. Students are required to answer any three main questions. Each question is set using Bloom's verbs. The questions must be set to assess the students outcomes described in the course document.

The question papers for internal test shall be set by the internal teachers who have taught the course. If the course is taught by more than one teacher all the teachers together shall devise a common question paper(s).

However, these question papers shall be scrutinized by the Question Paper Scrutiny Committee to bring in the uniformity in the question paper pattern and as well to maintain the necessary standards.

The evaluation of the answer scripts shall be done by the internal teachers who have taught the course and set the test paper.

Assignment/seminar/Project based learning/simulation based problem solving/field work should be set in such a way, students be able to apply the concepts learnt to a real life situation and students should be able to do some amount self-study and creative thinking. While setting assignment care should be taken such that the students will not be able to plagiarise the answer from web or any other resources. An assignment / Quiz can be set for a maximum of 20. Course instructor at his/her discretion can design the questions as a small group exercise or individual exercise. This should encourage collaborative learning and team learning and also self-study.

Internal assessment marks must be decided well before the commencement of Semester End examinations

Semester End Examination: The Semester End Examination is for 50 marks shall be held in the 18th and 19th week of the semester and the entire course syllabus must be covered while setting the question paper.

Semester End Examination paper is set for a maximum of 100 marks to be answered in 3 hours duration. Each main question be set for a maximum of 25 marks, main questions can have a 3-4 sub questions. A total of 8 questions are set so that students will have a choice. Each question is set using Bloom's verbs. The questions must be set to assess the students outcomes described in the course document. (Please note question papers have to be set to test the course outcomes)

There shall be three sets of question papers for the semester end examination of which one set along with scheme of examination shall be set by the external examiners and two sets along with scheme of examination shall be set by the internal examiners. All the three sets shall be scrutinized by the Board of Examiners. It shall be responsibility of the Board of Examiners particularly Chairman of the BOE to maintain the quality and standard of the question papers and as well the coverage of the entire syllabus of the course.

There shall be single evaluation by the internal teachers who have taught the subject. However, there shall be moderation by the external examiner. In such cases where sufficient number of external examiners are not available to serve as moderators internal senior faculty member shall be appointed as moderators.

Board of Examiners, question paper setters and any member of the staff connected with the examination are required to maintain integrity of the examination system and the quality of the question papers.

There shall also be an Program Assessment Committee (PAC) comprising at-least 3 faculty members having subject expertise who shall after completion of examination process and declaration of results review the results sheets, assess the performance level of the students, measure the attainment of course outcomes, program outcomes and assess whether the program educational objectives are achieved and report to the Director of the School. The Examination Review Committee shall also review the question papers of both Internal Tests as well Semester End Examinations and submit reports to the Director of the respective School about the scope of the curriculum covered and quality of the questions.

The report provided by the Examination Review Committee shall be the input to the Board of Studies to review and revise the scheme of instruction and curriculum of respective program

During unforeseen situation like the Covid-19, the tests and examination schedules, pattern of question papers and weightage distribution may be designed as per the convenience and suggestions of the board of examiners in consultation with COE and VC

University may decide to use available modern technologies for writing the tests and SEE by the students instead of traditional pen and paper

Any deviations required to the above guidelines can be made with the written consent of the Vice Chancellor

Online courses may be offered as per UGC norms.

For online course assessment guidelines would be as follows:

If the assessment is done by the course provider, then the school can accept the marks awarded by the course provider and assign the grade as per REVA University norms.

If the assessment is not done by the course provider, then the assessment is organized by the concerned school and the procedure explained in the regulation will apply

In case a student fails in an online course, s/he may be allowed to repeat the course and earn the required credits

IAs for online courses could be avoided and will remain the discretion of the school.

The online platforms identified could be SWAYAM, NPTEL, Coursera, Edx.org, Udemy, Udacity and any other internationally recognized platforms like MIT online, Harvard online etc.

Utilization of one or two credit online courses would be:

4 week online course – 1 credit

8 week online course / MOOC – 2 credits

12 week online course / MOOC – 3 credits

Summary of Internal Assessment, Semester End Examination and Evaluation Schedule is provided in the table given below.

Summary of Internal Assessment and Evaluation Schedule

Sl. No.	Type of Assessment	when	Syllabus Covered	Max Marks	Reduced to	Date by which the process must be completed
1	Test-1	During 6th week	First 40%	30	15	7th week
2	Test -2	During 12th Week	Second 40%	30	15	13th Week
3	Assignment / Quiz	15th Week	Last 20%	20	20	16th Week
4	SEE	18/19th Week	100%	100	50	20th Week

Assessment of Students Performance in Practical Courses

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.

The 50 marks meant for Internal Assessment (IA) of the performance in carrying out practical shall further be allocated as under:

i	Conduction of regular practical / experiments throughout the semester	20 marks
ii	Maintenance of lab records	10 marks
iii	Performance of mid-term test (to be conducted while conducting second test for theory courses); the performance assessments of the mid-term test includes performance in the conduction of experiment and write up about the experiment.	20 marks
	Total	**50 marks**

10.2 The 50 marks meant for Semester End Examination (SEE), shall be allocated as under:

i	Conducting 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**

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

For MOOC and Online Courses assessment shall be decided by the BOS of the School.

For > 3 credit courses

i	IA-I	25 marks
ii	IA-2	25 marks
iii	Semester end examination by the concern school board (demo, test, viva voice etc.)	50 marks
	Total	**100 marks**

For 1 & 2 credit courses

i	IA-I	15 marks
ii	IA-2	15 marks
iii	Semester end examination by the concern school board (demo, test, viva voice etc.)	20 marks
	Total	**50 marks**

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

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

Component – I	Periodic Progress and Progress Reports (25%)
Component – II	Demonstration and Presentation of work (25%)
Component – III	Evaluation of Report (50%)

Requirements to Pass a Course:

A candidate's performance from IA and SEE will be in terms of scores, and the sum of IA and SEE scores will be for a maximum of 100 marks (IA = 50, SEE = 50) and have to secure a minimum of 40% to declare pass in the course. However, a candidate has to secure a minimum of 25% (13 marks) in Semester End Examination (SEE) which is compulsory.

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

Marks, P	Grade, G	Grade Point (GP=V x G)	Letter Grade
90-100	10	v*10	O
80-89	9	v*9	A+
70-79	8	v*8	A
60-69	7	v*7	B+
55-59	6	v*6	B
50-54	5.5	v*5.5	C+
40-49	5	v*5	C
0-39	0	v*0	F
ABSENT			AB

O - Outstanding; A+-Excellent; A-Very Good; B+-Good; B-Above Average; C+-Average; C-Satisfactory; F – Unsatisfactory.

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

Computation of SGPA and CGPA

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

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e : SGPA (Si) = $\sum(Ci \times Gi) / \sum Ci$ where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	**Credit**	**Grade Letter**	**Grade Point**	**Credit Point (Credit x Grade)**
Course 1	3	A+	9	3X9=27
Course 2	3	A	8	3X8=24
Course 3	3	B+	7	3X7=21
Course 4	4	O	10	4X10=40
Course 5	1	C	5	1X5=5
Course 6	2	B	6	2X6=12
Course 7	3	O	10	3X10=30
	19			**159**

Thus, SGPA = 159 ÷ 19 = 8.37

Illustration No. 2

Course	**Credit**	**Grade letter**	**Grade Point**	**Credit Point (Credit x Grade point)**
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			**175**

Thus, SGPA = 175 ÷ 24 = 7.29

Illustration No.3

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	O	10	4 x 10 = 40
Course 2	4	A+	9	4 x 9 = 36
Course 3	3	B+	7	3 x 7 = 21
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	B+	7	3 x 7 = 21
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A+	9	2 x 9 = 18
	24			**199**

Thus, SGPA = 199 ÷ 24 = 8.29

Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (160) for B. Tech degree in Engineering & Technology is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e : CGPA = ∑(Ci x Si) / ∑Ci

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

Illustration:

CGPA after Final Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	19	6.83	19 x 6.83 = 129.77
2	21	7.29	21 x 7.29 = 153.09
3	22	8.11	22 x 8.11 = 178.42
4	22	7.40	22 x 7.40 = 162.80
5	22	8.29	22 x 8.29 = 182.38
6	22	8.58	22 x 8.58 = 188.76
7	22	9.12	22 x 9.12 = 200.64
8	10	9.25	10 x 9.25 =92.50
Cumulative	**160**		**1288.36**

Thus, CGPA = 19x6.83+21x7.29+22x8.11+22x7.40+22x8.29+22x8.58+22x9.12+10x9.25 = 8.05

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 8.05 x 10=80.5

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

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	C	Satisfactory	Pass
< 4 CGPA	0	F	Unsatisfactory	Unsuccessful

Overall percentage=10*CGPA

Provisional Grade Card: The tentative / provisional grade card will be issued by the Controller of Examinations at the end of every semester indicating the courses completed successfully. The provisional grade card provides Semester Grade Point Average (SGPA).

Final Grade Card: Upon successful completion of B. Tech Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Controller of Examinations.

14. Attendance Requirement:

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

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

14.3 Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc, during a semester shall not be permitted to appear to the end semester examination and such student shall seek re-admission

15. Re-Registration and Re-Admission:

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

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

Absence during Internal Test:

In case a student has been absent from an internal test due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Director of the School, for conducting a separate internal test. The Director of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and arrange to conduct a special internal test for such candidate(s) well in advance before the Semester End Examination of that respective semester. Under no circumstances internal tests shall be held / assignments are accepted after Semester End Examination.

17. Provision for Appeal

17.1. If a candidate is not satisfied with the evaluation of Internal Assessment components (Internal Tests and Assignments), he/she can approach the Grievance Cell with the written submission together with all facts, the assignments, and test papers, which were evaluated. He/she can do so before the commencement of respective semester-end examination. The Grievance Cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the University on the candidate if his/her submission is found to be baseless and unduly motivated. This Cell may recommend for taking disciplinary/corrective action on an evaluator if he/she is found guilty. The decision taken by the Grievance committee is final.

18. Grievance Committee:

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

The Controller of Examinations - 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.

Eligibility to Appear for Semester End Examination (SEE)

Only those students who fulfil a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc., as part of the program shall be eligible to appear for Semester End Examination

Provision for Supplementary Examination

In case a candidate fails to secure a minimum of 25% (13 marks) in Semester End Examination (SEE) and a minimum of 40% marks together with IA and SEE to declare pass in the course, such candidate shall seek supplementary examination of only such course(s) wherein his / her performance is declared unsuccessful. The supplementary examinations are conducted after the announcement of even semester examination results. The candidate who is unsuccessful in a given course(s) shall appear for supplementary examination of odd and even semester course(s) to seek for improvement of the performance.

Provision to Carry Forward the Failed Subjects / Courses:

The student who has failed in a maximum of 4 courses in odd and even semesters together shall move to next semester of succeeding year(s) of study till 8th semester. And he / she shall appear for Semester End examination of failed courses of previous semesters concurrently with odd semester end examinations and / or even semester end examinations of current year of study.

Examples:-

Student "A" has failed in 1 Course in First Semester and 3 Courses in Second Semester. He / she is eligible to seek admission for Third Semester and appear for Semester End Examination of 1 failed Course of First Semester concurrently with Third Semester end examination. Likewise, he / she is eligible to appear for Semester End Examination of 3 failed Courses of Second Semester concurrently with Fourth Semester end examination.

Student "B" has failed in 2 Courses of First Semester and 2 Courses in Fourth Semester and has passed in all Courses of First and Second Semesters. He / she is eligible to seek admission to Fifth Semester and appear for Semester End Examination of 2 failed Courses of First Semester concurrently with Fifth Semester end examination. Likewise he / she is eligible to appear for Semester End Examination of 2 failed Courses of Fourth Semester concurrently with Sixth Semester end examination.

Student "C" has failed in one course in Second Semester one course in third semester and two courses in fifth semester and has cleared all other courses from first semester to Sixth Semester. He / She has also passed all the courses of First to Sixth Semesters. Student "C" is eligible to seek admission for Seventh Semester and appear for Semester End Examination of one failed Course of Second Semester, one course of third semester and two courses in fifth semester concurrently with Seventh Semester end examination. However, he / she has to pass all the failed courses of Second Semester, Third Semester and Fifth Semester along with Seventh and Eighth Semesters courses to earn B. Tech Degree.

Student "D" failed in three courses in first semester and one course in second semester, but has passed in all the courses of second to sixth semester. Student "D" is also eligible to seek admission for 7th Semester and appear for Semester End Examination of 3 failed courses of 1st Semester and one course of second semester concurrently with 7th Semester and 8th semester end examinations. However, he / she has to pass three failed courses of first semester and one failed course of second semester along with Seventh and Eighth Semester courses to earn B. Tech Degree.

The student failed in any course(s) in any of the first to eight semesters has to pass all the failed courses of all Semesters within the double duration to earn B. Tech Degree failing which he / she has to seek re-admission to the program afresh.

Challenge Valuation:

a) A student who desires to apply for challenge valuation shall obtain a photo copy of the answer script(s) of semester end examination 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 Controller of Examinations within 10 days after the announcement of the results. This challenge valuation is only for semester end examination.
b) The answer scripts (in whatever form) 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.

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

All assessments must be done by the respective Schools as per the guidelines issued by the Controller of Examinations. However, the responsibility of announcing final examination results and issuing official transcripts to the students lies with the office of the Controller of Examinations.

School of Computing and Information Technology
Scheme of Instructions
B. Tech CSE (AI & ML)

I SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/ SC/ OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20AS0105	Multivariable Calculus and Linear Algebra	HC	3	0	0	3	3
2	B20EE0101	Basics of Electrical and Electronics Engineering	HC	3	0	1	4	5
3	B20CI0101	Introduction to Python Programming	FC	2	0	1	3	4
4	B20AS0104	Engineering Chemistry	HC	3	0	0	3	3
TOTAL				**11**	**0**	**2**	**13**	**15**
	Practical /Term Work / Practice Sessions /MOOCs							
5	B20ME0102	Design Thinking	FC	1	0	1	2	3
6	B20AS0109	Biology for Engineers	FC	1	0	0	1	1
7	B20ME0101	Computer Aided Engineering Drawing	HC	2	0	1	3	4
TOTAL				**4**	**0**	**2**	**6**	**8**
TOTAL SEMESTER CREDITS							**19**	
TOTAL CUMULATIVE CREDITS							**19**	
TOTAL CONTACT HOURS							**23**	

II SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/ SC/ OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20AS0204	Probability and Statistics	HC	4	0	0	4	4
2	B20AS0106	Physics for Computer Science	HC	3	0	0	3	3
3	B20CS0101	Introduction to Data Science	FC	2	0	1	3	4
4	B20CE0201	Basics of Civil and mechanical Engineering	HC	3	0	1	4	5
5	B20CS0102	Programming for Problem Solving	HC	3	0	1	4	5
TOTAL				**15**	**0**	**3**	**18**	**21**
	Practical /Term Work / Practice Sessions /MOOCs							
6	B20EC0101	IoT and Applications	FC	1	0	1	2	3
7	B20ME0104	Entrepreneurship	FC	1	0	0	1	1
TOTAL				**2**	**0**	**1**	**3**	**4**
TOTAL SEMESTER CREDITS							**21**	
TOTAL CUMULATIVE CREDITS							**40**	
TOTAL CONTACT HOURS							**25**	

III SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/ SC/ OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20CI0301	Analog and Digital Electronics.	HC	3	0	1	4	5
2	B20CI0302	Programming with JAVA	HC	3	0	1	4	5
3	B20CI0303	Data Structures	HC	3	0	1	4	5
4	B20AS0302	Discrete Mathematics and Graph Theory	HC	3	0	0	3	3
5	B20CI0304	Agile software development and DevOps	HC	3	0	0	3	3
TOTAL				**15**	**0**	**3**	**18**	**21**
	Practical /Term Work / Practice Sessions /MOOCs							
6	B20MGM301	Management Science	FC	2	0	0	2	2
7	B20AS0301	Environmental Science	FC	2	0	0	2	2
8	B20AHM301 OR B20AHM 302	Advanced Kannada OR Basics of Kannada	MC	0	0	0	0	0
TOTAL				**4**	**0**	**0**	**4**	**4**
TOTAL SEMESTER CREDITS							**22**	
TOTAL CUMULATIVE CREDITS							**62**	
TOTAL CONTACT HOURS							**25**	

IV SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/ SC/ OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20CI0401	Design and Analysis of Algorithms	HC	3	0	1	4	5
2	B20CI0402	Unix Operating System	HC	3	0	1	4	5
3	B20EA0401	Artificial Intelligence	HC	3	0	0	3	3
4	B20EJ0401	Computer Organization and Architecture	HC	3	0	0	3	3
5	B20CI0403	Database Management System	HC	3	0	1	4	5
6	B20AS0401	Numerical Methods and Optimization Techniques	HC	3	0	0	3	3
TOTAL				18	0	3	21	24
Practical /Term Work / Practice Sessions /MOOCs								
6	B20AH0301	Communication Skills	FC	2	0	0	2	2
7	B20LS0301	Indian Constitution and Professional Ethics	FC	2	0	0	2	2
8	B20AHM401	Universal human values	MC	0	0	0	0	0
TOTAL				**4**	**0**	**0**	**4**	**4**
TOTAL SEMESTER CREDITS							**25**	
TOTAL CUMULATIVE CREDITS							**87**	
TOTAL CONTACT HOURS							**28**	

V SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC /SC/ OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20EA0501	Computer Vision	HC	3	0	0	3	3
2	B20CI0502	Machine learning	HC	3	0	0	3	3
3	B20CI0501	Computer Networks	HC	3	0	0	3	3
4	B20EA0502	Virtualization and Cloud Computing	HC	3	0	0	3	3
5	B20EXS5(01-04)	Professional Elective-I	SC	3	0	0	3	3
6	B20XXO5XX	Open Elective-I	HC	3	0	0	3	3
7	B20EA0504	Computer Vision Lab	HC	0	0	1	1	2
8	B20CI0505	Machine learning Lab	HC	0	0	1	1	2
9	B20CI0506	Computer Networks Lab	HC	0	0	1	1	2
TOTAL				18	0	3	21	24
Practical /Term Work / Practice Sessions /MOOCs								
10	B20CI0503	Technical Documentation	FC	1	0	0	1	1
11	B20EA0503	AI & Humanity	FC	2	0	0	2	2
TOTAL				**3**	**0**	**0**	**3**	**3**
TOTAL SEMESTER CREDITS							**24**	
TOTAL CUMULATIVE CREDITS							**111**	
TOTAL CONTACT HOURS							**27**	

VI SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/SC / OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20EA0601	Big Data Analytics	HC	3	0	0	3	3
2	B20EA0603	Neural Networks and Deep learning	HC	3	0	0	3	3
3	B20EXS6(01-04)	Professional Elective-II	SC	3	0	0	3	3
4	B20EXS6(05-08)	Professional Elective-III	SC	3	0	0	3	3
5	B20EXS6(09-12)	Professional Elective-IV	SC	3	0	0	3	3
6	B20XXO6XX	Open Elective-II	HC	3	0	0	3	3
7	B20EA0604	Big Data Analytics Lab	HC	0	0	1	1	2
8	B20EA0605	Neural Networks and Deep learning Lab	HC	0	0	1	1	2
TOTAL				18	0	2	20	22

Practical /Term Work / Practice Sessions /MOOCs								
9	B20CI0601	Research Based Mini Project	HC	0	0	2	2	4
10	B20PA0501	Indian Tradition and Culture	FC	1	0	0	1	1
11	B20EA0602	Natural Language Processing	HC	1	0	1	2	3
TOTAL				**2**	**0**	**3**	**5**	**8**
TOTAL SEMESTER CREDITS							**25**	
TOTAL CUMULATIVE CREDITS							**136**	
TOTAL CONTACT HOURS							**30**	

VII SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/SC / OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20EXS7 (01-04)	Professional Elective-V	SC	3	0	0	3	3
2	B20XXO7XX	Open Elective-III	OE	3	0	0	3	3
TOTAL				**6**	**0**	**0**	**6**	**6**
Practical /Term Work / Practice Sessions /MOOCs								
3	B20CI0701	Summer Internship/Global Certification	HC	0	0	3	3	6
4	B20CI0702	Project Phase-I	HC	0	0	4	4	8
TOTAL				**0**	**0**	**7**	**7**	14
TOTAL SEMESTER CREDITS							**13**	
TOTAL CUMULATIVE CREDITS							**149**	
TOTAL CONTACT HOURS							**20**	

VIII SEMESTER

Sl. No	Course Code	Title of the Course	HC/FC/SC / OE	Credit Pattern & Credit Value				Contact Hours/ Week
				L	T	P	Credits	
1	B20CI0801	Capstone-Project Phase-2	HC	0	0	8	8	16
TOTAL				**0**	**0**	**8**	**8**	16
Practical /Term Work / Practice Sessions /MOOCs								
1	B20XXO8XX	Open Elective-IV	OE	3	0	0	3	3
TOTAL				**3**	**0**	**0**	**3**	**3**
TOTAL SEMESTER CREDITS							**11**	
TOTAL CUMULATIVE CREDITS							**160**	
TOTAL CONTACT HOURS							**19**	

Professional Electives in CSE(AI&ML) stream

	Code	Course	Code	Course	Code	Course	Code	Course
PE-I/V sem	B20EKS501	Introduction to Robotics and Drones	B20EAS502	Data Visualization techniques	B20EAS503	Decision Support & expert systems	B20EAS504	Fuzzy Logic and Systems
PE-II/ VI sem	B20EAS601	Knowledge Representation and Reasoning	B20EJS602	Information Retrieval System	B20EAS603	Modern Databases	B20EAS604	Information Theory and coding
PE-III/ VI sem	B20EAS605	Control Systems	B20EAS606	Predictive Analytics using R	B20EAS607	Bioinformatics	B20EAS608	Speech processing
PE-IV/ VI sem	B20EAS609	Advanced Topics in Machine Learning	B20EAS610	High Performance Computing	B20EAS611	Business Intelligence	B20EAS612	Video processing
PE-V/ VII sem	B20EAS701	Swarm and Bio-inspired Intelligence	B20EJS702	Augmented and Virtual Reality	B20EAS703	Cognitive Science	B20EAS704	Artificial Intelligence in Healthcare

Open Electives Offered to Other schools											
5TH SEM /OE-I			**6th SEM /OE-II**			**7th SEM /OE-III**			**8th SEM /OE-IV**		
Course code	Course Name	Teaching School	Course code	Course Name	Teaching School	Course code	Course Name	Teaching School	Course code	Course Name	Teaching School
B20CIO501	Introduction to AI	CIT	B20CIO601/602	Data Mining/ Machine Learning	CIT	B20CIO701	Python for data science	CIT	B20CIO801	IoT Programming	CIT
B20CIO502/503	OOPS with c++/Web technology	CIT	B20CIO603	Neural Networks	CIT	B20CIO702	Deep Learning	CIT	B20CIO802	Reinforcement Learning	CIT

Skill Development Programs

Skill Development Programs (by Clubs/Industries/Corporate-Trainers/School-Faculty)		
GitHub and Open Source Technologies	Project Development Tools	Ethical Hacking
Cyber Security and Forensics	Cyber Physical Systems	IOT And Cloud Convergence
Graphics With Open Source Tools	AR And VR With UNITY Software	Robotic Process Automation
Data Analysis Using Python	Python And ML	Data Analysis With R
Mongo dBand NOSQL	Django And Python	Full Stack Development
DevOps Tools	Linux System Administration	Cloud Administration
Network Administration	Software Testing with Scrum	Software Project Management
Big data Using Spark/Hadoop	Excel And SQL For Data Analysis	AWS Cloud and DevOps
Azure Cloud and DevOps	Google Cloud and DevOps	Coding And Programming Skills
Android Application Development	IOS Application Development	NLP With Python
Social Media Analytics	JavaScript For Web Design	Micro Website Design Google Web Designer
Algorithms Thinking and Data Structures	UI Design	Storage System Management
Digital SEO/Sem Marketing	Web Services (Restful Services in Java, Etc.)	Digital Photography with Photoshop
Network Programming	WSN And IOT Programming	Image Processing Using Python
5G And IOT	Sentiment Analysis	Machine Learning And IOT
System Integration Tools	Computational Biology Using Python	C# And .Net
Kotlin Programming	Julia Programming	Objective C Programming
JavaScript For Cyber Security	C++ Programming For Automotive Applications	E-Commerce Site Design
Banking And Insurance Using Python	MATLAB For Scientific Computing	Network Simulator NS3

Certification Programs		
EC Council: Certified Ethical Hacker	EC Council: CHFI Certified Hacking Forensics Investigator	Cisco: CCNP Security
CWNP: CWNS Certified Wireless Network Security Professional	ISACA: Certified Information Security Manager	Juniper: Juniper Network Certified Internet Professional
AWS: Certified Solutions Architect Professional	AWS: Certified DevOps Engineer	AWS: Certified Security Speciality
Google: Certified Professional Cloud Architect	Google: Associate Cloud Engineer	Red Hat: RHSCA in Red Hat Open Stack
Professional Cloud Developer	IBM: Certified System Administrator	IBM: Certified Database Administrator
PSC: Scrum Certification	Microsoft: Advanced MS Excel	PMI: PMP Certification
COBIT: IT Service Management Certification	VMWare: Advanced Certified Professional – Data Centre Virtualization	VMWare: Certified Professional Network Virtualization
IBM: Certified Application Developer	IBM: AI Certification	IBM: Data Science Professional Certificate
Wireshark: Certified Network Analyst	Cisco: CCNA Network Associate	Cisco: CCNP Enterprise
CWNP: WIFI administration	CWNP: Wireless Security Professional	Kubernetes and Red Hat Open Stack /AWS
VMWare: Certified Professional Cloud Management and Automation	Oracle: Business Intelligence	Oracle: Enterprise Management
Oracle: Virtualization	Red Hat: Microservices Certification	Block Chain Council: Blockchain Certification
DLA: Certified REST API Practitioner	Cloud Credential Council: IOT Certification	Microsoft: DevOps Engineer
Microsoft: Azure Data Engineer	Microsoft: Azure Administrator	Microsoft: Azure AI Engineer

Detailed Syllabus
Semester1

Course Title	Multivariable Calculus and Linear Algebra				Course Type		Theory	
Course Code	B20AS0105	Credits	4		Class		I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	4	4	4				
	Practice	-	-	-	Theory	Practical	IA	SEE
	Tutorial	-	-	-				
	Total	**4**	**4**	**4**	**52**	**-**	**50%**	**50%**

COURSE OVERVIEW:

The course Differential Calculus deals with the basic aspect's differential calculus. The students of Computer Science are equally benefited with this course as stepping stone to the broad areas of calculus. This course familiarizes students with important concepts coming under differential calculus and to develop strong foundations on these concepts.In Computer Science, Calculus is used for machine learning, data mining, scientific computing, image processing, and creating the graphics and 3D visuals for simulations. Calculus is also used in a wide array software program that require it.Linear algebra provides concepts that are crucial to many areas of computer science, including graphics, image processing, cryptography, machine learning, optimization, graph algorithms, information retrieval and web search.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the scalar product and vector product of two or more vectors.
2. Illustrate how to find angle between polar curves with a suitable example.
3. Demonstrate the use of radius of curvature of the curves can be best suited for machine learning techniques with big data analytics.
4. Describe the concepts of Linear algebra and calculus theory**.**

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply Taylor's and Maclaurin's series for finding series expansions of functions and approximating values. expansions of functions and approximating values.	1-6	1,2
CO2	Identify and evaluate the radius of curvature of the given curve. Also evaluate the given indeterminate form using L' Hospital rule.	1-6	1,2

CO3	Make use of Gauss elimination and Gauss Jordon method for solving the system of equations, if the given system of equations is consistent.	1-6	1,2
CO4	Determine the Eigen values, the corresponding Eigen vectors and diagonalizable the given square matrix.	1-6	1,2
CO5	Learn new tools and technologies in the linear algebra and apply for suitable application development.	12	1,2
CO6	Develop solutions in the linear algebra to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	2, 3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember(L1)	Understand(L2)	Apply(L3)	Analyse(L4)	Evaluate(L5)	Create(L6)
CO1			✓			
CO2			✓		✓	
CO3			✓			
C04			✓			
CO5			✓			
CO6			✓	✓		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	1							3	3	
CO2	3	3	3	3	3	1							3	3	
CO3	3	3	2	2	3	1							2	2	
C04	2	3	2	3	3	1							1	1	
CO5												2	2	2	
CO6					2				2	2				2	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT – 1

Introduction to Vector Differentiation: Introduction, Scalar and vector point functions, velocity, acceleration, Gradient, Divergence, Curl, Laplacian, Solenoidal and Irrotational vectors, Vector identities**.**

Differential Calculus-1:Successive differentiation- nth derivatives of standard functions (no proof) simple problems, Leibnitz Theorem (without proof) and problems, Taylor's series and McLaurin's series expansion for function of one variable(only problems), Polar curves- Angle between the radius vector and the tangent, angle between two curves, Pedal equation for polar curves. Applications in computer science.

UNIT-2

Differential Calculus-2: Derivative of arc length – concept and formulae (without proof), Radius of curvature- Cartesian, parametric, polar and pedal forms (with proof) problems.
Indeterminate forms and solution using L'Hospital's rule. Analysis of Randomized algorithms using Differential Calculus. Applications in computer science.

UNIT-3

LinearAlgebra-1: Basic concepts, Echelon form, normal form of a matrix, Rank of Matrix, Gauss-Jordon method to find inverse of a matrix, consistency of linear system of equations, Gauss elimination and Gauss-Jordon method to solve system of equations. Linear Algebra for statistics. Applications in computer science.

UNIT-4

Linear Algebra-2: Linear Transformations, orthogonal transformation, Eigen values and Eigen Vectors. Complex matrices, Similarity of Matrices, Diagonalization. Rayleigh power method to determiner largest Eigen value and the corresponding Eigen vector. Analysis of Randomized algorithms using Linear Algebra. Applications in computer science.

TEXTBOOKS:

1. Theodore Shifrin, "Multi-Variable Calculus and Linear Algebra with Applications", Wiley, 1st Edition,Volume 2, 2018.
2. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 43nd edition, 2015.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Publications, 9th edition,2013.
4. Ron Larson, "Multivariable Calculus, Cengage Learning", 10th Edition, 2013.

REFERENCE BOOKS:

1. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill Publications, 19th Reprint edition, 2013.
2. R.K.Jain and S.R.K.Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 4th edition, 2016.
3. Stanley I. Grossman, "Multivariable Calculus, Linear Algebra, and Differential Equations", 2nd Edition, Academic Press 1986.

JOURNALS/MAGAZINES

https://www.sciencedirect.com/journal/linear-algebra-and-its-applications

SWAYAM/NPTEL/MOOCs:

1. https://youtu.be/XzaeYnZdK5o
2. https://youtu.be/KSntcGOFdUc
3. https://youtu.be/LJ-LoJhbBA4

SELF-LEARNINGEXERCISES:

1. Vectors in Space, Generalized Leibniz Rules, Mean Value of Derivatives, Powers of a matrix,
2. Testing of Linear Dependence and Independence and multivariate calculus. Introduction to differential equations.

Course Title	Basic Electrical and Electronics Engineering				Course Type		Integrated	
Course Code	B20EE0101	Credits	4		Class		I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory Hours	Practical Hours	CIE	SEE
	Tutorial	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50%**	**50%**

COURSE OVERVIEW

Basic Electrical & Electronics Engineering covers basic concepts of electrical engineering and electromagnetism. This course introduces the student to the working AC and DC Machines. It also helps the student to understand the basics in digital electronics by applying the knowledge of logic gates and learning the applications of diodes in rectifiers, filter circuits. Further, it has a self-learning component on BJT's.

COURSE OBJECTIVE (S):

1. Explain the basics of electrical and electronics engineering terminologies.
2. Distinguish the single and three phase systems.
3. Illustrate the different building blocks in digital electronics using logic gates and explain simple logic functions using basic universal gates.
4. Discuss the applications of diode in rectifiers, filter circuits and wave shaping.
5. To build a broad concept for hands on experience in various types of electrical apparatus, tools and instrumentation with electrical safety norms.
6. To analyze the schematics for making electrical connection and to interpret experimental data for various electrical appliances.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Summarize the basics of electrical engineering terminology and the usage.	1-6	1
CO2	Analyze the concepts and applications of DC & AC Machines.	1-5	1
CO3	Apply the concept of domestic wiring, importance of safety and sensing devices	1-5,10	1
CO4	Analyze the different building blocks in digital electronics using logic gates and applications of diode in rectifiers, filter circuits and wave shaping.	1-5	1

CO5	Interpret, Identify and use appropriate electrical tools for electrical connections and to repair electrical equipment's.	1-7, 9,10	1,2
CO6	Compare experimental results with theoretical analysis and the ability to critically evaluate the performance of electrical appliances.	1-7, 9,10	1,2

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√				
CO2				√		
CO3			√			
CO4				√		
CO5			√			
CO6				√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	2	1							1		
CO2	1	3	2	2	1								1		
CO3	2	2	2	2	1					2			1		
CO4	3	3	3	1	1								1		
CO5	2	2	1	3	1	3	1		3	1			3	3	
CO6	2	2	1	3	1	3	1		3	1			3	3	

Note:1-Low,2-Medium,3-High

COURSE CONTENT:
THEORY:

CONTENTS

UNIT-1

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Kirchhoff's Laws, Resistive, Inductive, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations, Network Theorems (Superposition, Thevenin's & Norton's) Generation of an alternating Emf–average and rms values of alternating quantity–representation of alternating quantities by phasors–single phase series and parallel circuits (simple problems), three phase systems and power calculations

UNIT-2

DC-Machines: Construction and Principle of operation of DC Machines–Emf & Speed equations-types–applications.
AC-Machines: Principle of operation of single phase transformers–Emf equation–losses– efficiency and regulation-Construction and working principle of induction motors–Slip–torque characteristics–applications-Construction and Principle of operation of alternators applications.

UNIT-3

Instruments: Basic Principle of indicating instruments–PMMC&MI instruments. Tariff, Protective Devices and Sensors: Tariff schemes, basic concepts of domestic wiring and types, Earthing, protective fuses, MCB, sensors: pressure sensors, strain gage, proximity sensors, displacement sensors, Rotatory encoder and ultrasonic sensors and civil engineering applications.

UNIT-4

Diodes: Introduction, Physical operation of p-n junction diodes, Characteristics of p-n junction diodes, Zener diode, Rectifier circuits (half-wave, full-wave, bridge and peak rectifiers),Light emitting diodes.
Digital Electronic Principles: Introduction, Binary digits, Logic levels and Digital waveforms, Introduction to basic logic operation, Number system, Decimal numbers, Binary numbers, Decimal-to-Binary conversion, Simple binary arithmetic.

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1.	Electrical Safety Training. a) To Study the importance of Earthing during accidental shorting of line wire and the body of equipment. b) To conduct experiment and to know the Importance and mechanism of FUSE c) To study the Importance and mechanism of MCB.	Trainer kit Ohms Law Fall of resistance	Importance & applications of Earthing, Fuse & MCB
2.	Home Electrical Wiring Demonstration. a) To study & verify the connection procedure for fluorescent lamp wiring. b) To study the connection of Fan with switch and regulator.	Fluorescent Lamp wiring Panel Fan with switch and regulator Kit	Connection & Trouble shooting of fluorescent lamp wiring & Fan with switch and regulator
3.	Two-way switch/ staircase wiring. To study & verify the connection procedure for two-way switch or staircase wiring	Two-way switch or staircase wiring Kit	Connection, Working & application of Two-way switch
4.	Behaviour of current and voltage in series and parallel circuits. a)To study and verify the behaviour of current and voltage in series circuit. b) To study and verify the behaviour of current and voltage in parallel circuit.	Series and parallel circuits Kit	Connection & behaviour of current & voltage in series, parallel circuit
5	Polarity test on single phase transformer. a)To determine the additive polarity of a single-phase transformer. b) To determine the subtractive polarity of a single-phase transformer.	Transformer Kit	Polarities of single phase transformer
6	Determination of VI characteristics of Zener Diode	VI characteristics of Zener Diode kit	VI characteristics of Zener Diode
7	Determination of VI characteristics of Silicon Diode	VI characteristics of Silicon Diode kit	VI characteristics of Silicon Diode
8	Analyze the Half Wave and Full Wave rectifiers using Diode with and without filter	Rectifier kit	Determine the efficiency, Voltage regulation, ripple factor
9	Determine the Characteristics of BJT in Common Emitter Configuration	Characteristics of BJT in Common Emitter	Input & Output Characteristics of BJT
10	Determine the Characteristics of JFET in Common Source Configuration	Characteristics of JFET in Common	Input & Output Characteristics of JFET
11	Realization of Universal gates using basic logic gates.	Trainer kit	Universal gates will be realized using basic gates

TEXTBOOKS:

1. Nagrath I.J. and D. P. Kothari, “Basic Electrical Engineering”, Third Edition Tata McGraw Hill, 2009.
2. Hayt and Kimberly, “Engineering Circuit Analysis”, 8th Edition, Tata McGraw Hill, 2013.
3. Kulshreshtha D.C., “Basic Electrical Engineering”, Tata McGraw Hill, 2009.
4. Rajendra Prasad, “Fundamentals of Electrical Engineering”, Prentice Hall, India, 2009.
5. Hughes, E., “Electrical Technology”, Pearson, 2005.
6. David A. Bell, “Electronic Devices and Circuits”, Oxford University Press, 5th Edition, 2008.
7. D.P. Kothari, I. J. Nagrath, “Basic Electronics”, McGraw Hill Education (India) Private Limited, 2014.

REFERENCEBOOKS:

1. Theodore Wildi, “Electrical Machines, Drives, and Power, 5thSystems”, Pearson Edition, 2007.
2. Hughes, “Electrical Technology”, International Students 9th Edition, Pearson, 2005.

JOURNALS/MAGAZINES

1. International Journal of Electrical Power and Energy Systems (https://www.journals.elsevier.com/international- journal-of-electrical-power-and-energy-systems)
2. Journal of Electrical Engineering (https://link.springer.com/journal/202)

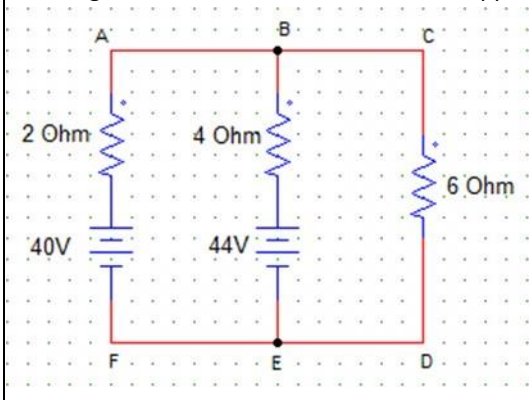
SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/108/108/108108076/

SELF-LEARNINGEXERCISES:

1. Build an electrical circuit using BJT as a switch
2. Identifying the practical application of Electromagnetic Induction

PROBLEM BASED LEARNING

No	Problems
1	A current of 20A flows through two ammeter A and B in series. Potential difference across A is 0.2V and across B is 0.8 V. Find how the same current will divide between A and B when they are joined in parallel.
2	For the given circuit calculate the current supplied by each battery and current in 6 ohm resistor. 
3	Two 12V batteries with internal resistances 0.2 ohm and 0.25 ohm respectively are joined in parallel and a resistance of 1 ohm is placed across the terminals. Find the current supplied by each battery.
4	A 6 pole induction motor is connected to a 50 Hz supply. It is running at a speed of 970 R.P.M. Find the synchronous speed and the slip

5	If A= $(1011)_2$ and B = $(1110)_2$, perform the following arithmetic operations. i)Addition ii) subtraction ii) Multiplication
6	Simplify the given Boolean expression and implement using logic gates. i)Y=AB+ABC+AB(D+E) ii) Y=ABCD+ABD iii) Y=AB+A(B+C)+B(B+C)
7	Simplify the given Boolean Expression: i) Y= XY+XYZ+XY$\bar{Z}$+$\overline{XYZ}$ ii) $Y = \bar{A}\bar{B}$C+ B + BC iii) Y= AC+C(A+ B)
8	a) Perform the following operations: (i)Convert $(01110111)_2$ to decimal (ii) Convert $(21)_{10}$ to binary (iii) Add: $(1010)_2$ and $(0011)_2$ (iv) Subtract: $(111.111)_2$ from $(1010.01)_2$ (v) Divide: $(101101)_2$ by $(110)_2$

PROJECT BASED LEARNING

To enhance the skill set in the integrated course, the students are advised to execute course-based design projects. Some sample projects are given below:

	Suggested Projects
1.	Design & Development of a rectifier circuit
2.	Identify the types of wiring
3.	Electricity bill calculation
4.	Identify the types of motors used in domestic & industrial application with nameplate details.
5.	Identification of different transformer based on their rating used for various applications.

Course Title	Introduction to Python Programming				Course Type		Integrated	
Course Code	B20CI0101	Credits	3		Class		I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	1	2	2	Theory	Practical	IA	SEE
	Tutorial	-	-	-				
	Total	**3**	**4**	**4**	**26**	**26**	**50**	**50**

COURSE OVERVIEW:

Python is a Programming Language that can be treated in a procedural way, an object-orientated way or a functional way. It can be used on a server to create web applications, create workflows, connect to database systems, read and modify files, handle big data and perform complex mathematics. It can implement objectoriented features and exception handling, It can parse the strings using regular expressions. It can be used for implementing the machine learning algorithms to develop solutions for interdisciplinary problems apart from any general problems leading to automation.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the fundamentals of python programming language constructs and their applications.
2. Inculcate knowledge of parsing of regular expressions and their usage in various application domains.
3. Gain expertise in Object oriented programming and NumPy package.
4. Discuss the files, Pandas and Data Virtualization concepts.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of language constructs to solve real world problems using python programming.	1- 4, 8, 9, 12	1
CO2	Develop programs for text processing and other application domains by making use of regular expressions.	1-3, 5,9,12	2
CO3	Apply features of object oriented and NumPy package to develop computationally intensive programming to analyze and interpret the	1- 5, 9, 12	3
CO4	Create data science solutions with the help of files, Pandas and Data Visualization.	1,4,5,9,12	1-3
CO5	Learn new tools and technologies in the python and apply for suitable application development.	12	1,2
CO6	Develop solutions in the python 1to the complex problems, either individually or as a part of the team and report the results with proper	5, 9, 10	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√	√		
CO4			√	√	√	√
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2				1	1			1	3		
CO2	3	2	3		2				1			1		3	
CO3	3	1	2	1	2				1			1			
CO4	3			2	2				1			1	3	3	3
CO5												1	2	2	
CO6					2				1	1				2	2

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Introduction to Computer Fundamentals: Computer Components, accessories, specifications of computers and external devices. Flowchart symbols and guidelines, types and advantages, Algorithm design.

Python Fundamentals: Introduction to Python: History, Applications, Your First Python Program, Constants, Variables, Naming conventions, simple data types, Type casting, Assignment statements, expressions, Boolean data type, Trigonometry functions, operators, precedence of operators, libraries, keywords, Python Collections, I/O statements, conditional statements, loops, functions, user defined functions. Introduction to GitHub and applications.

UNIT-2

Strings: Unicode, Formatting Strings, Format Specifiers, other Common String Methods, Slicing a String.

Regular Expressions: Case Study: Street Addresses, Case Study: Roman Numerals, Checking for Thousands, Checking for Hundreds, Using the {n,m} Syntax, Checking for Tens and Ones.

UNIT-3

Object Oriented Programming: Defining Classes, The init() Method, Instantiating Classes, OOP features: Abstraction. Encapsulation, Single Inheritance, Polymorphism.

Files: Reading from Text Files, Writing to text files, Reading and Writing the Binary Files.

UNIT-4

NumPy: Introduction to NumPy, Creating arrays, Indexing Arrays, Array Transposition, Universal Array Function, Array Processing, Array Input and Output.

Pandas and Data Visualization: Introduction, Series and Data Frames in pandas and Data Visualization.

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
Part-A			
1.	a). "LIST1" is a list that contains "N" different SRN of students read using a user defined function with the help of input () function. It is required to add SRN of "M" more students that are to be appended or inserted into "LIST1" at the appropriate place. The program must return the index of the SRN entered by user.	Windows/Linux OS, IDE, Jupiter	Create and perform operations on list.
	b)"TUPLE1" and "TUPLE2" are two tuples that contain "N" values of different data types read using the user defined function "READ" with the help of input() function. Elements of "TUPLE1" and "TUPLE2" are to be read one at a time and the "larger" value among them should be placed into "TUPLE3". Display all tuples.	Windows/Linux OS, IDE, Jupyter	Create and perform operations on Tuples.
2.	a)SET1 and SET2 are two sets that contain unique integers. SET3 is to be created by taking the union or intersection of SET1 and SET2 using the user defined function Operation (). Perform either union or intersection by reading choice from user. Do not use built in functions union () and intersection () and also the operators "|" and "&".	Windows/Linux OS, IDE, Jupyter	Create and perform Union and Intersection, Operations on Sets.
	b)The Dictionary "DICT1" contains N Elements and each element in dictionary has the operator as the KEY and operand's as VALUES. Perform the operations on operands using operators stored as keys. Display the results of all operations.		Create dictionary and perform operation using user defined function.
3.	a)A substring "Substr" between index1 and index2 is to be extracted from the given input string "Str1", which is read using input(). Display the substring "Substr" using a user defined function if available in string "Str1", otherwise display NULL.	Windows/Linux OS, IDE, Jupyter	String operations.
	b) A string containing multiple words is to be read from the user one at a time, after reading perform following operations. Convert all the strings to uppercase and display Split the words of a string using space as the separation character and display.		
4.	a)Consider the text file, "Std.txt", with the details of students like SRN, NAME, SEMESTER, SECTION AND AVG_MARKS. Read the file, "Std.txt" and display the details of all the students of 4th Semester "A" Section who have scored more than 75%.	Windows/Linux OS, IDE, Jupyter	File Handling.
	b)Consider the text file "Emp.txt", with the details of Employees like EMP_CODE, EMP_NAME, BASIC_SALARY, DA, GROSS_SALARY, NET_SALARY, LIC, PF and TOTAL-DEDUCTIONS. Read EMP_CODE, EMP_NAME, BASIC_SALARY, DA, LIC and PF from the user using input() and compute the following: TOTAL_DEDUCTIONS= (LIC+PF) GROSS_SALARY= BASIC_SALARY+ DA NET_SALARY= GROSS_SALARY – TOTAL_DEDUCTIONS. Write the above data to file for each employee. Read the content of "Emp.txt" and display the details of each employee		File Handling.

5.	a). A “CAR” has the attributes COMPANY_NAME, MODEL, COLOR, MANUFACUTING_YEAR and PRICE. A Class is required to be created for “CAR” to store the above attributes and perform the following operations: Get the details of “CAR” object from user and store into Array of objects Display the details of “CAR” object based on “COMPANY”, “MODEL” and “PRICE”. b). Airline Reservation System contains the attributes of passengers such as NAME, PAN_NO. MOBILE_NO, EMAIL_ID, SOURCE, DESTINATION, SEAT-NO, AIR-FARE and TRAVEL_DATE. A Class is required to be created for “Airlilne” with the above attributes and perform the following operations: Get the details of “Airline” object from user and store into Array of objects List details of all the passengers who travelled From “Bengaluru to London”. List details of all the passengers who travelled From “Chicago to Beijing” on 10th of Feb, 2020.	Windows/Linux OS, IDE, Jupyter	Classes and objects usage.
6.	a). “Arr_1” is an integer array of size M x N. Size and content of the array is to be read using input() by using the user defined function READ_DATA(). It is required to display the Diagonal elements of”Arr_1” Elements of mth row (row no should be entered by user) Elements of nth column (column no should be entered by user)	Windows/Linux OS, IDE, Jupyter	NumPy arrays usability.
	b)The dictionary “DICT1” contains the pass percentage of each semester of B. Tech in CSE, where, “Semester” acts as the key and “Pass Percentage” acts as the value. A Python Pandas dataframe is required to be created using the dictionary “DICT1” and display it using a user defined function.		Pandas Series usability.
	Part-B (Mini Project: Library Management System)		
1.	Develop a program to create the class “USER” with the attributes USER_NAME, USER_ID, SCHOOL_NAME, ADDRESS, PHONE_NO, EMAIL_ID, DOB and AGE. The functions add user (), delete user (), edit user (), search user () should be part of the class. Instantiate “User” class with 10 objects. Read the attributes of each “User” object using input () and store them in the file	Windows/Linux OS, IDE, Jupyter	Create a class user to read the attributes of user and store them in a file.
2	Develop a program to get the name of the “User” object whose details are to be deleted. Read the “User_File.txt” and delete the “User” object if found. Display the contents of “User_File.txt”	Windows/Linux OS, IDE, Jupyter	Create a class user to read the attributes and
3	Develop a program to get the name of the “User” object whose details are to be edited (modified). Edit the details of the user object in the file “User_File.txt” and display the contents after	Windows/Linux OS, IDE, Jupyter	To create a class and edit the file.
4	Develop a program to create the class “BOOK” with the attributes TITLE, AUTHOR, PUBLISHER, YEAR, PRICE, SCHOOL_NAME and the functions add book(), delete book(), edit book() and search book(). Instantiate “Book” class with 10 objects. Read the attributes of each “BOOK” object using input () and store them in the file	Windows/Linux OS, IDE, Jupyter	Create a class book to read the attributes of user and store them in a file.
5	Develop a program to get the name of the “BOOK” object whose details are to be deleted. Read the “Book_File.txt” and delete the “BOOK” object whose details match with the data entered. Display the contents of “Book_File.txt” after deletion.	Windows/Linux OS, IDE, Jupyter	Create a class book to read the attributes and delete the object.

6	Develop a program to get the name of the "BOOK" object whose details are to be edited (modified). Edit the details of the "Book" object in the file "Book_File.txt" and display the contents after modification.	Windows/Linux OS, IDE, Jupyter	To create a class and edit the file.
7	Develop a program to create the class "TRANSACTION" with the attributes USER_ID, USER_NAME, AUTHOR, TITLE, EDITION, ISSUE_DATE,DUE_DATE and RETURN_DATE and the functions issue book(), return book() and search book(). Instantiate "Transaction" class with 10 objects. Read the attributes of each "Transaction" object using input () and store them in the file "TransactionFile.txt". Develop a program to issue the book as requested by the user. Update the attributes in "Transaction	Windows/Linux OS, IDE, Jupyter	Create class and perform string operations.
8	Develop a program to return the book. Edit the details of the user like USER_ID, USER_NAME, AUTHOR, TITLE, EDITION, ISSUE_DATE, DUE_DATE and RETURN_DATE in "TransactionFile.txt" and display the contents after modification. Compute the fine amount to be paid if return date is not same as due date. If both return date and due date are same and put zero in fine amount.	Windows/Linux OS, IDE, Jupyter	Create class and perform string operation.
9	Develop a program to search for a book using its "author". Display the message "available" if search is successful otherwise display the message "not available".	Windows/Linux OS, IDE, Jupyter	Create class and object, perform file operations and regular expressions.
10	Develop a program to get a list of users by referring to "User_File.txt" and "Transaction_File.txt".	Windows/Linux OS, IDE, Jupyter	Create class and object, perform file operations and regular expressions.
11	Develop a program to get List of Books in stock by referring to "Book_File.txt" and "Transaction_File.txt".	Windows/Linux OS, IDE, Jupyter	Create class and object, perform file operations and regular expressions.
12	Develop a program to get List of Books Issued by referring to "User File", "Book File" and "Transaction File".	Windows/Linux OS, IDE, Jupyter	Create class and object, perform file operations and
13	Develop a project by integrating User, Books, Transaction and Reports Modules.	Windows/Linux OS, IDE, Jupyter	Module integration and project

TEXTBOOKS:

1. Mark Pilgrim, "Dive into Python 3", Apress special edition, second edition, 20l5.
2. Travis E. Oliphant, "Guide to NumPy", Trelgol publishers, 2006.

REFERENCEBOOKS:

1. A B Choudhary, "Flowchart and Algorithms Basics" Mercury Learning and Information,2020
2. Mark Lutz, "Learning Python", Oreilly. 2003.
3. John M. Zelle, "PYTHON Programming: An Introduction to Computer Science", Franklin, Beedle& Associates. 2004.
4. Michael Dawson, "Python Programming for the Absolute Beginners", 3rd Edition, CENAGE Learning.
5. Wesley J. Chun, "Core Python Programming", 2nd Edition, Prentice Hall.
6. Steve Holden and David Beazley, "Python Web Programming", New Riders, 2002. Springer, Kent D. Lee, "Python Programming Fundamentals", 2nd Edition.
7. John V. Guttag, "Introduction to Computation and Programming using Python", MIT Press, 2016.
8. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf

JOURNALS/MAGAZINES

1. https://www.codemag.com/Magazine/ByCategory/Python
2. http://ijaerd.com/papers/special_papers/IT032.pdf
3. https://iopscience.iop.org/article/10.1088/1742-6596/423/1/012027
4. https://ieeexplore.ieee.org/document/4160250

SWAYAM/NPTEL/MOOCs:

1. Coursera – Python for everybody, University of Michigan
2. Coursera – Python Basics, University of Michigan
3. https://nptel.ac.in/courses/106/106/106106182/
4. https://www.edx.org/learn/python

SELF-LEARNINGEXERCISES:

1. Explore PYTHON library for IOT programming
2. More exploration on GitHub
3. Data Visualization packages
4. C modules interface

Course Title	Engineering Chemistry				Course Type		Theory	
Course Code	B20AS0104	Credits	3		Class		I semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	IA	SEE
	Tutorial	0	0	0				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Engineering chemistry covers very relevant topics compatible with ECE, EEE and C&IT students and make them aware of importance of various aspects of basic science in engineering. The subject of Engineering chemistry covers area of light and matter interaction, clean energy storage and conversion devices, corrosion phenomenon and control which is widely an interdisciplinary subject of discussion. Further the course focus on the chemistry of engineering materials, and various applications. This area of science is very much interdisciplinary in its nature and gives a platform for students to strengthen their engineering knowledge to enlighten on the energy conversion and storage devices, which have become very attractive field of research in engineering stream. The subject deals with various engineering materials, their properties and applications in the field of engineering.

COURSE OBJECTIVE

The Engineering chemistry course is designed to fulfil the following objective;

i. Engineering chemistry covers the very basic knowledge required for engineering students to understand its importance of science in technology.
ii. It provides the basic knowledge on Interaction of light and matter to know the electronic transitions in materials and storage and conversion devices.
iii. Corrosion and metal finishing, explains the phenomenon of corrosion and its Prevention. It also covers the importance of metal finishing in various industries and fabrication of PCB
iv. Polymers are all about the properties of various polymeric materials and their Commercial significance. The chapter reveals about technical and commercial Importance of composite materials.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Understand the phenomenon of light and matter interaction to study the materials	1,2, 4,7,11	2
CO2	Demonstrate the electrode processes in Batteries and conversion devices.	6,11	2
CO3	Describe Corrosion phenomenon and precautions to be taken in the selection of materials in controlling corrosion, Fabrication of PCB and industrial	2,4,7,11	2
CO4	Illustrate the properties of polymers, nano materials, composite materials and their applications in various fields.	1,2, 11,12	2
CO5	Learn new tools and technologies in the engineering chemistry and apply for suitable application development.	12	1,2

CO6	Develop solutions in the engineering chemistry to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyse (L4)	Evaluate (L5)	Create (L6)
CO1	√					
CO2		√		√		
CO3		√	√			
CO4	√	√		√		
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3		1			2				1			2	
CO2						2					2	3		2	
CO3	2	2		2		1	2							2	
CO4		2		2			2				3			2	
CO5												2	2	2	
CO6					2				2	2				2	2

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents
UNIT-1

Light and matter interaction: Electro-magnetic spectrum-Applications in Engineering, Interaction of EM radiation with matter, work function of matter, Electrons in matter. Bonding theories: MOT, Band structure of matters HOMO-LUMO. Photochemical and thermal reactions: Laws of photochemistry, quantum yield, high and low quantum yield reactions. Jablonski diagram - photophysical and photochemical processes, photo-sensitization, photo- polymerization and commercial application of photochemistry.

UNIT-2

CLEAN ENERGY STORAGE AND CONVERSION DEVICES: Introduction to electrochemistry, basic concepts of Batteries and characteristics. Classification: Primary (Dry cell, Li-MnO2) and Secondary (Pb-acid, Li-ion) batteries. Super capacitors: classification, construction and applications in hybrid vehicles. Fuel cells: Alkaline fuel cells, Solid oxide fuel cells and phosphoric acid fuel cell. Photo-conversion devices: Photovoltaic cell, antireflective coating, panels and arrays. Production of single crystal semiconductor by Crystal pulling technique (Czochralski pulling technique), zone refining process (of Si).

Problems: Calculation of energy and power density, capacity of a Battery and capacitance of super capacitors for electric vehicle applications.

UNIT-3

Corrosion: Electrochemical theory of corrosion, types of Corrosion- differential metal corrosion, differential aeration corrosion, boiler corrosion, and grain boundary corrosion, Corrosion studies on Al, Fe with pourbiax diagram, Factors affecting rate of corrosion-Primary, secondary. Corrosion control: Galvanizing & tinning, cathodic protection & Anodic Protection.

Metal Finishing: Theory of electroplating, Factors required to study electroplating Effect of plating variables in electroplating process, Electroplating of gold (acid, neutral and alkaline cyanide bath). Electro less plating of copper and PCB manufacture by Electro less plating of copper. (Applications/case studies).

UNIT-4

CHEMISTRY OF ENGINEERING MATERIALS: Polymer composites: Carbon fiber, Kevlar synthesis and applications, Conducting polymers: synthesis, electron transport mechanism and applications in polyacetylene and polyaniline. Liquid crystals: Introduction classification and applications in electronic display devices. Nanomaterials: Introduction, classification based on dimensionality, quantum confinement. Size dependent properties- surface area, magnetic properties (GMR phenomenon), and thermal properties. Synthesis, Properties and applications of Fullerenes, CNT and Graphene. Sensors: Physical and chemical sensors, Biosensors for bioelectronic applications.

TEXTBOOKS:

1.R.V.Gadag & Nithyananda shetty,"Engineering Chemistry", Ik International Publishing house.

2.S.S. Dara ,"Text Book of Engineering Chemistry", S. Chand & Co.

3.S.S.Chawla ,"Text Book of Engineering Chemistry", Dhanpat Rai Pub.Co.

REFERENCE BOOKS:

1. P.W. Atkins, "Physical Chemistry", 5th edition Oxford.
2. Callister W.D., "Materials Science and Engineering", John Wiley & Sons.
3. R.Gopalan, D.\/enkappaya, S.Nagarajan,"Engineering Chemistry", Vikas Publication.

JOURNALS/MAGAZINES:

1. https://www.sciencedirect.com/journal/water-science-and-technology
2. https://iwaponline.com/wst
3. https://www.scitechnol.com/nanomaterials-molecular-nanotechnology.php
4. https://www.journals.elsevier.com/journal-of-energy-storage

SWAYAM/NPTEL/MOOCs

1. https://nptel.ac.in/courses/105/105/105105201/
2. https://nptel.ac.in/courses/112/108/112108150/

PROLEM BASED LEARNING

No	Problems
1	Calculation of wavelength and frequencies of the radiations
2	Calculation of band structure by HOMO and LUMO

3	Determination of cell potentials
4	Calculation of energy density and power density of a battery.
5	Determination of capacitance of a super capacitor
6	Crystal field stabilization energy

PROJECT BASED LEARNING

To enhance the skillset in the integrated course, the students are advised to execute course-based

Design projects.

Some sample projects are given below:

No.	Suggested Projects
1.	Collection of literature for the materials for the semi conducting applications
2.	Synthesis of a semiconductor materials for the electronic applications
3.	Construction of a PCB for the electronic device
4.	Synthesis of conducting polymers
5.	Synthesis of Energy storage materials
6.	Fabrication of efficient aqueous battery or super capacitor

Course Title	Design Thinking				Course Type		Integrated	
Course Code	B20ME0102	Credits	2		Class		I Semester	
Design Thinking	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	1	1	1				
	Tutorial	0	0	0	Theory	Practical	IA	SEE
	Practice	1	2	2				
	Total	**2**	**3**	**3**	**12**	**24**	**50%**	**50%**

COURSE OVERVIEW:

Today, innovation is everyone's business. At every level, in every kind of organization, design thinking provides the tools that one needs to become an innovative thinker and uncover creative opportunities. For example, companies like Procter, Gamble and GE have incorporated Design Thinking into their strategy and marketing. The course draws on methods from engineering and design, and combines them with ideas from the arts, tools from the social sciences, and insights from the business world. In this course, students start in the field, where they discover the needs of the target audience. They then iterate ideas on teams to develop a range of promising possible solutions, create rough prototypes to take back out into the field, and learn to test with real people in the target audience.

COURSE OBJECTIVE:

1. To impart knowledge on design thinking process for understanding designs.
2. To provide design skills to analyze design thinking issues and apply the tools and techniques of design.
3. To inculcate attitude to solve societal problems using design thinking tools.

COURSE OUTCOMES (CO's):

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

CO#	Course Outcomes	POs	PSOs
CO1	Identify the problems that fall under the purview of human centered design process for creative problem solving.	1,2, 9,10,12	1,2
CO2	Create empathy maps to visualize user attitudes and develop innovative products or services for a customer base using ideation techniques	1,2,9,10,12	2
CO3	Build simple prototypes for problems using gathered user requirements.	1,3, 9,10,12	1,2
CO4	Improve prototype by testing it with a specific set of users for making it sustainable by following ethics.	1,4,8,9,10,12	1,2
CO5	Learn new tools, technologies and apply for suitable application development.	12	1, 2
CO6	Develop solutions to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	2, 3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	✓					
CO2			✓			
CO3			✓			
CO4				✓		
CO5			✓			
CO6			✓	✓		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2							2	2		2	3	2	
CO2	1	3							2	3		2		2	
CO3	2		3						3	3		2	2	3	
CO4	2			2				1	3	2		2	2	3	
CO5												2	2	2	
CO6					2				2					2	2

Note:1-Low,2-Medium,3-High

Course Content
Theory

Contents

UNIT-1

Design Thinking Process: Types of the thinking process, Design thinking: Definition, Origin of design thinking, Importance of design thinking, Design vs Design thinking. Problem Exploration, Case Studies from Embrace-Stanford Innovation Challenge, IDEO, GE Healthcare, The Good Kitchen- Denmark Program etc, identifying the target users for the problem selected, Survey on existing solutions for the problem identified.

Empathizing: Powerful Visualizing tool – a method to connect to the user, Creating Empathy maps – Case studies.

UNIT-2

Defining the problems: POV statements from User perspective. Idea generation: Methods to spark the innovative ideas – Brainstorming, Mind map, Story board, Provocation etc.

What is a prototype? - Prototyping as a mindset, prototype examples, prototyping for products; Why we prototype? Fidelity for prototypes, Process of prototyping- Minimum Viable prototype

Prototyping for digital products: What's unique for digital, Preparation; Prototyping for physical products: What's unique for physical products, Preparation; Testing prototypes with users.

PRACTICE:

Sl.No	Name of the Practice Session	Tools and Techniques	Expected Skill /Ability
1	Identifying the problem that can be solved using Design Thinking approach	Observation and survey	Develop identifying human centered problems
2	Build the empathy maps for simple problems like single user	Visualization	Develop ability to understand other's emotions
3	Build the detailed empathy maps for problem identified in the teams formed	Visualization	Develop ability to understand other's emotions
4	Presentation by student teams	PPT	Develop ability to express their views
5	Obtain the insights into user's problems and make PoV statement	Understanding	Develop making problem statements from user perception
6	Presentation by student teams	PPT	Develop ability to express their views
7	Carry out Brain storming between the groups and generate as many as ideas possible	Ideation tools	Develop innovative mind set
8	Prototype for best 3 ideas selected	Sketching, simple model making etc	Develop prototyping techniques
9	Presentation by student teams	PPT	Develop ability to express their plan
10	Test the developed prototype with set of identified users	Google forms, cold calls, social media etc.	Develop understanding of various testing methods
11	Pitching final solution	PPT	Develop ability to express their views

TEXT BOOKS:

1. Gavin Ambrose, "Paul Harris, Basics Design-Design Thinking", AVA Publishing, 2010
2. Kathryn McElroy, "Prototyping for Designers: Developing the best Digital and Physical Products", O'Reilly,2017.

REFERENCE BOOKS:

1. Michael G. Luchs, Scott Swan, Abbie Griffin, "Design Thinking – New Product Essentials from PDMA", Wiley, 2015.
2. Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in Your Organization", 2012.

JOURNALS/MAGAZINES/ADDITIONAL SOURCES

1. Leonard, D., and Rayport, J. F. 1997. Spark Innovation through Empathic Design. In Harvard Business Review, November-December 1997, 102-113.
2. https://www.ideo.com
3. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process
4. https://www.ibm.com/design/thinking/page/toolkit
5. https://www.interaction-design.org/literature/article/define-and-frame-your-design-challenge- by-creating-your-point-of-view-and-ask-how-might-we
6. https://www.culturepartnership.eu/en/article/ten-tools-for-design-thinking
7. https://youtu.be/M66ZU2PCIcM
8. https://thisisdesignthinking.net/2017/07/innogy_energy_ecarsharing/

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/109/104/109104109/
2. https://nptel.ac.in/courses/110106124/

Course Title	Biology For Engineers				Course Type		Theory	
Course Code	B20AS0109	Credits	3		Class		I semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	1	1	1				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**1**	**1**	**1**	**13**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Understanding biological systems, principles and concepts in order to create usable, tangible, economically viable product or process has become need of the hour. Hence irrespective of the parent engineering discipline, knowledge and expertise from pure and applied sciences is necessary to create product or process related to healthcare, agriculture, environmental issues and many more. Any engineer will have a high probability of using biology related skills and concepts to create products and processes beneficial to the mankind and as well for the sustainable environmental friendly approach. For example, the knowledge can be used to create medical devices, diagnostic equipment's, bioreactor designing, agriculture related equipment/instruments or anything related to surface science, fluid mechanism and polymer science. This course is designed to lay foundation in the field of Cell biology, Molecular biology and Genetics, so that anyone who is interested can design better product/process to enhance the overall quality of life.

COURSE OBJECTIVES:

1. To inculcate the basic concepts of biology from engineering perspective among students
2. To understand the interplay between biology and engineering disciplines
3. To conceptualize the engineering design/process/product for life science challenges

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Understand and explain the biology concepts from engineering perspective.	1	1
CO2	Apply the principles of Biology either for the process/product development from the engineering perspective.	1,2	1,2

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√				
CO2	√	√	√			

COURSE ARTICULATIONMATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												2	
CO2	2	2											2	1

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

CONTENTS

Introduction to Biology, Evolution and Origin of Life, Biomolecules-Lipids, Biomolecules: Carbohydrates, Water, Biomolecules: Amino acids, Proteins, Biomolecules: Enzymes, Biomolecules: Nucleotides, Cell structure and function – Prokaryotes, Cell structure and function – Eukaryotes, Cell cycle-Mitosis and Meiosis, Mendelian genetics: Mendelian inheritance, Genetic diseases and Mendelian inheritance, Central Dogma – Replication, Transcription and Translation.

TEXTBOOKS:

1. G.K. Suraishkumar, “Biology for Engineers”, Oxford University Press, 2019.
2. “Biology for Engineers: As per AICTE curriculum”, Wiley publication.
3. Dr. Sohini Singh, Dr. Tanu Allen, “Biology for Engineers”, Vayu Education of India.

REFERENCE BOOKS:

1. P.S.Verma and V.K. Agarwal, “Cell Biology, Genetics, Molecular Biology”, Evolution and Ecology , 2018.
2. Sambamurthy, ”Handbook of Genetics”, Friends Publisher, 2010 .

JOURNALS/MAGAZINES

1. Current Sciences

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc19_ge31/preview
2. Coursera: Biology everywhere

SELF-LEARNING EXERCISES:

1. Case study: Computational biology in agriculture and Health Care
2. Artificial Intelligence in health care
3. Image processing for medical applications

PROBLEM BASED LEARNING

No.	Case Study
1	Case study: Computational biology in agriculture and Health Care
2	Case study: Artificial Intelligence in health care

Course Title	Computer Aided Engineering Drawing				Course Type		Integrated	
Course Code	B20ME0101	Credits	3		Class		I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	Tutorial	0	-	-				
	Total	**3**	**4**	**4**	**26**	**26**	**50**	**50**

COURSE OVERVIEW:

Engineering Graphics or drawing is known as language of engineers. All phases of engineering process require the conversion of new ideas and design concepts into the basic line language of graphics. There are many areas such as civil, mechanical, electrical, architectural, computer, electronics and industrial applications where knowledge and skills of the drawing play major roles in the design and development of new products or construction. This course emphasizes on projection of point, line, surfaces and solids. It also provides knowledge about representing the object in terms of 3d view and also development of the object.

COURSE OBJECTIVE (S):

1. To introduce the students to various concepts like dimensioning, conventions and standards of engineering drawings in order to become professionally efficient
2. To enable students to learn about the software tool to prepare engineering drawings
3. To teach the students about the concepts and principles of orthographic projections, development of lateral surfaces and isometric projection of simple solids
4. To communicate the concept/idea with others through the language of technical drawing and sketching.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Construct the simple 2D drawings manually and also by using CAD software	1,5,10,12	1
CO2	Draw orthographic projection of point, line, plane surfaces and simple solids	1,3,5,10, 12	1
CO3	Draw sectional views of a prisms, pyramids, cone and cylinder	1,3,5,10, 12	1
CO4	Develop the lateral surfaces of the solids	1-3,5,10,	1,2,3
CO5	Create isometric view of the solids	1,3,5,10, 12	1
CO6	Develop solutions in the CAD to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	2, 3

BLOOM'S LEVELOF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4				√		
CO5				√		
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				3					3		2	3		
CO2	3		2		3					3		2	3		
CO3	3		2		3					3		2	3		
CO4	3	2	2		3					3		3	3	3	2
CO5	3		2		3					3		3	3	2	1
CO6					2				2	2				2	2

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY:

CONTENTS

UNIT – 1

Introduction – Geometrical constructions, engineering drawing standards, Introduction to CAD Software. Orthographic projection of points in first and third Quadrant only. Orthographic projection of straight lines inclined to both horizontal and vertical planes. Orthographic projection of regular plane surfaces when the surface is inclined to both HP and VP.

UNIT-2

Orthographic projection of regular solids like prisms, pyramids cone and cylinder when the axis is inclined to both HP and VP.

UNIT-3

Sections of solids – Drawing sectional views and true shape of section, Development of surfaces- Parallel line method for prisms and cylinders, Radial line method for pyramids and cones.

UNIT-4

Isometric projections of simple and combined solids.

PRACTICE:

No	Practice	Tools and Techniques	Expected Skill /Ability
1.	Use of solid edge software and familiarization of tools	Solid Edge Software	Use of commands to draw the drawings
2.	Draw the projection of point locating in first and third quadrant	Solid Edge Software	Analyzing and software skill
3.	Draw the projection of lines locating in first quadrant	Solid Edge Software	Draw the views of the line and software skill
4.	Draw the projection of rectangular and pentagonal lamina inclined to both HP and VP	Solid Edge Software	analyzing and software skill
5.	Draw the projection of hexagonal and circular lamina inclined to both HP and VP	Solid Edge Software	analyzing and software skill
6.	Draw the projection of prisms inclined to both HP and VP	Solid Edge Software	interpretation and software skill
7.	Draw the projection of pyramids inclined to both HP and VP	Solid Edge Software	interpretation and software skill
8.	Draw the projection of cone and cylinder inclined to both HP and VP	Solid Edge Software	interpretation and software skill
9	Draw the projection of section of solids in simple position	Solid Edge Software	analyzing and software skill
10	Develop the lateral surface of prisms and cylinder	Solid Edge Software	Creative and software skill
11	Develop the lateral surface of pyramids and cone	Solid Edge Software	Creative and software skill
12	Draw the isometric projection of simple plane surface and simple solids	Solid Edge Software	Analyzing and software skill
13	Draw the isometric projection of two co-axial solids	Solid Edge Software	Analyzing and software skill

TEXT BOOKS:

1. K. R. Gopalakrishna, “Engineering Graphics”, Subhas Publications, 2012.
2. Bhatt N.D., Panchal V.M. & Ingle P.R., “Engineering Drawing”, Charotar Publishing House,2014.

REFERENCE BOOKS:

1. Luzadder and Duff, “Fundamental of Engineering Drawing”, Prentice hall of India Pvt Ltd. 11thEdition, 2001.
2. Shah, M.B. & Rana B.C., “Engineering Drawing and Computer Graphics”, Pearson Education,2008.

SWAYAM/NPTEL/MOOCS:

1. https://nptel.ac.in/courses/112/103/112103019/
2. https://www.udemy.com/course/ed/

PROBLEM BASEDLEARNING

Sl. No	Problems
1	A point 30 mm above XY line is the front view of two points A and B. The top view of A is 40 mm behind VP and the top view of B is 45 mm in front of VP. Draw the projections of the points and state the Quadrants in which the points are situated.
2	A point 'A' is 30 mm in front of VP & 40 mm above HP. Another point B is 20 mm behind VP & 35 mm below HP. The horizontal distance between the points measured parallel to XY line is 60 mm. Draw the three projections of the points. Join their front and top views.
3	A point P is on HP and 35 mm in front of VP. Another point Q is on VP and below HP. The line joining their front views makes an angle of 300 to XY line, while the line joining their top views makes an angle of 450 with XY line. Find the distance of the point Q from HP.
4	A point is 35 mm below HP, 20 mm behind VP and 25 mm behind / in front / from RPP. Draw its projections and name the side view.
5	A line AB 80 mm long is inclined to HP at 30 degree and inclined to VP at 45degree. Draw front and top views of line and determine their lengths. Also, measure the perpendicular distance of end B from both HP & VP.
6	A line AB has its end A 20 mm above the HP and 30 mm in front of VP. The other end B is 60 mm above HP and 45 mm in front of VP. The distance between end projectors is 70 mm. draw its true length and apparent inclinations.
7	The top view pq of a straight line is 70 mm and makes an angle of 60 degree with XY line. The end Q is 10 mm in front of VP and 30 mm above HP. The difference between the distances of P and Q above HP is 45 mm. draw the projections. Determine its true length and true inclinations with HP
8	The top view of a line 75 mm long measures 50 mm. The end P is 30 mm in front of VP and 15 mm above HP. The end Q is 15 mm in front of VP and above HP. Draw the projections of the line and find its true inclinations with HP and VP.
9	The distance between the end projectors through the end points of a line AB is 60 mm. the end A is 10 mm above HP and 15 mm in front of VP. The end B is 35 mm in front of VP. The line AB appears 70 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP and VP.
10	The point B of a line AB is on the horizontal plane, the top view of the line makes an angle of 30 degree with XY line, being 80mm. the point A is on the vertical plane and 50 mm above the horizontal plane. Draw the top and front views of the line and obtain the true length of the line. Also find the inclinations of the line with two planes.
11	The end A of a line AB is in HP and 25 mm in front of VP. The end B is 10 mm in front of VP and 50 mm above HP. The distance between the end projectors when measured parallel to the line of intersection of HP and VP is 80 mm, Draw the projection of the line AB and determine its true length and true inclination with HP and VP.
12	Find the true length and true inclination of a line AB with HP having one of its ends 20 mm in front of VP and 30 mm above the HP. The line is inclined at 40 degree to VP and left side view of the line is 60 mm long and inclined at 60degree to the x1y1 line. Draw all the three views of the line.
13	An equilateral triangular lamina of 25mm side lies with one of its edges on HP such that the surface of the lamina is inclined to HP at 60degree. The edge on which it rests is inclined to VP at 60degree.
14	A 30 degree-60degree setsquare of 60mm longest side is kept such that the longest side is in HP, making an angle of 30 degree with VP. The set square itself is inclined at 450 to HP. Draw the projections of the setsquare.
15	A square lamina ABCD of 40mm side rests on corner C such that the diagonal AC appears to be at 45 degree to VP. The two sides BC and CD containing the corner C make equal inclinations with HP. The surface of the lamina makes 30 degree with HP. Draw its top and front views.
16	A mirror 30 mm x 40 mm is inclined to the wall such that its front view is a square of 30 mm side. The Longer sides of the mirror appear perpendicular to both HP and VP. Find the inclination of the mirror with the wall.

Sl. No	Problems
17	A pentagonal lamina of sides 25 mm is resting on one of its edges on HP with the corner opposite to that edge touching VP. This edge is parallel to VP and the corner, which touches VP, is at a height of 15 mm above HP. Draw the projections of the lamina and determines the inclinations of the lamina with HP and VP and the distance at which the parallel edge lies from VP.
18	A pentagonal lamina of sides 25 mm is having a side both on HP and VP. The corner opposite to the side on which it rests is 15 mm above HP. Draw the top and front views of the lamina.
19	Draw the top and front views of a hexagonal lamina of 30mm sides having two of its edges parallel to both vertical and horizontal planes and one of its edges is 10 mm from each of the planes of projection. The surface of the lamina is inclined at an angle of 60° to the HP.
20	A hexagonal lamina of sides 30 mm has one of its comers in VP and its surface inclined at an angle of 30° with VP. The diagonal passing through that corner which is in VP appears to be inclined at 45° to HP. Draw the projections of the lamina.
21	A hexagonal lamina of sides 25 mm rests on one of its corners on HP. The corner opposite to the corner on which it rests is 35mm above HP and the diagonal passing through the corner on which it rests is inclined at 30° to VP. Draw its projections. Find the inclination of the surface with HP.
22	Draw the projections of a circular plate of negligible thickness of 50 mm diameter resting on HP on a point A on the circumference, with its plane inclined at 45° to HP and the top view of the diameter passing through the resting point makes 60° with VP.
23	A circular lamina inclined VP appears in the front view as an ellipse of major axis 30 mm and minor axis 15 mm. The Major- axis is parallel to both HP and VP. One end of the minor axis is in both the HP and VP. Draw the projections of the lamina and determine the inclination of the lamina with the VP.
24	A square prism 35mm side of base & 60mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º. Draw the projections of the prism when the axis is inclined to HP at
25	A pentagonal prism 25mm sides of base & 60mm axis length rests on HP on one of its edges of the base. Draw the projections of the prism when the axis is inclined to HP at 40º & VP at 30º
26	A Hexagonal prism 25mm sides of base and 50mm axis length rests on HP on one of its edges. Draw the projections of the prism when the axis is inclined to HP at 45º & appears to be inclined
27	A cone 40 mm diameter and 50 mm axis is resting on one generator on HP which makes 30º inclination with VP. Draw its projections.
28	A pentagonal pyramid 25mm sides of base and 50mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30º.Draw the projections of the pyramid when the axis is inclined to HP at 45º
29	A hexagonal pyramid 30mm sides of base and axis 70mm long is resting on its base on HP with one of the edges of the base parallel to VP. It is cut by sectional plane, perpendicular to VP, inclined at 30° to HP and bisects the axis. Draw the front view, sectional top view & true shape of
30	A vertical cylinder of base diameter 50 mm and axis 65 mm long rests on HP. It is cut by a section plane perpendicular to VP, inclined at 45 degree to HP and at a height of 30mm from the base. Draw its sectional top view and true shape of the section.
31	A hexagonal pyramid 30mm sides of base and axis 70mm long is resting on its base on HP with one of the edges of the base parallel to VP. It is cut by sectional plane, perpendicular to VP, inclined at 30° to HP and bisects the axis. Draw the front view, sectional top view & true shape of the section.
32	A square pyramid base 40mm side and axis 65mm long has its base on HP and all the edges of the base are equally inclined to VP. It is cut to with an inclined plane so as the truncated surface at 45 degree to axis, bisecting it. Draw the development of the truncated pyramid.
33	A Hexagonal prism of base side 30mm and axis length 60mm resting on HP in such a way that two of its edges are parallel to VP. The prism is cut by a section plane which is perpendicular to the VP and inclined at 30º to the HP at a height of 35mm from the base. Draw the development of the lateral surface of the prism.

Sl. No	Problems
34	A pentagonal prism, 30 mm base side & 50 mm axis is standing on HP on its base whose one side is perpendicular to VP. It is cut by a section plane 45 degree inclined to HP, through mid-point of axis. Draw FV, sectional top view& sec. Side view. Also draw true shape of section and Development of surface of remaining solid.
35	A hexagonal pyramid 25mm side of base and axis 65mm long is resting on its base on HP with one of the edged of the base parallel to VP. It is cut by a section plane inclined at 60º to HP and perpendicular to VP and intersecting the axis at 30mm above the base. Draw the development of the remaining portion of the pyramid.
36	A cone of base diameter 40 mm and height 50 mm is placed centrally on the top of a square slab side 60 mm and height 25 mm. Draw the isometric projection of the combination.
37	A sphere of diameter 45mm rests centrally over a frustum of cone of base diameter 60mm,top diameter 40mm and height 50mm.Draw its isometric projections.
38	A cube of 35 mm placed centrally on a square slab of 50 mm and thickness 30 mm. Draw the isometric projection of the combination.
39	Draw the isometric projection of the combination. Draw isometric projection of a hexagonal prism of side of base 40mm and height 60mm with a right circular cone of base 40mm as diameter and altitude 50mm, resting on its top such that the axes of both the solids are collinear.
40	A rectangular pyramid of base 40mmx25mm and height 50mm is placed centrally on a rectangular slab side 100mmx60mm and thickness 20mm.Draw the isometric projection of the combination.

PROJECT BASED LEARNING

To enhance the skill-set in the integrated course, the students are advised to execute course-based design projects. Some sample projects are given below:

No.	Suggested Projects
1.	Model making of different solids by using Hardbound sheet.
2.	Using Hardbound sheet, prepare the different solids models by development and section methods.
3.	Prepare a demo model to show the principle of orthographic projection.
4.	Prepare the models for showing the method of Isometric projection.
5.	Problem based on Practical approach in view of orthographic projection of lines and planes.
6.	Collection or Interpretation of Engineering Drawing sheets Related to Manufacturing, Civil construction, Layouts, Plans and other Applications.
7.	Study on Comparison of 3D views and isometric Views.
8.	Drawing the Plan of students Home or building (2D)

Detailed Syllabus
Semester 2

Course Title	Probability and Statistics				Course Type		Theory	
Course Code	B20AS0204	Credits	4		Class		II semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	4	4	4				
	Practice	-	-	-	Theory	Practical	IA	SEE
	Tutorial	-	-	-				
C	**Total**	**4**	**4**	**4**	**52**	**-**	**50%**	**50%**

OURSE OVERVIEW:

The course Probability and Statistics for Computer Science treats the most common discrete and continuous distributions, showing how they find use in decision and estimation problems, and constructs computer algorithms for generating observations from the various distributions. Probability in the design and analysis of randomized algorithms. Common randomized algorithms are things like Quicksort and Quick select. Probabilistic method can also useful to prove various important results. Probabilistic methods used to prove some partition theorems that were then used to create efficient data structure.

COURSE COBJECTIVE (S):

The objectives of this course are to:

1. Describe Curve fitting and regression in various problems in Computer Science & engineering fields
2. Illustrate the applications of Probability and statistics in various computer science engineering fields like data mining, classification problems etc.
3. Discuss Sampling theory concepts to solve various engineering problems like structured and unstructured Data models
4. Demonstrate Stochastic problem as Markov model as a problem solving methods for systematic model buildings.
5. Learn new algorithms and methods in probability and statistics and apply for suitable problem Solving methods.
6. Create solutions for problem solving methods using algorithms to the complex problems, either individually Or as a part of the team and report the results with proper analysis.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Solve the problems of Curve fitting and regression in various problems in Computer Science & Engineering fields.	1-6	1,2
CO2	Apply the concepts of Probability and statistics in various computer science engineering fields like data mining, classification problems etc.	1-6	1,2
CO3	Develop a stochastic problem as Markov model as a problem solving methods for systematic model buildings.	1-6	1,2

CO4	Make use of sampling theory concepts to solve various engineering problems like structured and unstructured data models.	1-6	1,2
CO5	Learn new algorithms and methods in probability and statistics and apply for suitable problem solving methods.	1-6	1,2
CO6	Create solutions for problem solving methods using algorithms to the complex problems, either individually or as a part of the team and report the results with proper analysis.	1-5,9	1

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember(L1)	Understand(L2)	Apply(L3)	Analyze(L4)	Evaluate(L5)	Create(L6)
CO1			✓			
CO2			✓		✓	
CO3			✓			
C04			✓	✓		
C05		✓				
C06			✓			

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3	1							3	3
CO2	3	3	3	3	3	1							3	3
CO3	3	3	2	2	2	1							2	2
CO4	2	3	2	2	3	1							1	1
CO5	3	3	2	2	1	1							2	1
CO6	2	3	3	3	1	1							2	1

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT
THEORY

Contents

UNIT – 1

Curve Fitting: Curve fitting by the method of least squares and fitting of the curves of the form,

y = ax + b, y = ax2 + bx + c, y = aebx and y = axb

Statistical Methods: Measures of central tendency and dispersion. Correlation-Karl Pearson's coefficient of correlation-problems. Regression analysis- lines of regression, problems. Rank correlation. Applications in computer science

UNIT – 2

Probability distributions: Recap of probability theory (definition, addition rule, multiplication rule, conditional probability). Random variables, Discrete and continuous probability distributions. Binomial, Poisson, exponential and normal distributions (derivation of mean and variance for all distributions). Applications in computer science.

UNIT – 3

Joint Probability distribution: Joint Probability distribution for two discrete random variables (both discrete and continuous cases), expectation, covariance, correlation coefficient.

Stochastic processes- Stochastic processes, probability vector, stochastic matrices, fixed points, regular

UNIT – 4

Sampling theory:-Sampling, Sampling distributions, standard error, test of hypothesis for means and proportions, confidence limits for means, student's t-distribution, Chi-square distribution as a test of goodness of fit. Applications in Computer Science.

TEXT BOOKS:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 43nd edition, 2015.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Publications, 9th edition, 2013.
3. Seymour Lipschutz, John J. Schiller., "Schaum's Outline of Introduction to Probability and Statistics" McGraw Hill Professional, 1998, pp. 256.

REFERENCE BOOKS:

1. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill Publications, 19th print edition, 2013.
2. R.K.Jain and S.R.K.Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 4th edition, 2016.
3. V.Sundarapandian, "Probability, Statistics and Queuing theory", PHI Learning, 2009
4. Dr. B. Krishna Gandhi, Dr. T.K.V. Iyengar, Dr. M.V.S.S.N. Prasad & S. Ranganatham. "Probability and Statistics" S. Chand Publishing, 2015.
5. J. K. Sharma "Operations Research theory and applications", Macmillan publishers, fifth

JOURNALS/MAGAZINES

1. https://www.hindawi.com/journals/jps/
2. https://www.journals.elsevier.com/statistics-and-probability-letters
3. http://www.isoss.net/japs/

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/browse/data-science/probability-and-statistics \
2. https://nptel.ac.in/courses/111/105/111105041/
3. https://onlinecourses.swayam2.ac.in/cec20_ma01/preview

SELF-LEARNING EXERCISES:

1. Curve fitting for application problems, Regression analysis for a bivariate data.
2. Probability distribution- Geometric, gamma- distributions, Joint probability distributions of Continuous random variables.
3. Sampling analysis of real time problems. Applications to computer science: Data Mining, classification problems etc.

Course Title	Physics for Computer Science				Course Type		Theory	
Course Code	B20AS0106	Credits	3		Class		I/II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	IA	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

This course introduces the basic concepts of Physics and its applications to Computer Science Engineering courses by emphasizing the concepts underlying four UNITs: Wave Mechanics, Lasers and optical fibers, EM wave and spectrum, Display Technology and Quantum computation. The subject has basic laws, expressions and theories which help to increase the scientific knowledge to analyze upcoming technologies.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1 .Impart the knowledge about wave mechanics, electromagnetic waves, and its applications

2. Demonstrate the different applications of lasers, and optical fibers

3. Discuss different types of display technologies, touch screen techniques and its applications

4. Explain the importance of quantum computation as an emerging technology.

5. Learn new tools and technologies Physics and its applications to Computer Science Engineering and Apply for suitable technologies.

6. Increase the scientific knowledge to analyze upcoming technologies.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply knowledge of wave mechanics, its importance, and applications	1-4	1
CO2	Classify EM waves based on the frequency range, optical fibers and derive expression for NA, number of Modes and attenuation.	1-4	1
CO3	Summarize capacitive and resistive Display Technologies.	1-4	2
CO4	Analyze the working and application of quantum computation	1-3	1

CO5	Learn new tools and technologies Physics and its applications to Computer Science Engineering and apply for suitable technologies.	1-4	2
CO6	Increase the scientific knowledge to analyze upcoming technologies	1-3	1

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember(L1)	Understand(L2)	Apply(L3)	Analyze(L4)	Evaluate(L5)	Create(L6)
CO1			√			
CO2		√				
CO3		√				
CO4			√			
CO5		√	√			
CO6				√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1									3		
CO2	3	3	2	1									3		
CO3	3	3	2	1										3	
CO4	3	2	1										3		
CO5	3	2	2										3		
CO6	3	2	2										3		

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Wave mechanics: Introduction to Wave mechanics, De-Broglie hypothesis. Expression for de-Broglie wavelength of an electron in terms of accelerating potential. Phase velocity and group velocity, Relation between phase velocity and group velocity.

Quantum Physics: Wave function, properties of wave function and physical significance. Probability density and Normalization of wave function, Schrodinger time- dependent and independent wave equation, Eigen values and Eigen functions. Applications of Schrödinger wave equation – energy Eigen values of a free particle, Particle in one dimensional infinite potential well with numerical examples. Application-Quantum

UNIT-2

Lasers: Lasers Interaction between radiation and matter (induced absorption, spontaneous and stimulated emission). Expression for energy density at thermal equilibrium in terms of Einstein's coefficients. Characteristics of laser light, Conditions for laser operation (population inversion and Meta stable state). Requisites of laser system, semiconductor laser and its applications.

Electromagnetic Waves: Basic idea of displacement current, Electromagnetic waves, their characteristics, Electromagnetic spectrum (7 types of EM waves) including elementary facts. Uses of EM waves in communications.

UNIT-3

Optical fibers: Construction and light propagation mechanism in optical fibers (total internal reflection and its importance), Acceptance angle, Numerical Aperture (NA), Expression for numerical aperture in terms of core and cladding refractive indices, Condition for wave propagation in optical fiber, V-number and Modes of propagation, Types of optical fibers, Attenuation and reasons for attenuation, Applications: Explanation of optical fiber communication using block diagram, Optical source (LED) and detector (Photodiode) and their applications. Advantages and limitations of optical communications.

UNIT-4

Display technology: Touch screen technologies: Resistive and capacitive touch screen and Displays: CRT, Field emission display, Plasma display, LED display, OLED display, LCD display.

Quantum Computation: Quantum wires (one dimensional), Quantum dots (zero dimensional); the idea of "qubit" and examples of single qubit logic gates- Classical bits, Qubit as a two-level system.

TEXT BOOKS:

1. William T. Silfvast, "Laser Fundamentals", Cambridge University press, New York, 2004
2. D. Halliday, R. Resnick and J. Walker, "Fundamentals of Physics", John Wiley and Sons, New York, 10th edition 2013
3. R. K. Gaur and S.L. Gupta, "Engineering Physics", Dhanpat Rai Publications (P) Ltd, New Delhi. 53rd edition, 2014.
4. M.N. Avadhanulu and P.G. Kshirsagar, "A textbook of Engineering Physics", S. Chand and Company, New Delhi, 2014.
5. EM Waves and Fields: P. Lorrain and O. Corson.

REFERENCE BOOKS:

1. Charls Kittel, "Introduction to Solid State Physics", Wiley, Delhi,8th Edition, 2004
2. Arthur Beiser, "Concepts of modern Physics", Tata McGraw Hill publications, New Delhi, 8th Edition, 2011.
3. S. O. Pillai, "Solid State Physics", New Age International publishers, New Delhi, 2010
4. Chen, Wayne Cranton, Mark Fihn, "Handbook of Visual Display Technology", Springer Publication, Second edition 2012.

JOURNALS/MAGAZINE

1. https://www.codemag.com/Magazine/ByCategory/Python
2. http://ijaerd.com/papers/special_papers/IT032.pdf
3. https://iopscience.iop.org/article/10.1088/1742-6596/423/1/012027https://ieeexplore.ieee.org/document/4160250
4. Python for scientific computing

SWAYAM/NPTEL/MOOCs:

1. https://www.mooc.org/
2. https://www.coursera.org/

Course Title	Introduction to Data Science				Course Type		Integrated	
Course Code	B20CS0101	Credits	3		Class		I/II semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	1	2	2	Theory	Practical	IA	SEE
	Tutorial	-	-	-				
	Total	**3**	**4**	**4**	**26**	**26**	**50%**	**50%**

COURSE OVERVIEW:

Data Science is an interdisciplinary, problem-solving oriented subject that is used to apply scientific techniques to practical problems. The course orients on preparation of datasets and programming of data analysis tasks. This course covers the topics: Set Theory, Probability theory, Tools for data science, ML algorithms and demonstration of experiments by using MS-Excel.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the fundamental concepts of Excel.
2. Illustrate the use of basic concepts of Data Science in the real world applications.
3. Demonstrate the use of SQL commands in real world applications.
4. Discuss the functional components of Data Science for real world applications

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the concepts of Data Science in developing the real world applications.	1-4,11	1,2
CO2	Apply the SQL commands in developing the real-world applications.	1,2	2, 3
CO3	Build the data analytics solutions for real world problems, perform analysis, interpretation and reporting of data.	1-4	1, 2, 3
C04	Create the real world AI based solutions using different machine learning algorithms	1-4	1, 2
C05	Learn new tools and technologies in Data Science and apply for suitable application development.	1-5	1,2
C06	Develop solutions in the Data Science to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation	1-3	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember(L1)	Understand(L2)	Apply(L3)	Analyze(L4)	Evaluate(L5)	Create(L6)
CO1			✓			
CO2			✓			
CO3			✓	✓		
C04			✓	✓	✓	✓
C05		✓	✓			
C06			✓	✓		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2							3	3	3	3	
CO2	2	2									2	2		3	3
CO3	3	3	3	3							3	3	3	3	2
C04	3	3	3	3							3	3	3	3	
C05	3	3	3	3									3	3	
C06	3	3	3	1									3	3	2

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Introduction to Microsoft Excel
Creating Excel tables, Understand how to Add, Subtract, Multiply, Divide in Excel. Excel Data Validation, Filters, Grouping. Introduction to formulas and functions in Excel. Logical functions (operators) and conditions. Visualizing data using charts in Excel. Import XML Data into Excel How to Import CSV Data (Text) into Excel, How to Import MS Access Data into Excel, Working with Multiple Worksheets.

UNIT-2

Introduction to Data Science
What is Data Science? Probability theory, Bayes theorem, Bayes probability; Cartesian plane, equations of lines, graphs; exponents.
Introduction to SQL
SQL: creation, insertion, deletion, retrieval of Tables by experimental demonstrations. Import SQL Database Data into Excel

UNIT-3

Data science components

Tools for data science, definition of AI, types of machine learning (ML), list of ML algorithms for classification, clustering, and feature selection. Description of linear regression and Logistic Regression. Introducing the Gaussian, Introduction to Standardization, Standard Normal Probability Distribution in Excel, Calculating Probabilities from Z-scores, Central Limit Theorem, Algebra with Gaussians, Markowitz Portfolio Optimization, Standardizing x and y Coordinates for Linear Regression, Standardization Simplifies Linear Regression, Modeling Error in Linear Regression, Information Gain from Linear Regression.

UNIT-4

Data visualization using scatter plots, charts, graphs, histograms and maps

Statistical Analysis: Descriptive statistics- Mean, Standard Deviation for Continuous Data, Frequency, Percentage for Categorical Data

Applications of Data Science

Data science life cycle, Applications of data science with demonstration of experiments either by using Microsoft Excel.

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill/Ability
1	The height (in cm) of a group of fathers and sons are given below, Find the lines of regression and estimate the height of son when the height of father is 164 cm. Plot the graph. Hgt of Fathers: 158 163 160 165 167 170 167 172 177 181 Hgt of Sons: 163 158 167 170 160 180 170 175 172 175	MS Excel	Create and perform operations on Excel data set by applying Linear regression
2	Using the data file DISPOSABLE INCOME AND VEHICLE SALES, perform the following: Plot a scatter diagram. Determine the regression equation. Plot the regression line (hint: use MS Excel's Add Trend line feature). Compute the predicted vehicle sales for disposable income of $16,500 and of $17,900. Compute the coefficient of determination and the coefficient of correlation	MS Excel	Perform prediction and visualization of data
3	Managers model costs in order to make predictions. The cost data in the data file INDIRECT COSTS AND MACHINE HOURS show the indirect manufacturing costs of an ice-skate manufacturer. Indirect manufacturing costs include maintenance costs and setup costs. Indirect manufacturing costs depend on the number of hours the machines are used, called machine hours. Based on the data for January to December, perform the following operations. Plot a scatter diagram. Determine the regression equation. Plot the regression line (hint: use MS Excel's Add Trend line feature). Compute the predicted indirect manufacturing costs for 300 machine hours and for 430 machine hours.	MS Excel	Perform prediction and visualization of data

4	Apply multiple linear regression to predict the stock index price which is a year: 2020 month: 10 interest rate: 2.75 unemployment rate: 5.3 stock index price: 1464	MS Excel	Perform prediction and visualization of data
5.	Calculate the total interest paid on a car loan which has been availed from HDFC bank. For example, Rs.10, 00,000 has been borrowed from a bank with annual interest rate of 5.2% and the customer needs to pay every month as shown in table below. Calculate the total interest rate paid for a loan availed of Rs.10, 00,000 during 3 years. Sl No. / A / B 1 / Principal / Rs.10,00,000 2 / Annual interest rate / 5.20% 3 / Year of the loan / 3 4 / Starting payment number / 1 5 / Ending payment number / 36 6 / total interest paid during period / ?	MS Excel	Create Excel data and perform EMI estimator
6	Create a supplier database of 10 records with SUPPLIER_ID as primary key, SUPPLIER_NAME, PRODUCTS, QUANTITY, ADDRESS, CITY, PHONE_NO and PINCODE, Where SUPPLIER_NAME, PRODUCTS, QUANTITY and PHONE_NO, should not be NULL.	SQL	Creating Tables
7	Create the customer database of a big Market with CUSTOMER_ID as primary key, CUSTOMER_NAME, PHONE_NO, EMAIL_ID, ADDRESS, CITY and PIN_CODE. Store at least twenty customer's details where CUSTOMER_NAME and PHONE_NO are mandatory and display the customer data in alphabetical order.	SQL	Creating and retrieving Tables
8	Apply linear regression to find the weather (temperature) of a city with the amount of rain in centimeters. Create your own database with following details. CITY / Temperature in Centigrade / Rain in Centimeters	MS Excel	Apply Linear regression
9	Use the linear regression technique to compare the age of humans with the amount of sleep in hours. Name / Age in Years / Sleep in hours Create your own database with above details.	MS Excel	Apply Linear regression
10	Apply the linear regression, compare the average salaries of batsman depending on the run rate scored/ recorded in the matches. Assume your own database.	MS Excel	Apply Linear regression
11	Design the ER diagram and create schema of the REVA library management system.	Entity Relationship	Entity Relationship
12	Design the ER diagram and create schema for Hospital Management system.	Entity Relationship	Schema design

TEXT BOOKS:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 43nd edition, 2015.
2. Ramakrishnan and Gehrke , "Database Management systems", Third Edition, McGraw Hill Publications, 2003.
3. Mastering Data Analysis in Excel - https://www.coursera.org/learn/analytics-excel.

4. Kenneth N. Berk, Carey, “Data Analysis with Microsoft Excel”, S. Chand & Company, 2004.

REFERENCE BOOKS:

1. B.V. Ramana, “Higher Engineering Mathematics”, Tata McGraw Hill Publications, 19th edition, 2013.
2. ErwinKreyszig, “Advanced Engineering Mathematics”, Wiley Publications, 9th edition, 2013.
3. Seymour Lipschutz, John J. Schiller, “Schaum's Outline of Introduction to Probability and Statistics”, McGraw Hill Professional, 1998.

JOURNALS/MAGAZINES

1. https://www.journals.elsevier.com/computational-statistics-and-data-analysis
2. https://www.springer.com/journal/41060
   International Journal on Data Science and Analytics
3. https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=8254253
   IEEE Magazine on Big data and Analytics

SWAYAM/NPTEL/MOOCs:

1. Excel Skills for Business: Essentials, Macquarie University (https://www.coursera.org/learn/excel-Essentials)
2. SQL for Data Science, University of California, Davis (https://www.coursera.org/learn/sql-for-data-science)
3. Data Science Math Skills, Duke University (https://www.coursera.org/learn/datasciencemathskills)
4. https://www.edx.org/course/subject/data-science
5. https://onlinecourses.nptel.ac.in/noc19_cs60/preview

SELF-LEARNING EXERCISES:

1. Relational database management system.
2. Advanced MS-Excel

Course Title	Basics of Civil Engineering and Mechanical Engineering				Course Type		Integrated	
Course Code	B20CE0201	Credits	4		Class		II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	IA	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW

This course introduces the Mechanical and Civil Engineering concepts, underlying the fact that this knowledge is essential for all Engineers. The students are made to understand the concept of internal combustion engines and power transmission systems. The students are also exposed to the knowledge of mechanical machine tools with its operations on lathe, drilling, and CNC machines. The students are introduced to the domain of fabrication processes like Soldering, Welding and 3D printing technology. Along with this student are made to expose to scope of Civil engineering, role of civil engineers in different infrastructure & economic development of the country. Students will learn about basic concept of forces, friction, centroid and moment of inertia.

COURSE OBJECTIVE

This course enables graduating students

1. To develop the basic knowledge of IC engines, refrigeration-air conditioning and power Transmission systems.
2. To incorporate the concepts of manufacturing processes using different machine tools, welding Techniques, CNC and 3D printing technology.
3. To understand a broad concept of engineering mechanics.
4. To develop the basics of composition of coplanar forces and fluid mechanics
5. Learn concept of internal combustion engines and power transmission systems
6. Introduction to the domain of fabrication processes like Soldering, Welding and 3D printing technology.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Describe the fundamentals of IC engines, refrigeration-air conditioning and power transmission systems.	1,2	3
CO2	Explain the manufacturing processes using lathe, drilling, welding, CNC machines and 3D printing technology	1,2	3
CO3	Describe the moment of force and couples and equivalent force-couple system.	1,2	3
CO4	Solve numerical problems on composition of coplanar concurrent and non-concurrent force system and basics of fluid mechanics	1,2	3

CO5	Learn concept of internal combustion engines and power transmission systems	1,2	1
CO6	Introduction to the domain of fabrication processes like Soldering, Welding and 3D printing technology.	1,5	1

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		✓				
CO2		✓				
CO3	✓	✓	✓	✓	✓	
C04	✓	✓	✓			
C05		✓				
C06		✓				

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2													1
CO2	3	2													1
CO3	3	2													1
C04	3	2													1
C05	3	2													1
C06	3	2													1

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Introduction to Mechanical Engineering: Overview of Mechanical Engineering, Importance and applications of Mechanical Engineering in different fields.

Thermal Energy Systems: Introduction to IC Engines, Classification, parts of IC Engine, working of 4-stroke Petrol engine with PV-diagram. Simple numerical on calculation of IP, BP and Mechanical efficiency, Introduction to refrigeration system, working of vapour compression refrigeration and window spit air conditioning system. Applications of refrigeration systems

UNIT-2

Power Transmission System: Introduction to drives, classification, belt drives (open and crossed-No derivations) and gear drives and types of gear, Numerical on gear drives.

Mechanical Machine Tools: Introduction- lathe, classification, major parts of engine lathe, operations, Drilling machine, classification working bench drilling machine and operations, CNC Machines-Block diagram and applications. Introduction to 3D Printing technology

Joining processes-Welding: Working of electric arc welding and soldering, Differences between welding and

UNIT-3

Introduction to Civil Engineering: Scope of Civil Engineering, Types of Infrastructure, Effect of Infrastructure facilities, Role of Civil Engineers in the Infrastructure and Economic Development of Country.

Introduction to Engineering Mechanics: Basic concepts, Newton laws of Motion Elements of force, system of forces, principles of physical Independence, superposition and Transmissibility of forces. Moment of force – Couple, Moment of couple and its characteristics, Equivalent Force – Couple system. Resolution and composition of forces. Coplanar Concurrent Force System: Parallelogram Law of forces, principle of resolved parts, composition of concurrent forces.

UNIT-4

Coplanar Non – concurrent forces: Varignon's principle of Moments, Resultant of Non – Concurrent force systems, Equilibrium of Coplanar Concurrent Force System: Type's forces acting on the body, free body diagrams, Equations of Equilibrium, Lami's theorem, Equilibrium of Non – concurrent forces equilibrium equations

Friction: Frictional forces, Law of friction, Angle of friction, Angle of Repose and Cone of Friction (Theory only)

Centroid: Center of Gravity, Center of Gravity of Flat Plate, Centroid, difference between Center of gravity and Centroid, Uses of Axis Symmetry, simple problems

Moment of Inertia: Moment of Inertia of Plane Figure, Polar Moment of Inertia and Moment of Inertia of Standard sections (Derivations not included). Simple problems.

Fluid Mechanics: Introduction, methods of describing fluid motion, definitions of types of fluid flow, streamline, path line, stream tube. General Continuity equation (problems).

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1.	Dismantling and Assembly of 2-Wheeler (2–stroke) Engine	2-Stroke Engine (TVS Bike)	Hands on Experience
2	Study of Fitting tools and preparation of fitting model (1 Model)	Fitting tools	Hands on experience
3.	Study of sheet metal tools and development of Cylinder (1 Model)	Sheet metal tools and soldering tools	Hands on experience
4.	Study of sheet metal tools and development of Pen stand and funnel (2-Models)	Sheet metal tools and soldering tools	Creative Thinking
5.	Hands on training on basic welding joint (Butt Joint-1 Model)	Welding tools	Hands on experience
6.	To study the carpentry tools with one model (Half joint-Model)	Carpentry Tools (Marking, Sawing, Planning and Chiseling	Comprehend the different handling carpentry tools
7.	To study the carpentry tools with one model (Dovetail-Model)	Carpentry Tools (Marking, Sawing, Planning and Chiseling	Comprehend the different handling carpentry tools

8.	To study the carpentry tools with one model (T-Joint - Model)	Carpentry Tools (Marking, Sawing, Planning and Chiseling	Comprehend the different handling carpentry tools
9.	To Study the plumbing tools and to make threads on pipe and pipe fittings using plumbing tools	Plumbing Tools	Comprehend the different handling plumbing tools
10.	To Study the plumbing tools used for valves and sanitary fitting	Plumbing Tools	Comprehend the different handling plumbing tools

TEXT BOOKS:

1. K.R. Gopalkrishna ,"Elements of Mechanical Engineering", 12th Edition, Subhash Publishers, Bengaluru, 2012.
2. Roy & Choudhury, "Elements of Mechanical Engineering", Media Promoters & Publishers Pvt. Ltd, Mumbai, 2000.
3. Mikell P Groover : Automation, Production Systems, and Computer Integrated
4. Manufacturing , Pearson India, 2007, 4th Edition

REFERENCE BOOKS:

1. SKH Chowdhary, AKH Chowdhary, Nirjhar Roy,"The Elements of Workshop Technology - Vol I & II, 11th edition, Media Promotors and publisher, Mumbai, 2001.
2. Avikshit Saras, "3D Printing-Made Simple", BPB Publications-New Delhi .

JOURNALS/MAGAZINES

1. International Journal of Machine Tools and Manufacture
2. International Journal of Refrigeration.

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/112/103/112103262/#
2. https://www.my-mooc.com/en/mooc/fundamentals-manufacturing-processes-mitx-2008x/
3. https://www.coursera.org/learn/3d-printing-applications

Course Title	Programming for Problem Solving				Course Type		Integrated (HC)	
Course Code	B20CS0102	Credits	4		Class		II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	IA	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50%**	**50%**

COURSE OVERVIEW:

Algorithms and flowcharts are the fundamental tools for problem solving which can be used by the computers. The computer programs can be developed using algorithms and flowcharts to provide solutions to problems. C Language is a general-purpose, structured and procedure oriented programming language. It is one of the most popular computer languages today because of its structure and higher-level abstraction C. This course introduces algorithms, flowcharts and various C Programming language constructs for the development of real world applications.

COURSE OBJECTIVE (S):

1. Explain algorithms, flowcharts and different programming constructs of C to be used for Development of applications.
2. Illustrate the use of iterative statements and conditional Statements for solving the real World problems.
3. Demonstrate the use of functions with parameter passing mechanisms for solving the real World problems.
4. Discuss the use of structures, unions, pointers and file operations for solving the real world Problems.
5. Learn new algorithms and technologies in C Programming and apply for suitable application development.
6. Develop solutions by using C Programming to the complex problems, either individually or as a part of team and report the results.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Identify the programming constructs of C language to solve a given problem.	1-6	1
CO2	Apply the concepts of matrices to develop data processing and analysis solutions in various application domains.	1-5	1
CO3	Develop text processing based applications using string operations.	1-5	2,3
CO4	Create solutions for real world problems using Pointers, Union, Structures and file operations.	1-5	2,3
CO5	Learn new algorithms and technologies in C Programming and apply for suitable application development	1-5	2,3
CO6	Develop solutions by using C Programming to the complex problems, either individually or as a part of the team and report the results	1-5,9	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1				✓		
CO2			✓			
CO3			✓			
CO4						✓
CO5		✓	✓			
CO6						✓

COURSE ARTICULATION MATRIX

CO#/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	3	1	2	1							3		
CO2	1	3	2	2	1								3		
CO3	2	2	2	2	1									3	3
CO4	3	3	3	1	1									3	3
CO5	3	3	3	2	2	1									
CO6	3	3	3	2	2	2							3	3	2

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY

Contents

UNIT-1

Algorithm: Definition, Purpose of writing an algorithm, Rules for writing an algorithm, Advantage of writing algorithm and examples.

Flowchart: Definition, Notations used to write a flow chart, Advantage and disadvantages of writing the flowchart and examples.

Introduction to "C": Introduction to GitHub, Structure of C program with example, C language & its features, C tokens, data types in C, variables, constants, input and output functions

UNIT-2

Operators and Expressions: Unary operator, assignment operator, arithmetic operator, relational operators, logical operators &bitwise operator, conditional operator, increment and decrement operator, special operator.
Conditional Statements: if statement, if-else statement, nested if, switch statement.
Unconditional Statements: break and continue statement, goto statement, return statement
Iterative Statements (loops): while loop, do-while, for loop, differences between while, do-while and for loop.

UNIT-3

Arrays: one dimensional array, two dimensional array, Linear and binary search and bubble sorting.
Functions: Structure of a function, types of functions, parameter passing mechanisms, Command line arguments.
Strings: string operations with and without using inbuilt string functions.

UNIT-4

Structures & Union: Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, union, typedef.
Pointers: Introduction to pointers.
File Operations: Formatted Input & Output, Character Input and Output Functions, Direct Input and Output Functions, File Positioning Functions, Error Functions

PRACTICE:

PART A:			
No	**Title of the Experiment**	**Tools and Techniques**	**Expected Skill /Ability**
1	Consider Loan applications in a bank consisting of various customer details such as Name, Organization, salary and loan amount applied. Segregate the loan applications based on income (low: <=5 lpa, medium: >5lpa <10lpa and high:>10lpa)	Condition checking	Apply if-else and switch
	Two files DATA1 and DATA2 contain sorted lists of integers. Write a C program to merge the contents of two files into a third file DATA i.e., the contents of the first file followed by those of the second are placed in the third file. Display the contents of DATA.	Files operations	Apply File concepts
2	Statistical measures are used for data analysis and interpretation. Develop program to determine the mean and stand deviation of data stored in an array.	Statistical Computing	Use Array and loops
	Consider the details of Airline passengers such as Name, PAN-No., Mobile-no, Email-id, Source, Destination, Seat-No and Air-Fare. Develop a program to read the details of airline passengers, store them in the structure “Airline” and List details of all the passengers who travelled From “Bengaluru to London”.	Search technique	Apply Structures
3	Assume that Mr. Peterson shopped N items at Big Market and his Cart comprises of name of the item, cost of the item per UNIT and quantity. Read the details of shopping and store them in the structure “Shop”. Compute the total amount spent on shopping at Big Market and also find out the item with minimum and maximum cost.	Statistical measure	Apply Structure and if then else
	b. Write a C program to define a structure named Student with name and DOB, where DOB in turn is a structure with day, month and year. Read the details of student and store them in the structure “Student”. Display name and date of birth of students using the concept of nested structures.	Nested Structures	Apply Nested Structures

4	Consider a set of N students with SRN, name, and marks scored in 8 subjects. Read the details of students and store them in the structure "Student_Marks". Compute total marks and average marks of each student and display them with suitable headings.	Average computation and visualization	Apply Structure, Array and Loops
	b. Create the structure "Book" with book_id, title, author_name and price. Write a C program to pass a structure as a function argument and print the book details.	Functions	Passing structures to function
5	Assume that Ms. Jassica shopped N items at Amazon and the Cart comprises of name of the item, cost of the item per UNIT and quantity. Arrange the items in the increasing order of cost of the item per UNIT.	Sorting	Apply sorting the contents of structure.
	Write a C program to compute the monthly pay of "N" employees using each employee's name, Basic_Pay, DA and HRA. The DA and HRA are 80% and 30% of the Basic_Pay respectively. Gross-salary is computed by adding DA and HRA to Basic_Pay. Store all the details in an array of structures and print the name and gross salary of each employee.	Reading and storing data	Use structures for reading and storing data
6	a. Consider the details of "N" Faculty members consisting of Name, EMP-ID,name of the school, address and salary. Create a file to store the above details. Retrieve the contents of the file to perform following operations: (i) Display the details of the faculty based on salary range entered. (ii) Display the details of the faculty based on the EMP-ID entered.	File operations	Create file, store data and display details.
	b. Write a C program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol using if else and switch case.	String operations	Apply string functions
PART B:			
	Project 1: Address Contact List with the following modules: User Add User(Name, Address, Primary contact number, secondary contact number, E-mail ID) Delete User Search for User Edit Find and replace the user name Edit the contact (Phone Number) details. Edit the Address of the user Report List of users based on the starting letter of their names. List of users based on first 2 digits of their mobile number. List of users based on the domain name of their E-mail ID.		
1	Develop a program in C to create the structure "Contact" with the fields, user_name, address, mobile, phone1 and email_id. Read the data into the structure "Contact" and store them in the file "Contact.txt".	Structures and Files	Develop the program using Structures and Files
2	Develop a program in C to open contact list from the file "Contact.txt" in read mode and delete contact details of the person based on name of the person by searching his/her details. Display the updated list.	String, File and Linear Search	Develop the program using String and File
3	Develop a program in C to input the string,"Str1"(which can be either a mobile no. or name of the user) and	String, File and Linear Search	Develop the program using

	search for it in the file , “Contact.txt” and display the details if it is found else display an error.		String and File
4	Develop a program in C to input the name of the user into the string, ”Str1” , search for it in the file “Contact.txt” and replace the content of “Str1” with the new data if found.	String, File and Linear Search	Develop the program using String, File and apply linear search
5	Develop a program in C to input the phone number of user into the string, “Str1”, search for it in the file “Contact.txt” and edit it with new data if found and save the same.	String, File and Linear Search	Develop the program using String, File and apply linear search
6	Develop a program in C to input the address of the user and search for the same in the file, “Contact.txt” and edit the address with new address and save the same.	String, File and Linear Search	Develop the program using String, File and apply linear search
7	Develop a program in C to input a letter into “Letter”, compare it with the details stored in “Contact.txt” and then display the list of the users whose name begin with “Letter “.	File operations	Develop the program using file
8	Develop a program in C to input first two digits of a mobile number into “Mobile”, search for the same in “Contact.txt” and display the details of all the users whose mobile number begin with “Mobile”.	File operations	Develop the program using file
9	Develop a program in C to input a domain name of email-id and search for the same in the file, “contact.txt” and list the details of the users whose email-id matches with the given domain name.	File operations	Develop the program using file

TEXT BOOKS:

1. B.W. Kernighan & D.M. Ritchie, "C Programming Language", 2nd Edition, PRENTICE HALL SOFTWARE SERIES, 2005.
2. Herbert Schildt, “C: The Complete Reference”, 4th edition, TATA McGRAW Hill, 2000.
3. B.S. Anami, S.A. Angadi and S. S. Manvi, “Computer Concepts and C Programming: A Holistic Approach”, second edition ,PHI,2008.

REFERENCE BOOKS:

1. Balaguruswamy,”Programming in ANSI C”, 4th edition, TATA MCGRAW Hill, 2008.
2. Donald Hearn, Pauline Baker, “Computer Graphics C Version”, second edition, Pearson Education,2004.

JOURNALS/MAGAZINES:

1. https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=6294
   (IEEE Journal/Magazine on IT Professional)
2. https://ieeexplore.ieee.org/document/1267572
   (IEEE Computing in Science and Engineering)

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc20_cs06/preview
   (Problem Solving through Programming in C)
2. https://www.edx.org/course/c-programming-getting-started

(C Programming Getting started)

3. https://www.coursera.org/specializations/c-programming
(Introduction to C programming)

SELF-LEARNING EXERCISES

1. **Fundamentals of computer graphics**: output primitives–Line, Circle and Ellipse drawing algorithms- Attributes of output primitives.
2. **Inline Assembly Language Program:** Simple inline assembly, Extended Assembly Syntax Microsoft C Compiler.

Course Title	IoT and Applications				Course Type		Integrated	
Course Code	B20EC0101	Credits	2		Class		II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	1	1	1				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**2**	**3**	**3**	**13**	**26**	**30%**	**30%**

COURSE OVERVIEW

The Internet of Things (*IoT)* expands access to the world-wide web from computers, smartphones, and other typical devices to create a vast network of appliances, toys, apparel, and other goods that are capable of connecting to the Internet. This introductory course focuses on IoT architecture, its domains and communication protocols. The course is supported with hands on sessions that incorporates different types sensors interfaced with IoT board to build IoT projects to solve real time problems. The case study of deployment of IoT in various applications are provided.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Explain the architecture of Internet of Things.
2. Inculcate knowledge of IoT devices, Sensors and Communication Protocols in various application domains.
3. Gain expertise in interface of various sensors to IoT Boards.
4. Discuss the various applications of IoT.
5. Learn new technologies in the IoT and apply for suitable application development.
6. Develop simple IoT projects and modules.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Describe the architecture of IoT eco-system	1	1,2
CO2	Identify IoT devices, architecture, sensors and Communication protocols	1	1,2
CO3	Demonstrate the interface of sensors to IoT board	1,5, 12	1,2
CO4	Realize various Applications of IoT through case studies	1,5, 12	1,2
CO5	Learn new technologies in the IoT and apply for suitable application development.	1,5,9, 12	1,2
CO6	Develop simple IoT projects and modules	1,5,6,9, 12	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√				
CO2		√				
CO3			√			
CO4				√	√	
CO5			√			√
CO6						√

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3	3	
CO2	3												3	3	
CO3	3				3							3	2	2	
CO4	3				3							3	1	1	
CO5	3		2		3				2				1	1	1
CO6	3				3				2			3	3	3	

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT
THEORY

Contents

UNIT-I

IoT Basics: Introduction to IoT, How does Internet of Things Works, Features of IoT, Advantages and Disadvantages of IoT, Embedded Devices in IoT, IoT eco-system

IoT Architecture and IoT Devices: Components of IoT architecture, Stages of IoT solution architecture, Smart Objects, IoT Devices.

UNIT-II

IoT boards in Market: Arduino, Arduino UNO, ESP8266 ,Raspberry Pi

IoT Platform: Amazon Web Services (AWS) IoT platform, Microsoft Azure IoT platform, Google Cloud Platform IoT, IBM Watson IoT platform, ThingWork IoT platform

Technologies Used in IoT: Bluetooth, Wi-Fi, Li-Fi, RFID ,Cellular ,Z-Wave

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1.	Introduction to IoT Board	Hardware	Identifications of various parts of Arduino and Node MCU boards Study of Ethernet shield and connection to the board
	Arduino UNO		
	Arduino Nano		
	Node MCU		
	Ethernet Shield		
2.	Working with Arduino IDE (Integrated Development Environment)	Open source Arduino IDE	Download specified software Modify code as per the application
3.	a) Demonstration of Multimeter usage	Multimeter Breadboard Resistor packs	Measurement of voltage at various points in IoT boards Choose the value of Resistor for an application
	b) Demonstration of Breadboard connection for Voltage, Ground, series and parallel connections		
	c) Exercise to read the value of resistor using Colour code chart		
4	Reading photo resistor sensor value connected to Arduino Board	Arduino UNO Arduino IDE LDR , Multimeter, Resistor	Interface of photo sensor to IoT board for light measurement applications
5	Reading temperature sensor value connected to Arduino Board	Arduino UNO , Arduino IDE, Temperature sensor, Multimeter	Interface of Temperature sensor to IoT board for temperature measurement application
6.	Reading motion detector sensor value connected to IoT board	Arduino UNO , Arduino IDE, pyro-dielectric sensor, Multimeter	Interface of Motion detector sensor to IoT board for motion detection applications
7	Reading distance measurement using Ultrasonic sensor Connected to IoT board	Arduino UNO , Arduino IDE, Ultrasonic sensor, Multimeter	Interface of Motion detector sensor to IoT board for motion detection
8	Interface relay to IoT board	Arduino UNO , Arduino IDE, relay Multimeter	Interface relay to IoT board for Switching applications
9	Connect Wifi-ESP8266 to Arduino UNO board , Send and receive data through smart phone.	Arduino UNO ESP8266, Arduino IDE Smart phone	Connect IoT board to Wifi network
9	Mini Projects Arduino Controlled Light intensity Thermometer Motion activated light lamp Touchless motion sensor trash can		

TEXT BOOK:

1. Vijay Madisetti, Arshdeep Bahga ,"Internet of Things: A Hands-On- Approach", ISBN: 978 0996025515, 2014.

REFERENCE BOOKS:

1. Raj Kamal ,"Internet of Things: Architecture & design Principle", McGraw Hill Education, 2017.

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/learn/iot

2. https://www.coursera.org/learn/interface-with-arduino

SELF-LEARNING EXERCISES:

a) Create Arduino project hub

Course Title	ENTREPRENEURSHIP				Course Type		Theory	
Course Code	B20ME0104	Credits	1		Class		I/II semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	1	1	1				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**1**	**1**	**1**	**13**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: This is an *introductory course* is designed to provide the foundational concepts of *entrepreneurship*, including the definition of *entrepreneurship*, the profile of the *entrepreneur*, and the role of venture creation in society. The course also provides a bird's eye view on the steps to start a venture, financing, marketing as well as support by various institutions towards entrepreneurship.

COURSE OBJECTIVE

1. To understand the basic terms, concepts in Entrepreneurship Development
2. To apply for the supporting schemes towards entrepreneurship

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Understand and explain the key terms, definitions, and concepts used in Entrepreneurship Development	1	1
CO2	Plan a startup and understand sources available for finance and the supporting schemes offered by state and central governments and other entrepreneurial development organizations	1,2	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√				
CO2	√	√	√			

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2												2		
CO2	2	2											2	1	

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY

Contents

UNIT-1

INTRODUCTION TO ENTREPRENEURSHIP

Evolution of term 'Entrepreneurship', Factors influencing entrepreneurship', Psychological factors, Social factors, Economic factors, Environmental factors. Characteristics of an entrepreneur, Difference between Entrepreneur and Entrepreneurship, Types of entrepreneurs. New generations of entrepreneurship viz. social entrepreneurship, Edupreneurship, Health entrepreneurship, Tourism entrepreneurship, Women entrepreneurship etc., Barriers to entrepreneurship, Creativity and entrepreneurship, Innovation and inventions, Skills of an entrepreneur, Decision making and Problem Solving

UNIT-2

INSTITUTIONAL SUPPORT FOR ENTREPRENEURSHIP

Organization Assistance to an entrepreneur, New Ventures, Industrial Park (Meaning, features, & examples), Special Economic Zone (Meaning, features & examples), Financial assistance by different agencies, MSME Act Small Scale Industries, Carry on Business (COB) licence, Environmental Clearance, National Small Industries Corporation (NSIC), e-tender process, Excise exemptions and concession, Exemption from income tax, The Small Industries Development Bank of India(SIDBI), Incentives for entrepreneurs

TEXT BOOKS:

1. K. Ramachandran ,"Entrepreneurship Development", Tata Mc. Graw Hill, 2008.
2. Sangeeta Sharma, "Entrepreneurship Development", PHI Publications, 2016.

REFERENCE BOOKS:

1. Baringer and Ireland, "Entrepreneurship", 11th Edition, Pearson, 2020.
2. P. Narayana Reddy, "Entrepreneurship – Text and Cases", Cengage Learning India, I edition, 2010
3. Paul Burns ,"Corporate Entrepreneurship: Building The Entrepreneurial Organization" , Palgrave Macmillan.
4. Drucker F Peter,:"Innovation and Entrepreneurship", 1985.Heinemann, London.
5. Doanld F Kuratko & Richard M ,"Entrepreneurship in the New Millennium", India Edition.

JOURNALS/MAGAZINES

1. International Small Business Journal: https://journals.sagepub.com/home/isb
2. Journal of Development Entrepreneurship: https://www.worldscientific.com/worldscinet/jde

SWAYAM/NPTEL/MOOCs:

1. Entrepreneurship: https://nptel.ac.in/courses/110/106/110106141/

SELF-LEARNING EXERCISES:

1. Introverts participate. If you have a few vocal students asking questions and little participation from others, anonymous questions lower student anxiety, which makes it easier for everyone to participate.

2. You learn what students are thinking about. Anonymity provides cover for students to ask questions they may be too afraid to ask but are curious about.
3. Discussions start. Anonymity means you can invite students to pose “challenging” questions. If you encourage your students to question what they’re learning, why it’s important, or why they should have to do the work you’re assigning, you spark discussions about how entrepreneurship is relevant, which can often be the key to increasing engagement.

PROBLEM BASED LEARNING

No.	Description
1	How to write a Business Plan
2	Creating Marketing, Financial and Organizational Plans.
3	How to apply for financial assistance via various schemes
4	How to file taxes as a Small Business and understand the importance of GST

Detailed Syllabus
Semester -3

Course Title	Analog and Digital Electronics				Course Type		Integrated	
Course Code	B20CI0301	Credits	4		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-							
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW

This course covers basic concepts of Electrical Engineering. The course introduces the working of analog components and helps in understanding basics in digital electronics by applying the knowledge of logic gates and learning the applications of diodes and opamps.The course provides foundation on designing and implementation of logic circuits. Analog circuits are simulated using ORCAD tool and digital circuits using XILINX tool which helps in gaining experience in creating and testing of circuits.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Discuss the applications of diode in rectifiers, filter circuits and wave shaping.
2. Describe the foundation on designing, building and testing of common combinational and sequential Digital logic circuits.
3. Explain the procedure required for simulation of digital logic circuits.
4. Analyze the working principle and designing of analog circuits using ORCAD tool
5. Analyze the working principle and designing of digial circuits using XILINIX tool
6. Demonstrate the use of general electronic instruments in design and testing of digital logic circuits.

COURSE OUTCOMES(COs)

Afterthecompletionofthecourse, the student will be able to:

CO#	Course Outcomes	POs	PSOs
CO1	Analyze the use of diodes in rectifiers, filter circuits and wave shaping	1 to 4	1
CO2	Apply the basic knowledge used in solid state electronics including diodes, and operational amplifiers for specific engineering applications.	1 to 3, 5	1
CO3	Identify the different families of digital integrated circuits build, and troubleshoot combinatorial circuits using digital integrated circuits	1 to 5	2
CO4	Analyze the working principle and designing of analog circuits using ORCAD tool Analyze the working principle and designing of digial circuits using XILINIX tool	1 to 4	1
CO5	Analyze the working principle and designing of digial circuits using XILINIX tool	1 to 4	1

CO6	Develop the ability to analyze and design analog electronic circuits using discrete components	1,4,5	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1				√		
CO2			√			
CO3			√			
CO4				√		
CO5				√		
CO6			√			

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2									3		
CO2	3	2	3		2								3		
CO3	3	1	2	1	2									3	
CO4	3	1	1	2									3		
CO5	3	1	1	2									3		
CO6	3			2	2										3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Limiters and Oscillators: Clipping and clamping circuits using diodes, Oscillator operation, Phase shift Oscillator, Wien bridge Oscillator, Tuned Oscillator circuits, Crystal Oscillator. (BJT Version Only) Simple design methods of Oscillators.

UNIT- 2

Operational Amplifiers: Ideal Opamp versus Practical Opamp, Performance Parameters, Some Applications: Peak Detector Circuit, Absolute Value Circuit, Comparator, Active Filters-First order LPF and HPF, Phase Shifters, Instrumentation Amplifier, Non-Linear Amplifier-Log and antilog amplifier.

UNIT – 3

Principle and Minimization Techniques of combinational Circuits: Introduction to combinational logic, Minimization Techniques: Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), 3 and 4 Variable Karnaugh map.

UNIT – 4

Analysis of Combinational and sequential Circuits: Half adder, full Adder, Half Subtractor,full Subtractor, multiplexers and Demultiplexers.

Introduction to Sequential circuits: flip-flops: SR, JK, D, T Characteristic tables and equations; Application of Shift register (Ring Counter and Johnson counter).

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
	Part-A		
1	To simulate a positive clipper, double ended clipper & positive clamper circuits using diodes	Orcad	Simulation of clipper and clamper electronic
2	To simulate a rectangular wave form generator (Op-amp relaxation oscillator) and compare the frequency and duty cycle with the design specifications	Orcad	Simulation of rectangular waveform generator
3.	To simulate a Schmitt trigger using Op-amp and compare the UTP andLTP values with the given specification	Orcad	Simulation of Schmitt trigger
4.	To simulate a Wien bridge Oscillator	Orcad	Simulation of wein bridge oscillator
5.	To determine the working of a power supply and observe the waveforms	Orcad	Simulationof power supply
6.	To build and simulate CE amplifier (RC coupled amplifier) for itsfrequency response and measure the bandwidth.	Orcad	Simulation of RC coupled amplifier and determining the frequency response
7.	Realization of Half/Full adder and Half/Full Subtractors using logic gates	ICs, Trainer kit and patch cords Create and perform the adder and subtractor circuits	ICs, Trainer kit and patch cords Create and perform the adder and subtractor circuits
8.	Design and develop VHDL code to realize Full adder and Full Subtractors	Xilinx	Simulation knowledge of the mentioned adders an
9.	.Given a 4-variable logic expression, simplify it using Entered Variable Map and realize the simplified logic expression using 8:1 multiplexer IC	ICs, Trainer kit and patch cords	Realization of a multiplexer
10.	Design and develop the VHDL code for an 8:1 multiplexer. Simulate and verify it's working	Xilinx	Simulation knowledge of combinational logic circuit

11.	Design and implement a ring counter using 4-bit shift register and demonstrate its working	ICs, Trainer kit and patch cords	Realization of shift register and ring counter
12.	Design and develop the Verilog / VHDL code for switched tail counter.	Xilinx	Simulation of ring counter

TEXTBOOKS:

1. Anil K Maini, Varsha Agarwal,"Electronic Devices and Circuits", Wiley, 2009.
2. Jacob Millman, Christos Halkias, Chetan D Parikh,"Millman's Integrated Electronics – Analog and Digital Circuits and Systems", 2nd Edition, Tata McGraw Hill, 2010.
3. Donald P Leach, Albert Paul Malvino&GoutamSaha ,"Digital Principles and Applications", 7th Edition, Tata McGraw Hill, 2010.

REFERENCEBOOKS:

1. Stephen Brown, ZvonkoVranesic," Fundamentals of Digital Logic Design with VHDL", 2nd Edition, Tata McGrawHill, 2005.
2. R D Sudhaker Samuel, "Illustrative Approach to Logic Design", Sanguine-Pearson, 2010.
3. Charles H. Roth," Fundamentals of Logic Design", Jr., 5th Edition, Cengage Learning, 2004.
4. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss," Digital Systems Principles and Applications", 10th Edition, Pearson Education, 2007.
5. M Morris Mano," Digital Logic and Computer Design", 10th Edition, Pearson Education, 2008.
6. Jacob Millman, Christos Halkias, " Analog and Digital Circuits and Systems", 2nd Edition, Tata McGraw Hill, 2010
7. R. D. Sudhaker Samuel," Electronic Circuits", Sanguine-Pearson, 2010

JOURNALS/MAGAZINES

1. https://ieeexplore.ieee.org/document/1085417
2. https://www.academia.edu/Documents/in/Digital_Electronics
3. https://www.mdpi.com/journal/electronics/special_issues/circuit_machine_learning

SWAYAM/NPTEL/MOOCs:

1. https://technobyte.org/digital-electronics-logic-design-course-engineering/
2. https://www.udemy.com/course/digital-electronics-logic-design/
3. https://www.javatpoint.com/digital-electronics/.

Course Title	Programming with JAVA				Course Type		Integrated	
Course Code	B20CI0302	Credits	4		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW

Java's unique architecture enables programmers to develop a single application that can run across multiple platforms seamlessly and reliably. In this course, students gain extensive experience with Java, object-oriented features and advance Java programming skills. Students learn to create robust object-oriented applications with Java.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the basic data types and control structures of the Java language.
2. Illustrate the creation of classes and objects in Java.
3. Demonstrate the extending a class (inheritance) and use proper program anomaly handling structures.
4. Discuss the use of Java generics and collections.
5. Discuss object-oriented features and advance Java programming skills
6. Explain to create robust object-oriented applications with Java.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of array concepts in java to solve real world problems.	1 to 5	1
CO2	Apply the features of OOPS in java to solve the real-world problems.	1 to 5	1
CO3	Develop program for stack implementation using Exception Handling in java.	1 to 5	2, 3
CO4	Identify suitable data structures to solve real world applications.	1 to 5, 12	2
CO5	Discuss object-oriented features and advance Java programming skills	1 to 5	1
CO6	Explain to create robust object-oriented applications with Java.	1 to 5, 12	2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√	√		
CO4			√			
CO5		√				
CO6		√				

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	1								3		
CO2	3	3	2	2	1								3		
CO3	3	3	1	1	1									3	3
CO4	3	3	3	1	2							1		3	
CO5	3	3	3	1	2								3		
CO6	3	3	2	2	2									3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Fundamental Programming Structures: Dissecting the "Hello, World" Program; Compiling and Running a Java Program; Primitive Types; Variables; Arithmetic Operations; Strings; Input and Output; Control Flow; Arrays; Functional Decomposition.

UNIT – 2

Object-Oriented Programming: Working with Objects; Implementing Classes; Object Construction; Static Variables and Methods, Packages; Nested Classes; Documentation Comments; Interfaces; Static, Default and Private Methods in interface; Lambda Expressions; Method and Constructor References; Local and Anonymous Classes.

UNIT – 3

Inheritance and Exceptions: Extending a Class; Object: The Cosmic Superclass; Enumerations; Runtime Type Information and Resources; Exception Handling: Throwing Exceptions; The Exception Hierarchy; Declaring Checked Exceptions; Catching Exceptions; the Try-with-Resources Statement; The finally Clause; Rethrowing and Chaining Exceptions; Uncaught Exceptions and the Stack Trace.

UNIT – 4

Generic Programming and Collections: Generic Classes; Generic Methods; Type Bounds; Type Variance and Wildcards; Restrictions on Generics; an Overview of the Collections Framework; Iterators; Sets; Maps.

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
	Part-A		
1.	The sieve of Eratosthenes is one of the most efficient ways to find all primes smaller than n when n is smaller than 10 million. Given a number n, use JAVA to print all primes	Windows/Linux OS, IDE	Understanding conditional operators and statements
2.	The Gauss-Jordan method is also known as Gauss-Jordan elimination method is very useful in solving a linear system of equations. It is a technique in which a system of linear equations is resolved by the means of matrices. Develop a	Windows/Linux OS, IDE	Creating an array and performing some operations on array.
3.	To compute a square root of any positive number a, start with an initial guess x=x1 for √a; then calculate successive approximations x2,x3...,√a using the formula: $x_i = \frac{x_{i-1} + (a/x_{i-1})}{2}, i = 2, 3, \ldots$ Develop a JAVA application that implements the above SQRT function to compute the square root of any positive number.	Windows/Linux OS, IDE	Understanding conditional statements (if, if..else, etc)

4.	Model a lamp as a Java object. Make a Lamp class. This will contain atleast one instance variable which will be of type Boolean and will hold the state of the lamp: i.e., whether it is on or off. In addition, add methods to do the following things: switch the light on and off, and check its current state, i.e., whether it is on or off. Maintain proper encapsulation mechanism. Next, write a launcher class with a main() method to carry out the following tasks: • create a lamp object; • turn it on and off; • Print the lamp's on/off status to the console.	Windows/Linux OS, IDE	Object and class creation and its usage
5.	Given the following functional interface: interface MathOperation { int operation(int a, int b);} Develop an application that would implement the above interface using lambda expressions as to perform theaddition, subtraction, multiplication and division operations.	Windows/Linux OS, IDE	Creation of interfaces and its usage.
6.	The String class in JAVA has a static method compare To Ignore Case, which compares two strings and the Arrays class has a static sort method. Build a JAVA program that creates an array of strings, use the sort function from Arrays class to sort the strings by passing the compare To Ignore Case function as a parameter to the sort function using method reference. Print the sorted array.	Windows/Linux OS, IDE	Creation of string class and its usage

7	XYZ technologies is firm that has 5 employees with 1 manager, and 4 technicians. XYZ wants to digitize its payroll system, the following requirements: Dearness Allowance is 70% of basic for all employees. House Rent Allowance is 30% of basic for all employees. Income Tax is 40% of gross salary for all employees. The annual increments to the employees are to be given of the following criteria: - Manager 10% of the basic salary, and Technicians 15% of basic. Develop the pay roll for XYZ. Implement a class hierarchy using inheritance, where Employee is an abstract class and Manager and Technician are derived from Employee. Demonstrate a polymorphic behavior for giving the annual increments.	Windows/Linux OS, IDE	Creation multiple inheritance and its usage
8	Define a new Exception class named Odd Exception. Create a new class named Even Odd. Write a method called halfOf(), which takes an int as parameter and throws an Odd Exception if the int is odd or zero, otherwise returns (int / 2). Write a main method that calls halfOf() three times (once each with an even int, an odd int, and zero), with three try/catch blocks, and prints either the output of halfOf() or the caught Odd Exception.	Windows/Linux OS, IDE	Creation of exception class and its usage
9	Implement a class named Fraction that represents fractions with numerator and denominator always stored reduced to lowest terms. If fraction is negative, the numerator will always be negative, and all operations leave results stored in lowest terms. Implement the addition, subtraction, multiplication and division operation for the Fraction class	Windows/Linux OS, IDE	Creation of exception class and its usage
10	Create a class Student that has instance variables as Name, Age, Address and access transmutation methods to access the instance variables along with display method to print the details of student. Next write a main() function that will create a collection of 10 students and reverse the list. Print the details before and after reversing the collection.	Windows/Linux OS, IDE	Object and class creation and its usage
11	Use generics to build a class Sort. Implement the bubble sort algorithm to sort an array of any type.	Windows/Linux OS, IDE	Creation of generics class and its usage
12	Write a generic method to count the number of elements in a collection that have a specific property (for example, odd integers, prime numbers, palindromes).	Windows/Linux OS, IDE	Creation of generics class and its usage

Sl. No.	Part B Mini Project
1	Develop a project for Airline reservation system List with the following modules: 1. PASSENGER a) Add member b) Delete member c) Search for member d) Edit member 2. FLIGHT a. Add Flight b. Delete Flight c. Search Flight d. Display Flights 3. RESERVATION a. Book b. Cancel Title: Airline Reservation system Problem Definition: *Airline Reservation System*" main aim is to provide the online ticket & seat reservation of National and International Flights and give the information about flight departures. Solution: Develop a project to implement an Airline reservation system with the following modules: 1. PASSENGER a. Add member b. Delete member c. Search for member d. Edit member 2. FLIGHT a. Add Flight b. Delete Flight c. Search Flight d. Display Flights 3. RESERVATION a. Book b. Cancel

List of Experiments:	
Sl.No	Name of the Experiment
1	Create a passenger class with the attributes Adhar_number, Passenger_name, Email_id, Phone, Address, DOB and the methods to facilitate Addition, Deletion, Search and Modify the passenger data. Store the details of the 10 passenger objects in "Passenger.txt" and Display. a. void Add_passenger() b. Display_details() c. void Delete_Passenger(Adhar_number) d. void Search_Passenger(Adhar_number) e. void Modify_Passenger(Adhar_number)
2	It is required to delete an existing passenger data based on the request from the passenger. Read adhar card number of the passenger to be deleted and delete the record from "passenger.txt" if found. Otherwise display an error message saying that "record does not exist". Develop a program to implement the above task.
3	It is required to modify an existing passenger data based on the request from the passenger. Read adhar card number of the passenger to be modified and modify the record from "passenger .txt" if found. Otherwise display an error message saying that "Record does not exist". Develop a program to implement the above task.
4	It is required to Search an existing passenger data based on the request from the passenger. Read Adhaar card number of the passenger to be searched for, search the record from "passenger .txt" and display the details of passenger if found. Otherwise display the error message "Record does not exist". Develop a program to implement the above task.
5	Create a Flight class with attributes Flight_number, Flight_name, Source, Destination, Departure_Timing and the methods Add_Flight(), Delete_Flight(), Search_Flight() and Display_Flight(). Store the details of any 5 Flights in a file called "Flights.txt" and display the same. Develop a program to achieve the above task.
6	It is required to delete the details a flight stored in "Flights.txt". Read the Flight_no and search for the same in "Flights.txt". If found, it should be deleted from "Flights.txt". Otherwise display the error message "Flight Does Not Exist". Develop a program to achieve the above task.
7	It is required to delete the search for a flight stored in "Flights.txt". Read the Flight_no and search for the same in "Flights.txt". If found, Display the details of Fllight, otherwise display the error message "Flight Does Not Exist". Develop a program to achieve the above task.
8	It is required to display the details of all the flights running from Source1 to Destination1. Read the name of source1 and destination1 and fetch from "Flights.txt" the details of all the flights running between Source1 and desitnation1 and display the same. Develop a program to achieve the above

	task.
9	Create a reservation class that facilitates booking and cancellation of domestic and international flights using the following methods and parameters. Develop a program to store the details of 10 bookings in "**Reservations.txt"** and display the same. a. Book_Ticket(Flight_Number, Flight_Name, Ticket_Number,Source, Destination, Adhar_number, Passport_number,Date, Departure_time, Class, Type_of_Travel(Domestic , International), Fare, Status) b. Cancel_Ticket(Ticket_Number)
10	A passenger would like to cancel the ticket due to a genuine reason. Read the ticket_no and search for the record in "Reservation.txt". Cancel the Ticket based on the request from passenger and update the status.

TEXTBOOKS:

1. Cay S. Horstmann, "Core Java® SE 9 for the Impatient", Addison Wesley, Second Edition, 2018.
2. HerbertSchild, "Java™:TheCompleteReference",McGraw-Hill,TenthEdition,2018.
3. David Gallardo, Ed Burnette, Robert Mcgovern, " Eclipse in Action a guide for java developers", Manning Publications,2003.
4. Ed Burnette; " Eclipse IDE Pocket Guide : Using the Full-Featured IDE", O'Reilly Media, Inc, USA,2005.

REFERENCEBOOKS:

1. Cay S. Horstmann, "Core Java™ Volume I—Fundamentals", Prentice Hall, Tenth Edition, 2015
2. Joshua Bloch, "Effective Java",Addison-WesleyProfessional,ThirdEdition,2017
3. Ken Kousen, " Modern Java Recipes", O'Reilly Media, Inc.,2017
4. Oracle Java Documentation. (https://docs.oracle.com/javase/tutorial/)

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1. https://ieeexplore.ieee.org/document/5464387
2. https://files.eric.ed.gov/fulltext/EJ1075126.pdf
3. https://www.sciencedirect.com/science/article/pii/S0167642304000590
4. https://www.informingscience.org/Publications/4322?Source=%2FJournals%2FJITEIIP%2FArticles%3FVolume%3D0-0
5. https://www.javadevjournal.com/
6. https://blogs.oracle.com/javamagazine/

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc19_cs84/preview
2. https://www.classcentral.com/course/swayam-programming-in-java-12930
3. https://swayam.gov.in/explorer?searchText=java

Self-Learning Exercises:

1. The Eclipse-IDE
2. Streams
3. Concurrent Programming
4. Swing and JavaFX
5. Networking- JDBC, Database Access

Course Title	Data Structures				Course Type		Integrated	
Course Code	B20CI0303	Credits	4		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW

The course focuses on basic and essential topics in data structures, including array-based lists, linked lists, recursion, stack, queues, and binary trees, heaps, sorting and searching algorithms. It also covers analysis and design of fundamental data structures and engages learners to use data structures as tools to algorithmically design efficient computer programs that will cope with the complexity of actual applications.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Discuss the concept of Abstract Data Types (ADT)
2. Provide the knowledge of stacks and queues.
3. Understand the importance of Linked lists
4. Illustrate the operations of trees
5. Demonstrate the use of appropriate of data structures for a given problem.
6. Design a data structure application for real time problems.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the Abstract Data Types, Structures.	1 to 5	1
CO2	Formulate the solution for any computational problem using stacks and queues.	1 to 5	1,2
CO3	Analyze the importance of linked lists.	1 to 5	1,2
CO4	Solve real time problems using trees data structure.	1 to 5	1,2
CO5	Apply appropriate data structures to solve a given problem.	1 to 5	1
CO6	Compare the performance of various data structures.	1 to 5	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			

CO3			√			
CO4			√			
CO5		√				
CO6			√			√

COURSE ARTICULATION MATRIX

CO#/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	2								3		
CO2	3	2	3	3	2								3	3	
CO3	3	1	2	3	1								3	3	
CO4	3	1	3	3	2								3	3	
CO5	3	2	2	3	2								3		
CO6	3	1	3	3	2								3	3	

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT- 1

Introduction to Data structures and Algorithms: Data, Data Types, Abstract Data Types and Examples, Algorithms, Arrays: One Dimensional and Two Dimensional, Structures: Introduction to structures and nested structures.

UNIT -2

Data Structures-1: Stacks, Evaluation of expressions: Infix, Prefix, postfix; Queues: Simple, circular and priority Queues.

UNIT- 3

Data Structures-2: Pointers; Dynamic memory allocation; Linked List: singly linked list, doubly linked list, stack using linked list, queue using linked list.

UNIT- 4

Data Structures-3: Trees: Binary Tree, Binary Tree Traversals, Binary search Tree.

PRACTICE:

1	Design, Develop and Implement a menu driven Program in C for the following Array operations a. Creating an Array of N Integer Elements b. Display of Array Elements with Suitable Headings c. Inserting an Element (ELEM) at a given valid Position (POS) d. Deleting an Element at a given valid Position(POS) e. Exit. Support the program with functions for each of the above operations.
2	Design, Develop and Implement a Program in C for the following operations on Strings a. Read a main String (STR), a Pattern String (PAT) and a Replace String (REP) b. Perform Pattern Matching Operation: c. Find and Replace all occurrences of PAT in STR with REP if PAT exists in STR. d. Report suitable messages in case PAT does not exist in STR Support the program with functions for each of the above operations. Note: Don't use Built-in functions
3	Design, Develop and Implement a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX) a. Push an Element on to Stack b. Pop an Element from Stack c. Demonstrate how Stack can be used to check Palindrome d. Demonstrate Overflow and Underflow situations on Stack e. Display the status of Stack f. Exit Support the program with appropriate functions for each of the above operations
4	Design, Develop and Implement a Program in C for converting an Infix Expression to Postfix Expression. Program should support for both parenthesized and free parenthesized expressions with the operators: +, -, *, /, %(Remainder), ^ (Power) and alphanumeric operands.
5	Design, Develop and Implement a Program in C for the following Stack Applications a. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^ b. Solving Tower of Hanoi problem with n disks 21 6 Design, Develop and Imp
6	Design, Develop and Implement a menu driven Program in C for the following operations on Circular QUEUE of Characters (Array Implementation of Queue with maximum size MAX)

	a. Insert an Element on to Circular QUEUE b. Delete an Element from Circular QUEUE c. Demonstrate Overflow and Underflow situations on Circular QUEUE d. Display the status of Circular QUEUE e. Exit Support the program with appropriate functions for each of the above operations
7	Design, Develop and Implement a menu driven Program in C for the following operations on Singly Linked List (SLL) of Student Data with the fields: USN, Name, Branch, Sem, PhNo a. Create a SLL of N Students Data by using front insertion. b. Display the status of SLL and count the number of nodes in it c. Perform Insertion and Deletion at End of SLL d. Perform Insertion and Deletion at Front of SLL e. Demonstrate how this SLL can be used as STACK and QUEUE f. Exit
8	Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Employee Data with the fields: SSN, Name, Dept, Designation, Sal, PhNo a. Create a DLL of N Employees Data by using end insertion. b. Display the status of DLL and count the number of nodes in it c. Perform Insertion and Deletion at End of DLL d. Perform Insertion and Deletion at Front of DLL e. Demonstrate how this DLL can be used as Double Ended Queue f. Exit
9	Design, Develop and Implement a Program in C for the following operations on Singly Circular Linked List (SCLL) with header nodes a. Represent and Evaluate a Polynomial P(x,y,z) = 6x2y2z-4yz5+3x3yz+2xy5z-2xyz3 b. Find the sum of two polynomials POLY1(x,y,z) and POLY2(x,y,z) and store the result in POLYSUM(x,y,z) Support the program with appropriate functions for each of the above operations
10	Design, Develop and Implement a menu driven Program in C for the following operations on Binary Search Tree (BST) of Integers a. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2 b. Traverse the BST in Inorder, Preorder and Post Order c. Search the BST for a given element (KEY) and report the appropriate message

	d. Delete an element(ELEM) from BST e. Exit

TEXTBOOKS:

1. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in JAVA ", Wiley, 6th Edition, 20l4
2. Herbert Schildt, "The Complete reference Java", 7th edition, 2007

REFERENCEBOOKS:

1. Richard Gilberg, Behrouz Forouzan, "DataStructures: A Pseudocode Approach with C", Cengage Learning,2004.
2. DebasisSamanta, "Classic DataStructures", second edition, PHI Learning Private Limited,2011.

JOURNALS/MAGAZINES

1. https://www.imedpub.com/scholarly/data-structure-journals-articles-ppts-list.php
2. https://www.mdpi.com/journal/algorithms/special_issues/Efficient_Data_Structures
3. https://ieeexplore.ieee.org/document/4055607
4. https://ieeexplore.ieee.org/abstract/document/6312216
5. https://www.sciencedirect.com/science/article/pii/0022000083900065
6. https://www.sciencedirect.com/journal/journal-of-algorithms

SWAYAM/NPTEL/MOOCs:

1. Coursera – Data Structures and Algorithms Specialization
2. Coursera – Data Structures, University of California San Diego
3. Data Structures and Algorithms, National Research University Higher School of Economics
4. https://nptel.ac.in/courses/106/102/106102064/
5. https://nptel.ac.in/courses/106/106/106106127/
6. https://nptel.ac.in/courses/106/103/106103069/

Self-LearningExercises:

AVL Trees, Threaded Binary Trees, Heaps, Sparse Matrix, Searching and sorting techniques.

Course Title	Discrete Mathematics and Graph Theory				Course Type		Theory	
Course Code	B20AS0302	Credits	3		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

Discrete Mathematics is the study of discrete objects. Discrete Mathematics is used to develop our ability to understand and create mathematical arguments and also used to provide the mathematical foundation for advanced mathematics and computer science courses.Graphs (abstract networks) are among the simplest mathematical structures, which are used in most of the areas of Computer Science to solve the complex problems.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain mathematical arguments using logical connectives and quantifiers.
2. Illustrate the operation on discrete structures such as sets, relations and functions.
3. Describe the theory and application of graphs, fundamental theorems and their proofs.
4. Demonstrate the use of graphs to model many types of relations and processes in physical, biological. Social and information system.
5. Explain to provide the mathematical foundation for advanced mathematics
6. Illustrate to use discrete mathematics to solve the complex problems in most of the areas of Computer Science

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Construct mathematical arguments using logical connectives and quantifiers	1 to 4	2
CO2	Apply the operations like union and intersection on discrete structures such as sets, relations and functions	1 to 3, 5,6	2
CO3	Make use of graph and fundamental theorems in real world applications	1 to 6	2

CO4	Develop a model using advanced concepts of graph for real world applications	1,2,4,5,6	2
CO5	Apply the mathematical foundation for advanced mathematics	1 to 3, 5,6	2
CO6	Solvethe complex problems in most of the areas of Computer Science	1,2,3,4	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			
CO5			√			
C06					√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2										3	
CO2	3	2	3		2	1								3	
CO3	3	1	2	1	2	3								3	
CO4	3	2		2	2	2								3	
CO5	3	2	3		2	1								3	
C06	3	2	3	3											3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Set Theory and Logic: Fundamentals of Sets, Sub sets, Venn diagram, Operations on sets, Laws of set theory, Countable and Uncountable sets, Addition Principle, Extended Addition Principle, Propositions, Logical

Connectives and truth tables (Illustrative Examples), Logical equivalence, Laws of logic, Duality, NAND and NOR connectives (Circuits), Converse, Inverse and Contrapositive, Rules of Inference, Open statements, Quantifier, Logical implication involving quantifiers, Statement with more than one variable. Methods of Proofs and Disproof.

UNIT – 2

Relations and Functions : Cartesian product of sets (Illustrative Examples), Matrices and Digraph of the relations, Properties of relations, Equivalence relations, Partial ordered relations, Posets, Hasse diagrams, Extremal elements in posets, Types of Functions, properties of Functions, The pigeon hole principle, composite functions, invertible functions, Floor and ceiling functions, Sterling number of second kind.

UNIT – 3

Introduction to graph theory: Konigsberg's bridge problems, Utilities problem, Seating Problem, Graphs, Representation of Graphs. Directed graphs, Incidence, Adjacency, Degree, In degree, Out degree, Regular graphs, Complete graphs, Null Graph, Bipartite Graphs, Isomorphism, Directed Graphs, Sub graphs, Walk, Trail, Path, Circuit, Cycle, Connected and disconnected graphs, Components, Weakley connected and Strongly connected Components, Complement of graphs, Partition and Decompositions.

UNIT – 4

Euler and Hamiltonian graphs and Graph coloring: Operation on graphs, Definition of Euler Trail, Euler Graphs, Hamiltonian path, Hamiltonian Cycle, Hamiltonian Graphs, Standard Theorems on Euler and Hamiltonian graphs, planar graph, detection of Planarity, Dual of planar graphs, Euler formula for planar graph, Graph coloring, Chromatic polynomial, Map coloring, Four Color Theorem, Five Color Theorem, Matching, Network flow, and its applications, Cut set, Cut vertex, Chord, Properties of Cut Sets, Max Flow Min Cut Theorem.

TEXT BOOKS:

1. Ralph P Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, 5th Edition, 2014.
2. Nasingh Deo, "Graph Theory with Applications to Engineering Computer Science", Prentice-Hall, 2014.

REFERENCE BOOKS:

1. Keneth H Rosen, "Discrete Mathematics and its applications", 5thEdition,, Tata McGraw Hill, 2014.
2. C L Liu, "Elements of Discrete Mathematics", 4th edition, Tata MacGraw Hill 2014.
3. Thomas Khoshy, "Discrete Mathematics with applications", Elsvier, 2012.
4. Ralph P Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, Asia, 2015.
5. Frank Harary, "Graph Theory", Norosa, 2013.
6. J. A. Bondy and V. S. R. Murthy,"Graph Theory with Applications", Macmillan, London, 2013.

JOURNALS/MAGAZINES

1. https://www.journals.elsevier.com/discrete-mathematics
2. http://www.math.iit.edu/~kaul/Journals.html
3. https://www.siam.org/publications/journals/siam-journal-on-discrete-mathematics-sidma
4. https://onlinelibrary.wiley.com/journal/10970118
5. https://iopscience.iop.org/article/10.1088/1742-6596/1175/1/012069/meta

6. https://iopscience.iop.org/article/10.1088/1742-6596/1188/1/012065/meta
7. https://www.worldscientific.com/worldscinet/jml
8. https://www.scimagojr.com/journalsearch.php?q=12000154480&tip=sid

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/111/107/111107058/
2. https://nptel.ac.in/courses/106/103/106103205/
3. https://onlinecourses.swayam2.ac.in/cec20_ma02/preview
4. https://onlinecourses.nptel.ac.in/noc20_ma05/preview
5. https://onlinecourses.swayam2.ac.in/cec20_ma03/preview
6. https://www.coursera.org/learn/graphs

Course Title	Agile software development and DevOps				Course Type		Theory	
Course Code	B20CI0304	Credits	3		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

The course provides students with a knowledge on the basic principles of software development life cycle, activities involved in software requirements engineering, software development, testing, evolution and maintenance. It introduces concepts such as software processes and agile methods, and essential software development activities.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Discuss the importance of the software development process.
2. Demonstrate the workflow of Automating process.
3. Explain the development of a software using Agile method
4. Illustrate with case study, the importance of DevOps.
5. Discussabout importance of software testing process.
6. Explian essential software development activities.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	Pos	PSOs
CO1	Apply software development process to solve complex problems of engineering	1	2
CO2	Make use of Agile principle for rapid software development	1,3	3
CO3	Distinguish between the traditional SDLC and agile ALM model for efficient and effective product delivery.	1,3,4	1
CO4	Develop the real-world applications using DevOps tools.	1,3	2,3
CO5	Discuss about importance of software testing process.	4	3
CO6	Explain essential software development activities.	4,6	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3				√		
CO4			√			
CO5				√		
CO6				√		√

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3									3	
CO2	1	1	3	3	3										3
CO3	1	3	2	3	1								3		
CO4	1	1	3	2	2									3	3
CO5				2											3
CO6				2		3									3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Introduction Defining the Software Development Process: Goals of Defining the Software Development Process , Why Is Defining the Software Development Process Important? , Where Do I Start?, Explaining the Software Development Lifecycle , Systems versus Software Development Life cycle Defining Requirements, Managing Complexity and Change, Validity of Requirements, Testing Requirements ,Functional Requirements, Nonfunctional Requirements, Epics and Stories, Planning for Changing Requirements , Workflow for Defining Requirements ,Test- Driven Development , Designing Systems ,Software Development ,Testing , Testing the Application ,Testing the Process Itself , Continuous Integration , Continuous Delivery and Deployment , Defining Phases of the Lifecycle ,Documentation Required , DevOps , Communicating with All Stakeholders, Production Support ,Maintenance and Bugfixes, Lifecycle in the Beginning ,Maintenance of the Lifecycle ,Creating the Knowledge Base.

UNIT – 2

Agile Application Life cycle Management: Goals of Agile Application Life cycle Management, Why Is Agile ALM Important? Where Do I Start? Understanding the Paradigm Shift, Rapid Iterative Development, Remember RAD?, Focuson12 Agile Principles, Agile Manifesto, Fixed Time box Sprints, Customer Collaboration, Requirements and Documentation.

UNIT – 3

Automating the Agile ALM: Goals of Automating the Agile ALM, Why Automating the ALMIs Important, Where Do I Start? Tools, Do Tools Matter? Process over Tools, Understanding Tools in the Scope of ALM, Staying Tools Agnostic, Commercial versus Open Source, What Do I Do Today?, Automating the Workflow, Process Modeling Automation, Managing the Lifecycle with ALM, Broad Scope of ALM Tools ,Achieving Seamless Integration ,Managing Requirements of the ALM, Creating Epics and Stories, Systems and Driven Development, Environment Management, Gold Copies, Supporting the CMDB, Driving DevOps ,Supporting Operations ,Help Desk ,Service Desk ,Incident Management , Problem Escalation ,Project Management, Planning the PMO ,Planning for Implementation, Evaluating and Selecting the Right Tools, Defining the Use Case, Training Is Essential, Vendor Relationships, Keeping Tools Current.

UNIT – 4

DevOps: Goals of DevOps, Why Is DevOps Important? Where Do I Start? How Do I Implement DevOps? Developers and Operations Conflicts, Developers and Operations Collaboration, Need for Rapid Change, Knowledge Management, the Cross-Functional Team, Is DevOps Agile? The DevOps Ecosystem, Moving the Process Upstream, Left-Shift, Right-Shift, DevOps inDev, DevOps as Development, Deployment Pipeline, Dependency Control, Configuration Control, Configuration Audits, QA and DevOps, Information Security, Infrastructure as Code, Taming Complexity, Automate Everything, Disaster Recovery and Business Continuity, Continuous Process Improvement.

TEXTBOOKS:

1. BobAiello and LeslieSachs, “Agile Application Life cycle Management Using DevOps to Drive Process Improvement”, Addison Wesly, First printing, 2016.

REFERENCEBOOKS:

1. Roger S, “Software Engineering-A Practitioner’s Approach”, seventh edition, Pressman, 2010.
2. Roger Pressman, Ian sommerville, “Software Engineering”, Pearson,9th edition,2010.
3. HansVanVliet, “Software Engineering: Principles and Practices”, Wiley,2008.
4. Richard Fairley, “Software Engineering Concepts”, McGraw-Hill ,2008
5. ACM Transactions on Software Engineering and Methodology(TOSEM).
6. IEEE Transactions on Software Engineering.

JOURNALS/MAGAZINES

1. Journal of Software Engineering Research and Development
2. International Journal of Agile and Extreme Software Development
3. A decade of agile methodologies: Towards explaining agile software development
4. Journal of Systems and Software

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/course/devops-core-fundamentals
2. https://www.scaledagile.com/certification/courses/safe-devops/
3. https://www.coursera.org/learn/devops-culture-and-mindset
4. https://www.coursera.org/learn/uva-darden-continous-delivery-devops

Self-LearningExercises:

1. Case study on Critical system
2. Case study on ATM using agile method

Course Title	Management Science				Course Type		Theory	
Course Code	B20MGM301	Credits	2		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**2**	**2**	**2**	**26**	**0**	**50**	**50**

COURSE OVERVIEW

The course intends to familiarise students to understand the management principles and applications, which lays a strong foundation for managers and leaders in critical thinking and decisions making process. The course emphasises on giving an overview of the functional area of management

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	To Plan organizational structure for a given context in the organisation carry out production operations through Work-study.	1-5	2
CO2	To carry out production operations through Work-study.	1-5	3
CO3	To Understand the markets, customers and competition better and price the given products Appropriately.	1-5	2
CO4	To Plan and control the HR function better.	1-5	2,3
CO5	To create foundation of decision making process and critical thinking	1-6	3
CO6	To emphasises on giving an overview of the functional area of management	2,4	2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√	√	√	√	
CO2	√	√	√	√	√	
CO3	√	√	√	√	√	
CO4	√	√	√	√	√	
CO5	√	√	√	√	√	√
CO6		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3									3	
CO2	1	1	3	3	3										3
CO3	1	3	2	3	1									3	
CO4	1	1	3	2	5									3	3
CO5	1	1	2	3	2	2									3
CO6		1		2										3	

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Introduction to Management and Organisation: Concepts of Management and organization- nature, importance and Functions of Management. Systems Approach to Management – Taylor's Scientific Management Theory- Taylor's Principles of Management, Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory– Hertzberg Two Factor Theory of Motivation – Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to OrganisationDepartmentation and Decentralisation.

UNIT – 2

. **Operations and Marketing Management**: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study –Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering(BPR) Statistical

Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis. Purchase Procedure, Stores Management and Store Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix. And Marketing Strategies based on Product Life Cycle. Channels of distribution.

UNIT – 3

Human Resources Management (HRM): Concepts of HRM. HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR.. Basic functionsof HRManager: Manpower planning, Recruitment, Selection, Training and Development. Placement, Wage and Salary Administration, Promotion. Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating -Capability Maturity Model (CMM) Levels – Performance Management System.

UNIT – 4

Strategic Management and Contemporary strategic Issues: Mission, Goals, Objectives, Policy, Strategy. Programmes, Elements of Corporate Planning Process, Environmental Scanning. Value Chain Analysis, SWOT Analysis. Steps in Strategy Formulation and implementation, Generic. Strategy alternatives. Bench Marking and Balanced Score and as Contemporary Business Strategies.

TEXTBOOKS:

I. Kotler Philip and Keller Kevin Lane, Marketing Management, Pearson, New York, 15th Edition, 2012.
2. Koontz and Weihrich: Essentials of management, McGraw Hill, New Delhi, 11th Edition, 2012.

REFERENCEBOOKS:

1. Thomas N. Duening and John M. Ivancevich, Management – Principles and Guidelines, Dreamtech Press; 1st Edition, 2012.
2. Samuel C. Certo, Modern Management, Prentice Hall, New York, 9th Edition, 2012.
3. Schermerhorn, Capling, Poole and Wiesner, Management, Wiley, New York, 6th Edition, 2012.
4. John A. Parnell, Strategic Management – Theory and Practice, Cengage Publications, 2018.
5. Lawrence R Jauch, R. Gupta and William F. Glucek: Business Policy and Strategic Management Science, McGraw Hill, New York, 5th Edition, 2012.

Course Title	Environmental Science				Course Type		Theory	
Course Code	B20AS0301	Credits	2		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**2**	**2**	**2**	**26**	**0**	**50**	**50**

COURSE OVERVIEW

This course intends to understand, analyze and execute the environmental conditions and the control measures on various types of pollutions can be recognized. This course also talks about the environmental degradation on global warming, acid rain formation, and waste management and how the energy and natural resources can be used effectively in ecosystem.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Graduates will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and societal responsibilities.
2. Graduates will have the ability to obtain the knowledge, and will recognize the need for engaging in life-long learning.
3. Will find the need of various types of energy (conventional & non-conventional) resources and natural resources.
4. Acquire knowledge with respect to biodiversity, threats, conservation and appreciate the concept of ecosystem.
5. Acquire knowledge about sources, effects and control measures of environmental pollution, degradation and waste management.
6. Explore the ways for protecting the environment.

COURSE OUTCOMES(Cos)

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

CO#	Course Outcomes	Pos	PSOs
CO1	Understand, analyse and execute favourable environmental conditions and the role of individual, government and NGO in environmental protection.	1-5	2
CO2	List the causes, effects & remedial measures and find ways to overcome them by suggesting the pollution-controlled products.	1-5	3
CO3	Classify different wastes, sources of waste and their effect on population	1-5	2,3
CO4	Get motivation to find new renewable energy resources with high efficiency through active research and innovation and Criticallyanalyse the ecological imbalances and provide recommendations to protect the environment.	1-5	2,3

CO5	To learn about increase in population growth and its impact on environment	2,3,4	3
CO6	To Gain knowledge about environment and ecosystem	1-5	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3				√		
CO4			√			
CO5		√	√	√		
CO6	√	√	√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3									3	
CO2	1	1	3	3	3										3
CO3	1	3	2	3	1									3	3
CO4	1	1	3	2	5									3	3
CO5		2	2	2											3
CO6	1	2	2	2	2										3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

ENVIRONMENT & ENVIRONMENTAL PROTECTION:

Basics of environment: Introduction & definition to Environment, objectives and guiding principles of environmental education, Components of environment, Structure of atmosphere, Sustainable environment/Development, Impact of technology on the environment in terms of modern agricultural practices and industrialization, Environmental Impact Assessment. 4 Hr

Environmental protection: Role of Government - Assignments of MOEF, Functions of central and state boards, Institutions in Environment and People in Environment,Environmental Legislations, Initiative and Role of Non-government organizations in India and world.

UNIT – 2

Environmental pollution, degradation & Waste management:

Environmental Pollution: Definition, sources and types, Pollutant-Definition & classification, Concepts of air pollution, water pollution, Soil pollution, Automobile Pollution-Causes, Effects & control measures.

Environmental degradation: Introduction, Global warming and greenhouse effect, Acid rain-formation & effects, Ozone depletion in stratosphere and its effect.

Waste management: Municipal solid waste, Biomedical waste and Electronic waste (E-Waste).

UNIT – 3

Energy & Natural resources:

Energy: Definition, classification of energy resources, electromagnetic radiation-features and applications, Conventional/Non-renewable sources – Fossil fuels based (Coal, petroleum & natural gas), nuclear energy, Non-conventional/renewable sources – Solar, wind, hydro, biogas, biomass, geothermal, ocean thermal energy, Hydrogen as an alternative as a future source of energy.

Natural resources:

Water resource - Global water resource distribution, Water conservation methods, Water quality parameters, Uses of water and its importance. Mineral resources - Types of minerals, Methods of mining & impacts of mining activities. Forest wealth - Importances, Deforestation-Causes, effects and controlling measures

UNIT – 4

Ecology, ecosystem & field work:

Ecology-Definition, branches, objectives and classification, Concept of an ecosystem – Structure and functions, Characteristics of an Ecosystem - Ecosystem Resilience, Ecological succession and productivity, Balanced ecosystem, Components of ecosystem-abiotic and biotic, biological diversity.

Biogeochemical cycles and its environmental significance – Carbon and nitrogen cycle, Energy flow in ecosystem, food chains –types, food web & Ecological Pyramids.

TEXTBOOKS:

1. R.J. Ranjit Daniels and Jagadish Krishnaswamy, "Environmental Studies", Wiley India Private Ltd., New Delhi, Co-authored &Customised by Dr.MS Reddy & Chandrashekar, REVA University, 1st Edition, 2017.
2. R.J. Ranjit Daniels and Jagadish Krishnaswamy, "Environmental Studies", Wiley India Private Ltd., New Delhi, 2nd Edition, 2014.
3. Benny Joseph, "Environmental Studies", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2nd Edition, 2008.
4. Dr.S.M.Prakash, "Environmental Studies", Elite Publishers, Mangalore, 2nd Edition, 2009.

REFERENCEBOOKS:

1. Rajagopalan R, "Environmental Studies – from Crisis to cure", Oxford University Press, New Delhi, 3rd Edition, 2016.
2. Anil Kumar Dey and Arnab Kumar Dey, "Environmental Studies", New age international private limited publishers, New Delhi, 2nd Edition, 2007.
3. Michael Allaby, "Basics of environmental Science", Routledge-Tayler & Francis e-library, New York, 2nd Edition, 2002.
4. Dr.Y.K Singh, "Environmental Science", New age international private limited publishers, New Delhi, 1st Edition, 2006.

Self-LearningExercises: Need for public awareness on the environment, Gaia Hypothesis

Course Title	ADVANCED KANNADA				Course Type		Theory	
Course Code	B20AHM301	Credits	0		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	-	-	-				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**-**	**-**	**-**	**-**	**-**	**-**	**-**

REVA UNIVERSITY
Bengaluru, India

ರುಕ್ಮಿಣಿ ಜ್ಞಾನವನ, ಕಟ್ಟಿಗೇನಹಳ್ಳಿ, ಯಲಹಂಕ, ಬೆಂಗಳೂರು – 560064

ಕನ್ನಡಿಗರಿಗೆ ಇಂಜಿನಿಯರಿಂಗ್ ಪ್ರಥಮ ಪದವಿ ಪಠ್ಯ

ಪರಿವಿಡಿ

ಘಟಕ – 1 : **ಕವಿತೆಗಳು**

1. ಬೆಳಗು – ದ ರಾ ಬೇಂದ್ರೆ
2. ಕಲ್ಕಿ – ಕುವೆಂಪು

ಘಟಕ – 2 : **ಕಥೆಗಳು**

3. ಗಾಂಧಿ – ಬೆಸಗರಹಳ್ಳಿ ರಾಮಣ್ಣ
4. ಸೆರೆ – ಯಶವಂತ ಚಿತ್ತಾಲ

ಘಟಕ – 3 : **ವಿಜ್ಞಾನ ಲೇಖನಗಳು**

5. ಆನೆಹಳ್ಳದಲ್ಲಿ ಹುಡುಗಿಯರು – ಬಿ ಜಿ ಎಲ್ ಸ್ವಾಮಿ
6. ವೃತ್ತಿಶಿಕ್ಷಣದಲ್ಲಿ ಕನ್ನಡ ಮಾಧ್ಯಮ – ಎಸ್ ಸುಂದರ್

ಘಟಕ – 4 : ಪರಿಸರ ಲೇಖನಗಳು

7. ಚೀಂಕ್ರ ಮೇಸ್ತ್ರಿ ಮತ್ತು ಅರಿಸ್ಟಾಟಲ್ – ಕೆ ಪಿ ಪೂರ್ಣಚಂದ್ರ ತೇಜಸ್ವಿ
8. ಗುಬ್ಬಚ್ಚಿಯ ಗೂಡು – ಪಿ ಲಂಕೇಶ್

- ಬಿ ಎಂ ಎಸ್ ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು ಕನ್ನಡಿಗರಿಗೆ **'ಕನ್ನಡ ಕಲಿ'** ಪಠ್ಯ ಪುಸ್ತಕ
- ಕರ್ನಾಟಕ ತಾಂತ್ರಿಕ ಶಿಕ್ಷಣ ವಿಭಾಗ ಕನ್ನಡಿಗರಿಗೆ **ಸಾಹಿತ್ಯ ಸಿಂಚನ'** ಪಠ್ಯ ಪುಸ್ತಕ
- ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ ಕನ್ನಡಿಗರಿಗೆ **'ಬಳಕೆ ಕನ್ನಡ'** ಪಠ್ಯ ಪುಸ್ತಕ

ಹಲವಾರು ಪಠ್ಯಪುಸ್ತಕಗಳು ಇಂಜಿನಿಯರಿಂಗ್ ವಿಭಾಗದಲ್ಲಿ ಕನ್ನಡ ಬೋಧನೆಗೆ ಬಳಕೆಯಲ್ಲಿದ್ದು ಜೊತೆಗೆ ಬಿಎಡ್ ಕನ್ನಡ ಕಲಿಕೆಯ ಪಠ್ಯಪುಸ್ತಕಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ರೇವಾ ವಿಶ್ವವಿದ್ಯಾಲಯದ ತಾಂತ್ರಿಕ ವಿಭಾಗದ ಕನ್ನಡಿಗರು ಮತ್ತು ಕನ್ನಡೇತರ ವಿದ್ಯಾರ್ಥಿಗಳನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಇಷ್ಟವಾಗುವ ಮತ್ತು ಪ್ರಯೋಜನಕಾರಿಯಾಗುವ ಪಠ್ಯ ಪುಸ್ತಕವನ್ನು ತರಗತಿಗಳು ಪ್ರಾರಂಭವಾಗುವುದರ ಒಳಗೆ ಸಿದ್ಧಪಡಿಸಲಾಗುವುದು.

Course Title	Basics of Kannada				Course Type		Theory	
Course Code	B20AHM302	Credits	0		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	-	-	-				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	-	-	-	-	-	-	-

REVA UNIVERSITY
Bengaluru, India

ರುಕ್ಮಿಣಿ ಜ್ಞಾನವನ, ಕಟ್ಟಿಗೇನಹಳ್ಳಿ, ಯಲಹಂಕ, ಬೆಂಗಳೂರು – 560064

ಕನ್ನಡೇತರರಿಗೆ ಇಂಜಿನಿಯರಿಂಗ್ ಪ್ರಥಮ ಪದವಿ ಪಠ್ಯ

ಭಾಷಾ ಕೌಶಲ್ಯಗಳು

ಘಟಕ – 1

1. ಆಲಿಸುವುದು

- ಆಲಿಸುವ ಕೌಶಲ್ಯ
- ಆಲಿಸುವಿಕೆಯಲ್ಲಿನ ದೋಷಗಳು
- ಉತ್ತಮ ಆಲಿಸುವಿಕೆ

ಘಟಕ – 2

2. ಮಾತನಾಡುವುದು

- ಸಂಭಾಷಣೆ
- ವ್ಯವಹಾರಿಕ ಸಂಭಾಷಣೆ
- ದೋಷಗಳು ಮತ್ತು ಪರಿಹಾರಗಳು

ಘಟಕ – 3

3. ಓದುವುದು

- ಓದು ಕಲಿಸುವಾಗ ಗಮನಿಸಬೇಕಾದ ಅಂಶಗಳು
- ಧ್ವನ್ಯಾಂಗಗಳ ಪರಿಚಯ
- ಓದಿನ ವಿಧಗಳು

ಘಟಕ – 4

4. ಬರೆಯುವುದು

- ವರ್ಣಮಾಲೆಯ ಸ್ವರೂಪ
- ಕಾಗುಣಿತ ಸ್ವರೂಪ
- ಕನ್ನಡ ಸಂಖ್ಯೆಗಳು

Detailed Syllabus

Semester-4

Course Title	Design and Analysis of Algorithm				Course Type		Theory	
Course Code	B20CI0401	Credits	4		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW

In this course the study of fundamental algorithms to solve a variety of problems, including sorting, searching and graph algorithms are discussed. Techniques for analyzing time and space complexity of algorithms are discussed and hence evaluation of tradeoffs between different algorithms is done.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the mathematical foundation for the analysis of algorithms.
2. Illustrate the algorithms using brute force and divide and conquer design technique.
3. Make use of greedy and dynamic algorithmic design techniques for a given problem.
4. Discuss the problems based on backtracking and branch and bound techniques.

COURSE OUTCOMES (COs):

After the completion o fthe course, the student will be able to:

CO#	Course Outcomes	POs	PSOs
CO1	Apply the knowledge of mathematical foundation for the analysis of algorithms.	1 to 5, 12	1,2
CO2	Develop a program to solve the given real world problems using brute force and divide and conquer design paradigm.	1 to 5,12	1,2
CO3	Make use of greedy and dynamic programming techniques for solving the given real world problem.	1 to 5,12	1,2,3
CO4	Utilize backtracking and branch and bound techniques to solve real world problems.	1,to 5,12	1,2,3

CO5	Learn new tools and technologies in the Desiging of algorithms and apply for suitable application development.	12	1
CO6	Develop solution to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,6,12	1,2

BLOOM'S LEVELOF THE COURSE OUTCOMES:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	3	1							1	3	3	
CO2	2	2	1	2	2							2	3	3	
CO3	2	2	1	3	2							2	3	3	3
CO4	2	1	1	3	2							1	3	3	3
CO5												3	3		
CO6					3				3	2			3	3	

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Introduction-Notion of an Algorithm; Fundamentals of Algorithmic Problem Solving; Fundamentals of the Analysis of Algorithm Efficiency- The Analysis Framework, Asymptotic Notations and Basic Efficiency Classes, Mathematical Analysis of Non-recursive Algorithms, Mathematical Analysis of Recursive Algorithms.

UNIT – 2

Brute Force: Bubble Sort, Selection Sort, Sequential Search and Brute-Force String Matching, Exhaustive Search, Depth-First Search and Breadth-First Search, Divide-and-Conquer: Merge sort, Quick sort, Multiplication of Large Integers, Decrease-and-Conquer- Insertion Sort, Topological Sorting.

UNIT – 3

Greedy Technique-Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm Dynamic Programming- Fibonacci numbers, Binomial coefficient, The Knapsack Problem and Memory Functions, Warshall's and Floyd's Algorithms

UNIT – 4

Space and Time Trade-Offs- Sorting by Counting, Input Enhancement in String Matching,, Coping with the Limitations of Algorithm Power- Backtracking-n-Queens Problem, Subset-Sum Problem, Branch-and-Bound, Assignment Problem, Travelling Salesman Problem

PRACTICAL:

Exp. No	PROBLEM STATEMENT
1	Search for a given pattern in a text string using Brute Force String Matching.
2	Sort a set of elements in ascending order using Quick Sort algorithm.
3	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's
4	Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithms. Differentiate the methods.
5	From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijikstra's algorithm
6	Design and Implement 0/1 Knapsack problem using Dynamic Programming.
7	Implement All-Pairs Shortest Paths Problem using Floyd's algorithm
8	Obtain the DFS ordering of vertices in a given digraph.
9	Implement Horspool's algorithm for String Matching and find the number of key comparisons in successful search and unsuccessful search
10	Sort a given set of elements in ascending order which has duplicate entries. Use the sorting by counting algorithm
11	Implement N Queen's problem using Back Tracking.
12	Write a program to sort all transactions of Big Mall by quantity of sales.
13	Write a program to find network of people of same location in Linkedin social network.

TEXTBOOKS:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson, 3rd Edition, 2012.

2. Ellis Horowitz, Satraj Sahni and Rajasekaran,"Computer Algorithms/C++", Universities Press, 2nd Edition, 2014.

3. Kleinberg, "Algorithm Design", Pearson Education, 1st Edition, 2013.

4. Michael Goodrich, Roberto Tamassia, "Algorithm Design and Applications", Wiley Publishers, 1st Edition, 2014.

REFERENCEBOOKS:

1. Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, “Introduction to Algorithms”, PHI, 3rd Edition,

2. ACM Transactions on Algorithms.

3. ACM Journal of Algorithms and Computational Technology.

JOURNALS/MAGAZINES

1. https://www.mdpi.com/journal/algorithms
2. https://ieeexplore.ieee.org
3. https://www.springer.com/journal/453
4. https://ieeexplore.ieee.org/document/7990553

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.swayam2.ac.in/cec20_cs03/preview
2. https://iiiier.org/NPTEL-Local-Chapter
3. https://www.edx.org/course/algorithm-design-and-analysis

Self-LearningExercises:

1. More exploration on GIThub

Course Title	Unix Operating System				Course Type		Integrated	
Course Code	B20CI0402	Credits	4		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW:

UNIX operating system provides a practical case of operating systems for the user to understand and master deeply and tangibly the theory and algorithms in operating systems. It gives deeper insights into the hierarchical structure, principles, applications, shells, development, and management of the UNIX operation system multi-dimensionally, systematically and from the elementary to the profound. It makes the user to understand about how UNIX operating system functions.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Explain the history, basics and structure of UNIX Operating System
2. Describe UNIX process concepts and scheduling techniques
3. Illustrate the use of different memory management techniques of UNIX.
4. Describe UNIX kernel, data structures and internal representation of files in UNIX operating system

COURSE OUTCOMES (COs):

After the completion of the course, the students will beableto:

CO#	Course Outcomes	POs	PSOs
CO1	Outline the history of UNIX environment and its software architecture.	1,2,5	1,3
CO2	Develop the programs to implement the different process states, attributes and control the process in foreground and background.	1,4,5	1,3
CO3	Compare and analyze the performance of different memory management techniques.	1,4,5	2,3
CO4	Make use of UNIX file types, file structure and file system implementation.	1,2,4, 5	1,3
CO5	Learn new tools and technologies in the Desiging of algorithms and apply for suitable application development.	12	1
CO6	Develop solution to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,6,10	1,2

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3				√		
CO4			√			
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3			1								3		3
CO2	3			3	3								3		3
CO3	3			3	3									3	3
CO4	3	3		3	2								3		3
CO5												2	3		
CO6					3				3	3			3	2	

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Background of UNIX Operating System: Introduction of Operating System, Types of UNIX, History of UNIX, UNIX Software Architecture: System Call Interface, Standard Libraries and Language Libraries, UNIX Shell, Applications, UNIX Environment, Character User Interface Versus Graphical User Interface, UNIX Command Lines.

UNIT – 2

UNIX Process Management: Multiple Processes Running Concurrently: Fundamental Concept for Scheduler and Scheduling Algorithm, UNIX Scheduling Algorithm and Context Switch, Process States, Process Image and Attributes, Process Control: Running Command in Foreground or in Background, More Concepts about Process Concurrently, Execution in UNIX, UNIX Inter-Process Communication, UNIX Signals, Termination of Processes, Daemons UNIX Background "Guardian Spirits", UNIX System Boot and Init Process.

UNIT – 3

UNIX Memory Management: Outline of Memory Management: Memory Allocation Algorithms in Swapping, Page Replacement Algorithms in Demand Paging, Process Swapping in UNIX: Swapped Content, Timing of Swapping, Allocation Algorithm, Selection Principle of Swapped Processes, Swapper, Swapping Effect, Demand Paging in UNIX: Demand Paging, Page Replacement.

UNIT – 4

UNIX File System: UNIX File System Structure: File System Organization, Home and Working Directories, Absolute and Relative Pathnames, UNIX Inodes and Data Structures for File System, UNIX File Concept and Types of Files, Managing Files and Directories : Displaying Pathname for Home Directory and Changing Directories, Viewing Directories and File Attributes, Creating Directories and Files, Displaying Type of a File, File and Directory Wildcards, UNIX File Storage and File System Implementation.

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
	Part-A		
1.	a) Execute at least ten UNIX shell commands on the terminal and the use of the shell commands.	Linux OS	Shell commands.
	b) Write a C/C++ program to display the output of any UNIX shell command.	Linux OS	
2.	a) Write a C/C++ program to create a sub process by printing its pid and the main process pid value.	Linux OS	Process Control.
	b) Write a C/C++ program to show the process is an orphan process and print its parent pid value.		
3.	a) Write a C/C++ program that creates a zombie and then calls system to execute the ps command to verify that the process is zombie.	Linux OS	Zombie Process.
	b) Write a C/C++ program to avoid zombie process by forking twice.		
4.	a) Write a C/C++ program that outputs the contents of its Environment list.	Linux OS	Process Control.
	b) Write a C/C++ program to illustrate the race condition.		
5.	a) Write a C/C++ to create hard link and soft link and display the hard link count with other attributes of the created file within the sample code.	Linux OS	File Types and File attributes

	b) Consider the last 100 bytes as a region. Write a C/C++ program to check whether the region is locked or not. If the region is locked, print pid of the process which has locked. If the region is not locked, lock the region with		
6.	a) Write a C/C++ program which demonstrates Interprocess communication between a reader process and a writer process of a FIFO file by using the	Linux OS	Inter Process Communication.
	b) Write a C/C++ program which demonstrates the signal handler function to handle the signal sent by the process.		UNIX signals.
	Part-B (Mini Project: Bank Management System)		
	Bank System is based on the concept of recording customer's account details. The system contains only the admin section. Here the admin can perform all the tasks like creating an account, deposit and withdraw amount, check balance, view all account holder. It contains the following modules of account creation. 1. Customer Module 2. Transaction Module	Linux OS	Modules of Bank Management System
1	Write a C++ program to create account of a customer of Bank Management System and display the contents.	Linux OS	Create a class bank to create account and display the
2	Write a C++ program to close or delete an account of a created customer accounts of Bank Management	Linux OS	To close an existing account.
3	Write a C++ program to display all account holders of a created customer accounts of Bank Management	Linux OS	To display all account holders.
4	Write a C++ program to modify an account of a created customer accounts of Bank Management System.	Linux OS	To modify account and display the contents.
5	Write a C++ program to deposit amount of a created customer account of bank Management System and display the contents	Linux OS	To deposit amount and display the contents.
6	Write a C++ program to deposit and withdraw amount of a created customer account of bank Management	Linux OS	To withdraw amount and display the contents.
7	Write a C++ program to check the balance amount of a created customer account of bank Management System and display the contents.	Linux OS	To check balance and display the contents.
8	Write a C++ program to intergrate the above modules scenario and display each module contents.	Linux OS	Complete knowledge of the project.

TEXT BOOKS:

1. Yukun Liu, Yong Yue ,Liwei Guo, “UNIX Operating System: The Development Tutorial via UNIX Kernel Services”, Springer, Higher Education Press, 2011.
2. Maurice J. Bach, “The Design of the UNIX Operating System; Pearson Education”, Prentice Hall of India, 2004.

REFERENCE BOOKS:

1. William Stallings, ”Operating Systems: Internals and Design Principles”, Prentice Hall of India, seventh edition 2011.
2. D. M. Dhamdhere, ”Operating Systems: A Concept-Based Approach”, Tata McGraw-Hill,2002.
3. Gary J. Nutt, ”Operating Systems: A Modern Perspective”, Addison-Wesley, 2011.

JOURNALS/MAGAZINES

1. https://link.springer.com/chapter/10.1007/978-3-030-02619-6_53
2. https://link.springer.com/chapter/10.1007/978-3-642-88049-0_25
3. https://link.springer.com/chapter/10.1007/978-3-642-20432-6_1

SWAYAM/NPTEL/MOOCs:

1. Coursera – The UNIX Workbench
2. Coursera – Practical Introduction to the Command line
3. https://www.edx.org/course/linux-basics-the-command-line-interface
4. https://www.edx.org/course/introduction-to-linux

Self-LearningExercises:

1. Basic Shell commands
2. Usage of vi and gedit text editors
3. UNIX I/O system and redirection
4. C modules interface

CourseTitle	Artificial Intelligence				CourseType		Theory	
CourseCode	B20EA0401	Credits	3		Class		IV semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

This course introduces the basics of Artificial Intelligence (AI), AI problems and search strategies. The students can explore knowledge representation issues and methods. This course provides planning methods /algorithms for, problem solving and controlling the knowledge and also demonstrates various learning methods for constructing knowledge and taking decisions

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Describe the basics of Artificial Intelligence (AI).
2. Illustrate knowledge representation issues and methods
3. Explain planning methods/algorithms in problem solving
4. Discuss the application of AI in Robot.

COURSE OUTCOMES(COs) :

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

CO#	Course Outcomes	Pos	PSOs
CO1	Solve AI problems using AI search strategies and production system	1,2,3,4,5	1,2
CO2	Develop knowledge base for representing the given real world data using logic and reasoning methods	1,2,3,4,5	1,2
CO3	Make use of planning and probability to solve uncertainty problems.	1,2,3,4,5	1,2
CO4	Design and develop an intelligent agent for robotics in a specific environmentto solve real world problems.	1,2,3,4,5	1,2,3
CO5	Learn new tools and technologies in Artificial Intelligence and apply for suitable application development.	12	1
CO6	Develop solutions in the Artificial Intelligence to the complex problems, either individually or as a part of the team and report the results with	5, 9, 10	1, 2, 3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom'sLevel					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2						√
CO3			√			
CO4			√			√
CO5			√	√		
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	3								3	3	
CO2	3	3	3	2	3								3	3	
CO3	3	2	3	3	3								3	3	1
CO4	3	2	2	2	2								3	3	3
CO5												3	3		
CO6					3				3	3			3	3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY

UNIT- 1

Problems and search: What is AI, AI Problems; AI Techniques; Problem Space and Problem Search techniques; Defining the problem as a state space search, production systems; Problem characteristics, production system characteristics, Issues in the design of search programs; Heuristic search techniques, generate-and-test; Hill climbing, BFS, DFS; Problem reduction; Constraint satisfaction.

UNIT- 2

Knowledge Representation: Knowledge representation Issues, representations and mappings; Approaches to knowledge representation; Issues in knowledge representation; Using Predicate logic: Representing simple facts in logic; Representing Instance and ISA relationships; Computable functions and predicates; Representing Knowledge using Rules; Procedural versus declarative knowledge; Resolution Forward versus backward reasoning; Matching

UNIT- 3

Planning: A simple planning agent; Representations for planning; A partial-order planning example; A partial-order planning algorithm; Planning with partially Instantiated operators; Knowledge Engineering for planning; Uncertainty: Sources of Uncertainty; Probability Theory, Issues with Probability; Advantages & Disadvantages of Bayesian Network

UNIT- 4

Robotic Sensing and Manipulation: Introduction to robotics, Sensing, Manipulation, Human-robot interaction

Mobile Robots: Navigation and path planning, Learning and robotics: Reinforcement learning, Case study: Autonomous vehicles technologies and impacts

TEXTBOOKS:

1. Russell & Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, Prentice-Hall, 2010.
2. Elaine Rich, Kevin Knight, "Artificial Intelligence", ", 3rdedition, TataMcgraw Hill, 2009

REFERENCE BOOKS:

1. Nils J.Nilsson, Elsevier, "Principles of Artificial Intelligence", 1980. "Artificial Neural Networks",
2. Krishan Mehrotra, Chilkuri K. Mohan, Sanjay Ranka, "Artificial Neural Networks", Penram International Publishing, 1997.
3. B.Yegananarayana, "Artificial Neural Networks", PHI, 2001.

JOURNALS/MAGAZINES:

1. Springer- Springer transaction for security based intelligent systems
2. IEEE transaction for computational Intelligence
3. ACM, ACM transaction on Multi-Agent System.
4. Boston Dynamics videos, 2018 , https://www.youtube.com/user/BostonDynamics
5. Priday, R. "What's Really Going on in those Boston Dynamics Videos," Wired, February 18, 2018
6. https://www.wired.co.uk/article/bostondynamics-robotics-roboticist-how-to-watch ○ RAND Institute, "Autonomous
7. RAND Institute, "Autonomous Vehicle Technology: A Guide for Policymakers", 2016
8. https://www.rand.org/content/dam/rand/pubs/research_reports/RR400/RR443-___2/RAND_RR443-2.pdf

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/noc21_cs42/preview
2. Introduction to Artificial Intelligence -Coursera

SELF-LEARNING EXERCISES:

Natural Language Processing, Deep Learning

Course Title	Computer Organization and Architecture				Course Type		Integrated	
Course Code	B20EJ0401	Credits	3		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

Computer organization and architecture is the science and art of selecting and interconnecting hardware components to create a computer that meets functional, performance, and cost goals. Computer organization defines the constituent parts of the system, how they are interconnected, and how they interoperate in order to implement the architectural specification. In this course, student will learn the basics of hardware components from basic arithmetic units to memory and I/O devices, instruction set architectures and assembly language, and designs to improve performance.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Explain architecture of ARM processor and write simple assembly programs.
2. Demonstrate the translation of assembly instructions into their binary representation.
3. Describe and understand the processor memory hierarchy.
4. Discuss basic understanding of interrupts, I/O devices, and I/O protocols

COURSE OUTCOMES(COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of ARM processor instruction set for developing simple assembly programs.	1,2,7,12	1
CO2	Interpret the functional architecture of computing systems.	1,2,4,10	1
CO3	Identify the issue related to instruction set architecture, memory unit and control unit and I/O functions.	1,11	1
CO4	Develop a real world application using parallel processing concepts.	1,2,4,10,11	1,2
CO5	Learn new tools and technologies and apply for suitable application development.	12	1

CO6	Develop solutions in the Computer Architecture and Organization to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 6, 10	1, 2

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2		√				
CO3			√			
CO4			√			
CO5			√			
CO6			√			

COURSE ARTICULATION MATRIX

CO#/ POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	3					3					1	3		
CO2	3	3		2						2			3		
CO3	3										2		3		
CO4	3	3		2						2	2		3	3	
CO5												1			
CO6					1				1	1			1	1	

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Introduction to ARM processor: Introduction to the architecture of Microprocessor, Microcontroller, Microcomputer and Internet of Things (IoT). ARM characteristics, Register structure, Addressing modes, Instructions, Assembly language, Operating Modes and Exceptions, Conditional execution of Instructions.

UNIT – 2

Arithmetic unit: Addition and Subtraction of Signed Numbers**,** Multiplication of unsigned numbers, Multiplication of signed numbers, Fast multiplication, Integer division, Floating point numbers and operations, Arithmetic operations on floating point numbers.

UNIT – 3

Memory System: Basic concepts, Synchronous RAM memories, Read-only memories, Direct Memory Access, Memory Hierarchy, Cache memories, Virtual memory.

UNIT – 4

Input/output Organization: Bus structure, Bus operation, Arbitration, Interface circuits, Intercommunication standards.

Parallel processing: Hardware multithreading, Vector (SIMD) processing and Shared Memory multiprocessors.

TEXTBOOKS:

1. Carl Hamacher ,ZvonkoVranesic, SafwatZaky, NaraigManjikian, "Computer Organization and Embedded Systems", Sixth Edition, McgraHIll.

REFERENCEBOOKS:

1. Linda Null, Julia Labor, "The Essentials of Computer Organization and Architecture", Viva Publishers, 4th Edition, 2015.
2. William Stallings. "Computer organization and architecture: designing for performance". Pearson Education India, 2000.
3. David A. Patterson, John L. Hennessy. "Computer organization and design: the Hardware/software interface". Elsevier, 2011.
4. Peter Knaggs , "ARM Assembly Language Programming", April 2016.

JOURNALS/MAGAZINES

1. https://engineering.lehigh.edu/cse/academics/course-index/cse-202-computer-organization-and-architecture-3
2. https://www.computer.org/csdl/magazine/co/1977/12/01646340/13rRUwInvnA
3. https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=10208

SWAYAM/NPTEL/MOOCs:

1. https://www.classcentral.com/course/swayam-computer-organization-and-architecture-a-pedagogical-aspect-9824
2. https://onlinecourses.nptel.ac.in/noc20_cs25/preview
3. https://www.edx.org/course/computation-structures-2-computer-architecture-2

Self-Learning Exercises:

1. Intel IA-32 architecture, Instruction Set Architecture of IA-32, Basic Input/Output, Basic processing unit and Pipelining.

Course Title	Database Management System				Course Type		Integrated	
Course Code	B20CI0403	Credits	4		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW:

This course introduces topics such as conceptual data modelling, relational data model, relational query languages, and relational database design. It helps the students to gain fundamental concepts, techniques and applications in database.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Explain the basics of Database Management System.
2. Demonstrate the use of Relational model and Relational algebra.
3. Illustrate the use of different SQL statements.
4. Discuss the topics such as Database Design and Normalization.

COURSE OUTCOMES(COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Design conceptual entity relationship diagrams for the real world applications.	1 to 5, 10,12	1,2
CO2	Make use of the concepts of relational algebra to solve queries over database.	1 to 5,12	1,2
CO3	Construct the database for given real world application and solve queries over it using SQL commands.	1 to 5,12	1,2,3
CO4	Develop an optimized database using design guidelines and normalization technique.	1,to 5,12	1,2
CO5	Learn new tools and technologies in DBMS and apply for suitable application development.	12	1
CO6	Develop solutions and create better database, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,6,10	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX:

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2					1		1	3	3	
CO2	3	3	2	3	1							1	3	3	
CO3	3	3	2	3	3							1	3	3	3
CO4	3	3	2	3	1							1	3	3	
CO5												3	2		
CO6					2				3	2			3	3	

Note: 1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Introduction to databases and Conceptual Modelling: Introduction to database, characteristics of the database approach, data models, schemas, instances, database languages and interfaces, Using high-level conceptual data models for database design, a sample database application, entity types, attributes, keys, relationship types, weak entity types, ER diagrams, naming conventions, design issues. Introduction to various database tools and framework (commercial and open source)

UNIT – 2

Relational Data Model and Relational algebra: Relational model concepts, relational model constraints and relational database schemas, update operations, transactions, dealing with constraint violations, unary relational operations, select and project, relational algebra operations from set theory, binary relational operations, join and division, additional relational operations, examples of queries in relational algebra.

UNIT – 3

SQL: SQL data definition and data types, specifying constraints in SQL, basic retrieval queries in SQL, insert, delete, update statements in SQL, additional features of SQL, schema change statements in SQL, Retrieving data using the SQL Select Statement, Restricting and sorting data, Using Single row functions, Joins, More complex SQL retrieval queries, views in SQL.

UNIT – 4

Database Design Theory and Normalization: Informal design guidelines for relation schemas, Functional dependencies, and Normal forms based on primary keys, General definitions of second and third normal forms, Other Normal forms.

PRACTICE:

S.No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1.	Consider the following schema for Order Database: SALESMAN (Salesman_id, Name, City, Commission) CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id) Write SQL queries to 1. Count the customers with grades above Bangalore's average. 2. Find the name and numbers of all salesmen who had more than one customer. 3. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.) 4. Create a view that finds the salesman who has the customer with the highest order of a day. 5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted	SQL PLUS	Solving queries using SQL
2.	Consider the following schema for Order Database: SALESMAN (Salesman_id, Name, City, Commission) CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id) ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id) Write SQL queries to 1. Count the customers with grades above Bangalore's average. 2. Find the name and numbers of all salesmen who had more than one customer. 3. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.) 4. Create a view that finds the salesman who has the customer with the highest order of a day. 5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted	SQL PLUS	Solving queries using SQL
3.	Solve the below queries by using SQL Student(snum, sname, major, level, age) Class(cname, meets at, room, fid) Enrolled(snum, cname) Faculty(fid, fname, deptid) The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Queries 1. Find the names of all juniors (Level = JR) who are enrolled in a class taught by I. Teacher. 2. Find the age of the oldest student who is either a History major or is enrolled in a course taught by I. Teacher. 3. Find the names of all classes that either meet in room R128 or have five or more students enrolled. 4. Find the names of all students who are enrolled in two classes that meet at the same time. 5. Find the names of faculty members who teach in every room in which some class is taught. 6. Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five. 7. Print the Level and the average age of students for that Level, for each Level.	SQL PLUS	Solving queries using SQL

	8. Print the Level and the average age of students for that Level, for all Levels except JR. 9. Find the names of students who are enrolled in the maximum number of classes. 10. Find the names of students who are not enrolled in any class.		
4.	Solve the below queries by using SQL branch (branch-name, branch-city, assets) customer (customer-name, customer-street, customer-city) account (account-number, branch-name, balance) loan (loan-number, branch-name, amount) depositor (customer-name, account-number) borrower (customer-name, loan-number) employee (employee-name, branch-name, salary) 1. Find the names of all Customers. 2. Find the names of all brancehes in the loan relation, don't display duplicates. 3. Display the entire branch table. 4. Find the account number of all cuatomers where the balance is greater than $7000. 5. Find the account number and balance for all account from Brighton where the balance is greater than $8000. 6. Display the brance name and assets from all brances in thousands of dollars and rename the asset column to "Assets in thousand". 7. Find the name of all brances with assets between one and four million dollar. 8. Find the name, account number, and balance of all customers who have an account. 9. Find the name, account number, and balance of all cuatmer who have an account with a balance of $1400 or less.	SQL PLUS	Solving queries using SQL
5.	Consider the following schema for a Library Database: BOOK (Book_id, Title, Publisher_Name, Pub_Year) BOOK_AUTHORS (Book_id, Author_Name) PUBLISHER (Name, Address, Phone) BOOK_COPIES (Book_id, Branch_id, No-of_Copies) BOOK_LENDING (Book_id, Branch_id, Card_No, Date_Out, Due_Date) LIBRARY_BRANCH (Branch_id, Branch_Name, Address) Write SQL queries to 1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc. 2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017 3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation. 4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query. 5. Create a view of all books and its number of copies that are currently available in the Library.	SQL PLUS	Solving queries using SQL

TEXTBOOKS:

1. Elmasri and Navathe, "Fundamentals of Database Systems", Pearson Education, 5th Edition, 2007.
2. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", McGraw-Hill, 3rd Edition, 2003.
3. Phill Pratt, "Concepts of Database Management, Cengage Learning", 8th Edition, 2014
4. Jeffrey A Hoffer, "Modern Database Management, Pearson", 12th Edition, 2015

REFERENCE BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan: “Database System Concepts”, 6th Edition, McGraw Hill, 2010.
2. C J Date, “Database Design and Relational Theory: Normal Forms and All that Jazz”, O ‘Reilly, April 2012.
3. James Martin, “Principles of Database Management Systems”, 1985, Prentice Hall of India, New Delhi
4. IEEE Transactions on Knowledge and Data Engineering
5. Elsevier Data and Knowledge Engineering
6. ACM Transactions on Database Systems

JOURNALS/MAGAZINES

1. http://www.ijstr.org/final-print/june2019/Database-Management-System.pdf
2. https://www.dbjournal.ro/

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/courses?query=database%20management

Course Title	Numerical Methods and Optimization Techniques				Course Type		Theory	
Course Code	B20AS0401	Credits	3		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Numerical Methods and Optimization Techniques emphasizes on the development of numerical algorithms to provide solutions to common problems formulated in science and engineering. The primary objective of the course is to develop the basic understanding of the construction of numerical algorithms, and perhaps more importantly, the applicability and limits of their appropriate use. The emphasis of the course will be the thorough study of numerical algorithms to understand the guaranteed accuracy that various methods provide, the efficiency and scalability for large scale systems. and issues of stability. Optimization Techniques provide ability to solve real-world problems by finding the optimal solutions to the models subject to constraints.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain numerical methods to obtain approximate solutions to mathematical problems.
2. Examine numerical methods for various mathematical operations and tasks, such as interpolation and integration.
3. Illustrate the notation of vector spaces, sub spaces, linear independence, coordinate and change of coordinate.
4. Solve linear programming problems considering Transportation and Assignment Problems.

COURSE OUTCOMES(COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply numerical methods to obtain approximate solutions for mathematical problems.	1 to 3, 12	1
CO2	Determine suitable interpolation formula and quadrature formulae to find the solution for the given data.	1 to 4 ,12	2

CO3	Solve the matrix associated with liner transformation with respect to the given base and understand the relationship between the operation and linear transformations and their corresponding	1 to 5,	3
CO4	Develop mathematical equations with simplex method and Transportation-Assignment problem for linear programming	1 to 5,12	1,2,3
CO5	Learn new tools and technologies in the Numerical Methods and apply for suitable application development.	12	
CO6	Develop solutions in the Numerical Methods to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,6,10	

BLOOM'S LEVELOF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2					√	
CO3			√			
CO4			√			
CO5			√			
CO6			√		√	

COURSE ARTICULATION MATRIX

CO#/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3									1	3		
CO2	3	3	3	3								1		3	
CO3	3	3	3	3	3							1			3
CO4	3	3	3	3	3							1	3	3	3
CO5												2			
CO6					2	3				3					

Note: 1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Numerical Methods: Errors in Numerical Calculations Types of Errors-Significant Digits-Programming Errors- Numerical Solution of Non-Linear Equations-Bisection Method-Regula Falsi Method-Newton Raphson Method –Fixed Point Method of Iteration – Rates of Convergence of These Methods. Solutions of Algebraic Equations, Relaxation Method and Gauss Seidel Iteration Method.

UNIT – 2

Numerical Analysis: Finite Differences-Operators (Δ, ∇ and E), Interpolation, Newton-Gregory Forward Interpolation Formula, Central Difference, Stirling And Bessel's Interpolation Formulae, Lagrange's Interpolation Formula, Inverse Interpolation Formula, Divided Difference Formula, and Newton's Divided Differences Formula**.** Numerical integration**:**Newton-Cotes quadrature formulae: Trapezoidal, Simpson's rules and Weddle's rule.

UNIT – 3

Vector Spaces and Linear transformations: Bases, Echelon forms, Rank, and determinants. Gauss elimination and its complexity, Inner products, Gram-Schmidt orthogonalization. Linear transformations.

UNIT – 4

Linear Programming: Introduction, Canonical and Standard Form of LPP-Simplex Method-Big M Method- Two Phase Method-Principle of duality-Dual Simplex Method. Transportation Problem and Assignment problem.

TEXTBOOKS:

1. Sastry S.S., "Numerical Analysis", Prentice-Hall India (module I), 4th edition
2. K. Hoffman and R. Kunze," Linear Algebra", Prentice-Hall India, 1971.
3. R Panneerselvam," Operations research", 2nd edition, PHI

REFERENCES

1. KanthiSwarup, P.K. Gupta, Man Mohan, "Operations research", Sultan Chand & Sons. (module II), 5th edition.
2. Froberg, "Introduction to Numerical Analysis",Second Edition, Addition Wesley
3. Gerald and Wheatley, "Applied Numerical Analysis", Pearson Education Asia, Sixth Edition
4. S.S Rao, "Optimization Theory and Applications", Wiley Eastern
5. Grawin W. W, "Introduction of Linear Programming", McGraw Hill.
6. M. K. Jain, S. R. K. Iyengar and R. K. Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International Publishers, 6th edition, 2012.

JOURNALS/MAGAZINES

1. https://onlinelibrary.wiley.com/journal/10970207
2. https://www.springer.com/journal/245
3. https://ijnao.um.ac.ir/
4. https://www.scimagojr.com/journalrank.php?category=2612

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/106/108/106108056/
2. https://www.coursera.org/learn/intro-to-numerical-analysis

3. https://nptel.ac.in/courses/122/102/122102009/
4. https://nptel.ac.in/courses/122/106/122106033/
5. https://www.edx.org/course/convex-optimization

Self-LearningExercises:

1. Optimization Methods for Business Analytics
2. Numerical Methods and Optimization in Finance

Course Title	Communication Skills				Course Type		Theory	
Course Code	B20AH0301	Credits	2		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	2	2	2	26	0	50%	50%

COURSE OVERVIEW:

This course is aimed to develop basic communication skills in English in the learners, to prioritize listening and reading skills among learners, to simplify writing skills needed for academic as well as workplace context, to examine that the learners use the electronic media such as internet and supplement the learning materials used in the classroom.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Develop basic communication skills in English.
2. Emphasize on the development of speaking skills amongst learners of EngineeringandTechnology
3. Impart the knowledge about use of electronic media such as internet and supplement the learning materials used in the classroom.
4. Inculcate the habit of reading and writing leading to effective and efficient communication.

COURSE OUTCOMES(Cos):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate speaking ability with clarity, confidence and comprehension and communicate with one or many listeners using	1 to 3, 12	1,3
CO2	Build inferences from the text.	1 to 4 ,12	2
CO3	Makeuseofaccuratewritingskillsusingdifferentcomponentsof academicwriting.	1 to 5,12	2
CO4	Develop the ability to write cohesively, coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideaslogically on a topic	1 to 5,12	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2					√	
CO3			√			
CO4			√			

COURSE ARTICULATION MATRIX:

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3									1	3		1
CO2	3	3	3	3								1		3	
CO3	3	3	3	3	3							1		2	
CO4	3	3	3	3	3							1		3	3

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY:

UNIT – 1

FunctionalEnglish: Grammar: Prepositions; Modal Auxiliaries, Reading Comprehension, Active and passive voice, Giving Instructions.

UNIT – 2

Interpersonal Skills: Grammar: Tenses; Wh-questions, Compound words; Phrasal verbs, Recommendations

UNIT – 3

Multi tasking Skills Grammar: Conditional Sentences, Homonyms; homophones, Subject-verb agreement.

UNIT – 4

Communication Skills Grammar: Direct and indirect speech, Interpreting visua lmaterials (linegraphs,pie chartsetc.),Single word substitutes.

TEXT BOOKS:

1. Green, David. Contemporary English Grammar Structures and Composition, NewDelhi: MacMillan Publishers, 20l0,

2. Thorpe, Edgar and Showick, Basic Vocabulary. Pearson Education India, 20l2.
3. Leech, Geoffrey and JanSvartvik, A Communicative Grammar of English, Longman,2003.

REFERENCES:

1. Murphy,Raymond " Murphy's EnglishGrammar with CD", Cambridge University Press,2004.
2. Rizvi, M.Ashraf, "EffectiveTechnicalCommunication", NewDelhi, TataMcGraw-Hill, 2005.
3. Riordan,Daniel, "Technical Communication", NewDelhi:CengagePublications,20ll.
4. Senetal, "CommunicationandLanguage Skills" Cambridge University Press, 20l5.

Course Title	Indian Constitution and Professional Ethics				Course Type		Theory	
Course Code	B20LS0301	Credits	2		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**2**	**2**	**2**	**26**	**0**	**50**	**50**

COURSE OVERVIEW

The Constitution of India lays down in defining fundamental political principles, establishes the structure, procedures, powers and duties of government institutions and sets out fundamental rights, directive principles and duties of citizen. It helps to know and understand the human rights and human values. It also helps to know the meaning of ethics and need of ethics in personal and professional life.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain basic knowledge required to understand Constitution of India.
2. Describe the Fundamental Rights, Duties and other Rights.
3. Discuss different types of ethics.
4. Explore ethical standards followed by different companies.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Analyze the Fundamental Rights, Duties and other Rights protected under Indian Constitution.	1 ,6,7,8,9, 12	1,3
CO2	Demonstrate the practicality of Constitution perspective and make them face the world as a bonafide citizen.	1 to 4,7,8 ,12	2
CO3	Illustrate the professional ethics and human values.	1 to 5, 7,8 ,12	2
CO4	Summarize ethical standards followed by different companies.	1 to 5,7,8,12	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2					√	

CO3			√			
CO4			√			

COURSE ARTICULATION MATRIX

CO#/	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3					2	2	2	2			1	3		1
CO2	3	3	3	3			3	3				1		3	
CO3	3	3	3	3	3		3	3				1		2	3
CO4	3	3	3	3	3		3	3				1		3	3

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY:

UNIT – 1

Indian constitution: Sailent features, fundamental rights and duties (Directive principle and statepolicy), Legislature (Loka Sabha &Rajya Sabha), Executive (President& Governor) and Judiciary (Supreme court & high court), Composition and function of parliament, Council of ministers, prime minister, Speaker, Passing of bills.

UNIT – 2

Human Rights: Nature and Scope of human rights, Universal protection of human rights (UDHR), Regional protection of human rights, National level protection of human rights, Human rights and vulnerable groups (children, women & old-age).

Human values: Truth, Honesty, Loyalty, Love, Peace with examples, Difference between ethics, beliefs and morals.

UNIT – 3

Ethics: Meaning, Definition, Evolution, Need of ethics, Aristotlean Ethics, Utilitarianism, Katianism, human values (Good conduct, respect for elders), ethical human conduct (Gender equality), Professional Ethics, Personal Ethics and Business Ethics, Ethical Standards, Duties of Employers and Employees.

UNIT – 4

Engineering Ethics: Definition Scope and needs, Ethics in Consumer Protection, 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. Kapoor, S.K., "Human rights under International Law and Indian Law", Prentice Hall of India, New Delhi, 2002.
2. Basu, D.D., "Indian Constitution", Oxford University Press, New Delhi, 2002.
3. Chakraborty, S.K., "Values and ethics for Organizations and Theory Practice", Oxford University Press, New Delhi, 2001.

REFERENCES BOOKS:

1. Meron Theodor, “Human Rights and International Law Legal Policy Issues”, Vol. 1 and 2, Oxford University, Press, New Delhi, 2000.

2. M V Pylee, “An Introduction to Constitution of India”, S Chand & Company, 5th Edition

3. Durga Das Basu, “Introduction to constitution of India”, LexisNexis, 23rd Edition.

SELF-LEARNING EXERCISES:

Abuse of Technologies: Hacking and other crimes, addiction to mobile phone usage, video games and social networking websites

Course Title	Universal human values				Course Type		Theory	
Course Code	B20AHM401	Credits	0		Class		IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	0	0	0				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**0**	**0**	**0**	**0**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Universal human values help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensures ustained happiness and prosperity, which are the core aspirations of all human beings.To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Development of a holistic perspective based on self-explorati on about themselves (humanbeing), family, society and nature/existence.
2. Understanding (o rdeveloping clarity) of the harmony in the humanbeing, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act

COURSE OUTCOMES(COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Understand the significance of value inputs in a classroom and start applying them in their life and profession	1 to 3, 12	1,3
CO2	Distinguish between values and skills, happiness and accumulation of Physical facilities, the Self and the Body, Intention and Competence of an individual, etc.	1 to 4 ,12	2
CO3	Understand the role of a humanbeing in ensuring harmony in society and nature.	1 to 5,12	2
CO4	Demonstrate the role of humanbeing in the abetment of pollution	1 to 5,12	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2					√	
CO3			√			
CO4			√			

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3									1	3		1
CO2	3	3	3	3								1		3	
CO3	3	3	3	3	3							1		2	3
CO4	3	3	3	3	3							1		3	3

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY:

UNIT – 1

Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship, basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly, Method to fulfil human aspirations: understanding and living in harmony at various levels, Understanding humanbeing as a co-existence of the sentient 'I' and them aterial 'Body'. Understanding the needs of Self('I') and 'Body'- happiness and physical facility.Understanding the Body as an instrument of 'I' (I being the doer, seeker and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail.

UNIT – 2

Understanding values in human- human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship. Understanding the meaning of Trust; Difference between intention and competence. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society-Undivided Society, Universal Order – from family to world family.

UNIT – 3

Understanding the harmony in the Nature: Interconnectedness and mutualfulfilment among the four orders of nature-recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence. Include practice sessions to discuss humanbeing as cause of imbalance in nature (film"Home"canbeused), pollution, depletion of resources and role of technology etc.

UNIT – 4

Natural acceptance of humanvalues: Definitiveness of Ethical Human Conduct .Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics: a. Ability to utilize the

professional competence for augmenting universal human order b.Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: a)At the level of individual: associally and ecologically responsible engineers, technologists and managers b)At the level of society: as mutually enriching institutions and organizations

TEXTBOOKS:

1. R R Gaur, R Sangal, G P Bagaria, Human Values and Professional Ethics, ExcelBooks, New Delhi, 2010
2. A.N Tripathy, HumanValues, NewAge Intl. Publishers, NewDelhi, 2004.
3. R.R.Gaur, R.Sangal and G.P.Bagaria, A Foundation Course in Human Values and Professional Ethics, Excel Books, NewDelhi, 2010
4. Bertr and Russell, Human Society in Ethics &Politics, Routledge Publishers, London, 1992

REFERENCES

1. Corliss Lamont, Philosophy of Humanism, Humanist Press, London, 1997
2. I.C.Sharma, Ethical Philosophy of India, Nagin&co, Julundhar, 1970
3. Mohandas Karamchand Gandhi, The Story of My Experiments with Truth, Navajivan Mudranalaya, Ahmadabad,1993
4. William Lilly, IntroductiontoEthics, Allied Publisher, London, 1955

Detailed Syllabus
Semester-5

Course Title	COMPUTER VISION				Course Type		Theory	
Course Code	B20EA0501	Credits	4		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW:

Course Description: Computer Vision is one of the fastest growing and most exciting AI disciplines in today's academia and industry. This course is designed to open the doors for students who are interested in learning about the fundamental principles and important applications of computer vision. The course, introduces a number of fundamental concepts in computer vision, expose students to a number of real-world applications that are important to our daily lives. More importantly, students will be guided through a series of well-designed projects such that they will get to implement using few interesting and cutting-edge computer vision algorithms. The course benefit is to apply computer vision algorithms to solve real world problems.

COURSE OBJECTIVE

The objectives of this course are to:

1. Explain the fundamentals of Computer vision
2. Discuss various segmentation techniques.
3. Demonstrate the use of techniques for registration and classification of images.
4. Describe the object detection and recognition process in a given application.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Utilize linear filters to enhance the quality of images in given real world application.	1 to 5	1,2
CO2	Develop Segmentation technique to solve real world problems.	1 to 5	1,2
CO3	Design and Develop program for registration and classification of images in the real world application.	1 to 5	1,2
CO4	Apply object detection and recognition techniques to solve real world problems.	1 to 5	1,2,3
CO5	Learn new tools and technologies in the Computer Vision and apply for suitable application development.	12	
CO6	Develop solutions in the Computer Vision to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			

CO2		√			√	√
CO3		√	√			√
CO4			√	√	√	√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3									3	3	
CO2	3	2	2	3									3	3	
CO3	3	2	3	3									3	3	
CO4	3	2	3	3									3	3	3
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents

UNIT-1

Introduction and overview to computer vision: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, Technique: Normalized Correlation and Finding, Technique: Scale and Image Pyramids. Local Image Features: Computing the Image Gradient , Representing the Image

Gradient, Finding Corners and Building Neighbourhoods , Describing Neighbourhoods with SIFT and HOG Features , Computing Local Features in Practice , Texture

UNIT-2

MID-LEVEL VISION: Segmentation by Clustering, Human Vision Grouping and Gestalt, Important Applications, Background Subtraction, Shot Boundary Detection, Interactive Segmentation, Forming Image Regions , Image Segmentation by Clustering Pixels . Basic Clustering Methods , The Watershed Algorithm , Segmentation Using K-means , Mean Shift: Finding Local Modes in Data ,Clustering and Segmentation with Mean Shift, Segmentation, Clustering, and , Terminology and Facts for Graphs , Agglomerative Clustering with a Graph ,Divisive Clustering with a Graph.

UNIT-3

HIGH-LEVEL VISION: Registration: Registering Rigid Objects, Model-based Vision: Registering Rigid Objects, Registering Deformable Objects .Learning to Classify: Classification, Error, and Loss, Major Classification Strategies, Practical Methods for Building Classifiers, Classifying Images: Building Good Image Features, Classifying Images of Single, Image Classification

in Practice

UNIT-4

Detecting Objects in Images: The Sliding Window Method, Detecting Deformable Objects, The State of the Art of Object Detection Topics in Object Recognition: What Should Object Recognition Do?

TEXT BOOKS:

1. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach" , 2nd Edition, University of Illinois atUrbana-Champaign Jean Ponce, Ecole Normale Superieure, Paris©2012, Pearson
2. Richard Szeliski, " Computer Vision: Algorithms and Applications" , Springer
3. David Marr, Tomaso A. Poggio, Shimon Ullman "A Computational Investigation into the Human Representation and Processing of Visual Information", , eBook - Amazon.com

RECOMMENDED LEARNING RESOURCES (REFERENCE BOOKS):

1. Gary Bradski, Adrian Kaehler, " Learning OpenCV: Computer Vision with the OpenCV Library" Amazon
2. International Journal of Computer Vision, Springer
3. Image and Vision Computing, Elsevier
4. Computer Vision and Image Understanding, Elsevier

JOURNALS/MAGAZINES

1. International Journal of Computer Vision, Springer
2. Image and Vision Computing, Elsevier
3. Computer Vision and Image Understanding, Elsevier
4. IEEE Transactions on Image Processing
5. IEEE Transactions on Pattern recognition and machine intelligence

SWAYAM/NPTEL/MOOCs:

1. Computer Vision and Image Processing - Fundamentals and Applications: https://onlinecourses.nptel.ac.in/noc21_ee23/preview
2. Computer Vision: https://nptel.ac.in/courses/106/105/106105216/
3. Deep Learning for Computer Vision: https://nptel.ac.in/courses/106/106/106106224/

Self-Learning Exercises:

1. Artificial Neural Networks, Convolutional Neural Networks.
2. Implementation of applications using the above topics

Course Title	**Computer Networks**				**Course Type**		**Theory**	
Course Code	B20CI0501	**Credits**	**4**		**Class**		**V semester**	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: The main emphasis of this course is on the organization and management of local area networks (LANs). The course description include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks, and about Open Systems Interconnection (OSI) communication model with TCP/IP protocol; This course provides knowledge of error detection and recovery; local area networks; bridges, routers and gateways; network naming and addressing; and local and remote procedures. This course also emphasis on User Datagram Protocol, TCP Congestion Control; DNS Message Formatting and Remote Login. Protocols.

COURSE OBJECTIVE:

The main objectives of this course are:

1. Explain the protocol stacks (OSI and TCP/IP) for data communication
2. Discuss the error detection & correction strategies for data transmission.
3. Design the connection establishment of network computing devices.
4. Illustrate the TCP, UDP protocols and explain Domain Name System.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the architectural principles of computer networking and compare different approaches to organising networks	1 to 6,12	1,2
CO2	Identify the good network design with simplicity, scalability, performance and the end-to-end principle	1 to 6,12	1,2
CO3	Appraise the working principles of Internet	1 to 6,12	1,2
CO4	Develop applications using network protocols	1 to 6,12	1,2
CO5	Learn new tools and technologies in the Computer Networks and apply for suitable application development.	5,6,9,10	2
CO6	Develop solutions in the Computer Networks to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,6,9,10	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√		√		√
CO2					√	√
CO3	√				√	√
CO4						√
CO5			√			
CO6						√

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	1						1	3	3	
CO2	3	3	3	3	2	2						1	3	3	
CO3	3	3	3	3	2	1						2	3	3	
CO4	3	3	3	2	2	1						1	3	3	
CO5					2	3			2	3				3	
CO6					2	3			2	3					3

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT – 1

Introduction to Data Communication and Networking: Internet history and Internet today, Data Communications, Networks, Network Topologies, Classification of Networks, Protocols & Standards, Introduction to Network Tools-(WireShark, Packet Tracer, NS3, etc), Layered Tasks, The OSI model, Layers in OSI model, TCP/IP Protocol suite, Addressing. Introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks, Physical Layer – Periodic Analog signals, Digital signals, Request bit rate, shanon capacity, performance, PCM, DM, Parallel transmission, serial transmission, ASK, FSK, PSK, QAM, AM, FM, PM.

UNIT-2

Coding: Line Coding and block coding. Multiplexing: FDM, WDM, TDM, FHSS, DSSS. Transmission Media.

Error Detection and Correction: Introduction, cyclic Codes: Cyclic redundancy code generation. Frames, Packets, Data Link Protocols: HDLC, Point-to-Point Protocol.

MAC Protocols: classification of MAC protocols, Random access (ALOHA, CSMA/CD, CSMA/CA), Controlled Access (Reservation, Polling, Token passing), Channelization Protocols (FDMA, TDMA, CDMA)

Introduction to Networking Devices: Digital Subscriber line Modems, Cable modems, Repeaters, Hubs, Bridges, Routers, and High layered switches, Gateways, Virtual LAN.

UNIT – 3

Standards: IEEE Standards, Standard Ethernet, Fast Ethernet, Gigabit Ethernet. IEEE 802.11: Architecture, MAC Sublayer, Addressing Mechanism. Bluetooth Architecture.

Introduction to Wireless networks WiFi, WiMAX, 4G, 5G, Satellite networks, MPLS,VPN, ATM.

Network Layer: IPv4 addresses, IP Datagram format, ICMP Messages, Mobile IP, IPv6 addresses, IPv6 Packet Format, Transition from IPv4 to IPv6, Routing algorithms (Distance Vector, Link State and Path vector), Unicast Routing protocols(RIP, OSPF), Introduction to BGP, Introduction to Multicasting protocols, brief introduction to multicast protocols such DVMRP, MOSPF, PIM, IGMP.

UNIT –4

Transport Layer: Introduction to GoBack-N, Selective repeat N, Piggybacking. Services and port numbers, User Datagram Protocol (UDP): UDP Segment, Transmission Control. Protocol (TCP): TCP Segment, TCP Connection Set up, Application of TCP and UDP. TCP flow control, TCP error control, TCP Congestion Control and options. Introduction to SCTP services and features.

Application Layer: Client server programming using UDP and TCP, Name/Address Mapping, DNS Message Format.

TEXT BOOKS:

1. Behrouz A Forouzan, "Data Communications and Networking", 5th Edition, McGraw – Hill, 2016.
2. Nader F. Mir, "Computer and Communication Networks", Pearson Education, 2009.

REFERENCE BOOKS:

1. Alberto Leon-Garcia and Indra idjaja, "Communication Networks – Fundamental Concepts and Key Architectures", 2nd Edition Tata McGraw – Hill, 2004.
2. Andrew S. Tanenbaum, "Computer Networks", 4th Edition, Pearson Education, 2005.
3. Larry L. Peterson and Bruce S. Davie, "Computer Networks- A system Approach", 5th Edition, Elsevier, 2012.
4. William Stallings, "Data and Computer Communications", 10th Edition, Pearson Education, 2008.
5. Douglas E. Comer, "Internetworking with TCP/IP", Vol.1, 6th Edition, Pearson, 1995.

JOURNALS/MAGAZINES:

1. IEEE Transactions on Networking.
2. Elsevier Journal of Computer Networks
3. Springer Journal of communications and Information networks.

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/topic/computer-network/
2. https://www.coursera.org/courses?query=computer%20network
3. https://nptel.ac.in/courses/106/105/106105183/
4. https://www.edx.org/learn/computer-networking

SELF-LEARNINGEXERCISES:

Wifi, WiMAX, 4G, 5G, Satellite Networks, MPLS, VPN, ATM. Bluetooth Architecture. World Wide Web (WWW).

Course Title	Machine Learning				Course Type		Integrated	
Course Code	B20CI0502	Credits	4		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	3	3	3	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization, and computer science to create automated systems that can process through large volumes of data at high speed to make predictions or decisions without human intervention.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain machine learning and problems relevant to machine learning.
2. Discuss the fundamentals of Decision trees learning and its issues
3. Illustrate neural networks, Bayes classifier and k nearest neighbour for problems appearing in machine learning.
4. Describe statistical analysis of machine learning techniques.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the basics of machine learning concepts.	1 to 5	1,2,3
CO2	Implement suitable classification technique for intelligent applications	1 to 5	1,2,3
CO3	Implement clustering algorithms for intelligent applications	1 to 5	1,2,3
CO4	Implement machine learning algorithms for intelligent applications	1 to 5	1,2,3
CO5	Learn new tools and technologies related to machine learning and apply for suitable application development.	10,12	2,3
CO6	Develop solutions using machine learning based algorithms for the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	11,12	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1						√
CO2			√			√

CO3				√		√
CO4				√	√	√
CO5		√		√		
CO6				√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2	1								3	3	3
CO2	3	2	3	1	2								3	3	3
CO3	3	1	2	1	2								3	3	3
CO4	3	2	2	2	2								3	3	3
CO5										2		3		2	2
CO6											3	3		3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY:

Contents

Unit-1:

Introduction to Machine Learning: What is Machine Learning, challenges, Applications, methods of Machine Learning, performance metrics, Data preprocessing, Data Loading, Understanding data, Pre-Processing unit

Unit-2:Classification – Decision Tree, K-nearest neighbor, logistic regression, support vector machine algorithm, naive Bayes algorithm, random forest algorithm

Unit -3:Regression - linear regression, Random Forest Regression

Clustering: overview, k – means clustering, mean shift clustering, hierarchical clustering, DBSCAN clustering algorithm.

Unit – 4

Introduction to neural networks:

Biological Neuron, ANN Perception, Network Topology (Feed forward network, Feedback Networks), Adjustments of Weights or Learning, Activation Functions, Training Algorithm, Gradient descent algorithms -Batch Gradient Descent, Stochastic Gradient

TEXT BOOKS:

1. Tom M. Mitchell, Machine Learning, India Edition McGraw Hill Education, 2013.

Websites:

1. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
2. https://www.tutorialspoint.com/artificial_neural_network/index.htm

RECOMMENDED LEARNING RESOURCES (REFERENCE BOOKS):

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", 2nd edition, springer series in statistics.
2. Ethem Alpaydın, "Introduction to machine learning", second edition, MIT press.

JOURNALS/MAGAZINES:

1. Springer Journal of Machine Learning.
2. International Journal of Machine Learning and Computing.

SWAYAM/NPTEL/MOOCs:

1. Coursera – Machine Learning
2. Coursera – Deep Learning
3. https://onlinecourses.nptel.ac.in/noc19_cs53/preview

SELF-LEARNING EXERCISES:

Reinforcement Learning: Introduction, Learning Task, Q Learning

Course Title	VIRTUALIZATION & CLOUD COMPUTING				Course Type		Theory	
Course Code	B20CS0602	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

Cloud Computing has become one of the greatest technologies in recent times. Most of the big Multinational Companies are utilizing Cloud Computing to analyse, design, and deploy their applications. This course introduces the fundamental concepts of cloud computing, models in cloud, specialized environment, cloud management mechanisms and virtualizations.

COURSE OBJECTIVE

1. Introduce cloud computing and provide knowledge in different layers of cloud computing such as: InfrastructureasaService(IaaS),PlatformasaService(PaaS),andSoftwareasaService(SaaS)
2. Describe various cloud computing technologies like data center technology, virtualization technology, web technology, multitenant technology; service technology
3. Explain Virtualization technologies: Hypervisor, emulation, and application VM, Platform virtualization, storage virtualization, and network virtualization.
4. Provide knowledge about cloud security and threats
5. Gain expertise in cloud security mechanisms

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the cloud computing concepts such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service(SaaS)	1,2,4,6	1,2
CO2	Use various cloud computing technologies like data center technology, virtualization technology, web technology, multitenant technology, service technology	2,3,6,8	1,2
CO3	Apply Virtualization technologies: Hypervisor, emulation, and application VM, Platform virtualization, storage virtualization, and network virtualization in developing cloud applications.	2,7,12	1,2
CO4	Analyse cloud security and threats for new problems in hand and develop and provide security services for cloud-based applications	1-6,12	1,2
CO5	Learn new tools and technologies in the Virtualization & Cloud Computing and apply for suitable application development.	12	
CO6	Develop solutions in the Virtualization & Cloud Computing to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√	√			
CO2		√		√		
CO3	√		√	√	√	
CO4		√	√	√	√	√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2		1		2							3	2	
CO2		2	1			2		1					3	2	
CO3		2					1					2	3	2	
CO4	2	2	1	1	1	2						1	3	2	
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

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

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

UNIT-2

Cloud Computing Technologies: Broadband networks and internet architecture, data center technology, virtualization technology, web technology, multitenant technology, service technology Cloud Infrastructure
Mechanisms: Logical Network Perimeter, Virtual Server, Cloud Storage Device, Cloud Usage Monitor, Resource Replication, Ready-made environment

UNIT-3

Specialized Cloud Environment: Automated Scaling Listener, Load Balancer, SLA Monitor,

Pay-per-use monitor, Audit Monitor, Failover System, Hypervisor, Resource cluster, Multi-device Broker, State Management
Cloud Management Mechanisms: Remote Administration System, Resource Management System, SLA Management System, Billing Management System.

UNIT-4

Virtualization: Implementation levels of virtualization, virtualization structures/tools and mechanisms, virtualization of CPU, memory and I/O devices.

TEXTBOOKS:

1. Thomas Erl , Ricardo Puttini , Zaigham Mahmood Cloud Computing: Concepts, Technology & Architecture PHI, 2013.
2. KaiHwang, Geoffrey C.Fox, Jack J Dongarra, Distributed and Cloud Computing, MK, 2012.

REFERENCE BOOKS:

1. Dan C. Marinescu, Cloud Computing: Theory and Practice, MK
2. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
3. Rajkumar Buyya, James Broberg, Andrzej Goscinski, Cloud Computing- Principles and Pradigms, Wiley.
4. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Cloud Computing, A practical approach, TATA McGRAW HILL.
5. Gautam Shroff, Enterprise Cloud Computing- Technology, Architecture, Applications, CAMBRIDGE.
6. David Marshall, Wade A. Reynolds and Dave McCrory, Advanced Server Virtualization-VMware and Microsoft Platforms in the Virtual Data Center, AUERBACH Publications.

JOURNALS/MAGAZINES:

1. International Journal of Cloud Computing, INDERSCIENCE Publishers.
2. IEEE Cloud Computing
3. International Journal of Cloud Applications and Computing (IJCAC), IGI Global.

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc21_cs15/preview
2. https://onlinecourses.nptel.ac.in/noc21_cs14/preview
3. https://www.classcentral.com/course/swayam-cloud-computing-and-distributed-systems-17544

SELF LEARNING EXERCISE:

1. https://www.cybrary.it/course/virtualization-management/
2. http://cds.iisc.ac.in/faculty/simmhan/SE252/
3. https://data-flair.training/blogs/hardware-virtualization-in-cloud-computing/

<table>
<tr><td>Course Title</td><td colspan="4">INTRODUCTION TO ROBOTICS & DRONES (PE-1)</td><td colspan="2">Course Type</td><td colspan="2">Theory</td></tr>
<tr><td>Course Code</td><td>B20EKS501</td><td>Credits</td><td colspan="2">3</td><td colspan="2">Class</td><td colspan="2">V semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of Classes Per Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>-</td><td>-</td><td>-</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>Tutorial</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>3</td><td>3</td><td>3</td><td>39</td><td>-</td><td>50%</td><td>50%</td></tr>
</table>

COURSE OVERVIEW:

This course introduces techniques, algorithms and principles of interactive computer graphics and animation, this course also prepares for study in real-time rendering, realistic image Synthesis, and computer animation.

COURSE OBJECTIVE:

1. Discuss the fundamental concepts of Robotics.
2. Explain intelligent module for robotic motion control.
3. Demonstrate robotic vision system using transformation techniques.
4. Illustrate the working of innovative robotic devices.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Outline the fundamentals and architecture of robotics.	1 to 5	1,2
CO2	Design an Intelligent module to control robotic system.	1 to 5	1,2
CO3	Develop robotic vision system using transformation techniques and sensors. Make use of innovative robotic devices for industrial and socially relevant applications.	1 to 5,9,12	1,2
CO4	Make use of innovative robotic devices for industrial and socially relevant applications.	1 to 5	1,2
CO5	Learn new tools and technologies in the Introduction To Robotics & Drones and apply for suitable application development.	12	
CO6	Develop solutions in the Introduction To Robotics & Drones to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVELOF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				√
CO2			√			√
CO3			√	√	√	√
CO4		√	√	√	√	√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2								3	3	
CO2	3	3	3	3	3								3	3	
CO3	3	3	3	3	3				1			1	3	3	
CO4	3	3	2	2	2								3	3	
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents

UNIT – 1

Introduction: Robot anatomy-Definition, law of robotics, History and Terminology of Robotics-Accuracy and repeatability of Robotics-Simple problems-Specifications of Robot-Speed of Robot- Robot joints and links-Robot classifications-Architecture of robotic systems-Robot Drive systems-Hydraulic, Pneumatic and Electric system.

UNIT -2

End effectors and robot controls: Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, cam type-Magnetic grippers-Vacuum grippers-Air operated grippers-Gripper force analysis-Gripper design-Simple problems-Robot controls-Point to point control, Continuous path control, Intelligent robot-Control system for robot joint-Control actions-Feedback devices-Encoder, Illustration using ARDUINO Boards

UNIT – 3

Robot transformations and sensors: Robot kinematics-Types- 2D, 3D Transformation-Scaling, Rotation, and Translation- Homogeneous coordinates, multiple transformation-Simple problems. Sensors in robot – Touch sensors-Tactile sensor – proximity and range sensors – Robotic vision sensor-Force sensor-Light sensors, Pressure sensors, Illustration using ARDUINO Boards

UNIT – 4

Robot cell design and applications :Robot work cell design and control-Sequence control, Operator interface, Safety monitoring devices in Robot-Mobile robot working principle, actuation using MATLAB, NXT Software Introductions-Robot applications- Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting and undersea robot. Introduction to robotic operating system (ROS) .

TEXT BOOKS:

1. S.R. Deb, “Robotics Technology and flexible automation”, Tata McGraw-Hill Education, 2009.
2. Mikell P Groover & Nicholas G Odrey, Mitchel Weiss, Roger N Nagel, Ashish Dutta, “Industrial Robotics, Technology programming and Applications”, McGraw Hill, 2012.

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REFERENCE BOOKS:

1. Richard D. Klafter, Thomas .A, ChriElewski, Michael Negin, “Robotics Engineering an Integrated Approach”, Phi Learning.,2009.
2. Francis N. Nagy, Andras Siegler, “Engineering foundation of Robotics”, Prentice Hall Inc., 1987.
3. P.A. Janaki Raman, “Robotics and Image Processing an Introduction”, Tata McGraw Hill Publishing Company Ltd., 1995
4. Carl D. Crane and Joseph Duffy, “Kinematic Analysis of Robot manipulators”, Cambridge University press, 2008.

5. Craig. J. J., “Introduction to Robotics mechanics and control”, Addison- Wesley, 1999.

JOURNALS/MAGAZINES:

1. Elsevier Journal of Robotics and autonomous systems.
2. IEEE Journal on robotics and automation.

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/topic/robotics/beginner/
2. https://www.coursera.org/specializations/robotics

SELF LEARNING EXERCISES:

https://www.generationrobots.com/en/162-tools

Course Title	Data Visualization Techniques (PE I)				Course Type		Theory	
Course Code	B20EAS502	Credits	V semester		Class		V Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

This course is all about data visualization, the art and science of turning data into readable graphics. We'll explore how to design and create data visualizations based on data available and tasks to be achieved. This process includes data modeling, data processing (such as aggregation and filtering), mapping data attributes to graphical attributes, and strategic visual encoding based on known properties of visual perception as well as the task(s) at hand. Students will create their own data visualizations, and learn to use Open Source data visualization tools like Tableau and R. Students will also read papers from the current and past visualization literature and create video presentations of their findings.

COURSE OBJECTIVE (S):

1. Introduction to theory of data visualizations and create data visualizations.
2. Conduct exploratory data analysis using visualization.
3. Craft visual presentations of data for effective communication.
4. Design and evaluate color palettes for visualization based on principles of perception.
5. Apply data transformations such as aggregation and filtering for visualization and Identify opportunities for application of data visualization in various domains.
6. Use tools tableau and R for visualization techniques. Design and evaluate color palettes for visualization based on principles of perception

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Understanding concepts of Data Visualization presentation and exploratory graphics.	1,2,11	3
CO2	Data Visualization through Graphical Representations, Graph-theoretic Graphics, High-dimensional Data Visualization, Multivariate Data Glyphs for analyzing data.	1-5,9	3
CO3	Applying mapping techniques and separation methods to analyze visualizations.	1-6,9	3
CO4	Understanding concepts of R and Tableau for filtering visualization	1-5,9,12	2
CO5	Apply data transformations such as aggregation and filtering for visualization and Identify opportunities for application of data visualization in various domains	1-5,9,12	2
CO6	Design and evaluate color palettes for visualization based on principles of perception	1-5,9,12	2

BLOOM'S LEVEL OF THE COURSE OUTCOMES:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2	√	√		√		
CO3		√				√
CO4		√				
CO5		√	√			
CO6				√	√	√

COURSE ARTICULATION MATRIX:

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**2**									**2**		3		
CO2	**3**	**3**	**3**	**2**	**2**				**3**						
CO3	**3**	**3**	**3**	**2**	**3**	**2**			**2**						
CO4	**2**	**2**	**3**	**2**	**2**				**3**			**2**		**2**	
CO5	**3**	**3**	**3**	**2**	**3**				**2**			**3**			
CO6	**2**	**2**	**3**	**2**	**3**				**2**			**3**			**2**

COURSE CONTENT
THEORY:

UNIT – I

Introduction to Data Visualization:

Theory of Data Visualization, Presentation and Exploratory Graphics, Graphics and Computing.

UNIT – II

Principles and Methodologies:

Data Visualization through Graphical Representations, Graph-theoretic Graphics, High-dimensional Data Visualization, Multivariate Data Glyphs: Principles and Practice, Linked Views for Visual Exploration, Linked Data Views, Visualizing Trees and Forests, Interactive Linked Micromap Plots for the Display of Geographically Referenced Statistical Data, Smoothing Techniques for Visualisation, Structural Adaptive Smoothing by Propagation–Separation Methods.

UNIT – III

Data visualization using Tableau:

Introduction to tableau, connecting to data, Visual Analytics, Dashboard and stories, Calculations, Mapping ,Tableau online & competitors

UNIT – IV

Data visualization using R:

Introduction to R, Getting spotted with basic plots, visualizations Libraries in R, Visualizing geographical data in R and conclusion.

TEXT BOOKS:

1. Visualization Analysis & Design by Tamara Munzner (2014)
2. Learning Tableau Book by Joshua N. Milligan
3. Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master
4. R for Data Science Book by Garrett Grolemund and Hadley Wickham
5. R in Action Book by Rob Kabacoff

REFERENCE BOOKS:

1. Interactive Data Visualization for the Web by Scott Murray 2nd Edition (2017)
2. Semiology of Graphics by Jacques Bertin (2010)
3. The Grammar of Graphics by Leland Wilkinson
4. ggplot2 Elegant Graphics for Data Analysis by Hadley Wickham

JOURNALS/MAGAZINES:

1. https://analyticsindiamag.com/tag/data-visualisation/
2. https://www.cs.uic.edu/~kzhao/Papers/00_course_Data_visualization.pdf
3. https://www.perceptualedge.com/.../Whitepapers/Data_Visualization.pdf
4. https://www.sas.com/.../data-visualization-techniques-106006.pdf

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc20_mg24/preview
2. https://www.coursera.org/specializations/data-visualization

Course Title	Decision Support System and Expert System (PE I)				Course Type		Theory	
Course Code	B20EAS503	Credits	3		Class		V Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	3	3	3	39	-	50%	50%

Course Overview:

The Course provides the knowledge on the basics of decision support systems that are designed to help people overcome their biases and limitations, and make decisions more knowledgeably and effectively. It includes the components and various models of the decision support system. This course provides the methods to design DSS. This course also includes the insight of Expert systems.

Course Objective(s):

The objectives of the course are:

1. Explains the concept of Decision Support Systems
2. Exhibit the decision making techniques
3. Investigate various models in Decision Support Systems
4. Apply Design and development techniques in DSS
5. Design an expert system by applying various Knowledge Acquisition techniques.

Course Outcome(s):

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

CO#	Course Outcomes	Pos	PSOs
CO1	Understand the concept of Decision Support Systems	1,2,3,12	1
CO2	Apply various decision making techniques for decision support systems	1,2,3,4,6	1,2
CO3	Analyze various models in decision support systems	1,2,3,4,6,9	2
CO4	Apply intelligence in decision support systems	1,2,3,6,9	
CO5	Design a decision support systems	1,2,3,6	1
CO6	Design an expert system by applying various knowledge acquisition techniques	1,2,3,6,9	1

Bloom's Level of Course Outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2			√			
CO3				√		
CO4			√			
CO5			√			
CO6			√			

COURSE ARTICULATION MATRIX:

CO# / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1									1	1		
CO2	3	1	2	1		2							2	1	
CO3	2	2	3	2		2			1					3	
CO4	2	1	2			2			1						
CO5	1	1	3			2							1		
CO6	3	1	3			1			1				1		

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY

Content

Unit I

Introduction to Decision Support Systems: What is DSS?, Uses of Decision support systems. Decision Making- Rational Decision, Nature of Managers, Appropriate Decision Support, Group Decision Making, Intuition, Qualitative data and Decision Making, Business Intelligence and Decision Making

Unit II

DSS Components: Data Components-Characteristics of Information, Database, DBMS, Data Warehouse, Case study on Car. Model Components – Model and Analysis, Options for Models, Data Mining, Model-Based Management Systems and Example.

Unit III

Intelligence and DSS: Programming Reasoning, Uncertainty, User Interface: Goal, Mechanisms of User Interfaces, User Interface Components,

Designing a Decision Support: Planning for DSS, DSS Design and Reengineering.

Unit IV

Expert System: Definition of Expert systems, Features of Good expert systems, Architecture and Components of Expert Systems, Role of Individuals who interact with the expert System, Advantage and Disadvantages of Expert Systems, Source of errors in Expert system development.

Knowledge Acquisition: Knowledge basics, Knowledge Engineering, Knowledge Acquisition Techniques – Natural Techniques, Contrived Techniques, Modelling Techniques- Laddering, Concept tree

TEXT BOOKS:

1. Vicki L. Sauter, "Decision Support systems for Business Intelligence", Jonh Wiley & Sons, 2010.
2. I. Guptha, G. Nagpal, "Artificial Intelligence and Expert Systems", Mercury Learning and Information, 2020.

REFERENCE BOOKS:

1. Daniel J. Power, "Decision Support Systems – Concept and Resources for Managers", Quourum Books, London, 2002.
2. Efraim Turban, Ramesh E Sharda, Dursun Delen, "Decision support and Business Intelligence Systems", 9th Edition, Pearson Publications, 2010.
3. Maryse Salles, "Decision-Making and Information Systems", Wiley, 2015

J**OURNALS/MAGAZINES:**

1. Journal of Decision Support systems and E-Commerce, Elsevier
2. International Journal of Decision Support Systems, Inderscience Publishers
3. Journal of Soft Computing and Decision Support Systems
4. Expert Systems with Applications, Elsevier
5. Journal of Knowledge Engineering, Expert Systems, Wiley Online

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/business -intelligence-tools
2. https://nptel.ac.in/courses/110/105/110105147
3. https://alison.com/course/diploma-in-decision-support-systems-for-managers
4. https://infyni.com/course/detail/65/artificial-intelligence-expert-systems

SELF LEARNING EXERCISE:

1. Case study on Decision making.
2. Case study on modeling the Decision Support Systems.

Course Title	FUZZY LOGIC & SYSTEMS(PE-I)				Course Type		Theory	
Course Code	B20EAS504	Credits	3		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: This course covers the introduction to Classical Sets, Fuzzy Sets, Classical Relations and Fuzzy Relations, Properties of Membership Functions, Fuzzification and Defuzzification, Development of Membership Functions, Decision Making with Fuzzy Information, Classification by Equivalence Relations, Fuzzy Pattern Recognition and to understand the difference between Logic and Fuzzy systems.

COURSE OBJECTIVE

Objectives of this course are to:

1. Provide insights about the basics of Classical Sets, Fuzzy Sets, Classical Relations and Fuzzy Relations.
2. Explain the Properties of Membership Functions, Fuzzification and Defuzzification and to identify the difference between Logic and Fuzzy systems.
3. Describe the Development of Membership Functions and to work with Decision Making using Fuzzy Information.
4. Classify Fuzzy System to know the interpretation of Fuzzy Pattern Recognition.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the fundamental concepts of Fuzzy sets, functions and classification to solve real world problems.	1 to 5	1 ,2
CO2	Apply the different types of Fuzzy system and decision making with fuzzy.	1 to 5	1 ,2
CO3	Develop Fuzzy logic to solve real life problems.	1 to 5	1 ,2
CO4	Model the Fuzzy logic for the given problem domain.	1 to 5	1 ,2
CO5	Learn new tools and technologies in the fuzzy logic and apply for suitable application development.	12	1
CO6	Develop solutions in the fuzzy logic to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√	√		
CO3				√	√	√
CO4		√				√
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1								3	3	
CO2	3	2	2	1	1								3	3	
CO3	3	2	2	1									3	3	
CO4	3	3	2	2	1								3	3	
CO5												3			
CO6					2				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Introduction: Classical Sets and Fuzzy Sets: The Case for Imprecision, A Historical Perspective, The Utility of Fuzzy Systems, Limitations of Fuzzy Systems, The Illusion: Uncertainty and Accuracy, Uncertainty and Information, Fuzzy Sets and Membership, Chance versus Fuzziness, Sets as Points in Hypercube.

UNIT-2

Properties of Membership Functions, Fuzzification and Defuzzification: Features of the Membership Function, Various Forms, Fuzzification, Defuzzification to Crisp Sets, Lambda -Cuts for Fuzzy Sets, Lambda - Cuts for Fuzzy Relations, Defuzzification to Scalars. **Logic and Fuzzy systems:** Part1 Logic, Part II Fuzzy Systems.

UNIT-3

Development of Membership Functions - Membership Value Assignments. **Decision Making with Fuzzy Information:** Fuzzy Synthetic Evaluation, Fuzzy Ordering, Non - Transitive Ranking, Preference and Consensus, Multi Objective Decision Making, Fuzzy Bayesian Decision Method, Decision Making under Fuzzy States and Fuzzy Actions.

UNIT-4

Fuzzy Classification: Classification by Equivalence Relations - Crisp Relations, Fuzzy Relations, Cluster Analysis, Cluster Validity, c- Means Clustering - Hard c-Means (HCM), Fuzzy c-Means (FCM), Classification Metric, Hardening the Fuzzy c-Partition, Similarity Relations from Clustering. Fuzzy Pattern Recognition: Feature Analysis, Partitions of the Feature Space, Single-Sample Identification, Multifeature Pattern Recognition, Image processing

TEXT BOOKS:

1. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", Wiley India, 3rd Edition, 2010.
2. George K Klirand and Bo Yuan, "Fuzzy Sets and Fuzzy Logic: Theory and Applications", Prentice Hall, 1995.

REFERENCE BOOKS:

1. B Kosko, "Neural Networks and Fuzzy Systems: A Dynamical System Approach", PHI, 1991.

JOURNALS/MAGAZINES:

1. https://www.journals.elsevier.com/fuzzy-sets-and-systems/most-downloaded-articles
2. https://www.springer.com/journal/40815

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/course/fuzzy-logic/
2. https://www.coursera.org/lecture/children-literacy/fuzzy-logical-model-of-perception-ZT8ZJ

SELF-LEARNING EXERCISES:

Automated Methods for Fuzzy System, Batch Least Squares Algorithm, Recursive Least Squares Algorithm, Gradient, Fuzzy Systems Simulation, Nonlinear Simulation Using Fuzzy System

<table>
<tr><td>Course Title</td><td colspan="4">Computer Vision LAB</td><td colspan="2">Course Type</td><td colspan="2">Practical</td></tr>
<tr><td>Course Code</td><td>B20EA0504</td><td>Credits</td><td colspan="2">1</td><td colspan="2">Class</td><td colspan="2">V semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">13Hrs/ Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>Tutorial</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>1</td><td>2</td><td>2</td><td>0</td><td>26</td><td>50%</td><td>50%</td></tr>
</table>

COURSE OVERVIEW:

Computer Vision is one of the fastest growing and most exciting AI disciplines in today's academia and industry. This course is designed to open the doors for students who are interested in learning about the fundamental principles and important applications of computer vision. The course, introduces a number of fundamental concepts in computer vision, expose students to a number of real-world applications that are important to our daily lives. More importantly, students will be guided through a series of well-designed projects such that they will get to implement using few interesting and cutting-edge computer vision algorithms. The course benefit is to apply computer vision algorithms to solve real world problems.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the fundamentals of Computer vision
2. Experiment with different segmentation techniques
3. Demonstrate the use of techniques for registration and classification of images.
4. Illustrate the object detection in a given application.

COURSE OUTCOMES (COs):

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

CO1	Outline the fundamentals of Computer vision.
CO2	Apply image enhancement in one dimension and two dimensional using DFT
CO3	Implement registration and classification of images.
CO4	Develop application to perform object detection

CO5	Apply and compare different segmentation techniques.
CO6	**Analyze wavelet transform in various compression standard**

BLOOM'S LEVEL OF THE COURSE OUTCOMES:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2	√	√				
CO3		√	√			
CO4		√	√	√		√
CO5			√	√		√
CO6			√	√		√

COURSE ARTICULATION MATRIX:

CO#/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1				1				1		2	2	
CO2		2	3	1	1									3	1
CO3	1	2	1	2				3	1		1			2	1
CO4	1	2	3	1							1	1		2	1
CO5															2
CO6					2							2	2		

Note- 1-Low, 2-Medium, 3-High

SL NO	Lab Programs	PAGE NO

01	Write a program by Using OpenCV in python read and display an image.	
02	Write a program to Opening in grayscale mode.	
03	Write a program using python open cv to create a border to an image	
04	**Write a** Python **program** to Image blurring using OpenCV	
05	**Write a program for** Image Processing in Python Scaling, Rotating	
06	Write a program for Image Processing in Python Shifting and Edge Detection.	
07	**Write a program to** Erosion and Dilation of images using OpenCV in python	
08	Write a python program code to Below is the Python code explaining Opening Morphological Operation	
09	Write a Python program to explain cv2.line() method	

TEXT BOOKS:

1. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach" , 2nd Edition, University of Illinois at Urbana-Champaign Jean Ponce, Ecole Normale Superieure, Paris©2012, Pearson
2. Richard Szeliski, " Computer Vision: Algorithms and Applications" , Springer
3. David Marr, Tomaso A. Poggio, Shimon Ullman "A Computational Investigation into the Human Representation and Processing of Visual Information", , eBook - Amazon.com

REFERENCE BOOKS:

1. Gary Bradski, Adrian Kaehler, " Learning OpenCV: Computer Vision with the OpenCV Library" Amazon
2. International Journal of Computer Vision, Springer
3. Image and Vision Computing, Elsevier
4. Computer Vision and Image Understanding, Elsevier
5. IEEE Transactions on Image Processing
6. IEEE Transactions on Pattern recognition and machine intelligence

Course Title		Machine Learning Lab			Course Type		Practical	
Course Code	B20CI0505	Credits	1		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	-	-	-				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	1	2	2	-	**26**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization, and computer science to create automated systems that can process through large volumes of data at high speed to make predictions or decisions without human intervention.

COURSE OBJECTIVES:

The objectives of this course are to:

5. Explain machine learning and problems relevant to machine learning.
6. Discuss the fundamentals of Decision trees learning and its issues
7. Illustrate neural networks, Bayes classifier and k nearest neighbour for problems appearing in machine learning.
8. Describe statistical analysis of machine learning techniques.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the basics of machine learning concepts.	1 to 5	1,2,3
CO2	Implement suitable classification technique for intelligent applications	1 to 5	1,2,3
CO3	Implement clustering algorithms for intelligent applications	1 to 5	1,2,3
CO4	Implement machine learning algorithms for intelligent applications	1 to 5	1,2,3
CO5	Learn new tools and technologies related to machine learning and apply for suitable application development.	10,12	2,3
CO6	Develop solutions using machine learning based algorithms for the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	11,12	2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1						√
CO2			√			√
CO3				√		√

CO4				√	√	√
CO5		√		√		
CO6				√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2	1								3	3	3
CO2	3	2	3	1	2								3	3	3
CO3	3	1	2	1	2								3	3	3
CO4	3	2	2	2	2								3	3	3
CO5										2		3		2	2
CO6											3	3		3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT LAB:

1	**Decision Tree Classifier** Implement and demonstrate a Decision Tree Classifier to classify the instances of dataset. Display the classification results. Also, try the same algorithm to classify the instances for any given medical diagnosis dataset.
2	**Feature extraction using Principal Component Analysis (PCA)** Implement and demonstrate the Principal Component Analysis algorithm for dimensionality reduction for any dataset.
3	**K nearest neighbour (KNN)** Implement and demonstrate the k-Nearest Neighbour algorithm (k-NN) to classify the iris data set. Display the Confusion matrix and classification report. Also, try the same algorithm of the social networks dataset to predict a customer can purchase an item or not.
4	**Support Vector Machine (SVM)** Implement and demonstrate a Support vector machine classifier to classify the instances of any dataset. Display the classification results. Also, try the same algorithm to classify the instances for any given dataset
5	Short Title: **Regression** Implement and demonstrate linear regression and logistic regression algorithms for any given dataset(s). Visualize the results using graphs. (Salary prediction, Price Prediction)
6	**Random Forest (RF)** Implement and demonstrate a Random Forest classifier to classify the instances of dataset. Display the classification results. Also, try the same algorithm to classify the instances for any given dataset
7	**K-Means Clustering** Implement and demonstrate the k-means clustering algorithms. Visualize the results using graphs.
8	**Hierarchical clustering** Implement and demonstrate the hierarchical clustering algorithms. Visualize the results using graphs.
9	**DBSCAN clustering**

	Implement and demonstrate the hierarchical clustering algorithms. Visualize the results using graphs.
10	Short Title: **Artificial Neural Networks (ANN)** Implement and demonstrate the two hidden layer multilayer perceptron neural network to any given dataset for classification. Apply two different optimizers or activation functions and compare the results.

TEXT BOOKS:

1. Tom M. Mitchell, Machine Learning, India Edition McGraw Hill Education, 2013.

Websites:

1. https://www.tutorialspoint.com/machine_learning_with_python/index.htm
2. https://www.tutorialspoint.com/artificial_neural_network/index.htm

RECOMMENDED LEARNING RESOURCES (REFERENCE BOOKS):

3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", 2nd edition, springer series in statistics.
4. Ethem Alpaydın, "Introduction to machine learning", second edition, MIT press.

JOURNALS/MAGAZINES:

3. Springer Journal of Machine Learning.
4. International Journal of Machine Learning and Computing.

SWAYAM/NPTEL/MOOCs:

4. Coursera – Machine Learning
5. Coursera – Deep Learning
6. https://onlinecourses.nptel.ac.in/noc19_cs53/preview

SELF-LEARNING EXERCISES:

Reinforcement Learning: Introduction, Learning Task, Q Learning

Course Title	INTRODUCTION TO AI (OE-1)				Course Type		Theory	
Course Code	B20CIO501	Credits	3		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: This course introduces the basics of Artificial Intelligence (AI), AI problems and search strategies. The students can explore knowledge representation issues and methods. This course provides planning methods /algorithms for, problem solving and controlling the knowledge and also demonstrates various learning methods for constructing knowledge and taking decisions.

COURSE OBJECTIVE:

The objectives of this course are to:

1. Describe the basics of Artificial Intelligence (AI).
2. Illustrate knowledge representation issues and methods
3. Explain planning methods/algorithms in problem solving
4. Discuss the application of AI in Robot .

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Solve AI problems using AI search strategies and production system	1 to 5	1,2
CO2	Develop knowledge base for representing the given real world data using logic and reasoning methods	1 to 5	1,2
CO3	Make use of planning and probability to solve uncertainty problems	1 to 5	1,2
CO4	Design and develop an intelligent agent for robotics in a specific environmentto solve real world problems.	1 to 5	1, 2,3
CO5	Learn new tools and technologies in the Introduction to AI and apply for suitable application development.	12	
CO6	Develop solutions in the Introduction to AI to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	**Understand (L2)**	**Apply (L3)**	**Analyze (L4)**	**Evaluate (L5)**	**Create (L6)**
CO1			√			√
CO2				√	√	√
CO3	√			√	√	
CO4			√		√	√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	3								3	3	
CO2	3	3	3	2	3								3	3	
CO3	3	2	3	3	3								3	3	
CO4	3	2	2	2	3								3	3	3
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT – 1

Problems and search: What is AI, AI Problems; AI Techniques; Problem Space and Problem Search techniques; Defining the problem as a state space search, production systems; Problem characteristics, production system characteristics, Issues in the design of search programs; Heuristic search techniques, generate-and-test; Hill climbing, BFS, DFS; Problem reduction; Constraint satisfaction.

UNIT -2

Knowledge Representation: Knowledge representation Issues, representations and mappings; Approaches to knowledge representation; Issues in knowledge representation; Using Predicate logic: Representing simple facts in logic; Representing Instance and ISA relationships; Computable functions and predicates; Representing Knowledge using Rules; Procedural versus declarative knowledge; Resolution Forward versus backward reasoning; Matching

UNIT – 3

Planning: A simple planning agent; Representations for planning; A partial-order planning example; A partial-order planning algorithm; Planning with partially Instantiated operators; Knowledge Engineering for planning; Uncertainty: Sources of Uncertainty; Probability Theory, Issues with Probability; Advantages & Disadvantages of Bayesian Network

UNIT – 4

Robotic Sensing and Manipulation: Introduction to robotics, Sensing, Manipulation, Human-robot interaction

Mobile Robots: Navigation and path planning, Learning and robotics: Reinforcement learning, Case study: Autonomous vehicles technologies and impacts

TEXT BOOKS:

1. Russell &Norvig, “Artificial Intelligence: A Modern Approach”, Third Edition, Prentice-Hall, 2010.
2. Elaine Rich, Kevin Knight, “Artificial Intelligence”, 3rdedition, TataMcgraw Hill, 2009.

REFERENCE BOOKS:

1. Nils J.Nilsson, “Principles of Artificial Intelligence”, Elsevier, 1980.
2. Krishan Mehrotra, Chilkuri K. Mohan, Sanjay Ranka, “Artificial Neural Networks”, Penram International Publishing, 1997.
3. B.Yegananarayana, “Artificial Neural Networks”, PHI, 2001.
4. Boston Dynamics videos, 2018 ,https://www.youtube.com/user/BostonDynamics

5. Priday, R. “What’s Really Going on in those Boston Dynamics Videos,” Wired, February 18, 2018 https://www.wired.co.uk/article/bostondynamics-robotics-roboticist-how-to-watch ○ RAND Institute, “Autonomous
6. RAND Institute, “Autonomous Vehicle Technology: A Guide for Policymakers”, 2016 https://www.rand.org/content/dam/rand/pubs/research_reports/RR400/RR443- 2/RAND_RR443-2.pdf

JOURNALS/MAGAZINES:

1. ACM, ACM transaction on Multi-Agent System.
2. IEEE, IEEE transaction for computational Intelligence.
3. Springer, Springer transaction for security based intelligent systems.

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/topic/artificial-intelligence/
2. https://www.udemy.com/course/introduction-to-ai-for-business/

SELF LEARNING EXERCISES:

Analyze the different types of Agents in Intelligent agents, Illustrate the communication between agents in Multi-agent environment.

Course Title	OOPS With C++(OE-1)				Course Type		Theory	
Course Code	B20CIO502	Credits	3		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	3	3	3	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

This course introduces the basic concepts of object oriented programming. Familiarizes with object creation and accessing members of object. OOPs concepts such as data abstraction, information hiding (Encapsulation), overloading operations, inheritance mechanisms, virtual functions, friend functions and are discussed. FileI/O operations, Templates and exception handling mechanisms are also introduce

COURSE OBJECTIVE

The objectives of this course are to:

1. Explain the basic concepts of objects and classes for a real world application.
2. Illustrate the use of operator overloading/function overloading for given applications.
3. Demonstrate the use of inheritance in real world applications.
4. Describe I/O streams and Templates and Exception Handling

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply the basic concepts of objects and classes for a real world application	2,3,7,11	1,2
CO2	Develop applications by implementing operator overloading and function overloading.	2,3,4,5	2,3
CO3	Make use Inheritance feature of OOPs to develop a real world application	1-4,8,9,11	2,3
CO4	Build the real world application using exception handling and templates	1-4,11,12	2,3
CO5	Learn new tools and technologies in the OOPS USING C++and apply for suitable application development.	12	
CO6	Develop solutions in the OOPS USING C++to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	**Understand (L2)**	**Apply (L3)**	**Analyze (L4)**	**Evaluate (L5)**	**Create (L6)**
CO1		√				
CO2	√	√				
CO3		√	√			
CO4		√	√	√		√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1				1				1		2	2	
CO2		2	3	1	1									3	1
CO3	1	2	1	2				3	1		1			2	1
CO4	1	2	3	1							1	1		2	1
CO5												3			
CO6					3				3	3					

Note: 1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Introduction: Introduction to object oriented concepts: Encapsulation, Abstraction, Inheritance, Polymorphism, Overview of OOP, Introduction to object oriented modelling, Introduction to variables in C++, I/O operators, Function overloading, Inline function, Recursive function.
Classes & Objects: Introduction to Classes, Member Functions and Member data, Constructors and Destructors, Static Class members.

UNIT-2

Operator overloading: Introduction to Objects, Array of Objects, Dynamic Objects, Pointers to objects, Friend Function, Access specifiers.
The scope resolution operator, Generic functions and classes, Operator overloading using Friend function: Unary operator '+' & binary operator, Copy constructor.

UNIT-3

Inheritance: Base Class, Inheritance and Protected members, inheriting multiple base classes, Constructors, Destructors and Inheritance, Virtual base classes. Virtual functions and Polymorphism: Virtual functions, pure virtual functions, Early and late binding.

UNIT-4

Templates and Exception handling: Template Functions, Template Classes, Fundamentals of Exception handling, handling derived class exceptions.

TEXTBOOKS:

1. Herbert Schildt,"The Complete Reference C++", 4th Edition, Tata McGraw Hill, 2003.
2. Sanley B. Lippmann, Josee Lajore, "C++ Primer", 4th Edition, Pearson Education, 2005.

REFERENCE BOOKS:

1. Paul J Deitel, Harvey M Deitel, "C++ for Programmers", Pearson Education, 2009.
2. K R Venugopal, Rajkumar Buyya, T Ravi Shankar, "Mastering C++", Tata McGraw Hill,l999.

JOURNALS/MAGAZINES:
1. ACM, ACM Transactionson Programming Languages and Systems(TOPLAS).
2. ACM Journal on Object-Oriented Programming

SWAYAM/NPTEL/MOOCS:
1. https://www.coursera.org/specializations/object-oriented-programming
2. https://www.coursera.org/lecture/writing-running-fixing-code/introduction-to-the-programming-environment-sXizU

3. https://www.coursera.org/learn/object-oriented-design

SELF LEARNING EXERCISES:
I/O System Basics, File I/O: C++ stream classes, Formatted I/O, <fstream> and File classes.

Course Title	WEB TECHNOLOGY (OE-1)				Course Type		Theory	
Course Code	B20CIO503	Credits	3		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW: The basics of Web application tools such as HTML, XHTML and CSS are introduced. The course also provides knowledge about advanced research topics such as XML, Perl and PHP.

COURSE OBJECTIVE

The objectives of this course are to:

1. Understand the various steps in designing a creative and dynamic website.
2. Describe the hierarchy of objects in HTML and XML.
3. Design dynamic and interactive web pages by embedding Java Script code in HTML.
4. Illustrate the advantages and use of different types of CSS.
5. Examine the HTML. Know how to use Dynamic HTML.
6. Familiarize server side scripting language like Perl &PHP.

COURSE OUTCOMES (COs)

CO#	Course Outcomes	POs	PSOs
CO1	Describe the concepts of WWW including browser and HTTP protocol and summarize the various HTML tags and use them to develop the user friendly web pages.	2,3,7,11	1,2
CO2	Define the CSS with its types and use them to provide the styles to the web pages at various levels.	2-5	2,3
CO3	Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.	1,4,8,9,11	2,3
CO4	Apply JavaScript to develop the dynamic web pages and use server side scripting with PHP to generate the web pages dynamically using the database connectivity.	1-4,11,12	2,3
CO5	Examine the HTML .Know how to use Dynamic HTML	2,3,4,5	2,3
CO6	Familiarize server side scripting language like Perl & PHP.	2-5	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	**Understand (L2)**	**Apply (L3)**	**Analyze (L4)**	**Evaluate (L5)**	**Create (L6)**
CO1	√	√				
CO2		√	√	√		
CO3			√			
CO4			√	√	√	
CO5		√	√	√	√	
CO6		√	√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	1				1				1		2	2	
CO2		2	3	1	1									3	1
CO3	1	2	1	2				3	1		1			2	1
CO4	1	2	3	1							1	1		2	1
CO5		2	2	3	1									2	2
CO6		1	2	3	1								1	2	

COURSE CONTENT THEORY

Contents

UNIT-1

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers-Case Study. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics- Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-XML Creating HTML Documents. Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration - Namespaces JavaScript and XML

UNIT-2

Style Sheets: Lists, Tables, Forms, Frames CSS: Introduction, 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.

Javascript: Overview of Javascript, Object orientation and Javascript, Syntactic characteristics, Primitives, operations, and expressions, Screen output and keyboard input, Control statements, Object creation and modification, Arrays, Functions, Constructors.

UNIT-3

Perl, CGI Programming: Origins and uses of Perl, Scalars and their operations, Assignment statements and simple input and output, Control statements, Fundamentals of arrays, Hashes, References, Functions, Pattern matching, File input and output; Examples. The Common Gateway Interface; CGI linkage; Query string format; CGI.pm module;

Cookies. Database access with Perl and MySQL

UNIT-4

Introduction and basic syntax of PHP: Decision and looping with examples, PHP and HTML, Arrays, functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP. PHP and MySQL: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables.

TEXT BOOKS:

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education.
2. Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006. 2007.

REFERENCE BOOKS:

1. Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.
2. Marty Hall and Larry Brown, “Core Web Programming” Second Edition, Volume I and II,
3. Pearson Education, 2001.
4. Bates, “Developing Web Applications”, Wiley, 2006.

JOURNALS/MAGAZINES:

1. International Journal of Web Technology- ISSN:2278-2389
2. International Journal of Web & Semantic Technology(IJWesT)
3. ELSEVIER Journals within "Internet And Web Technology”

SWAYAM/NPTEL/MOOCS:

1. Coursera - Web Design: Wireframes to Prototypes
2. Coursera – Web Application Technologies and Django
3. https://nptel.ac.in/courses/106/105/106105084/
4. 4.https://www.edx.org/learn/web-development

SELF LEARNING EXERCISES:

1. HTML5
2. JQuery
3. XML
4. Ruby
5. Introduction to REST and RESTful API

Course Title	TECHNICAL DOCUMENTATION				Course Type		Theory	
Course Code	B20CI0503	Credits	1		Class		V semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	1	1	1				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**1**	**1**	**1**	**13**	**-**	**50**	**50**

COURSE OVERVIEW:

The goal of this course is to prepare engineering students with the individual and collaborative technical writing, presentation, and research skills necessary to be effective technical communicators in academic and professional environments

COURSE OBJECTIVE

The objectives of this course are:

1. Understanding the characteristics of technical writing and the importance of purpose, audience, and genre for written communication in technical fields.
2. Planning, drafting, revising, editing, and critiquing technical and professional documents through individual and collaborative writing.
3. Writing effective technical documents that are grammatically and stylistically correct.
4. Explain the knowledge and skills required for undertaking a research project, for presenting a conference paper and for writing a scientific article.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Describe the characteristics of technical writing and the importance of purpose, audience, and genre for written communication in technical fields.	1 to 4, 8, 9, 12	1
CO2	Develop professional documents through individual and collaborative writing.	1 to 3, 5,9,12	1
CO3	Write effective technical documents that are grammatically and stylistically correct	1 to 5, 9, 12	2
CO4	Writing effective paper for conference or journal publication	1,4,5,9,12	1
CO5	Learn new tools and technologies in the Technical Documentation and apply for suitable application development.	12	
CO6	Develop solutions in the Technical Documentation to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVELOF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√	√		
CO4						√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2				1	1			1	2	2	
CO2	3	2	3		2				1			1		3	1
CO3	3	1	2	1	2				1			1		2	1
CO4	3			2	2				1			1		2	1
CO5												3			
CO6					3				3	3					

Note: 1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents

UNIT-1

Introduction Technical Reports: Importance of Reports, Objectives of Reports ,characteristics of a Report, Categories of Reports, Informative Reports , Analytical Reports , Periodic and Special Reports , Oral and Written Reports , Long and Short Reports , Formal and Informal Reports, Individual and Group Reports Formats , Prewriting , Purpose and Scope ,Audience , Sources of Information , Organizing the Material , Interpreting Information ,Making an Outline , Structure of Reports (Manuscript Format), Prefatory Parts ,
Main Text, Supplementary Parts , Types of Reports , Writing the Report , First Draft ,Revising, Editing, and Proofreading.

Technical Proposals: Introduction , Definition and Purpose , Types , Characteristics , Structure of Proposals , Prefatory Parts , Body of the Proposal , Supplementary Parts , Style and Appearance , Evaluation of Proposals.

TEXTBOOKS:

1. Meenaxi Raman and Sangeetha Sharma, "Technicial communication", Oxford University press, 2015.
2. C. R. Kothari, Research Methodology Methods and Techniques, 2nd. ed. New Delhi: New Age International Publishers, 2009.
3. R. Panneerselvam, Research Methodology, New Delhi: PHI, 2005.
4. P. Oliver, Writing Your Thesis, New Delhi: Vistaar Publications, 2004.
5. F. Mittelbach and M. Goossens,The LATEX Companion, 2nd. ed. Addison Wesley, 2004.

Course Title	AI and Humanity				Course Type		Integrated	
Course Code	B20EA0501	Credits	2		Class		V Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**2**	**2**	**2**	**26**	**0**	**50**	**50**

COURSE OVERVIEW

AI and Humanity provides an analytical framing and a common language for understanding the effects of technological advances in artificial intelligence on society. The theme is driven by an exploration of the cultural and etymological roots of a series of keywords relevant to both AI and society. Here the possibility of applying the key principles and tools of current artificial intelligence (AI) to design future human systems in ways that could make them more efficient, fair, responsive, and inclusive.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the fundamentals of artificial intelligence and its applications to society.
2. Discuss the machine learning concepts.
3. Inculcate knowledge of data processing and building classifiers in various application domains.
4. Gain expertise in logic programming and search techniques.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of AI Techniques to solve social problems.	1 to 4, 8, 9 , 12	1
CO2	Develop programs for machine learning algorithms.	1 to 3, 5,9,12	1
CO3	Apply the techniques of data pre-processing and build a classifier.	1 to 5, 9, 12	2
CO4	Create search solutions for different application.	1,4,5,9,12	1
CO5	Learn new tools and technologies in the AI and Humanity and apply for suitable application development.	12	
CO6	Develop solutions in the AI and Humanity to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√	√		
CO4			√	√	√	√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2				1	1			1	3		
CO2	3	2	3		2				1			1		3	
CO3	3	1	2	1	2				1			1			3
CO4	3			2	2				1			1	3	3	3
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY:

UNIT – 1

Introduction: Basic Concept of Artificial Intelligence (AI), The Necessity of Learning AI, What is Intelligence?, What is Intelligence Composed Of?, What's Involved in AI, Application of AI,

UNIT – 2

AI and Machine Learning: Types of Machine Learning (ML), supervised machine learning algorithms, unsupervised machine learning algorithms, Reinforcement machine learning algorithms,

UNIT – 3

Data Preparation and Building a Classifier: Techniques for Data Preprocessing, Labeling the Data, , Naïve Bayes Classifier, Support Vector Machines (SVM), Logistic Regression, Decision Tree Classifier, Random Forest Classifier, Performance of a classifier, Class Imbalance Problem, Sampling.

UNIT – 4

Logic Programming and Gaming: How to Solve Problems with Logic Programming, Heuristic Search, Difference between Uninformed and Informed Search, Minimax Algorithm, Alpha-Beta Pruning.

TEXTBOOKS:

1. AI and Humanity, Illah Reza Nourbakhsh, publishers Pearson, March 2020.
2. How Artificial Intelligence is redefining who we are. Coleman, Flynn. A Human Algorithm: Counterpoint Press, 2019.

REFERENCEBOOKS:

1.Artificial Intelligence with Python by Prateek Joshi, first edition 2017, Packt publishers.
2.Artificial Intelligence For Dummies Stuart Jonathan Russell, Peter Norvig

SWAYAM/NPTEL/MOOCs:

1. https://medium.com/javarevisited/10-best-udemy-and-coursera-courses-to-learn-artificial-intelligence-in-2020-ec77ad13bdc1
2. https://medium.com/javarevisited/10-best-udemy-and-coursera-courses-to-learn-artificial-intelligence-in-2020-ec77ad13bdc1
3. https://javarevisited.blogspot.com/2020/08/top-10-coursera-courses-and-certification-for-artificial-intelligence-and-machine-learning.html#axzz6jQ05pXOG

Self-Learning Exercises:

1. Prolog programming language for artificial intelligence.

2. Multi-Agent Systems and Agent Communication for distributed problem solving which is performed by agents working together towards a solution of a common problem.

Detailed Syllabus Semester-6

Course Title	BIG DATA ANALYTICS				Course Type		Integrated	
Course Code	B20EA0601	Credits	4		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

This course is for those new to data science and interested in understanding why the Big Data Era has come to be. It is for those who want to become conversant with the terminology and the core concepts behind big data problems, applications, and systems. It is for those who want to start thinking about how Big Data might be useful in their business or career. It provides an introduction to one of the most common frameworks, Hadoop, that has made big data analysis easier and more accessible -- increasing the potential for data to transform our world.

COURSE OBJECTIVE (S):

1.Introduce Big Data concepts and managing big data.
2.Describe Hadoop and processing data using Hadoop.
3.Illustrate the use of map-reduce analytics using Hadoop and related tools.
4.Describe Hadoop tools, PIG and Hive architecture

COURSE OUTCOMES (COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the concepts of Big Data in real world applications.	1 to5,9,12	2
CO2	Apply the theories of Hadoop.	1 to5,9,12	2
CO3	Illustrate the fundamental techniques and scalable algorithms like Hadoop, Map Reduce.	1 to5,9,12	1
CO4	Develop a real world application using Hadoop tools	1 to5,9,12	1
CO5	Learn new tools and technologies in the bigdata and apply for suitable application development.	1 to5,9,12	1
CO6	Develop solutions in the bigdata platform to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	1 to 5,9,12	2

BLOOM'S LEVEL OF THE COURSE OUTCOMES:

CO#	Bloom's Level					
	Remember(L1)	Understand(L2)	Apply(L3)	Analyze(L4)	Evaluate(L5)	Create(L6)
CO1		√			√	√

CO2			√			
CO3				√		√
CO4						√
CO5						√
CO6				√		

COURSE ARTICULATION MATRIX:

CO#/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	2				1			3		3	
CO2	3	3	3	3	3				1			3		3	
CO3	3	3	3	3	3				1			3	3		
CO4	3	3	3	3	3				2			3	3		
CO5	3	3	3	3	3				2			3	3		
CO6	3	3	3	3	3				1			3		3	

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

UNIT	Syllabus
1	**Unit – 1** **Introduction to Big Data:** Classification of digital data, characteristics of data, evolution of big data, definition of big data, challenges with big data, what is big data, why big data, traditional business intelligence (BI) versus big data, A typical data warehouse environment, A typical Hadoop environment, top challenges facing big data, why is big data analytics, what kind of technologies are we looking toward to help meet the challenges posed by big data?
2	**Unit – 2** **Introduction to Hadoop:** Introducing Hadoop, why Hadoop, why not RDBMS, RDBMS versus Hadoop, History of Hadoop, Hadoop overview, use case of Hadoop, Hadoop distributors, HDFS, Processing data with Hadoop, NoSQL, Hadoop-Features of Hadoop.
3	**Unit – 3** **MapReduce:** A weather dataset, Analyzing data with UNIX tools, Analyzing data with Hadoop, scaling out, How MapReduce Works, Anatomy of a MapReduce job run, shuffle and sort, job scheduling.
4	**Unit – 4** **Hadoop Related Tools:** Introduction to PIG, What is PIG, The anatomy of PIG,PIG on Hadoop, PIG Latin, Data types in PIG, running PIG,Execution modes,HDFS Commands,Relational operators,PIG versus Hive, Introduction to HIVE, What is hive ,hive architecture, hive data types,hive file formats,HQL,UDF.

TEXT BOOKS:

1. Sridhar Alla, "Big Data Analytics with Hadoop 3", published by Packt Publishing Ltd, May 2018.
2. Subhashini Chellappan, Dharanitharan Ganesan," Practical Apache Spark Using the Scala API", A Press, 2018.

REFERENCE BOOKS:

1. Michael Minelli, Michele chambers, Ambiga Dhiraj," Big data, big analytics", Wiley,2013
2. P. Tan, M. Steinbach, V. Kumar, "Introduction to Data Mining", Addison-Wesley, 2005.
3. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", 2nd ed. Morgan Kaufmann, 2005.

JOURNALS/MAGAZINES:

1. IEEE,Introduction to the IEEE Transactions on Big Data
2. Elsevier, Big data research journal Elsevier
3. Springer, Journal on Big Data Springer.
4. ACM DL,The Journal of Machine Learning Research-ACM

SWAYAM/NPTEL/MOOCS:

1. **Coursera – Big Data**
2. **Coursera – Introduction to Big Data**
3. **https://nptel.ac.in/courses/106/104/106104189/**
4. **https://www.edx.org/learn/big-data**

SELF-LEARNING EXERCISES:

Spark Real-Time Use Case: Data Analytics Project Architecture, Data Ingestion, Data Storage, Data Processing, Data Visualization

1. https://www.journals.elsevier.com/big-data-research
2. https://journalofbigdata.springeropen.com
3. https://dl.acm.org/journal/jmlr

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/106/104/106104189/
2. https://www.edx.org/course/big-data-and-education

SELF-LEARNING EXERCISES:

Spark Real-Time Use Case: Data Analytics Project Architecture, Data Ingestion, Data Storage, Data Processing, Data Visualization.

Course Title	Neural Networks & Deep Learning				Course Type		Theory	
Course Code	B20EA0603	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

OVERVIEW:

Neural Networks are an effective programming paradigm that enable a computer to learn from observed data. They simulate biological learning of the nervous system and have been demonstrated to increase the power of known machine learning models by stacking them as computational graphs. This is different from conventional programming where human programmers define the set of tasks to be carried out by a computer to solve a problem. Deep learning is a subset of machine learning that uses many layers of neural networks to accomplish tasks like image recognition, text procession, speech recognition, natural language processing etc. This course aims at giving the students the knowledge and the skills required to model the solutions to real world problems using neural networks and deep learning.

COURSE OBJECTIVE

The objectives of this course are to:

1. Explain the fundamentals of neural network based paradigm to problem solving.
2. Inculcate knowledge of concepts involved in training of neural networks.
3. Discuss the concepts and issues in deep neural networks.
4. Explain generalizability of deep neural networks and introduce prominent deep neural architectures.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the fundamental architecture of neural network and the concepts involved.	1,2,3,4,5	1,2
CO2	Apply the shallow neural network models - Perceptron, Least-Squares Regression, Logistic Regression, Support Vector machines to solve real world binary and multiclass classification problems.	1,2,3,4,5	1,2
CO3	Develop simple deep neural networks to solve problems in unsupervised learning.	1,2,3,4,5	1,3
CO4	Create deep neural models like CNN and RNN to solve problems.	1,2,3,4,5	1,3
CO5	Illustrate the applications of CNN for solving real world Problems	1,2,3, 11, 12	1,3
CO6	Illustrate the applications of CNN for solving real world Problems	1,2,3, 11, 12	1,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2			√	√		√
CO3			√	√		√
CO4			√	√	√	√
CO5			√	√		
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2	1								2	2	
CO2	3	2	3	1	2								2	2	
CO3	3	1	2	1	2								2		2
CO4	3	2	2	2	2								2		2
CO5	3	2	2								1	1			
CO6	3	2	3								1	1			

Note: 1-Low, 2-Medium, 3-High

Course Content:
Theory:

Contents

UNIT-1

Introduction to Neural Networks: The basic architecture of Neural Networks – Single computational layer – The Perceptron, What Objective Function Is the Perceptron Optimizing? , Relationship with Support Vector Machines Choice of Activation and Loss Functions, Some Useful Derivatives of Activation Functions Choice and Number of Output Nodes multilayer neural network, The Multilayer Network as a Computational Graph, Training a Neural Network with Backpropagation, Practical Issues in Neural Network Training -The Problem of Overfitting, The Vanishing and Exploding Gradient Problems

Common Neural Architectures - Simulating Basic Machine Learning with Shallow Models, Radial Basis Function Networks, Restricted Boltzmann Machines, Recurrent Neural Networks, Convolutional Neural Networks, Two Notable Benchmarks - The MNIST Database of Handwritten Digits, The ImageNet Database

UNIT-2

Machine Learning with Shallow Neural Networks - Neural Architectures for Binary Classification - Revisiting the Perceptron, Least-Squares Regression, Logistic Regression, Support Vector machines, Neural Architectures for Multiclass Models - Multiclass Perceptron, Weston-Watkins SVM, Multinomial Logistic Regression (Softmax Classifier), Hierarchical Softmax for Many Classes, Auto encoder: Basic Principles, Nonlinear Activations, Deep Auto encoders, Application to Outlier Detection, When the Hidden Layer Is Broader than the Input Layer, Word2vec: An Application of Simple Neural Architectures, Simple Neural Architectures for Graph Embedding's

UNIT-3

Deep Neural Networks – Introduction, Backpropagation - Backpropagation with the Computational Graph Abstraction,

Backpropagation with Post-Activation Variables, Backpropagation with Pre-activation Variables, Examples of Updates for Various Activations, Loss Functions on Multiple Output Nodes and Hidden Nodes, Setup and Initialization Issues - Tuning Hyper-parameters, Gradient-Descent Strategies- Learning Rate Decay, Momentum-Based Learning -Nesterov Momentum, Parameter-Specific Learning Rates –AdaGrad, RMSProp, Adam, Gradient Clipping, Second-Order Derivatives, Batch Normalization.

UNIT-4

Teaching Deep Learners to Generalize- The Bias-Variance Trade-Off, Generalization Issues in Model Tuning and Evaluation, Issues with Training at Scale, Penalty-Based Regularization - L1-Regularization, L1- or L2-Regularization, Penalizing Hidden UNITs: Learning Sparse Representations, Ensemble Methods- Bagging and Subsampling, Parametric Model Selection and Averaging, Randomized Connection Dropping, Dropout, Data Perturbation Ensembles, Early Stopping.

Prominent Deep Learning Models - **Restricted Boltzmann Machines** – The Boltzmann Machine, How a Boltzmann Machine Generates Data, Training the RBM, **Recurrent Neural Networks** - The Architecture of Recurrent Neural Networks, Long Short-Term Memory (LSTM), **Convolutional Neural Networks** - The Basic Structure of a Convolutional Network Training a Convolutional Network, **Deep Reinforcement Learning** - The Basic Framework of Reinforcement Learning

COURSE CONTENT

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
1.	A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of AND and OR gates.	Python Programming	Analytical/Problem solving through coding
2	Simulate XOR Gate Using Multi-Layer Perceptron with Error Back Propagation.	TensorFlow /Keras/ Python	Analytical/Problem solving through coding
3	Develop a feedforward neural network to classify digits as even or odd.	Python	Data Analysis/ Problem solving through coding
4	Neural networks can solve some really interesting problems once they are trained. They are very good at pattern recognition problems and with enough elements (called neurons) can classify any data with accuracy. Develop a deep neural network to classify Wine samples in the dataset available at - http://archive.ics.uci.edu/ml/datasets/Wine	TensorFlow /Keras/Python	Data Analysis/ Problem solving through coding
5	Build a neural network model to classify movie reviews as positive or negative using the IMDB Movie reviews dataset available at https://ai.stanford.edu/~amaas/data/sentiment/	Keras/Python	Data Analysis/ Problem solving through coding
6	Develop your own neural network to predict daily bike rental ridership using the data set available at https://archive.ics.uci.edu/ml/datasets/bike+sharing+dataset. Perform the necessary data preprocessing to improve the model performance.	TensorFlow /Keras/Python	Data Analysis/ Problem solving through coding

7	Develop a python program that implements an artificial neural network to predict the prices of houses. Use the input data set available at https://www.kaggle.com/prasadperera/the-boston-housing-dataset/data	TensorFlow /Keras/Python	Data Analysis/ Problem solving through coding
8	Build your own convolutional network for classifying digits in MNIST dataset	TensorFlow /Keras/Pyt	Data Analysis/ Problem solving
9	Develop a neural network model in Keras to make predictions using **pima-indians-diabetes dataset available at https://raw.githubusercontent.com/jbrownlee/Datasets/master/pima-indians-diabetes.data.csv**	TensorFlow /Keras/Python	Data Analysis/ Problem solving through coding
10	Develop a simple Recurrent Neural Network from scratch using Keras / Numpy.	Keras/Python	Data Analysis/ Problem solving
11	Develop an RNN to classify movie reviews as positive or negative. Use the dataset available at https://victorzhou.com/movie-reviews-dataset.zip	Tensorflow /Keras/Python	Data Analysis/ Problem solving through coding
12	Develop your CNN to recognize photos. Train your CNN using CIFAR 10 dataset in Keras. Use data augmentation techniques to improve your model.	TensorFlow /Keras/Python	Data Analysis/ Problem solving through coding

TEXTBOOKS:

1. Charu Aggarwal, "Neural Networks and Deep Learning", Springer, 2018.
2. Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning", MIT Press

REFERENCEBOOKS:

1. Francis Chollet, "Deep Learning with Python", Manning, 2018.
2. Jacek M. Zurada, Introduction to Artificial Neural Systems, PWS Publishing Company, 1995.
3. Simon Haykin, Neural Networks: A Comprehensive Foundation, Macmillan College Publishing Company, 1994.
4. Mohamad H. Hassoun, Fundamentals of Artificial Neural Networks, The MIT Press, 1995.
5. Laurene Fausett, Fundamentals of Neural Networks: Architectures, Algorithms, and Applications, Prentice Hall International, Inc., 1994.
6. B. D. Ripley, Pattern Recognition and Neural Networks, Cambridge University Press. 1996.

JOURNALS/MAGAZINES

1. IEEE Transactions on Neural Networks and Learning Systems https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=5962385
2. IEEE Transactions on Pattern Analysis and Machine Intelligence https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=34http://ijaerd.com/papers/special_papers/IT032.pdf
3. International Journal of Intelligent Systems https://onlinelibrary.wiley.com/journal/1098111x
4. http://www.charuaggarwal.net/neural.htm
5. http://neuralnetworksanddeeplearning.com/
6. https://github.com/mnielsen/neural-networks-and-deep-learning
7. deeplearning.stanford.edu
8. http://yann.lecun.com/exdb/mnist/
9. University of California Irvine Machine Learning Repository - https://archive.ics.uci.edu/ml/datasets.php

SWAYAM/NPTEL/MOOCs:

1. Swayam Nptel – Deep Learning – IIT Ropar https://onlinecourses.nptel.ac.in/noc21_cs35/preview
2. Coursera – Neural Networks and Deep Learning Andrew Ng
3. Coursera - Neural Networks for Machine Learning by Geoffrey Hinton in Coursera

SELF-LEARNINGEXERCISES:

1. Experiment with problems on Kaggle.com
2. Tweak the given solutions with changes to hyper-parameters

Course Title	Knowledge Representation and Reasoning(PE II)				Course Type		Theory	
Course Code	B20EAS601	Credits	03		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

Knowledge representation and reasoning is the field of artificial intelligence (AI) dedicated to representing information about the world in a form that a computer system can utilize to solve complex tasks such as diagnosing a medical condition or having a dialog in a natural language. Knowledge representation incorporates findings from psychology about how humans solve problems and represent knowledge in order to design formalisms that will make complex systems easier to design and build. Knowledge representation and reasoning also incorporates findings from logic to automate various kinds of reasoning, such as the application of rules or the relations of sets and subsets.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the fundamentals concepts of knowledge representation and reasoning.
2. Inculcate knowledge of reasoning, production systems and their usage in various application domains.
3. Gain expertise in Object oriented representation.
4. Discuss the actions and planning concepts.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Understand and explain the key terms, rules and concepts used in knowledge representation and reasoning	1 to 4,6, 11,12	1
CO2	Identify the core concepts and other application domains by making use of reasoning and production systems	1 to 3, 6,7,11	1
CO3	Apply features of object-oriented representation to analyze and interpret the data.	1 to 5, 11, 12	1,2
CO4	Describe the role of actions and planning with the help of mathematical concepts	1 to 6,10,12	1
CO5	Continuous learning with knowledge representation and reasoning for futuristic research development	11, 12	2
CO6	Applying mathematical concepts with continuous learning for progressing knowledge representation	11, 12	2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2		√	√			
CO3		√	√		√	
CO4		√	√	√		
CO5				√	√	
CO6			√			√

COURSE ARTICULATION MATRIX

CO#/ Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2		1					1	1	2		
CO2	3	2	1			1	1				1		1		
CO3	3	3	3	2	2						1	1	3	1	
CO4	3	1	2	1	2	1				1		1	3		
CO5											2	2		2	2
CO6											2	2		2	2

Note: 1-Low,2-Medium,3-High

COURSE CONTENT THEORY:

UNIT – 1

Introduction

Knowledge-Based Systems, Why Knowledge Representation?, Why Reasoning?, The Role of Logic, The Syntax, The Semantics, The Pragmatics, Explicit and Implicit Belief, Knowledge Engineering, Vocabulary, Basic Facts, Complex Facts, Terminological Facts, The Propositional Case, Handling Variables and Quantifiers, Dealing with Computational Intractability

UNIT – 2

Reasoning and Production Systems

Horn Clauses, SLD Resolution, Backward Chaining, Forward Chaining, Facts and Rules, Rule Formation and Search Strategy, Algorithm Design, Specifying Goal Order, Committing to Proof Methods, Controlling Backtracking, Negation as Failure, Production Systems: Basic Operation, Working Memory, Production Rules, Conflict Resolution, Applications and Advantages

UNIT – 3

Object Oriented Representation

Objects and Frames, Generic and Individual Frames, Reasoning with Frames, Object-Driven Programming with Frames, Noun Phrases, Concepts, Roles, and Constants, Interpretations, Entailment, Normalization, Structure Matching, Inheritance Networks. Strategies for Defeasible Inheritance, Extensions, Some Subtleties of Inheritance Reasoning

UNIT – 4

Actions and Planning

Non categorical Reasoning, Objective Probability, A Basic Bayesian Approach, Belief Networks, Dempster–Shafer Theory, Vagueness, The Situation Calculus, Complex Actions, Planning in the Situation Calculus, Progressive Planning, Regressive Planning, Planning as a Reasoning Task

TEXTBOOKS:

1. Ronald J.Brachman and Hector J.Levesque, "Knowledge Representation and Reasoning", First edition, Morgan Kaufmann Publishers, 2004.
2. Frank van Harmelen, Vladimir Lifschitz and Bruce Porter, "Handbook of Knowledge Representation", First edition , Elsevier Science,2008.

REFERENCEBOOKS:

1. Patrick Henry Winston, "Artificial Intelligence", Third Edition, Addison –Wesley Publishers, 1993
2. George F Luger, "Artificial Intelligence: Structures and Strategies for Complex Problem Solving", Sixth Edition, Pearson Education, 2009.
3. Stuart Russell and Peter Norvig, "Artificial Intelligence A Modern Approach", Third Edition , Pearson Education/Prentice Hall Series, 2015.
4. David L.Poole and Alan K.Mackworth , "Artificial Intelligence: Foundations of Computational Agents" Cambridge University Press, 2010
5. Pascal Hitzler, Markus Krotzsch and Sebastian Rudolph, "Foundations of Semantic Web Technologies", CRC Press- Taylor and Francis Group, 2009
6. Elaine Rich, Kevin Knight and Shivashankar B Nair, "Artificial Intelligence", Third Edition, Tata McGraw-Hill, 2009

JOURNALS/MAGAZINES

1. https://www.sciencedirect.com/topics/computer-science/knowledge-representation-and-reasoning
2. https://ieeexplore.ieee.org/document/6772009
3. https://www.sciencedirect.com/science/article/pii/S187705091732834X
4. https://www.emerald.com/insight/content/doi/10.1108/eb026790/full/html
5. https://onlinelibrary.wiley.com/toc/1098111x/3/3

SWAYAM/NPTEL/MOOCs:

1 https://nptel.ac.in/course.html
2 https://www.edx.org/course/machine-learning-fundamentals-2
3 https://www.edx.org/course/cs50s-introduction-to-artificial-intelligence-with-python
4 https://onlinecourses.nptel.ac.in/noc21_cs26/preview

Self-Learning Exercises:

3. Explore the core concepts of artificial intelligence
4. More exploration on machine learning
5. Explore Object oriented principles and design concepts
   Mathematical concepts related to knowledge representation and reasoning

Course Title	Information Retrieval System (PE-II)				Course Type		Theory	
Course Code	B20EJS602	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW

Information retrieval is the process through which a computer system can respond to a user's query for text-based information on a specific topic. IR was one of the first and remains one of the most important problems in the domain of natural language processing (NLP). Web search is the application of information retrieval techniques to the largest corpus of text anywhere -- the web -- and it is the area in which most people interact with IR systems most frequently.

COURSE OBJECTIVE(S)

The objectives of this course are to:

1. Describe the basic concepts of the information retrieval and its models.
2. Illustrate the use of query languages and its operations in real world applications
3. Demonstrate the use of user interfaces and visualization for search process
4. Explain the multimedia IR models, Indexing and searching the web concepts.
5. Explain the information Access Process for Human-computer Interaction.
6. Illustrate the different searching techniques using Hyperlinks

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Outline basic concepts of the information retrieval.	1 to 5	1,2
CO2	Apply appropriate Query technique on given real world applications	1 to 5	2
CO3	Develop user interfaces and visualization for search process to address research issues.	1 to 5	2,3
CO4	Identify appropriate indexing and searching method for Feature Extraction.	1 to 5	1,2
CO5	Analyze the information Access Process for Human-computer Interaction	1 to 5	1,2
CO6	Analyze different Searching techniques using Hyperlinks	1 to 5	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			
CO5				√		
CO6				√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	1								3	2	
CO2	3	2	3	1	2									3	
CO3	3	1	2	2	3									3	3
CO4	2	2	2	1	1								2	3	
CO5	2	2	2	1	1								2	2	
CO6	2	2	2	1	1								3	2	

Note: 1-Low,2-Medium,3-High

COURSE CONTENT
Theory:

Contents

UNIT-1

INTRODUCTION TO INFORMATION RETRIEVAL AND MODELING: Introduction: Basic Concepts, The Retrieval Process. Modelling: Introduction, classic Information Retrieval, Alternative set Theoretic Models, Alternative Algebraic Models, Alternative Probabilistic Models, Structured Text Retrieval Models, Models for browsing, Trends and research Issues.

UNIT-2

QUERY LANGUAGES AND QUERY OPERATIONS: Query languages: Introduction, keyword querying, Pattern Matching, Structural Queries, Query Protocols, Trends and research issues. Query Operations: Introduction, User Relevance Feedback, Automatic Local Analysis, Automatic Global Analysis, Trend and Research Issue.

Text Operations: Document Preprocessing, Document Clustering, Text Compression, Comparing Text compression Techniques. Indexing and Searching: Inverted files, Boolean Queries, Sequential Searching, Pattern Matching, Structural Queries, Compression

UNIT-3

USER INTERFACES AND VISUALIZATION: Human-computer Interaction, The information Access Process, Starting points, Query specification, context, using Relevance judgments, interface support for the search process, trends and research issues.

UNIT-4

MULTIMEDIA IR: Data Modeling, Query languages, Trends and research issues. Indexing and searching: A generic Multimedia indexing Approach, One-dimensional Time series, Two-dimensional color images, Automatic Feature Extraction.

Searching the web: Challenges, Characterizing the web, Search engines, Browsing, Metasearchers, Finding the needle in the Haystack, Searching using Hyperlinks.

TEXT BOOKS:

1. Ricardo Baeza -Yates and Berthier Ribeiro - Neto, Modern Information Retrieval: The Concepts and Technology behind Search 2nd Edition, ACM Press Books 2011.
2. William B.Frakes, Ricardo Baeza-Yates "Information Retrieval : Data Structures and Algorithms" Fifth edition, Pearson,2012.

REFERENCE BOOKS:

1. C. Manning, P. Raghavan, and H. Schütze, Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Ophir Frieder "Information Retrieval: Algorithms and Heuristics: The Information Retrieval Series ", 2nd Edition, Springer, 2004.

JOURNALS/MAGAZINES

1. Springer Journal on Information Retrieval(https://link.springer.com/journal/10791)

SWAYAM/NPTEL/MOOCs:

https://www.nptel.ac.in/courses/106/101/106101007

SELF-LEARNINGEXERCISES:

Introduction about Text and Multimedia languages and properties, Meta data, text, Markup Languages, Multimedia.

Course Title	MODERN DATABASES(PE II)				Course Type		Theory	
Course Code	B20EAS603	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

This course will provide students with a general overview of databases, introducing you to database history, modern database systems, the different models used to design a database, and Structured Query Language (SQL), which is the standard language used to access and manipulate databases. Effective collection, analysis, and maintenance of data is key to achieve rapid progress in almost all disciplines of science and engineering.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Explain the concepts of DBMS and SQL
2. Discuss the Object oriented concepts and object relational Databases
3. Demonstrate the use of parallel and distributed databases in real world applications
4. Illustrate the development of Enhanced Data Model for given applications
5. Utilize a wide range of features available in a DBMS package.
6. Analyse database requirements and determine the entities involved in the system and their relationship to one another.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the concepts of DBMS and SQL in real world applications	1 to 4, 8, 9 , 12	1
CO2	Develop programs for Make use of the Object oriented concepts and object relational databases in real world applications.	1 to 3, 5,9,12	1
CO3	Apply features of Experiment with parallel and distributed databases.	1 to 5, 9, 12	2
CO4	Create enhanced Data Model for given applications	1,4,5,9,12	1
CO5	Utilize a wide range of features available in a DBMS package.	1,4,5,9,12	1
CO6	Analyse database requirements and determine the entities involved in the system and their relationship to one another.	1,4,5,9,12	1

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			√
CO2			√			√
CO3			√	√		
CO4			√	√	√	
CO5			√			
CO6				√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	2									3		
CO2	2	2	3		2									3	
CO3	3	1	2	1	2										3
CO4	3			2	2								3	3	3
CO5	3			2	2								3	3	3
CO6	3			2	2								3	3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Overview of DBMS and SQL: Introduction to DBMS and SQL, SQL Data Definition and Data Types, Schema change statements in SQL, Specifying basic constraints in SQL, Basic Queries in SQL, More Complex Queries in SQL.

UNIT-2

Modern database: General Constraints as Assertions, Views in SQL, Database Programming, Embedded SQL. Introduction to Hadoop, NoSQL, New SQL, MongoDB, Amazon RDS, Oracle & other latest technologies.

UNIT-3

Overview of Object-Oriented Concepts: Objects, Encapsulation, Polymorphism, Type and class hierarchies etc. Object model of ODMG, Object definition Language ODL; Object Query Language OQL

UNIT-4

Object and Object-Relational Databases: Overview of C++ language binding; Conceptual design of Object

database; Overview of object relational features of SQL; Object-relational features of Oracle.

TEXTBOOKS

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

REFERENCEBOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan: Database System Concepts, 6th Edition, McGraw Hill, 2010.
2. C J Date, Database Design and Relational Theory: Normal Forms and All that Jazz, O 'Reilly, April 2012.
3. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier, 2011.
4. Connolly and Begg, Database Systems, 4th Edition, Pearson Education, 2002.

JOURNALS/MAGAZINES

1. IEEE, IEEE Transactions on Knowledge and Data Engineering
2. Elsevier, Elsevier Data and Knowledge Engineering
3. ACM, ACM Transactions on Database Systems

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/courses?query=database
2. https://www.edx.org/learn/databases
3. https://academy.oracle.com/en/solutions-curriculum.html

SELF-LEARNING EXERCISES

1. Data warehousing, Data Marts, Getting data into the warehouse More exploration on GIThub
2. Data warehousing &KM, Data warehousing & CRM C modules interface

Course Title	Information Theory and coding(PE – II)				Course Type		Theory	
Course Code	B20EAS604	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	IA	SEE
	Tutorial	0	0	0				
	Total	3	3	3	39	0	50%	50%

Course Overview:

Information produced in many ways every day such as text, image, video etc. If directly stored as it received makes the security in question mark also it occupies more storage area. This course discusses about the various forms of information and its storage methods.

Course Objective(s):

The objectives of this course are:

1. To introduce the concept of information
2. To understand the limits of error free representation of information signals and the transmission of such signals over a noisy channel
3. To design and analyses data compression techniques with varying efficiencies as per requirements
4. To understand the concept of various theorems proposed by Shannon for efficient data compression and reliable transmission
5. To give idea on different coding techniques for reliable data transmission
6. To design an optimum decoder for various coding schemes used.

Course Outcome(s):

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

CO#	Course Outcomes	POs	PSOs
CO1	Students will be able to understand the concept of information and entropy	1,2,3,12	1,2
CO2	Students will be able to design a lossless transmission system on the basis of channel capacity and source coding theorem	1,2,3,5,12	1,2
CO3	Students will be able understand the basics of Gaussian Channel & Shannon's Limit	1,2,3,5,12	1,2
CO4	Students will be able to analyze error correction and detection using linear block codes.	1,2,3,5,12	1,2
CO5	Students will be able to analyze error correction and detection using cyclic codes.	1,2,3,5,12	1,2
CO6	Students will be able to implement encoding and decoding of convolutional codes.	1,2,3,5,12	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyse (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2						√
CO3		√	√			
CO4	√			√		
CO5	√			√		
CO6			√			√

COURSE ARTICULATION MATRIX

CO#/ POs		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	3	1									2	3	2	
CO2		3	3	2		2							2	3	2	
CO3		3	3	2		2							2	1	1	
CO4		3	3	3		2							2	3	2	
CO5		3	3	3		2							2	3	2	
CO6			3	3		2							2	3	2	

Note: 1-Low, 2-Medium, 3-High

Course Content

Theory

Contents

UNIT-1

Fundamentals of Information Theory: Introduction to Information Theory. Concept of information, units, entropy, marginal, conditional and joint entropies, relation among entropies, mutual information, information rate.

Source coding: Instantaneous codes, construction of instantaneous codes, Kraft's inequality, coding efficiency and redundancy, Huffman coding

UNIT-2

Channel capacity and Source Channels: Channel capacity – redundancy and efficiency of a channel, binary symmetric channel (BSC), Binary erasure channel (BEC) – capacity of band limited Gaussian channels.

Continuous Sources and Channels: Differential Entropy, Mutual information, Waveform channels, Gaussian channels, Shannon – Hartley theorem, bandwidth, SNR trade off, capacity of a channel of infinite bandwidth, Shannon's limit.

UNIT-3

Rings and Perfect codes: Introduction to rings, fields, and Galois fields. Codes for error detection and correction – parity check coding – linear block codes – error detecting and correcting capabilities – generator and parity check matrices – Standard array and syndrome decoding.

Perfect codes, Hamming codes, encoding and decoding cyclic codes, generation of cyclic codes, decoding of cyclic codes BCH codes, Construction and decoding

UNIT-4

Convolutional Codes: Convolutional Codes – encoding – time and frequency domain approaches, State Tree & Trellis diagrams – transfer function and minimum free distance – Maximum likelihood decoding of convolutional codes – The Viterbi Algorithm. Sequential decoding

TEXT BOOKS:

1. P S Sathya Narayana, Concepts of Information Theory & Coding, Dynaram Publications, 2005.
2. Simon Haykin: Digital Communication Systems, Wiley India, 2013.
3. Bose, Information theory coding and cryptography, 3/e McGraw Hill Education India , 2016
4. D.E.R. Denning, Cryptography and Data Security, Addison Wesley, 1983.
5. K. Sam Shanmugam, "Digital and Analog Communication Systems" reprint: 2014, by John Wiley & Sons. ISBN: 978-81-265-3680-1

REFERENCE BOOKS:

1.J S Chitode, Information Theory and Coding, Technical Publications, Pune, 2009
2. Kelbert & Suhov, Information theory and coding by examples, Cambridge University Press, 2013
3. Shu Lin & Daniel J. Costello. Jr., Error Control Coding : Fundamentals and Applications, 2/e, Prentice Hall Inc., Englewood Cliffs, NJ,2004

JOURNALS/MAGAZINES

1. https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=18
2. https://www.inderscience.com/jhome.php?jcode=ijicot
3. https://airccse.org/journal/ijit/index.html

SWAYAM/NPTEL/MOOCs

1. https://www.mooc-list.com/tags/information-theory
2. https://www.coursera.org/learn/information-theory
3. https://nptel.ac.in/courses/108/102/108102117/

Course Title	Control Systems(PE III)				Course Type		Theory	
Course Code	B20EAS605	Credits	3		Class		VI Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	3	3	3	39	-	50%	50%

Course Overview:

Control systems begin with a discussion of the systems and representation of linear time invariant systems. The subject provides a wide idea in analysis of the LTI systems in both time domain and frequency domains. It provides idea about the powerful graphical techniques like bode, root locus, polar and nyquist methods in analyzing the LTI systems. The stability analysis is also provided briefly in which absolute, asymptotic and relative stability is discussed. The modern control modeling method state variable analysis is also discussed in a wide manner.

Course Objective(s):

The objectives of the course are:

1. To understand the different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response
2. To assess the system performance using time domain analysis and methods for improving it
3. To assess the system performance using frequency domain analysis and techniques for improving the performance.
4. To introduce state variable representation of physical systems and study the effect of state feedback

Course Outcome(s):

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

CO#	Course Outcomes	Pos	PSOs
CO1	Develop the mathematical model of the physical systems	1,2	1
CO2	Apply methods of representation of systems and Design their transfer function models	1,2,4,5	
CO3	Analyze the time response using Controllers	1,2,4,5	
CO4	Derive the open and closed loop time and frequency response of LTI systems and Analyze the steady state error	1,2,3,4,5,6	
CO5	Analyze the stability of the closed and open loop systems	1,2,3,4,5,6	
CO6	Develop and analyze state space models	1,2,4,5,6	

Bloom's Level of Course Outcomes:

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2			√			
CO3				√		
CO4			√			
CO5			√			
CO6			√			

COURSE ARTICULATION MATRIX:

CO# / POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											2		
CO2	3	3		2	2										
CO3	3	3		2	2										
CO4	3	3	1	2	2	1									
CO5	3	3	1	2	2	1									
CO6	3	3		2	2	1									

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY

Content

Unit I

Introduction to Control Problem: Industrial Control examples. Mathematical models of physical systems. Control hardware and their models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram algebra.

Unit II

Time Response: Standard test signals, Unit step response of First and Second order Systems. Time response specifications, Time response specifications of second order systems, steady state errors and error constants. Introduction to PI, PD and PID Controllers.

Unit III

FREQUENCY RESPONSE: Frequency response – Bode plot – Polar plot – Determination of closed loop response from open loop response - Correlation between frequency domain and time domain specifications
Stability Analysis: Characteristics equation – Routh Hurwitz criterion – Nyquist stability criterion

Unit IV

STATE VARIABLE ANALYSIS: Concept of state variables – State models for linear and time invariant Systems – Solution of state and output equation in controllable canonical form – Concepts of controllability and observability –Effect of state feedback.

TEXT BOOKS:

1. M. Gopal, 'Control Systems, Principles and Design', 4th Edition, Tata McGraw Hill, New Delhi,2012
2. S.K.Bhattacharya, Control System Engineering, 3rd Edition, Pearson, 2013.

REFERENCE BOOKS:

1. Arthur, G.O.Mutambara, Design and Analysis of Control; Systems, CRC Press, 2009.
2. Richard C. Dorf and Robert H. Bishop, " Modern Control Systems", Pearson Prentice Hall, 2012.
3. Benjamin C. Kuo, Automatic Control systems, 7th Edition, PHI, 2010.
4. K. Ogata, 'Modern Control Engineering'1, 5th edition, PHI, 2012.

J**OURNALS/MAGAZINES:**

1. IEEE Journal on Automatic Control
2. International Journal of Control, Automation and Systems(IJCAS), Springer
3. Journal of Control Science and Engineering
4. IFAC Journal of System and Control, Elsevier

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/topic/control-systems/
2. https://www.edx.org/course/introduction-to-control-system-design-a-first-look
3. https://onlinecourses.nptel.ac.in/noc19_de04/
4. https://www.isa.org/training-and-certification/isa-training/control-systems-training

SELF LEARNING EXERCISE:

1. Case study on effect of P, PI, and PID Controllers
2. Design a controller using MATLAB Software

Course Title	PREDICTIVE ANALYTICS USING R (PE-III)				Course Type		Theory	
Course Code	B20EAS606	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

R has become the language of choice for data analytics. Students will learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication. The focus in the treatment of these topics will be on breadth, rather than depth, and emphasis will be placed on integration and synthesis of concepts and their application to solving problems. To make the learning contextual, real datasets from a variety of disciplines will be used. Data Science is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions.

COURSE OBJECTIVE

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

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Compare various measures of central tendency and dispersions of a dataset using R programming	1 to 5	1, 2, 3
CO2	Design and develop the programs in R to solve real world problems.	1 to 5	1, 2, 3
CO3	Develop R programs for implementation of regression, classification and clustering algorithms	1 to 5	1, 2, 3
CO4	Identify suitable algorithm and model for processing the language using natural language processing.	1 to 5	1, 2
CO5	Learn new tools and technologies in the Predictive analysis and apply for suitable application development.	12	1,2
CO6	Develop solutions to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	1,2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√		√		
CO2			√			√
CO3				√	√	√
CO4		√	√		√	
CO5			√	√		
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	3								3	3	3
CO2	3	1	3	2	3								3	3	3
CO3	3	2	3	3	3								3	3	3
CO4	3	1	3	2	3								3	3	
CO5												2			
CO6					2				2	2					

Note: 1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents
UNIT-1
Data Definition: Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Introduction to statistical learning and R Programming. **Descriptive Statistics**: Measures of central tendency, Measures of location of dispersions, Practice and analysis with R.
UNIT-2
R-programming: History and overview of R: R nuts and bolts, Getting Data In and Out of R, Interfaces to the Outside World, Subsetting R Objects, Managing Data Frames with the dplyr package, Control structures, Functions, Loop functions, R Graphics: Quickly exploring data and Bar graphs. **Basic Analysis Techniques**: Basic analysis techniques, Statistical hypothesis generation and testing, Chi-Square test, t-Test, Analysis of variance Correlation analysis
UNIT-3
Regression Algorithms: Ordinary Least Squares, Lasso, Bayesian **Classification Algorithms:** Logistic, Decision Tree, kNN, Random Forest, Ensemble models – Bagging and Boosting **Clustering Algorithms:** K-means, DBSCAN, Hierarchical, Agglomerative Case study: Jake's Exercise: Naive Bayes for Article Classification.
UNIT-4
Natural Language Processing: Bag-of-words model and algorithms for NLP. Machine Learning with stats models and mlr- package for machine learning for R, Deep learning with Tensor Flow for R.

TEXT BOOKS:

1. Eric Mayor, "Learning Predictive Analytics with R", Packt Publishing, ASIN: BOOYSIKNKC, 2015.
2. Rachel Schutt and Cathy O'Neil, " Doing Data Science", Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472, 2013.
3. Roger D. Peng, "R Programming for Data Science", Leanpub, 2015.
4. Winston Chang, "R Graphics Cookbook Practical Recipes for Visualizing Data", O'Reilly Media, 2012.
5. **Kuhn,** Max, **Johnson** and Kjell, "Applied Predictive Modeling", Springer eBook, 2012.

REFERENCE BOOKS:

1. John Main donald, W. John Braun, "Data Analysis and Graphics Using R – an Example Based Approach", 3rd Edition, Cambridge University Press, 2010.
2. Johannes Le dolter, "Data Mining And Business Analytics With R", WILEY, 2013.

JOURNALS/MAGAZINES:

1. Inderscience Journal of Data Mining , Modelling and Management
2. ACM Transactions on Knowledge Discovery from Data (TKDD)
3. ACM Transactions on data Science (TDS).

SWAYAM/NPTEL/MOOCS:

1. https://nptel.ac.in/courses/110/107/110107129/
2. https://onlinecourses.nptel.ac.in/noc19_mg47/preview
3. https://onlinecourses.swayam2.ac.in/cec20_cs12/preview

SELF LEARNING EXERCISES:

Visualization Tools in R, Deep Learning with R.

Course Title	Bioinformatics (PE-III)				Course Type		Theory	
Course Code	B20EAS607	Credits	3		Class		VI Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

Bioinformatics represents a new, growing area of science that uses computational approaches to answer biological questions. Answering these questions requires that investigators take advantage of large, complex data sets (both public and private) in a rigorous fashion to reach valid, biological conclusions. The potential of such an approach is beginning to change the fundamental way in which basic science is done, helping to more efficiently guide experimental design in the laboratory.

COURSE OBJECTIVE(S):

The objectives of this course are to:

1. Explain the fundamentals of Bioinformatics, Technological Tools and its understanding in problem solving
2. Inculcate knowledge of applying tools in analyzing bio-centric complex problems and patterns
3. An experimental and computational knowledge to embrace a systems biology approach under Database
4. Discuss the Applications on predictive models and phylogenetic methods using Machine Learning

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Introducing Bioinformatics in Technological Computation approaches for solving complex problems	1, 2	1
CO2	Developing domain knowledge on applying, analyzing and validating bioinformatics and Databases under WEB	1,3	1
CO3	Able to understand the data structure (databases) used in bioinformatics and interpret the information	1,2,3	2
CO4	Understanding current research and to be able to critically evaluate the literature and to identify the influence of machine learning in bioinformatics	1,2,3,4,12	1
CO5	Apply machine learning algorithms for cluster analysis and feature extraction on gene networks	1 to 4,9,12	1
CO6	Apply Phylogenetic analysis and predictive methods for tree building and tree Evaluation	1 to 4,9,12	1

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√		√		
CO2			√	√		
CO3		√				
CO4		√	√	√	√	√
CO5			√			
CO6			√			

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2											3		
CO2	3		2										3		
CO3	3	2	3											3	
CO4	3	2	2	3								3	3		
CO5	3	2	3	2					1			2	3		
CO6	3	2	3	2					1			2	3		

Note: 1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – 1

Introduction to Bioinformatics & Internet – History and Scope of Bioinformatics, Dogma- Central and Peripheral, Observables and data archives, WWW & Programming, Biological classification and nomenclature, searching for similar sequences in databases: PSI-BLAST, Introduction to protein structure, Classification, Protein structure prediction and engineering

UNIT – 2

Structure Databases and Sequence Alignment: Introduction, Evolutionary basis of sequence alignment, Optimal alignment methods, Substitution scores & gap penalties, Statistical significance of alignments, Database similarity searching, FASTA, BLAST, Low complexity regions, Repetitive elements, Multiple Sequence Alignment: Progressive alignment methods, Motifs and patterns, Genomic Mapping

UNIT – 3

Phylogenetic analysis and predictive methods: Elements of phylogenetic models, data analysis: Alignment, substitution model building, tree building and tree evaluation, building methods, searching for trees, hooting trees, Evaluating trees and data, phylogenetic software Some simple practical consideration, Gene structure Genome-types, Gene Prediction tools, Genome, Browsers, Genome Annotation pipeline Codon Bias Detection, Protein identity based on composition, Propsearch, Physical properties based on sequences, secondary structure features prediction, Tertiary structure, homology modeling, and initio methods threading

UNIT – 4

Advances in Bioinformatics: Machine Learning - Supervised, Unsupervised, Dimensional Reduction, Cluster Analysis, Classification and Regression models, Feature Extraction (Biological Data Coding), Gene Network, S- Systems.

TEXTBOOKS:

1. Arthur M Lesk, “Introduction to Bioinformatics”, Fourth Edition, Oxford Press, 2014
2. Andreas D. Baxevanis, B. F. Francis Ouellette, “BIOINFORMATICS: A Practical Guide to the Analysis of Genes and Proteins” Second Edition, A John Wiley & Sons, Inc., Publication, 2001
3. Yang, Zheng Rong. Machine learning approaches to bioinformatics. Vol. 4. World scientific, 2010.

REFERENCEBOOKS:

1. Jones, Neil C., Pavel A. Pevzner, and Pavel Pevzner. “An introduction to bioinformatics algorithms”. MIT press, 2004.
2. Ramsden, Jeremy. “Bioinformatics: an introduction”, Vol. 21. Springer, 2015.
3. Mitra, Sushmita, Sujay Datta, Theodore Perkins, and George Michailidis “Introduction to machine learning and bioinformatics”. CRC Press, 2008.

JOURNALS/MAGAZINES

1. Aoki-Kinoshita, Kiyoko F. "An introduction to bioinformatics for glycomics research." PLoS computational biology 4, no. 5 (2008): e1000075.
2. Wang, Jason TL, Mohammed J. Zaki, Hannu TT Toivonen, and Dennis Shasha. "Introduction to data mining in bioinformatics." In Data Mining in Bioinformatics, pp. 3-8. Springer, London, 2005.
3. Ewens, Warren J., and Gregory R. Grant. Statistical methods in bioinformatics: an introduction. Springer Science & Business Media, 2006.

SWAYAM/NPTEL/MOOCs:

Coursera – Bioinformatics

Self-LearningExercises:

1. Explore Bioinformatics
2. DNA Sequencing and Analysis

Course Title	Speech Processing (PE-III)				Course Type		Theory	
Course Code	B20EAS608	Credits	3		Class		VI Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

Speech processing is a discipline of computer science that deals with designing computer systems that recognize spoken words. The main purpose of speech processing is (i) To understand speech as a means of communication (ii) To represent speech for transmission and reproduction (iii) To analyze speech for automatic recognition and extraction of information and (iv) To discover some physiological characteristics of the talker. Speech recognition software works by breaking down the audio of a speech recording into individual sounds, analyzing each sound, using algorithms to find the most probable word fit in that language, and transcribing those sounds into text. Hidden Markov Models (HMMs) provide a simple and effective frame- work for modelling time-varying spectral vector sequences. As a con- sequence, almost all present day large vocabulary continuous speech recognition (LVCSR) systems are based on HMMs.

COURSE OBJECTIVE(S)

The objective of this course is:

1. To introduce the mathematical basics of speech modeling, and its applications.
2. To understand the various applications of speech modeling
3. To comprehend the computational concepts learned in the lecture classes through numerical simulations and programming
4. To help the students extend their understanding of signal processing algorithms for speech processing.
5. To strengthen the research skills of students in speech processing.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply the mathematical methods required for speech modelling	1, 2, 12	1, 2
CO2	Analyze the various applications of speech modeling theory	1, 2, 12	2, 3
CO3	Evaluate the selected machine learning algorithms used in spoken language processing	1, 2, 4	2, 3
CO4	Implement the selected speech modeling algorithms, and understand the characteristics of the different types of speech signals	1, 2, 3	3
CO5	Develop an insight into the working of the machine learning algorithms used in spoken language processing	1, 2, 3, 12	3
CO6	Develop solutions in the speech processing to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√	√		
CO3			√	√		
CO4			√	√		
CO5			√		√	
CO6				√		√

COURSE ARTICULATION MATRIX

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2										2	2	2	
CO2	2	2										2		2	2
CO3	3	3		3										2	2
CO4	3	2	3												3
CO5	3	2	3									3			3
CO6					3				3	3					3

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

Contents

UNIT 1

Speech analysis - source filter modeling - Speech sounds - Lip radiation - Linear prediction - Lattice filters - Levisnon-Durbin recursion. Feature extraction for speech processing: Short Term Fourier Transform - Mel frequency cepstral coefficients (MFCC) - Perceptual linear prediction (PLP) - Mel filter bank energies

UNIT 2

Principles of speech coding - Main characteristics of a speech coder - Key components of a speech coder - From predictive coding to CELP - Improved CELP coders - Wide band speech coding - Audio-visual speech coding. Speech synthesis: Linguistic processing - Acoustic processing - Training models automatically - Text preprocessing - Grapheme to phoneme conversion – Rule based and decision tree approaches - Syntactic prosodic analysis - Prosodic analysis - Speech signal modeling.

UNIT 3

Principles of speech recognition - Hidden Markov models (HMM) for acoustic modeling, Observation probability and model parameters - HMM as probabilistic automata - Viterbi algorithm - Language models - n-gram language modeling and difficulties with the evaluation of higher order n-grams and solutions - Spoken language identification – Approaches – Acoustic – Phonetic – (LVCSR) Large Vocabulary Continuous Speech Recognition based.

UNIT 4

Introduction to text to speech synthesis (TTS) - popular techniques used in TTS -Introduction to speech understanding – challenges ahead in developing state-of-the-art natural language processing systems. Spoken keyword spotting approaches - Evaluation metric - detection error trade-off (DET) – measured by equal error rate (ER) – Cost function – weighted error rate and half total error rate (HTER).

TEXT BOOKS:

1. Joseph Mariani (Ed), Language and Speech Processing, John Wiley and Sons, 2009.
2. Xuedong Huang, Alex Acero and Hsiao-Wuen Hon, Spoken Language Processing, A Guide to Theory, Algorithm and System Development, Prentice Hall Inc, New Jersey, USA, 2000.
3. Lawrence R Rabiner and Ronald W Schafer, Digital Processing of Speech Signals, Pearson Education, 2003.

REFERENCE BOOKS:

1. J Benesty, M MSondhi, Y. Huang (Eds.), "Springer Handbook on Speech Processing", Springer-Verlag Berlin, Heidenberg, 2008.
2. Thomas F. Quatieri Cloth, Discrete-Time Speech Signal Processing: Principles and Practice, Prentice Hall Inc, 2008.
3. B. Gold and N. Morgan, Speech and Audio Signal Processing: Processing and Perception of Speech and Music, Wiley, 2000.

JOURNALS/MAGAZINES

1. IEEE Transactions on Speech Processing
2. Signal Processing - Journal – Elsevier
3. International Journal of Speech Technology - Springer.

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/lecture/nlp-sequence-models/speech-recognition-sjiUm
2. https://nptel.ac.in/courses/117/105/117105145/
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-345-automatic-speech-recognition-spring-2003/
4. https://swayam-uat-node1.appspot.com/practice_course1/preview

Self-Learning Exercises:

Case study, Assignments, MOOC / Coursera/Conference

Course Title	Advanced Topics in Machine Learning (PE-IV)				Course Type		Theory	
Course Code	B20EAS609	Credits	3		Class		VI Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	0	0	0	Theory	Practical	CIE	SEE
	-	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

The course combines breadth and depth of concepts involved in machine learning, offering advanced concepts on learning, hypothesis, analytical learning, inductive analytical approaches to learning

COURSE OBJECTIVE (S):

The objectives of the course are to:

1. Enable students to understand advanced probabilistic concepts in machine learning
2. Explore various models in advanced machine learning.
3. Design model parameters
4. Help the student choose most appropriate model to solve a problem.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the advanced concepts in machine learning techniques	1,2,3,4,5,12	1,2
CO2	Examine the problem to determine correct model to apply	1,2,3,4,5,12	1,2
CO3	Estimate parameters of different types of models in advanced machine learning	1,2,3,4,5,12	1,2
CO4	Decide on the best ML approach and model to apply for solving a real world problem.	1,2,3,4,5,12	1,2
CO5	Learn new tools and technologies in the Machine learning and apply for suitable application development.	12	1,2
CO6	Develop solutions in the Machine learning to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2				√		
CO3		√				

CO4				√		
CO5			√			
CO6			√			

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3			1	1			3	3	3	
CO2	3	3	3	3	3				1			3	3	3	
CO3	3	2	2	2	3				1			2	3	3	
CO4	3	3	2	3	3				1			3	3	3	
CO5												2	2	2	
CO6					3				3	3			3	3	2

Note: 1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT – I

Introduction – Machine Learning : what and why – Types of ML, Supervised Learning – Classification , Regression, Unsupervised Learning – discovering clusters, discovering latent factors. Parametric vs non-parametric models, a simple non-parametric classifier – K-nearest neighbors, Curse of dimensionality, Parametric models for classification and regression, linear regression, logistic regression, overfitting, model selection, no free lunch theorem. **A brief review of probability** – Discrete random variables, discrete distributions, Bayes rule. **Bayesian Statistics** - MAP estimation, Bayesian Occam's razor, Priors – Uninformative priors, Jeffreys priors, Robust priors, Mixtures of conjugate priors

UNIT – 2

Gaussian Models : Introduction – notation, basics, MLE for an MVN, Maximum entropy derivation of the Gaussian, Linear discriminant analysis, two class LDS, Nearest shrunken centroids classifier

Linear Regression – Maximum Likelihood estimation least squares- derivation, robust linear regression, ridge regression – basic idea, connection with PCA, Bayesian Linear Regression – computing posterior, computing posterior predictive, Bayesian linear regression.

Bayesian Logistic Regression – Laplace approximation.

Boosting - Forward stage wise additive modeling, L2 bosting, AdaBoost, LogitBoost, Boosting as functional gradient descent, sparse boosting. Ensemble learning – stacking

UNIT – 3

Bayesian Concept Learning – Likelihood, prior, posterior, posterior predictive. Beta binomial model – likelihood, prior,

posterior, posterior predictive, Dirichlet multinomial model-likelihood, prior, posterior, posterior predictive.

Gaussian Models – Notation, Basics, Maximum likelihood estimation for a MVN. Gaussian discriminant analysis – quadratic discriminant analysis, linear discriminant analysis, two class LDA, regularized LDA, nearest shrunken centroids classifier.

Advanced Models -Generalized linear models – basics, Probit regression –ML/MAP estimation using gradient based optimization

UNIT – 4

Multi-task learning – Hierarchical Bayes for multi task learning, application to personalized email spam filtering, Directed Graphical Models (Bayes nets) – Markov and Hidden Markov Models, Medical Diagnosis, Mixture Models – Mixtures of Gaussians, using mixture models for clustering. EM algorithm for GMMS, l1 and l2 regularization, Kernel functions – RBF, kernels for comparing documents, Mercer kernels, linear kernels, Matern kernels, string kernels, string kernels, Pyramid match kernels. Kernel machines, kernel trick, kernelized nearest neighbor classification, kernelized K-medoids clustering, kernelized ridge regression.

TEXTBOOKS:

1. Kevin P. Murphy Machine Learning: A Probabilistic Perspective,2012, The MIT Press.

REFERENCEBOOKS:

1. Tom M. Mitchell, “Machine Learning”, India Edition McGraw Hill Education, 2013.
2. Chris Bishop, “Pattern Recognition and Machine Learning” , Springer (India) Private Limited, 2013.
3. Ethem Alpaydin, “Introduction to Machine Learning”, Second edition MIT press, 2010, Chapters 1, 2, 6, 7, 19.
4. Yoshua Bengio and Aaron Courville , ”Deep Learning”, Ian Good fellow, MIT Press book,2016.
5. Richard o. Duda, Peter E. Hart and David G. Stork, “Pattern classification”, John Wiley & Sons Inc., 2001

JOURNALS/MAGAZINES

1. IEEE Transactions on Pattern Analysis and Machine Intelligence
2. Springer machine learning
3. Elsevier Computational Statistics and Data Analysis
4. Wiley- International Journal of Intelligent Systems

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/106/106/106106198/
2. Advanced Machine Learning Specialization -Coursera

Self-Learning Exercises:

Latent linear models – factor analysis, PCA, Sparse linear models

Course Title	HIGH PERFORMANCE COMPUTING(PE-V)				Course Type		Theory	
Course Code	B20EQS610	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: The goal of this course is to give students solid foundations for developing, analyzing, and implementing parallel and locality-efficient algorithms. This course focuses on theoretical underpinnings. To give a practical feeling for how algorithms map to and behave on real systems and will supplement algorithmic theory with hands-on exercises on modern HPC systems, such as Cilk Plus or OpenMP on shared memory nodes, CUDA for graphics co- processors (GPUs) and OpenMPI for message passing.

COURSE OBJECTIVE

The objectives of this course are to:

1. Explain the features of Modern processors and parallel computers
2. Describe different levels of parallelism along with the synchronization and scheduling
3. Demonstrate the use of features of OpenMP programming.
4. Illustrate the use of features of Open MPI programming.
5. Learn new tools and technologies in High Performance computing and apply for suitable solutions for application development.
6. Develop solutions in High Performance computing to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	Pos	PSOs
CO1	Identify different levels of parallelism that can be applied to solve the given real world problems.	1 to 5, 9 ,12	1,2
CO2	Develop the programs using different levels of parallelism to solve the real world problems.	1 to 4 , 9, 12	1,2
CO3	Make use of features of OpenMP to develop parallel programs for solving real world problems.	1 to 5, 9 ,12	3
CO4	Apply the features of Distributed-memory parallel programming with openMPI for solving real world problems.	1 to 5, 9 ,12	3
CO5	Learn new tools and technologies in High Performance computing and apply for suitable solutions for application development.	12	2
CO6	Develop solutions in High Performance computing to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	1 to 5,9,12	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√		√		√
CO2				√	√	√
CO3		√				
CO4			√			
CO5		√				
CO6						√

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2				3			1	3	3	
CO2	3	2	1	1					3			1	3	3	
CO3	3	2	2	2	2				3			1			3
CO4	3	2	2	2	3				2			2			3
CO5												2			
CO6					2				2	3	2				3

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY

Contents

UNIT-1

Modern Processors: Stored-program computer architect; General-purpose cache-based microprocessor architecture; Memory hierarchies; Multicore processors; Multithreaded processors; Vector processors.
Parallel computers: Taxonomy of parallel computing paradigms; Shared-memory computers; Distributed-memory computers; Hierarchical (hybrid) systems; Networks.

UNIT-2

Basics of parallelization: Why parallelize; Parallelism; Parallel scalability.

UNIT-3

Shared-memory parallel programming with OpenMP: Introduction to OpenMP; Case study: OpenMP-parallel Jacobi algorithm; Advanced OpenMP: Wavefront parallelization.
Efficient OpenMP programming: Profiling OpenMP programs; Performance pitfalls; Case study: Parallel sparse matrix-vector multiply.

UNIT-4

Distributed-memory parallel programming with MPI: Message passing; A short introduction to MPI; Example: MPI parallelization of a Jacobi solver.
Efficient MPI programming: MPI performance tools; Communication parameters; Synchronization, serialization, contention; Reducing communication overhead; Understanding intranode point-to-point communication.

TEXT BOOKS:

1. Georg Hager, Gerhard Wellein," Introduction to High Performance Computing for Scientists and Engineers", CRC, Press, 2011.

REFERENCE BOOKS:

1. Rohit Chandra, Leo Dagum , DrorMaydan , David Kohr, Jeff McDonald , Ramesh Menon, "Parallel Programming inOpenMP", Morgan Kaufmann,2000
2. Shameem Akhter and Jason Roberts 6," Multi-core programming, Increase performance through software multithreading", IEEE Transactions on Knowledge and Data Engineering.
3. Kai Hwang ", Advanced Computer Architecture: Parallelism, Scalability, Programmability", TATA McGraw Hill, 1993
4. George S. Almasi and Alan Gottlieb,"Highly Parallel Computing".
5. 5.Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar ,"Introduction to Parallel Computing", Addison-Welsey, 2003.

JOURNALS/MAGAZINES:

1. International *Journal* of *High Performance Computing* Applications, ACM
2. The International *Journal* of *High Performance Computing* Applications, sagepub
3. International *Journal* of *High Performance Computing* and Networking, Inderscience

SWAYAM/NPTEL/MOOCS:

1. https://nptel.ac.in/courses/112/105/112105293/
2. https://nptel.ac.in/courses/106/103/106103206/

SELF LEARNING EXERCISES:

More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

Course Title	Business Intelligence (PE IV)				Course Type		Theory	
Course Code	B20EAS611	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

This course provides an introduction to the concepts of business intelligence (BI) as components and functionality of information systems. It explores how business problems can be solved effectively by using operational data to create data warehouses, and then applying data mining tools and analytics to gain new insights into organizational operations. Detailed discussion of the analysis, design and implementation of systems for BI, including: the differences between types of reporting and analytics, enterprise data warehousing, data management systems, decision support systems, knowledge management systems, big data and data/text mining. Case studies are used to explore the use of application software, web tools, success and limitations of BI as well as technical and social issues.

COURSE OBJECTIVE(S)

The objective of this course is:

1. To define the importance of business intelligence.
2. Identify how various business intelligence systems can contribute to organizational success.
3. Apply common methods used in business intelligence.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Identify concept, process, and practice of the data science and how methodologies are applied to visualize information from raw data.	1,2	1, 2
CO2	Explore various predictive and statistical approach used in business intelligence	1, 2,	2, 3
CO3	Analyze BI concepts and techniques	1, 2, 4	2, 3
CO4	Apply BI Techniques for various situations	1, 2, 3	3
CO5	Implement BI techniques by using various tools and Create data visualization.	1, 2, 3, 12	3
CO6	Develop solutions to the complex problems of, business intelligence either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2		√				
CO3				√		
CO4			√	√		
CO5			√		√	
CO6				√		

COURSE ARTICULATION MATRIX

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2											2	2	
CO2	2	2												2	2
CO3	2	3		3										2	2
CO4	3	2	3												3
CO5	3	2	3									3			3
CO6					3				3	3					3

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY

Contents

UNIT 1

An Overview of Business Intelligence: A Framework for Business Intelligence, Analytics Overview, Analytics Examples in Selected Domains, A Brief Introduction to Big Data Analytics, An Overview of the Analytics Ecosystem, **Descriptive Analytics -1:** The Nature of Data, A Simple Taxonomy of Data, The Art and Science of Data Preprocessing, Data Visualization, Different Types of Charts and Graphs, The Emergence of Visual Analytics

UNIT 2

Descriptive Analytics -2: Business Intelligence and Data Warehousing, Data Warehousing Process, Data Warehousing Architectures, Data Integration and ETL Processes, Data Warehouse Development, Data Warehousing Implementation Issues, Performance Measurement, Six Sigma as a Performance Measurement System

UNIT 3

Predictive Analytics: Data Mining Process, Data Mining Methods, Text Analytics and Text Mining Overview, Text Mining Applications, Text Mining Process, Sentiment Analysis, Web Mining Overview, Search Engines, Web Usage Mining (Web Analytics), Social Analytics,

UNIT 4

Prescriptive Analytics :Model-Based Decision Making, Structure of Mathematical Models for Decision Support, Certainty, Uncertainty, and Risk, Decision Modeling with Spreadsheets, Mathematical Programming Optimization, **Future Trends, Privacy and Managerial Considerations in Analytics:** Cloud Computing and Business Analytics, Location-Based Analytics for Organizations, Issues of Legality, Privacy, and Ethics, Impacts of Analytics in Organizations: An Overview, Data Scientist as a Profession

TEXTBOOKS:

1. Ramesh Sharda, Dursun Delen, Efraim Turban "Business Intelligence, Analytics, and Data Science: A Managerial Perspective ", 4th Edition, Pearson, 2017

REFERENCE BOOKS:

1. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager‟s Guide", Second Edition, 2012.
2. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003
3. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.

JOURNALS/MAGAZINES

1. IEEE Transactions on Knowledge and Data Engineering
2. Data Mining and Knowledge Discovery
3. Journal of Knowledge Management

SWAYAM/NPTEL/MOOCs

1. https://www.coursera.org/specializations/data-warehousing
2. https://www.udemy.com/course/the-business-intelligence-analyst-course-2018

SELF-LEARNING EXERCISES:

Case study, Assignments, MOOC / Coursera/Conference

Course Title	VIDEO PROCESSING (PE IV)				Course Type		Theory	
Course Code	B20EAS612	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50**	**50**

COURSE OVERVIEW

Video processing is a particular case of signal processing, where the input and output signals are video files or video streams. Video processing techniques are used in television sets, VCRs, DVDs, video codecs, video players and other devices. A video processor may perform all or some combination of the following functions: up conversion, deinterlacing, frame rate conversion, noise reduction, artifact removal, lip sync (A/V synchronization) and edge enhancement.

COURSE OBJECTIVE(S)

The objective of this course is:

1. To provide deep understanding of two dimensional and three dimensional transforms in video processing.
2. To understand and implement video processing algorithms.
3. To efficiently solve real time problems using video processing algorithms.
4. To understand how tracking and segmentation in video processing.
5. To apply various motion analysis techniques in real world applications.

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain basic techniques in digital video processing, including imaging characteristics and sensors.	1, 2, 3	1
CO2	Apply motion estimation and object tracking algorithms on video sequence	1, 2, 4, 5, 12	1, 3
CO3	Analyze the video formation techniques	1, 2, 4, 5, 12	3
CO4	Learn about the techniques for applying motion estimation in video coding	1, 2, 4, 5, 12	3
CO5	Apply the concepts of video processing and their applications	1, 2, 4, 5, 12	2, 3
CO6	Develop solutions in the video processing to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	2, 3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2			√	√		
CO3			√			
CO4			√	√		
CO5			√	√		
CO6				√	√	

COURSE ARTICULATION MATRIX

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1									1	2		
CO2	2	3		3	3							3	2		3
CO3	3	3		3	3							3			3
CO4	2	3		3	3							3			3
CO5	2	3		3	3							3	2		3
CO6					3				2	2			2		3

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT

THEORY

Contents

UNIT 1

Basics of Video Processing: Video formation, perception and representation: Principle of color video, video cameras, video display, pinhole model, CAHV model, Camera motion, Shape model, motion model, Scene model, two dimensional motion models. Three Dimensional Rigid Motion, Approximation of projective mapping.

UNIT 2

Motion estimation Techniques: Optical flow, motion representation, motion estimation criteria, optimization methods, pixel based motion estimation, Block matching algorithm, Gradient Based, Intensity matching, feature matching, frequency domain motion estimation, Depth from motion.

UNIT 3

Tracking and Segmentation:2D and 3D video tracking, blob tracking, Kernel based counter tracking, feature matching, filtering Mosaicing, video segmentation, mean shift based, active shape model, video short boundary detection. Interframe compression, Motion compensation

UNIT 4

Motion analysis applications: Video Summarization, video surveillance, Steepest Descent method, Newton Raphson method, Transform coding, 3D waveform coding, Global minima, Predictive coding, Photometric image formation, Photometric effects of 3D motion,

TEXTBOOKS:

1. M. Tekalp," Digital video Processing", Prentice Hall International
2. Yao wang, Joem O starmann and Ya – quin Zhang, "Video processing and communication ",1st edition, PHI

REFERENCE BOOKS:

1. "Handbook of Image and Video processing", Al Bovik, Academic press, second Edition.

JOURNALS/MAGAZINES

4. Image and Vision Computing - Journal – Elsevier
5. Signal, Image and Video Processing | Home – Springer
6. Journal on Image and Video Processing - ACM Digital Library
7. Multimedia Image and Video Processing | Taylor & Francis

SWAYAM/NPTEL/MOOCs

1. https://www.coursera.org/lecture/internet-of-things-multimedia/video-processing-oRMdY
2. https://nptel.ac.in/courses/117/104/117104020/

SELF-LEARNING EXERCISES:

Case study, Assignments, NPTEL/Coursera courses, Conference

<table>
<tr><td>Course Title</td><td colspan="4">Big data analysis Lab</td><td colspan="2">Course Type</td><td colspan="2">Practica
l</td></tr>
<tr><td>Course Code</td><td>B20EA0604</td><td>Credits</td><td colspan="2">1</td><td colspan="2">Class</td><td colspan="2">VI semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of Classes Per Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>Tutorial</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>1</td><td>2</td><td>2</td><td>-</td><td>26</td><td>50%</td><td>50%</td></tr>
</table>

Lab programs

1 Installation and Configuration of Hadoop.

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability

2 Evaluate the performance of MapReduce program on word count for different file size.

3 Evaluate the performance of MapReduce program on Character count for different file size.

4 Using MapReduce process the weather dataset.

5 Evaluate performance of PIG Latin script for student data.

Course Title	Neural Networks & Deep Learning Lab				Course Type		Practica l	
Course Code	B20EA0605	Credits	1		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	-	-	-				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**1**	**2**	**2**	**-**	**26**	**50%**	**50%**

OVERVIEW:

Neural Networks are an effective programming paradigm that enable a computer to learn from observed data. They simulate biological learning of the nervous system and have been demonstrated to increase the power of known machine learning models by stacking them as computational graphs. This is different from conventional programming where human programmers define the set of tasks to be carried out by a computer to solve a problem. Deep learning is a subset of machine learning that uses many layers of neural networks to accomplish tasks like image recognition, text procession, speech recognition, natural language processing etc. This course aims at giving the students the knowledge and the skills required to model the solutions to real world problems using neural networks and deep learning.

COURSE OBJECTIVE

The objectives of this course are to:

5. Explain the fundamentals of neural network based paradigm to problem solving.
6. Inculcate knowledge of concepts involved in training of neural networks.
7. Discuss the concepts and issues in deep neural networks.
8. Explain generalizability of deep neural networks and introduce prominent deep neural architectures.

1.	A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of NOT gate without the concept of learning.	Python Programming	Analytical/Problem solving through coding
2	a). A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of OR gate without the concept of learning. b). A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of AND gate without the concept of learning.	Python Programming	Analytical/Problem solving through coding
3	A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of XOR gate without the concept of learning. We can observe that, XOR(x1,x2)=AND(NOT(AND(x1,x2)),OR(x1,x2))	Python Programming	Analytical/Problem solving through coding
4	A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of NAND gate with the concept of learning and backpropagation.	Python Programming	Analytical/Problem solving through coding
5	A simplest perceptron has a single-layer network whose weights and biases can be trained to produce a correct target vector when presented with the corresponding input vector. The training technique used is called the perceptron learning rule. Develop a python program to create a simple perceptron from scratch to simulate working of XOR gate with the concept of learning using backpropagation.	TensorFlow /Keras/ Python	Analytical/Problem solving through coding
6	Binary classification for Classifying movie reviews of IMDB dataset using neural networks	TensorFlow /Keras/Pyt hon	Data Analysis/ Problem solving through coding
7	Neural network for classification of MNIST data (From text book) using sequential dense model	TensorFlow /Keras/Pyt hon	Data Analysis/ Problem solving through coding
8	Linear regression for predicting house price (The Boston Housing Price dataset)	TensorFlow /Keras/Pyt hon	Data Analysis/ Problem solving through coding
9.	Classifying newswires: a multi-class classification example on Reuters dataset	TensorFlow /Keras/Pyt hon	Data Analysis/ Problem solving through coding

10	Using Convolutional neural network for classification of images	TensorFlow /Keras/Pyt hon	Data Analysis/ Problem solving through coding
	Self Learning: Prevent overfitting by using regularization, dropout, hyper parameter tuning, RNN	TensorFlow /Keras/Pyt hon	Data Analysis/ Problem solving through coding

TEXTBOOKS:

1. Charu Aggarwal, "Neural Networks and Deep Learning", Springer, 2018.
2. Ian Goodfellow, YoshuaBengio, Aaron Courville, "Deep Learning", MIT Press

REFERENCEBOOKS:

7. Francis Chollet, "Deep Learning with Python", Manning, 2018.
8. Jacek M. Zurada, Introduction to Artificial Neural Systems, PWS Publishing Company, 1995.
9. Simon Haykin, Neural Networks: A Comprehensive Foundation, Macmillan College Publishing Company, 1994.
10. Mohamad H. Hassoun, Fundamentals of Artificial Neural Networks, The MIT Press, 1995.
11. Laurene Fausett, Fundamentals of Neural Networks: Architectures, Algorithms, and Applications, Prentice Hall International, Inc., 1994.
12. B. D. Ripley, Pattern Recognition and Neural Networks, Cambridge University Press. 1996.

JOURNALS/MAGAZINES

10. IEEE Transactions on Neural Networks and Learning Systems https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=5962385
11. IEEE Transactions on Pattern Analysis and Machine Intelligence https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=34http://ijaerd.com/papers/special_papers/IT032.pdf
12. International Journal of Intelligent Systems https://onlinelibrary.wiley.com/journal/1098111x
13. http://www.charuaggarwal.net/neural.htm
14. http://neuralnetworksanddeeplearning.com/
15. https://github.com/mnielsen/neural-networks-and-deep-learning
16. deeplearning.stanford.edu
17. http://yann.lecun.com/exdb/mnist/
18. University of California Irvine Machine Learning Repository - https://archive.ics.uci.edu/ml/datasets.php

SWAYAM/NPTEL/MOOCs:

4. Swayam Nptel – Deep Learning – IIT Ropar https://onlinecourses.nptel.ac.in/noc21_cs35/preview
5. Coursera – Neural Networks and Deep Learning Andrew Ng
6. Coursera - Neural Networks for Machine Learning by Geoffrey Hinton in Coursera

Course Title	**Computer Networks Lab**				**Course Type**		**Practical**	
Course Code	**B20CI0506**	**Credits**	**1**		**Class**		**V semester**	
Course Structure	TLP	Credits	Contact Hours	Work Load	13weeks/Semester		Assessment in Weightage	
	Theory	-	-	-				
	Practice	**1**	**2**	**2**	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	1	2	2	-	**26**	**50%**	**50%**

COURSE OVERVIEW:

The main emphasis of this course is on the organization and management of local area networks(LANs).The course description include learning about computer network organization and implementation, obtaining a the or etical understanding of data communication and computer networks, and about Open Systems Interconnection(OSI) communication model with TCP/IP protocol; This course provides knowledge of error detection and recovery; local area networks; bridges, routers and gateways;

network naming and addressing; and local and remote procedures. This course also emphasis on User Datagram Protocol, TCP Congestion Control; DNS Message Formatting and Remote Login. Protocols

COURSE OBJECTIVE(S):

The main objectives of this course are:

1. Explain the protocol stacks (OSI and TCP/IP) for data communication
2. Discuss the error detection & correction strategies for data transmission.
3. Design the connection establishment of network computing devices.
4. Illustrate the TCP, UDP protocols and explain Domain Name System.
5. Emphasis the management of local area networks
6. Learning about computer network organization and implementation

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the architectural principles of computer networking and compare different approaches to organizing networks.	1to6,12	1
CO2	Identify the good network design with simplicity, scalability, performance and the end-to-end principle.	1to6,12	1
CO3	Appraise the working principles of Internet.	1to6,12	1
CO4	Develop applications using network protocols.	1to6,12	1,2,3
CO5	Emphasis the management of local area networks	1to6,12	2,3
CO6	Learning about computer network organization and implementation	1to6,12	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember(L1)	Understand(L2)	Apply(L3)	Analyze(L4)	Evaluate(L5)	Create(L6)
CO1		√		√		√
CO2					√	√
CO3	√				√	√
CO4						√
CO5	√	√	√	√		
CO6	√	√	√	√	√	

COURSE ARTICULATION MATRIX

CO#/Pos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	1						1	3		
CO2	3	3	3	3	2	2						1	3		

CO3	3	3	3	3	2	1						2	3		
CO4	3	3	3	2	2	1						1	3	3	3
CO5	3	3	3	2	2	1						2		3	3
CO6	3	3	3	2	2	1						2	2	3	3

Note:1-Low,2-Medium,3-High

PRACTICE:

No	Title of the Experiment	Tools and Techniques	Expected Skill /Ability
Part – A			
1	) Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.	RJ-45 connector, IO Connector, Crimping Tool, Twisted pair Cable, Cable Tester.	Cable Crimping, Standard Cabling and Cross Cabling, IO connector crimping and testing the crimped cable using a cable tester can be done successfully
	) Install and Configure Wired and Wireless NIC and transfer files between systems in LAN and Wireless LAN.	NIC, Adapter	Installation and configuration of Wired and Wireless (remotely) NIC and transfer files between systems in LAN and Wireless LAN between two systems in a LAN can be done successfully.
	) Install and configure Network Devices: HUB, Switch and Routers.	HUB, Switch, Router and configuration software.	Gain the knowledge on configuring the different connecting devices
	) Connect the computers in Local Area Network.	Computer Systems with connecting media.	Interconnection and building a simple LAN
2	a) Establish Peer to Peer network connection using two systems using Switch and Router in a LAN.	Computer Systems with connecting media.	Configuration of peer to peer network communication
	b) Configure Internet connection and use IPCONFIG, PING / Tracer and Net stat utilities to debug the network issues.	Connected Computer Systems.	Configure Internet connection
	c) Transfer files between systems in LAN using FTP Configuration, install Print server in a LAN and share the printer in a	Connected Computer Systems with printer.	File *t*ransfer between systems in LAN using FTP Configuration.

	network		
	d) Study of basic network command and Network configuration commands	Command Prompt	Network configuration
3	In information theory and coding theory with applications in computer science and telecommunication, error detection and correction or error control are techniques that enable reliable delivery of digital data over unreliable communication channels. Many communication channels are subject to channel noise, and thus errors may be introduced during transmission from the source to a receiver. Error detection techniques allow detecting such errors, while error correction enables reconstruction of the original data in many cases. Write a Program for Implementation of any one mechanism for Error Detection / Error Correction Techniques.	CRC Hamming Code	Error detection and control in data transmission.
4	A routing algorithm is a procedure that lays down the route or path to transfer data packets from source to the destination. They help in directing Internet traffic efficiently. ... Routing algorithm mathematically computes the best path, i.e. "least – cost path" that the packet can be routed through Write a Program for Implementation of any routing algorithms.	Distance vector & Link state routing	Routing in networks before the communication begins.
Part B: Mini Project 1: Design of Corporate Network			
1	Configuring a Switched network and Study of VLAN's and assigning a PC based on the VLAN.	Windows/Linux OS, Packet Tracer	Switch and VLAN Configuration.
2	Implementing an IP Addressing Scheme Configuring WEP on a Wireless Router. Interpreting Ping and Traceroute Output	Windows/Linux OS, Packet Tracer	Router configuration and connectivity checking.
3	Configuring Static Routing. Configuring Dynamic Routing protocols RIP, OSPF.	Windows/Linux OS, Packet Tracer	Static and Dynamic Routing over a network
4	Examining Network Address Translation (NAT). Configuring a Cisco Router as a DHCP Server	Windows/Linux OS, Packet Tracer	Configuration and working of NAT with setup of DHCP server.
Part C: Mini Project 2: Performance Analysis of TCP and UDP applications over the different Topologies of network			
1	Consider Six nodes and demonstrate the different ways of connecting them in topology methods. Also specify the different transmission media with specific channel specifications.	Python, NS3, Ubuntu.	Create an interface between the devices using different topologies.
2	Configure the IP address of the nodes in the specified network. Achieve the port specifications for different applications. Apply and Demonstrate the TFTP on the specified network using UDP. Observe the trace results.	Python, NS3, Ubuntu.	Analyze the performance using UDP based applications
3	Apply and Demonstrate the FTP and TELNET on the specified network using TCP. Observe the trace results.	Python, NS3, Ubuntu.	Analyze the performance using TCP based applications
4	Apply and Demonstrate the Congestion and Error Controlling mechanism in the	Python, NS3, Ubuntu.	Analyze the congestion and error controlling in TCP based

	specified networks. Observe the trace results.		applications

TEXTBOOKS:

1. Behrouz A Forouzan, "Data Communications and Networking", 5th Edition, McGraw – Hill, 2016.
2. Nader F. Mir, "Computer and Communication Networks", Pearson Education, 2009.

REFERENCE BOOKS:

1. Alberto Leon-Garcia and Indra idjaja, "Communication Networks – Fundamental Concepts and Key Architectures", 2nd Edition Tata McGraw – Hill, 2004.
2. Andrew S. Tanenbaum, "Computer Networks", 4th Edition, Pearson Education, 2005.
3. Larry L. Peterson and Bruce S. Davie, "Computer Networks- A system Approach", 5th Edition, Elsevier, 2012.
4. William Stallings, "Data and Computer Communications", 10th Edition, Pearson Education, 2008.
5. Douglas E. Comer, "Internetworking with TCP/IP", Vol.1, 6th Edition, Pearson, 1995.
6. IEEE Transactions on Networking.
7. Elsevier Journal of Computer Networks
8. Springer Journal of Communications and Information Networks.

JOURNALS/MAGAZINES:

1. IEEE Transactions on Networking.
2 Elsevier Journal of Computer Networks

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/topic/computer-network/
2. https://www.coursera.org/courses?query=computer%20network
3. https://nptel.ac.in/courses/106/105/106105183/
4. https://www.edx.org/learn/computer-networking

SELF LEARNING EXERCISES:

Remote Login. Protocols: TELNET Protocol and SSH Protocol. Electronic Mail (E-Mail), World Wide Web (WWW).

Course Title	DATA MINING (OE-II)				Course Type		Theory	
Course Code	B20CIO601	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

This course will cover the major techniques for mining and analyzing text data to discover interesting patterns, extract useful knowledge, and support decision making, with an emphasis on statistical approaches that can be generally applied to arbitrary text data in any natural language with no or minimum human effort. Detailed analysis of text data requires understanding of natural language text, which is known to be a difficult task for computers. This course focuses on extracting knowledge from the web by applying Machine Learning techniques for classification and clustering of hypertext documents. Basic approaches from the area of Information Retrieval and text analysis are also discussed. The students use recent Machine Learning and Data Mining software to implement practical applications for web document retrieval, classification and clustering.

COURSE OBJECTIVE

1. Introduce the basics of data mining, data types, similarity and dissimilarity measures
2. Explain association rules and algorithms
3. Describe the classification algorithms for data categorization
4. Illustrate the clustering algorithms for grouping datasets
5. Demonstrate the appropriate data mining techniques for decision making

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Explain the basics of data mining techniques, data types, identify the similarity and dissimilarity between the datasets and analyze the data sets using the association rules and algorithms	1,2,4,6,11,12	1,2
CO2	Characterize and discriminate data sets with classification methods	1-7	2
CO3	Employ the clustering methods in real life problems	1-7	2,3
CO4	Apply the knowledge for data mining applications	1-7,12	2,3
CO5	Learn new tools and technologies in the Data Mining and apply for suitable application development.	12	
CO6	Develop solutions in the Data Mining to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1	√	√				
CO2		√	√	√		
CO3			√	√		
CO4			√		√	
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATIONMATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		1		1					2	1	2	3	
CO2	3	3	2	2	3	2	1						3	3	
CO3	3	2	3	2	3	2	3							3	3
CO4	3	2	3	2	3	1	1					2		3	3
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents

UNIT-1

Introduction: What is Data Mining? Motivating Challenges, The origins of data mining, Data Mining Tasks, Types of Data, Data Quality, Data Preprocessing, Measures of Similarity and Dissimilarity, Data Mining Applications, Visualization.

UNIT-2

Association Analysis: Basic Concepts and Algorithms, Frequent Itemset Generation, Rule Generation, Compact Representation of Frequent Itemsets, Alternative methods for generating Frequent Itemsets, FP GROWTH Algorithm, Evaluation of Association Patterns .

UNIT-3

Classification: Basics, General approach to solve classification problem, Decision Trees, Evaluating the performance of a Classifier, Rule Based Classifiers, Nearest Neighbour Classifiers, Naïve Bayes Classifier

UNIT-4

Clustering: overview, K-means**,** agglomerative hierarchical clustering, DBSCAN, Cluster Evaluation, Characteristics of Data, Clusters and Clustering Algorithms, Prototype Based Clustering.

TEXTBOOKS:

1. A Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education,2007.
2. JiaweiHanandMichelineKamber,"DataMiningConceptsandTechniques"SecondEdition,Elsevier, Reprinted2008.

REFERENCE BOOKS:

1. K.P.Soman, Shyam Diwakar and V.Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India,2006.
2. G.K.Gupta,"IntroductiontoDataMiningwithCaseStudies",EasterEconomyEdition,Prentice Hall of India,2006.

JOURNALS/MAGAZINES:

1. Data Mining and Knowledge Science – Springer.
2. Interscience,The International Journal of DataMining, Modelling and Management-
3. IEEE, IEEE Transactions on Knowledge and Data Engineering.

SWAYAM/NPTEL/MOOCS:

1. https://www.linguamatics.com/what-text-mining-text-analytics-and-natural-language-processing
2. https://www.coursera.org/learn/text-mining
3. https://www.ibm.com/cloud/learn/text-mining

SELF LEARNING EXERCISES:

1. https://www.linguamatics.com/what-text-mining-text-analytics-and-natural-language-processing
2. https://www.coursera.org/learn/text-mining
3. https://www.ibm.com/cloud/learn/text-mining

Course Title	Machine Learning (OE II)				Course Type		Theory	
Course Code	B20CIO602	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**00**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: Machine learning uses interdisciplinary techniques such as statistics, linear algebra, optimization, and computer science to create automated systems that can process through large volumes of data at high speed to make predictions or decisions without human intervention.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain machine learning and problems relevant to machine learning.
2. Discuss the fundamentals of Decision trees learning and its issues
3. Illustrate neural networks , Bayes classifier and k nearest neighbour for problems appearing in machine learning.
4. Describe statistical analysis of machine learning techniques.

COURSE OUTCOMES(COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Design the learning system to provide the solution for the given problem.	1 to 5	1,2,3
CO2	Apply Decision Tree technique for Classification problem	1 to 5	1,2,3
CO3	Develop Recognition or Prediction systems using Neural Network/Bayesian Model	1 to 5	1,2,3
CO4	Solve the problem by hypothesis testing using probability and statistics.	1 to 5	1,2,3
CO5	Learn new tools and technologies in the Machine Learning and apply for suitable application development.	12	
CO6	Develop solutions in the Machine Learning to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1						√
CO2			√			√
CO3				√		√
CO4				√	√	√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	2	1								3	3	3
CO2	3	2	3	1	2								3	3	3
CO3	3	1	2	1	2								3	3	3
CO4	3	2	2	2	2								3	3	3
CO5												3			
CO6					3				3	3					

Note: 1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents

UNIT-1

Introduction: Well posed learning problems, designing a Learning system, Perspective and Issues in Machine Learning.
Concept Learning: Concept learning task, Concept learning as search, Find-S algorithm, Version space, Candidate Elimination algorithm, Inductive Bias.

UNIT-2

Decision Tree Learning: Decision tree representation, Appropriate problems for decision tree learning, Basic decision tree learning algorithm, hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.

UNIT-3

Artificial Neural Networks: Introduction, Neural Network representation, appropriate problems, Perceptrons, Back propagation algorithm.
Bayesian Learning: Introduction, Bayes theorem, Bayes theorem and concept learning, ML and LS error hypothesis, ML for predicting probabilities, MDL principle, Naive Bayes classifier, Bayesian belief networks, EM algorithm.

UNIT-4

Evaluating Hypothesis: Motivation, Estimating hypothesis accuracy, Basics of sampling theorem, General approach for deriving confidence intervals, Difference in error of two hypothesis, Comparing learning algorithms.
Instance Based Learning: Introduction, k-nearest neighbour learning, locally weighted regression, radial basis function, cased-based reasoning.

TEXT BOOKS:

1. Tom M. Mitchell, Machine Learning, India Edition McGraw Hill Education,2013.

REFERENCE BOOKS:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, "The Elements of Statistical Learning", 2nd edition, springer series in statistics.
2. Ethem Alpaydın, "Introduction to machine learning", second edition, MIT press.

JOURNALS/MAGAZINES:

1. Springer Journal of Machine Learning.
2. International Journal of Machine Learning and Computing.

SWAYAM/NPTEL/MOOCs:

1. Coursera – Machine Learning
2. Coursera – Deep Learning
3. https://onlinecourses.nptel.ac.in/noc19_cs53/preview

SELF-LEARNING EXERCISES:

Reinforcement Learning: Introduction, Learning Task, Q Learning

Course Title	NEURAL NEWORKS(OE-II)				Course Type		Theory	
Course Code	B20CIO603	Credits	3		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: This course introduces the basic learning models, learning algorithms, and some applications of neural networks. The focus is on to understand and use neural networks for solving different problems related to pattern recognition, function approximation, data visualization, etc.

COURSE OBJECTIVE

The objectives of this course are to:

1. Understand mathematical basics of neural networks.
2. Choose appropriate error function and optimization algorithm
3. Enable a student to train a neural network using suitable approach
4. Design real world solutions using Neural networks.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Outline the mathematical concepts behind working of neural networks	1 to 8	1,2
CO2	Illustrate the error functions and optimization algorithms that can be applied to a neural network model	1 to 5	1,2
CO3	Demonstrate the training of a neural network model to solve a problem.	1 to 5	1,2,3
CO4	Design a neural network using Tensor Flow to solve a real-world problem.	1 to 5	1, 2, 3
CO5	Learn new tools and technologies in the Neural Networks and apply for suitable application development.	12	
CO6	Develop solutions in the Neural Networks to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2				√	√	

CO3						√
CO4			√			√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	2	1	1	1					3	3	
CO2	3	3	2	2	3								3	3	
CO3	3	2	3	2	3								3	3	3
CO4	3	2	3	2	3								3	3	3
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY:

Contents

UNIT-1

Neural Network Basics – Statistical Pattern Recognition – an example character recognition, classification and regression, pre-processing and feature extractions, polynomial curve fitting, multivariate non-linear functions, decision boundaries, minimizing risk, single layer networks – linear discriminant functions, linear separability, least squares techniques, the perceptron, multi-layer perceptron – feed forward network mappings, threshold units, sigmoidal units, error back propagation, Jacobian Matric, Hessian matrix.

UNIT-2

Learning and Generalization:
Error Functions and Parameter Optimization Algorithms – Sum of squares error, Minkowski error, input dependent variance, modelling conditional distributions, estimating posterior probabilities, sum of squares for classification, cross entropy for two classes, entropy. Error Surfaces, Local quadratic approximation, linear output units, optimization in practice, gradient descent, conjugate gradients, Newton's Method,
Bias and Variance, Regularization, Training with noise, soft weight sharing, Linear Neurons and Their Limitations, Sigmoid, Tanh, and ReLU Neurons, Softmax Output Layers, Looking Forward

UNIT-3

Training Feed-Forward Neural Networks: The Fast-Food Problem, Gradient Descent, The Delta Rule and Learning Rates, Gradient Descent with Sigmoidal Neurons, The Back-propagation Algorithm, Stochastic and Mini batch Gradient Descent, Test Sets, Validation Sets, and Over fitting, Preventing Over fitting in Deep Neural Networks. Back Propagation: The Back propagation Network, The Generalized Delta Rule, Practical Considerations,

BPNApplications, The Back propagation Simulator.

UNIT-4

Implementing Neural Networks in Tensor Flow: Definition of Tensor Flow, Installing Tensor Flow, Creating and Manipulating Tensor Flow Variables, Tensor Flow Operations, Placeholder Tensors ,Sessions in Tensor Flow, Navigating Variable Scopes and Sharing Variables, Managing Models over the CPU and GPU, Specifying the Logistic Regression Model in Tensor Flow, Logging and Training the Logistic Regression Model, Leveraging Tensor Board to Visualize Computation Graphs and Learning, Building a Multilayer Model for MNIST in Tensor Flow.

TEXTBOOKS:

1. Christopher M Bishop, "Neural Networks for Pattern Recognition", Clarendon Press, Oxford, 2005.
2. Nikhil Buduma, Nicholas Locascio, "Fundamentals of Deep Learning, designing next-generation machine intelligence algorithms", O'Reilly, 1st Edition.

REFERENCE BOOKS:

1. Simon Haykin, "Neural Networks- A comprehensive foundation", Pearson Education, 2003.
2. S.N.Sivanandam, S.Sumathi,S. N. Deepa "Introduction to Neural Networks using MATLAB 6.0", TATA Mc Graw Hill, 2006.
3. Neural Networks Algorithms, Applications, and Programming Techniques - James A. Freeman

JOURNALS/MAGAZINES:

1. IEEE Transactions on Neural Networks and learning systems
2. IEEE Transactions on Evolutionary Computation
3. IEEE Transactions on Fuzzy systems
4. Journal of Applied Soft Computing –Elsevier

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/topic/neural-networks/
2. https://www.coursera.org/learn/neural-networks-deep-learning

SELF LEARNING EXERCISES:

Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis. Neural network applications: Process identification, control, fault diagnosis.

Course Title	RESEARCH BASED MINI PROJECT				Course Type		Theory	
Course Code	B20CI0601	Credits	2		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	-	-	-				
	Practice	2	4	4	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**2**	**4**	**4**	**0**	**52**	**50%**	**50%**

COURSE OVERVIEW:

This course offers "An overview of research methodology including basic concepts employed in quantitative and qualitative research methods. This course introduces problem selection, synopsis writing, ethics, research design skills, research methods, how to carry out literature survey, reading and writing technical paper, thesis writing, introduction latex and beamer and how to design the quality research proposal.

COURSE OBJECTIVE

The objectives of this course are to:

1. Explain the dimensions and methods of research.
2. Illustrate the design of informed choice from the large number of alternative methods and experimental designs available.
3. Describe the features of a good research proposal.
4. Discuss the skills required for undertaking a research project and preparing a technical paper.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of the dimensions and methods of research for solving real world problems.	1,4,7,11,12	2,3
CO2	Identify the appropriate research problem and parameters to carry out the research work.	2,5,6,12	2,3
CO3	Apply different research skills in preparing proposal for research project and technical paper.	6,7,11	2,3
CO4	Create IPR documents using Latex Tool.	3,12	3
CO5	Learn new tools and technologies in the Research Based Mini Project and apply for suitable application development.	12	
CO6	Develop solutions in the Research Based Mini Project to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2				√	√	

CO3			√			
CO4						√
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2			2			1				1	1	1	2	
CO2		2			1	3						2	2	2	
CO3						2	1				2		2	1	
CO4			2									2			3
CO5												3			
CO6					3				3	3					

Note:1-Low,2-Medium,3-High

A Mini Project has to be carried out by the students and the same has to be completed by the end of semester. Students have to spend a minimum of 8 hours per week on the mini project. A Mini Project has to be developed and documented using Latex. The outcome of the mini project should be paper publication/ IPR

Course Title	INDIAN TRADITION & CULTURE				Course Type		Theory	
Course Code	B20PA0501	Credits	1		Class		VI semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	1	1	1				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**1**	**1**	**1**	**13**	**-**	**50%**	**50%**

COURSE OVERVIEW:

This course offers the students with various aspects of culture and heritage of India. This course also enable the students to understand the contribution of our ancestors in the areas of science, medicine, arts, language and literature.

COURSE OBJECTIVE

1. To provide conceptual knowledge of Indian culture and traditions
2. To introduce students to the science and technological advancements related to Indian culture
3. To help students understand the Indian spiritual aspects of Indian culture
4. To help learners understand the factors which unite the diverse cultures of India

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Gain conceptual understanding of Indian culture and traditions.	2,3,4,6,8, 12	3
CO2	Describe various ancient theories in treatment of any disease, Appreciate the science and technological advancements in ancient India.	10,11	3
CO3	Comprehend the Indian spiritual aspects of Indian culture like yoga, meditation, and nirvana.	11	3
CO4	Demonstrate the theory behind celebrating Hindu festivals and concept of making varieties of food and Understand India as a land united by cultural diversity	11,12	3
CO5	Learn new tools and technologies in the Indian Tradition & Culture and apply for suitable application development.	12	
CO6	Develop solutions in the Indian Tradition & Culture to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2		√	√			
CO3		√				
CO4		√				
CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	1	2		2		3				3
CO2										2	2	
CO3											2	
CO4											2	2
CO5												3
CO6					3				3	3		

Note: 1-Low,2-Medium,3-High

COURSE CONTENT THEORY

Contents

UNIT-1

Indian Tradition

i. Culture – Indus Valley Civilization and early cultural practices, The Vedic culture, Influence of Buddhism and Jainism on Indian Culture, Influence of Islam and Christianity, Indian Cultural Renaissance of the 19th Century
ii. Religion – Pre-vedic and Vedic religion, Jainism, Buddhism, Hinduism, Religious Reform Movements, Advent of Christianity
iii. Art – Introduction to Natyashastra, classical and contemporary art forms (dance and music), regional art forms (dance and music), Folk art, puppetry
iv. Architecture – Engineering and Architecture in Ancient India; Evolution of Hindu Temple Structures, Sculptures, Coins and Pottery from Ancient India
v. Literature- Vedas, Upanishads, Ramayana, Mahabharata & Bhagavat Gita.

UNIT-2

Contribution of ancient India to Science and Maths. Development of Science in Ancient India- Astronomy, Mathematics, Medicine, Metallurgy.

ii. Scientists of Ancient India:

a. Mathematics and Astronomy- Baudhayan, Aryabhata, Brahmagupta, Bhaskaracharya, Mahaviracharya
b. Science- Kanad, Varahamihira, Nagarjuna
c. Medical Sciences (Ayurveda and Yoga)- Susruta, Charaka, Yoga and Patanjali

iii. Science and Scientists in Medieval India- Mathematics, Biology, Chemistry, Astronomy, Medicine, Agriculture.

iv. Scientists in Modern India- Srinivas Ramanujan, Chandrasekhara V Raman, Jagadish Chandra Bose, Homi Jehangir Bhabha, Dr, Vikram Ambalal Sarabhai, ,Dr. APJ Abdul Kalam

UNIT-3

Indian Spiritual Aspects

I. Hindu Spirituality based on shruti and smriti- Hinduism in General, Basic notions of Vedas, Upanishads, Ramayana, Mahabharata & Bhagavat Gita.

ii. Hata Yoga and Pranayama- Main Features, Basics of Yoga –Different kinds of Yoga; Raja Yoga (Ashtanga yoga);

Karma yoga; Bhakti Yoga – yoga of Loving Devotion; Jnana yoga – Yoga of Knowledge; Hatha Yoga (Asana/ Pranayamas); Kundalini Yoga; Nada Yoga; Sannyasa Yoga

iii. Buddhist, Jaina Spiritualities- Main Doctrines of Buddhism: Four Noble Truths (Arya Satya), Concept of Nirvana - Ashtanga Marga

UNIT-4

Unity in Diversity

i. Commensality and the Significance of Food – Eating Together as Family and as a Society, Food at Rituals; annaprasan, marriage and funeral, Kitchen as Shared Space for Women, Food and Nationalist Response of Indian Community, Visibility of Indian Cuisine in the World
ii. Celebrating Diverse Festivals – Festival Types: Religious and Seasonal, Religious - Holi, Diwali, Ganesh Chaturthi, Janmashtami, Mahavir Jayanthi, Ramadan, Christmas, Buddha Purnima; Seasonal (harvest festivals) - Baisakhi, Pongal, Sankranti
iii. Attire - Indus Valley Civilization, Vedic period, Modern India

TEXT BOOKS:

1. Sundararajan K.R., Hindu Spirituality - Vedas through Vedanta, Cross Road Publications, New York, 1997.
2. Griffiths Bede, Yoga and the Jesus Prayer Tradition, Asian Trading Corporation, Bangalore, 1992

REFERENCE BOOKS:

1. Ansh Mishra, Science in Ancient India, Indian Corporation, New Delhi, 1998
2. Sen Taylor, Collen. Feasts and Fasts: A History of Food in India. Reaktion Books, New Delhi, 2014.
3. Thapar, Romila, Readings in Early Indian History. Oxford University Press. New Delhi, 2018

JOURNALS/MAGAZINES

1. Arts and Humanities (miscellaneous)
2. History
3. Language and Linguistics
4. History and Philosophy of Science
5. Literature and Literary Theory

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/109/104/109104102/
2. https://nptel.ac.in/courses/109/103/109103018/

SELF-LEARNING EXERCISES:

Different languages of india, Indian history

Course Title	Natural Language Processor				Course Type		Theory &Practical	
Course Code	B20EA0602	Credits	2		Class		V semester	
- Course Structure	TLP	Credits	Contact Hours	Work Load	13weeks/Semester		Assessment in Weightage	
	Theory	1	1	1				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**2**	**3**	**3**	**13**	**26**	**50%**	**50%**

COURSE OVERVIEW:

This course examines fundamental Natural Language Processor and related pre-processing techniques. In particular, the important phases of language recognition will be reviewed, emphasizing the significance of each phase of NLP different. The course will also include concepts such as test word level analysis and syntactic analysis.

COURSE OBJECTIVE(S):

- Analyze the natural language text.
- Define the importance of natural language.
- Understand the concepts Text mining.
- Illustrate information retrieval techniques.

COURSE CONTENT
THEORY

Contents
UNIT-1 **Overview and language modeling:** Overview: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages- NLP Applications-Information Retrieval. Language Modeling: Various Grammar- based Language Models-Statistical Language Model.
UNIT-2 **Word level and syntactic analysis:** Word Level Analysis: Regular Expressions-FiniteState Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. Syntactic Analysis: Context-free GrammarConstituency- Parsing-Probabilistic Parsing.

PRACTICE:

S .No.	Name of the Experiments	Tools and Techniques
1	Preprocessing of Text (Tokenization, Filtration, Script Validation, Stop Word Removal, Stemming)	Python
2	Morphological Analysis	Python
3	N-Gram Model	Python

4	POS Tagging	Python
5	Chunking	Python
6	Named Entity reorganization	Python
7	Virtual La on Word Generator	Python
8	Mini Project based on NLP Application	Python

Text Books:

1. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.
2. Anne Kao and Stephen R. Poteet (Eds), "Natural LanguageProcessing and Text Mining", Springer-Verlag London Limited 2007.

Reference Books:

1. Daniel Jurafsky and James H Martin, "Speech and Language Processing: Anintroduction to Natural Language Processing, Computational Linguistics and SpeechRecognition", 2nd Edition, Prentice Hall, 2008.
2. James Allen, "Natural Language Understanding", 2nd edition, Benjamin/Cummingspublishing company, 1995.
3. Gerald J. Kowalski and Mark.T. Maybury, "Information Storage and Retrieval systems", Kluwer academic Publishers, 2000.

Detailed Syllabus Semester-7

Title	Swarm and Bio-inspired Intelligence(PE V)				Course Type		Theory	
Course Code	B20EAS701	Credits	3		Class		VII semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: The basics of swarm and bio inspired intelligence are introduced. The course also provides knowledge Bio-inspired algorithms such as ant colony algorithm, bat algorithm (BA), cuckoo search (CS), firefly algorithm (FA), and particle swarm optimization.

COURSE OBJECTIVE(Cos):

The objectives of this course are to:

1. Impart the knowledge of swarm and bio inspired intelligence
2. Illustrate the swarm intelligence algorithms
3. Discuss Meta heuristic Algorithms
4. Analyze Swarm algorithms

COURSE OUTCOMES(COs):

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

CO#	Course Outcomes	POs	PSOs
CO1	Identify the fundamentals of Swarm and Bio inspired intelligence	1,2,4,5	1,2
CO2	Analyze the performance of Swarm based Algorithm for Constrained Optimization	1,2,3,4,5	1,2
CO3	Apply Meta heuristic algorithm for Meta heuristic Optimization	1,2,3,4,5	1,2
CO4	Develop a program to solve real world problem using Self-Adaptive Memantic Swarm Optimization Algorithm.	1,2,3,4,5	1,2
CO5	Learn new tools and technologies and apply for suitable application development.	12	1,2
CO6	Develop solutions using optimization to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	1,2

BLOOM'S LEVELOF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2				√		
CO3			√			

CO4			√			√
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2	1								3	3	
CO2	3	2	2	1	1								3	3	
CO3	3	2	2	1	1								3	3	
CO4	3	2	1	1	1								3	3	
CO5												2			
CO6						1			1	1					

Note:1-Low,2-Medium,3-High

COURSE CONTENT THEORY:

Contents

UNIT-1

Introduction to swarm and bio inspired Intelligence. Current Issues in Bio-Inspired Computing, Search for the Magic Formulas for Optimization, Characteristics of Metaheuristics, Swarm-Intelligence-Based Algorithms

UNIT-2

Analysis of Swarm Intelligence Based Algorithms for Constrained Optimization, Ant bee colony, Cuckoo search, Numerical examples

UNIT-3

Metaheuristic Algorithms, Le´vy Flights in Global Optimization, Metaheuristic Algorithms Based on Le´vy Probability Distribution: Is It a Good Idea?

UNIT-4

Memetic Self-Adaptive Firefly Algorithm, Swarm Algorithms

TEXT BOOKS:

1. Xin-She Yang, Zhihua Cui, Renbin Xiao, Amir Hossein Gandomi, Mehmet Karamanoglu,"Swarm Intelligence and Bio Inspired
2. Computation", Elsevier, 1st Edition, 2013.
3. Eric Bonabeau, Marco Dorigo, Guy Theraulaz "Swarm Intelligence: From Natural to Artificial Systems", Springer, 19
4. Felix Chan, Manoj Tiwari, "Swarm Intelligence: Focus on Ant and Particle Swarm Optimization", InTech, 2007
5. Veysel Gazi and Kevin M. Passino, "Swarm Stability and Optimization", Springer, 2011

REFERENCE BOOKS:

1. James Kennedy and Russel Eberhart, “Swarm Intelligence”, Morgan Kaufmann, 2001.
2. Zbigniew Michalewicz and David Fogel, “How to solve it: Modern Heuristics”, Springer, 2001.
3. Marco Dorigo and Thomas Stützle, “Ant Colony Optimization”, The MIT Press, 2004.
4. C. Solnon, “Ant Colony Optimization and Constraint Programming”, Wiley 2010.
5. Gerhard Weiss, “Multiagent Systems: A modern approach to distributed artificial systems”, The MIT Press, 2000.
6. Christian Müller-Schloer, Hartmut Schmeck and Theo Ungerer, “Organic Computing — A Paradigm Shift for Complex Systems”, Springer, 2011.

JOURNALS/MAGAZINES

1. https://www.springernature.com/gp/researchers/text-and-data-mining
2. https://www.researchgate.net/publication/220834557_Using_Swarm_Intelligence_Techniques_in_Document_Management_Systems

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-ma29/

SELF-LEARNINGEXERCISES:

Comparative study of swarm and bio inspired algorithms

Course Title	Augmented and Virtual Reality(PE IV)				Course Type		Theory	
Course Code	B20EJS702	Credits	3		Class		VII semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW

Course Description: This course covers basic concepts of augmented reality and virtual reality. The course also introduces the student to the working of multiple models of input and output interface in VR. The course also helps the student to understand development tools and frameworks in VR. Further, this course helps the student to work on the application of VR in digital entertainment.

COURSE OBJECTIVE(S)

The objectives of this course are to:

1. Explain the principles and multidisciplinary features of Virtual Reality.
2. Illustrate the multimodal user interaction and perception in Virtual Reality.
3. Demonstrate the use of objects for managing large scale Virtual Reality environment in real time.
4. Discuss the various solutions using Virtual Reality system framework and development tools for industry and social relevant applications.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Identify the components of Augmented Reality and Virtual Reality.	1,10	1
CO2	Apply multimodal user interaction and perception techniques involved in Virtual Reality.	1,2,3,5,10	3
CO3	Develop real world applications using simulation and interactive techniques.	1,2,3,5,10, 11	2,3
CO4	Choose the innovative Virtual Reality solutions for industrial and Social relevant applications.	1,10,11	1
CO5	Evaluate current trends of AR and VR media delivery to propose options to potential clients, and discuss the benefits, challenges and misconceptions involved with working in AR and VR.	1,8,12	1,2
CO6	Evaluate various interaction schemes common to AR/VR experiences.	5,9,10	2

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3						√
CO4		√				
CO5					√	
CO6					√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3									3			3		
CO2	3	3	3		3					3					3
CO3	3	3	3		3					3	2			3	3
CO4	3									3	2		3		
CO5	2							2					1	2	
CO6					2				2	2				2	

Note: 1-Low,2-Medium,3-High

COURSE CONTENT
THEORY:

Contents

UNIT-1

Introduction to Augmented Reality (AR): Definition and Scope, A Brief History of Augmented Reality, Examples, Related Fields, System Structure of Augmented Reality, Key Technology in AR.
Introduction to Virtual Reality (VR): Fundamental Concept and Components of VR, Primary Features and Present Development on VR.

UNIT-2

Multiple Models of Input and Output Interface in VR: Input – Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus and 3D Scanner. Output – Visual, Auditory, Haptic Devices.

UNIT-3

Environment Modeling in VR: Geometric Modeling, Behavior Simulation, Physically Based Simulation.
Interactive Techniques in VR: Body Track, Hand Gesture, 3D Manus, Object Grasp.

UNIT-4

Development Tools and Frameworks in VR: Frameworks of Software Development Tools in VR, X3D Standard, Vega, MultiGen, Virtools, Unity.
Application of VR in Digital Entertainment: VR Technology in Film and TV Production, VR Technology in Physical Exercises and Games, Demonstration of Digital Entertainment by VR.

TEXT BOOKS:

1. Dieter Schmaltzier and Tobias Hollerer. Augmented Reality: Principles and Practice, Addison-Wesley, 2006.
2. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.

REFERENCE BOOKS:

1. Sherman, William R. and Alan B. Craig, Understanding Virtual Reality – Interface, Application, and Design, Morgan Kaufmann, 2002.
2. Fei GAO, Design and Development of Virtual Reality Application System, Tsinghua Press, March 2012.
3. Guangran LIU, Virtual Reality Technology, Tsinghua Press, Jan. 2011.

JOURNALS/MAGAZINES

1. International Journal of Virtual and Augmented Reality (IJVAR),
2. https://www.igi-global.com/journal/international-journal-virtual-augmented-reality/145080
3. Springer, Virtual Reality, https://www.springer.com/journal/10055

SWAYAM/NPTEL/MOOCs:

1. https://www.mooc-list.com/tags/virtual-reality
2. https://nptel.ac.in/courses/106/106/106106138/

SELF-LEARNINGEXERCISES:

Unity 3D, Manus VR

Course Title	Cognitive Science				Course Type		Theory	
Course Code	B20EAS703	Credits	3		Class		VII semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSEOVERVIEW:

This course provides theoretical foundation level training that enables, appreciate and effective participation in Cognitive Science projects. This course is an interdisciplinary with Cognitive Psychology, Neuroscience, Computational Modeling, Linguistics and Philosophy. This Lay foundation to the basics of mental processes and several other aspects of the mind studied through Mathematical methodologies encompassing psychology, Neuroscience and Computer Science. Course expects some basics of Brain functions, Mathematics and Programming knowledge but it is not mandatory.

COURSE OBJECTIVE(COs)

The objectives of this course are to:

1. Learn the concepts of Cognitive Science and Scope of Work
2. Learn Mathematical models to analyze
3. Areas of application and future work
4. Students should be able to read and analyze Journals

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Introduction to Cognitive Science. Learn basics and Fundaments of Cognitive Science and interdisciplinary context. Explore Human faculties	1 to 5,9,12	1,2,3
CO2	Examine Brain Functions, Analyze Visual Perception and Understand and Investigate Human behavior and Formulate observations	1 to 5,9,12	1,2,3
CO3	Evaluate Fundamentals of Multisensory Integration, Analyze User Experience. Investigate Human-Machine interfaces	1 to 5,9,12	1,2,3
CO4	Learn Fundamentals of Brain Imaging, Language and Cognition Investigate Visual designs to create Advertisements, Audio assisting Book reading	1 to 5,9,12	1,2,3
CO5	Mathematical Methods for Cognitive Science, Understand methodologies of mathematical models, Probability, Statistics	12	1,2
CO6	Introduction to Real life examples of Cognitive Science, Investigate and project work	5,9,10	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2		√	√			
CO3			√	√		
CO4			√	√	√	

CO5		√	√	√		
CO6			√	√	√	

COURSE ARTICULATION MATRIX

CO#/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	3	1								1	3	3	3
CO2	1	1	2	3	1							1	3	3	3
CO3	1	1	1	3	1							1	3	3	3
CO4	1	1	1	3	1							1	3	3	3
CO5	1	1	3	1	1							1	3	3	3
CO6	1	3	1	1	1				1			1	3	3	3

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY:

Contents

Unit-1

Cognitive Science: Learn basics and Fundaments of Cognitive Science and interdisciplinary context like Cognition, Neuroscience, Neuropsychology, and Neuroscience. Learn important Brain functions like Attention, Emotion, Learning, Action, Language, Memory and Language.
Describe the emotional incident you have experienced in your life and write your thoughts and perception on it. Read the book" first few chapters and write a report "Redirect: Surprising New Science of Psychological Change"

Unit-2

Visual perception and Social Behaviour: Study and examine Visual implications in Attention, Eye catching, Memory, Recalling and Perception.
Explore Social Behaviours of Humans, Understanding, Beliefs, Motivation, Stress, and Relaxation
Case study of Start up: Pintrest, Instagram, InShorts, Facebook

Unit-3

Mathematical models: Explore Brain functions with the help of Mathematical functions, Probability, Statistics.
Examine by Examples like Finding Minimal Route (Google Map), Investigate Visual designs to create Advertisements, Audio assisting Book reading,

Unit-4

Applications: Decision making, Relaxation, Communication,
Evaluate User friendly designs for Fully/Partial paralysed,
Community development of ADHD, Dyslexic, Depression candidates
Survey of Cognitive science Journals and Paper works.

TEXT BOOKS:

1) Timothy D. Wilson, "Redirect: Surprising New Science of Psychological Change", Little, Brown and Company
2) Bergmann, M. et al (2013) The Logic Book. 6'hed. New York: McGraw Hill.

REFERENCE BOOKS:

1. Computational Neuroscience: Dayan and Abbot; MIT Press
2. Speech and Language Processing: Daniel Jurafsky and James H Martin; Pearson Education
3. The Logic Manual, Volker Halbach, OUP.

JOURNALS/MAGAZINES

1. https://ieeexplore.ieee.org/document/5196041

SWAYAM/NPTEL/MOOCs:

1. https://www.coursera.org/learn/philosophy-cognitive-sciences

SELF-LEARNING EXERCISES:

How Cognitive Science techniques can be used for teaching profession and also Learning Disabilities.

Course Title	Artificial Intelligence in Health Care				Course Type		Theory	
Course Code	B20EAS704	Credits	3		Class		VII semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**-**	**50%**	**50%**

COURSEOVERVIEW:

This course provides theoretical foundation level training that enables immediate and effective participation in AI in Health Care projects. The course provides grounding in basic methods to AI in Health Care. Basic building blocks of AI and Methodologies.

COURSE OBJECTIVE (COs)

The objectives of this course are to:

1. Learn the concepts of Artificial Intelligence and its Business Implications
2. Learn Deep Learning framework and setup
3. Understand methods for Data Analysis
4. Demonstrate solving of Medical problems using AI setup

COURSE OUTCOMES (COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Identify and differentiate Artificial Intelligence and Machine Learning, Algorithms, Philosophy of the AI and Address Myths of AI	2, 3,4,5,6, 8,12	1,2,3
CO2	Learn Fundamentals of Learning. Differentiate Supervised and Unsupervised Learning. Team work to prepare a report	1, 2, 3,4,5, 9,10	1,2,3
CO3	Learn and analyze Searching, logic representation concepts	1, 2, 3 4,5,12	1,2,3
CO4	Methods of Investigate Data, Statistical Ranking, Link Analysis, Data Storage and retrieval	1,2,3, 4,5, 12	1,2,3
CO5	Analyze modern medical practices and Medical Image processing, Understanding Different infections. Prepare a Team report on identifying and analysing pathological infections.	1,2,3, 4,5, 9, 12	1,2
CO6	Apply above knowledge to Rank and analyse. Read the literature and Journals to equip and participate in the AI projects	1,2,3, 4, 5,9,12	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√	√		
CO2		√	√	√	√	
CO3		√	√	√		
CO4		√	√	√	√	
CO5		√	√	√	√	√
CO6			√	√	√	√

COURSE ARTICULATION MATRIX

CO#/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		3		3			2				2	**3**	**3**	**3**
CO2	1	3		2	3				1	3		3	**3**	**3**	**3**
CO3	2	2		3	3							3	**3**	**3**	**3**
CO4	2	3	3	3	3							3	**3**	**3**	**3**
CO5	1	1	3	3	3				3			3			
CO6	1	1	3	3	3				3			3			

Note:1-Low,2-Medium,3-High

COURSE CONTENT
THEORY:

Contents

Unit-1

Artificial Intelligence: Introduction and Defining AI, History of AI, Debunk myths of AI, Features and Principles. Learn the essential components of Artificial Intelligence. Debunk the myths of AI. History of Artificial Intelligence.

Unit-2

Basics and Fundamentals of Learning: Logic representation. Basics and Fundamentals of Learning, Logic representation and retrieval.

Supervised Learning: Learn supervised learning, Inputs to the Intelligence. Discuss statistical methods such as the k-nearest neighbour algorithm or decision trees, Introduction to Bayesian inference. Look into other methods such as kernel-based learning and stochastic processes.

Unit-3

Unsupervised Learning

Learning the unsupervised methods. Explore the distribution of data points in collection and attempt to discover clusters and other structures of interest using k-means and hierarchical clustering, density-based spatial clustering and anomaly detection.

Unit-4

Deep Learning

Deep learning is a recently popular machine learning paradigm based on multi-layered Methods. Introduction to the formal framework of neural networks and discuss a number of frequently encountered network architectures such as feed-forward, convolution or recurrent neural networks.

Use case of Medical Imaging to approximate early detection of Infections:

Any of the project one can take up

Collect and analyze the medical images and determine the future infections/malignant tumors.

Discovery of Drugs with new evolving type of diseases.

TEXT BOOKS:

1. Bishop, Christopher M. Pattern Recognition and Machine Learning . Springer (2011). ISBN: 978-0-387-31073-2
2. Artificial Intelligence: Modern approach By Stuart Russel and Peter Norvig ISBN 0-13-103805-2

REFERENCE BOOKS:

1. Jurafsky, Daniel and Martin, James H. Speech and Language Processing . Pearson (2008). ISBN: 978-0-131-87321-6

JOURNALS/MAGAZINES

2. https://ieeexplore.ieee.org/document/8974295
3. https://ieeexplore.ieee.org/document/542794

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/courses/106/102/106102220/

SELF-LEARNING EXERCISES:

AI Real time Use Case: Medial Image processing to analyze the Carcinoma diagnostic images to determine the infestation accuracy and with speed.

Course Title	Python for Data Science (OE-III)				Course Type		Theory	
Course Code	B20CIO701	Credits	3		Class		VII semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

This course covers fundamentals of Python programming, data preprocessing, sampling methods, Data Visualization techniques, it involves developing the methods to analyzing data effectively to extract useful information and statistical method used in statistical decision using experimental data.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain the fundamentals of python programming
2. Discuss the data science and issues of Data science.
3. Describe the methods and programming tips of handling large data
4. Summarize the fundamentals of statistics and various Data Visualization techniques.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply the concepts of python programming to develop simple applications.	1,2,3,4,5	1,2
CO2	Make use of the concepts of data science for solving real world problem.	1,2,3,4,5	1,2
CO3	Identify the techniques which are suitable to handle large volumes of data for distributed data storage.	1,2,3,4,5	1,2
CO4	Analyze the results obtained using various visualization techniques on given data.	1,2,3,4,5	3
CO5	Learn new tools and technologies in the data science and apply for suitable application development.	12	1,2
CO6	Develop solutions in the data science to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5, 9, 10	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3		√				
CO4			√	√		
CO5						
CO6						

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	1								3	3	
CO2	2	2	1	2	2								3	3	
CO3	2	2	2	1	2								3	3	
CO4	2	2	1	2	2										3
CO5												3	2	2	
CO6					2				2	2			2	2	2

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

Content

UNIT- 1

Introduction to concepts of OOPs: Objects and Classes, Data Abstraction, Encapsulation, Polymorphism and Inheritance. Difference between OOP and POP. Python IDEs

Your First Python Program: Diving in; Declaring Functions; Optional and Named Arguments, Writing Readable Code, Documentation Strings, The import Search Path, Everything Is an Object, What's an Object?, Indenting Code, Exceptions, Catching Import Errors, Unbound Variables

Native Data types: Booleans, Numbers, Coercing integers to Floats and Vice Versa, Numbers in a Boolean Context, Lists, Tuples, Sets, and Dictionaries

Comprehensions: Working with Files and Dictionaries, List Comprehensions, Dictionary Comprehensions, Set Comprehensions

UNIT- 2

Introduction: Introduction to Data Science: Definition: Big Data and Data Science Hype, Why Data Science, Getting Past the Hype, Current Landscape, Who is Data Scientist?, Data Science Process Overview, Defining goals, Retrieving data, Data preparation, Data exploration, Data modeling , Presentation.

UNIT -3

Handling large data on a single computer: The problems you face when handling large data, General techniques for handling large volumes of data, General programming tips for dealing with large data sets, Case study 1: Predicting malicious URLs, Case study 2: Building a recommender system inside a database. First Steps in Big data: Distributing data storage and processing with Frameworks, Case study: Assessing risk when loaning money.

UNIT- 4

Statistics: Introduction, Types of Statistics. Data Visualization and Interpretation: Histogram, Bar Charts, Scatter Plots, Good vs. Bad Visualization.

Sampling distributions; Point estimation - estimators, minimum variance unbiased estimation, maximum likelihood estimation, method of moments, consistency; Interval estimation.

TEXT BOOKS:

1. Mark Pilgrim, “Dive into Python 3”, Apress special edition, second edition, 20l5.
2. Davy Cielen, Arno D. B. Meysman, Mohamed Ali, “Introducing Data Science”, Manning Publications Co., 1st edition, 2016.
3. Travis E. Oliphant, “Guide to NumPy”, Trelgol publishers,2006.
4. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Morgan Kaufmann, 2011.
5. William Navidi ,“Statistics for Engineers and Scientists”, McGraw Hill Education, India, 3rd Edition, 2013.

REFERENCE BOOKS:

1. Mark Lutz, “Learning Python”, Oreilly.2003.
2. John M. Zelle, “PYTHON Programming: An Introduction to Computer Science”, Franklin, Beedle& Associates, 2009.
3. Michael Dawson, “Python Programming for the Absolute Beginners”, 3rd Edition, CENAGE Learning, 2011.
4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Person Education, 2007.
5. K.P. Soman, Shyam Diwakar and V. Ajay “, Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2016.

JOURNALS/MAGAZINES

1. https://datascience.codata.org
2. https://www.springer.com/journal/41060
3. https://ieeexplore.ieee.org/document/8757088
4. https://www.ijcseonline.org/pub_paper/57-IJCSE-03229.pdf

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc21_cs33/preview
2. Python for Data Science, AI & Development -Coursera

Self-Learning Exercises:

Data Science using R, Creating own datasets, functions and packages in R and using packages in R

Course Title	Deep Learning (OE III)				Course Type		Theory	
Course Code	B20CI0702	Credits	3		Class		VII semester	
Course Structure	TLP	Credits	Contact Hours	Work	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50%**	**50%**

COURSE OVERVIEW:

Course Description: This course is an introduction to deep learning, a branch of machine learning concerned with the development and application of modern neural networks. Deep learning algorithms extract layered high-level representations of data in a way that maximizes performance on a given task. Deep learning is behind many recent advances in AI, including Siri's speech recognition, Facebook's tag suggestions and self-driving cars.

COURSE OBJECTIVE:

The objectives of this course are to:

1. Explain the basic concepts of Deep Learning.
2. Describe supervised and unsupervised learning.
3. Demonstrate the use of a deep learning neural network in a real world application.
4. Illustrate the use of deep learning techniques in neural networks and natural language processing

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply the basic concepts of mathematics to solve problems based on deep learning concepts.	1,2,3,4	1,2
CO2	Make use of suitable machine learning algorithms on real world problems (classification, clustering).	1,3,4,5,8	1,2
CO3	Utilize deep learning neural network model on real time applications.	1,3,4,5,8	1,3
CO4	Develop Recommender systems applications using CNN concepts of NLP.	1,2,4,5	1
CO5	Learn new tools and technologies in the deep learning and apply for suitable application development	12	1,2
CO6	Develop solutions in the deep learning to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	1,2

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√	√			
CO2			√			
CO3			√			
CO4						√
CO5			√	√		
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2									3	3	
CO2	2		1	2	1			1					3	3	
CO3	1		1	2	2			1					3		3
CO4	1	1		2	1								3		
CO5												2	2		
CO6					2				2	2			2	2	

Note:1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

Contents

UNIT-1

Machine Learning Basics: Linear Algebra-Scalors, Vectors, Matrices and Tensors, Eigen Decomposition, SVD, PCA Probability and Information Theory-Probability Distribution, Conditional Probability, Chain Rule of Conditional Probability, Bayes' Rule.

UNIT-2

Numerical Computation: Overflow, Underflow, Gradient Based Optimization, Constrained Optimization, Linear Least Squares, Machine Learning Basics- Learning Algorithms, Overfitting and Underfitting, Maximum Likelihood Estimation, Supervised and Unsupervised Learning Algorithms, Building Machine Learning Algorithm, Challenges Motivating Deep Learning.

UNIT-3

Deep Networks: Modern Practices-Example: Learning XOR, Gradient-Based Learning, Hidden Units, Architectural Design, Back-Propagation Algorithm.

UNIT-4

Convolutional Networks: Recurrent Neural Networks, Applications- Natural Language Processing, Recommender Systems.

TEXT BOOKS:

1. Bengio, Yoshua, Ian J. Good fellow, and Aaron Courville. "Deep learning." First edition, An MIT Press book in preparation, 2015.

REFERENCE BOOKS:

1. Duda, R.O., Hart, P.E., and Stork, D.G. “Pattern Classification”, Wiley-Interscience. 2nd Edition. 2001.
2. Theodoridis, S. and Koutroumbas, K. ,”Pattern Recognition”, Edition 4. Academic Press, 2008.
3. Russell, S. and Norvig, N. ,”Artificial Intelligence: A Modern Approach”, Prentice Hall Series in Artificial Intelligence. 2003.

JOURNALS/MAGAZINES

1. Springer Journal of Machine Learning, https://www.springer.com/journal/10994
2. http://ieeexplore.ieee.org/document/8297269/

SWAYAM/NPTEL/MOOCs:

1. https://www.my-mooc.com/en/categorie/deep-learning
2. https://nptel.ac.in/courses/106/105/106105215/

SELF-LEARNING EXERCISES:

Linear factor Models, Structured probabilistic Models, Monte-Carlo Methods, Deep generative Moodles.

Detailed Syllabus Semester- 8

Course Title	IoT Programming (OE-IV)				Course Type		Theory	
Course Code	B20CI0801	Credits	3		Class		VIII Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

The course covers the importance of IoT in society, the current components of typical IoT devices and trends for the future. IoT design considerations, constraints and interfacing between the physical world and your device will also be covered. This course will get to know how to make design trade-offs between hardware and software. It also covers key components of networking to ensure that students understand how to connect their device to the Internet.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Explain basics of Arduino programs.
2. Illustrate sample programs to interface sensors to aurdino board storead, process and analyze data.
3. Demonstrate WebApp storead and stored at a from sensors, and to monitor and control IoT devices.
4. Discuss IoT programming to develop larger smart products useful for the society.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	POs	PSOs
CO1	Develop programs to interface sensors to Aurdino board stored, process and analyze data.	1,2,3,4,5,6	3
CO2	Analyse the performance of Communication Protocols used in real time IoT Projects.	1,2,3,4,5,6	1
CO3	Make use of different IoT Patterns to develop the real world applications.	1,2,3,4,5,6	1
CO4	Identify the IoT security requirements to solve the given real world problem.	1,2,3,4,5,6	1
CO5	Learn new tools and technologies in the IoT and apply for suitable application development.	12	1
CO6	Develop solutions in the IoT to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	1

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1				√		√
CO2				√		
CO3			√			√
CO4		√	√			
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2									3
CO2	2	3	3	2	2	3							3		
CO3	3	3	2	2	3	3							3		
CO4	3	3	3	3	3	2							3		
CO5												2	2		
CO6					2				2	2			2		

Note: 1-Low,2-Medium,3-High

COURSE CONTENT

THEORY:

UNIT- 1

Building Blocks: Arduino Basics, Hardware Requirements, Software Requirements: Toolbar, Status Window, Serial Monitor Window; Arduino Programming Language Reference Internet Connectivity: Arduino Uno Wired Connectivity (Ethernet), Hardware Required, Software Required Circuit, Code(Arduino), Final Product; Arduino Uno Wireless Connectivity(WiFi), Hardware Required, Software Required, Circuit, Code (Arduino), Final Product

Communication Protocols: HTTP: Code (Arduino), Final Product; MQTT: Intrusion Detection System, Remote Lighting Control, Code (Arduino), Final Product

UNIT -2

Complex Flows: Node-RED: Hardware Required, Software Required, Circuit, Node-REDFlow, Code (Arduino), External Libraries, Internet Connectivity (Wireless),Read Sensor Data, Data Publish, Standard Functions and the Final Product.

IoT Patterns: Real-time Clients: Hardware Required, Software Required, Circuit, Code (Arduino): External Libraries, Internet Connectivity (Wireless), Read Sensor Data, Data Publish, Standard Functions, Code (Android): Project Setup, Screen Layout, Screen Logic, MQTT Client and the Final Product.

IoT Patterns: Remote Control: Hardware Required, Software Required, Circuit, Code (Android): Project Setup, Screen Layout, Screen Logic; MQTT Client,Code(Arduino):External Libraries, Internet Connectivity(Wireless) ,Data Subscribe, Control Lights, Standard Functions and the Final Product.

UNIT- 3

IoT Patterns: On-Demand Clients: Hardware Required, Software Required, Circuit, Database Table(MySQL), Code(PHP): Database Connection, Receive and Store Sensor Data, Get the Parking Spot Count; Code(Arduino): External Libraries, Internet Connectivity(Wireless), Read Sensor Data; Code(iOS): Project Setup, Screen Layout, Screen Logic and the Final Product.

IoT Patterns: Web Apps: Hardware Required, Software Required, Circuit, Database Table (MySQL),Code(PHP): Database Connection, Receive and Store Sensor Data, Dashboard; Code (Arduino): External Libraries, Internet Connectivity (Wireless), Read Sensor Data, Data Publish, Standard Functions and the Final Product.

IoT Patterns: Location Aware: Hardware Required, Software Required, Circuit, Database Table (MySQL), Code(PHP):Database Connection, Receive and Store Sensor Data, Map; Code (Arduino):External Libraries, Get GPS Coordinates, Data Publish, Standard Functions and the Final Product.

UNIT-4

IoT Patterns: Machine to Human: Hardware Required, Software Required, Circuit, Code (Arduino): External Libraries, Internet Connectivity (Wireless), Read Sensor Data, Data Publish, Standard Functions, Effektif Workflow: Process Creation, Process Configurations; Node-RED Flow and the Final Product.

IoT Patterns: Machine to Machine: Light Sensor Device, Code (Arduino): Lighting Control Device, Code (Arduino) and the Final Product

IoT Platforms: Hardware Required, Software Required, Circuit, Xively Setup, Zapier Setup, Xively Trigger, Code (Arduino): External Libraries, Internet Connectivity (Wireless), Read Sensor Data, Data Publish, Standard Functions and the Final Product. Security Requirements in IoT Architecture - Security in Enabling Technologies - Security Concerns in IoT Applications. Security Architecture in the Internet of Things - Security Requirements in IoT - Insufficient Authentication/Authorization - Insecure Access Control - Threats to Access Control, Privacy, and Availability - Attacks Specific to IoT. Vulnerabilities - Secrecy and Secret-Key Capacity - Authentication/Authorization for Smart Devices - Transport Encryption - Attack & Fault trees

TEXT BOOKS:

1. Adeel Javed,"Building Arduino Projects for the Internet of Things: Experiments with Real-World applications", Apress, 2015.
2. Brian Russell, DrewVanDuren,"PracticalInternetofThingsSecurity(KindleEdition)",2016

REFERENCE BOOKS:

1. Agus Kurniawan, "Smart Internet of Things Projects ", Packt Publishing,2016.

JOURNALS/MAGAZINES

1. https://www.researchgate.net/publication/266854342_On_IoT_programming
2. https://jisajournal.springeropen.com/about/new-content-item
3. https://ieeexplore.ieee.org/document/8628483/
4. https://ieeexplore.ieee.org/document/8845363

SWAYAM/NPTEL/MOOCs:

1. https://onlinecourses.nptel.ac.in/noc20_cs66/preview
2. An Introduction to Programming the Internet of Things (IOT) Specialization -Coursera

Self-Learning Exercises:

Explore any one of the boards like Raspberry Pi, Intel Galileo, Beagle Bone Black, Dragon Board, UDOO DUAL/QUAD, ARM Boards, DIY Development boards for IoT prototyping (C.H.I.P, MediatekLinkit One, Particle Photon, Tessel, Adafruit Flora, LightBlue Bean, Udoo Neo, Intel Edison)

Course Title	Reinforcement Learning (OE-IV)				Course Type		Theory	
Course Code	B20CIO802	Credits	3		Class		VIII Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of Classes Per Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	-	-	-	Theory	Practical	CIE	SEE
	Tutorial	-	-	-				
	Total	**3**	**3**	**3**	**39**	**0**	**50**	**50**

COURSE OVERVIEW

This course covers fundamental principles and techniques in deep and reinforcement learning. Topics include convolution neural networks, recurrent and recursive neural networks, back propagation algorithms, regularization and optimization techniques for training such networks, dynamic programming, Monte Carlo, and temporal difference, and function approximation reinforcement learning algorithms, and applications of deep and reinforcement learning.

COURSE OBJECTIVE (S):

The objectives of this course are to:

1. Describe back propagation algorithms to train deep neural networks and apply regularization techniques.
2. Explain optimization techniques to train deep neural networks and convolutional neural networks.
3. Discuss recurrent neural networks to analyze basic deep learning algorithms for speech recognition, face recognition, object recognition and NLP.
4. Demonstrate reinforcement learning algorithms for real time applications.

COURSE OUTCOMES(COs)

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

CO#	Course Outcomes	Pos	PSOs
CO1	Identify the concepts of Deep Feed forward Networks to train deep neural networks.	1,2,3,4,5,6	1
CO2	Utilize optimization techniques in deep neural networks and convolutional neural networks for real world application.	1,2,3,4,5,12	1
CO3	Develop recurrent neural networks algorithm for analysis of NLP applications.	1,2,3,4,5,6,9, 12	1
CO4	Solve real world complex problems using reinforcement learning algorithms.	1,2, 4,5 ,6	1,2
CO5	Learn new tools and technologies in the Reinforcement learning and apply for suitable application development.	12	
CO6	Develop solutions in the Reinforcement learning to the complex problems, either individually or as a part of the team and report the results with proper analysis and interpretation.	5,9,10	

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3				√		√
CO4			√			
CO5			√			
CO6			√	√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	2							3		
CO2	1	2	1	1	1							1	3		
CO3	3	2	1	2	2	1			1			1	3		
CO4	2	1		2	2	1							3	3	
CO5												1			
CO6					1				1	1					

Note: 1-Low, 2-Medium, 3-High

COURSE CONTENT THEORY:

UNIT-1

Deep Networks:Deep Feedforward Networks: Example: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms**. Regularization for Deep Learning**: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multitask Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier.

UNIT-2

Optimization for Training Deep Models: How Learning Differs from Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta-Algorithms. **Convolutional Networks:** The Convolution Operation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, The Neuro scientific Basis for Convolutional Networks.

UNIT-3

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence, Architectures, Deep Recurrent Networks, Recursive Neural Networks, The Challenge of Long-Term Dependencies, Echo State Networks, Leaky Units and Other Strategies for Multiple Time Scales, The Long Short-Term Memory and Other Gated RNNs, Optimization for Long-Term Dependencies, **Applications:** Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing.

UNIT-4

The Reinforcement Learning Problem: Reinforcement Learning, Elements of Reinforcement Learning, Limitations and Scope. Multi-arm Bandits :An n-Armed Bandit Problem, Action-Value Methods, Incremental Implementation, Tracking a Nonstationary Problem, Optimistic Initial Values, Upper-Confidence-Bound Action Selection, Gradient Bandits, Associative Search, **Finite Markov Decision Processes** : The Agent–Environment Interface , Goals and Rewards, Returns, Unified Notation for Episodic and Continuing Tasks, The Markov Property, Markov Decision Processes, Value Functions, Optimal Value Function, Optimality and Approximation, Dynamic Programming: Policy Evaluation, Policy Improvement, Policy Iteration, Value Iteration, Asynchronous Dynamic Programming, Generalized Policy Iteration.

TEXT BOOKS:

1. Ian Good fellow, Yoshua Bengio, and Aaron Courville Deep Learning, MIT Press, 2016.
2. Richard S. Sutton and Andrew G. Barto, “Reinforcement Learning: An Introduction” second edition, the MIT PRESS, 2015.

REFERENCE BOOKS:

1. Abhishek Nandy, Manisha Biswas, Reinforcement Learning: With Open AI, TensorFlow and Keras Using Python, Apress, 2017.
2. Eugene charniak, Introduction to Deep Learning, The MIT Press, 2018.

JOURNALS/MAGAZINES

1. https://ieeexplore.ieee.org/document/6025669
2. https://ieeexplore.ieee.org/document/7301554
3. https://www.jair.org/index.php/jair/article/view/10166
4. http://www.ijstr.org/final-print/mar2020/A-Study-Of-Reinforcement-Learning-Applications-Its-Algorithms.pdf

SWAYAM/NPTEL/MOOCs:

1. https://nptel.ac.in/noc/courses/noc18/SEM1/noc18-cs27/
2. Reinforcement Learning, Practical Reinforcement Learning-Coursera

Self-Learning Exercises:

Implement and apply Monte Carlo reinforcement learning algorithms, implement and apply temporal-difference reinforcement learning algorithms.

10 YEARS OF UNIVERSITY RECOGNITION

20 YEARS OF ACADEMIC EXCELLENCE

REVA UNIVERSITY

Bengaluru, India

School of Computer Science and Engineering HANDBOOK

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

REVA UNIVERSITY
Bengaluru, India

School of Computer Science and Engineering

HANDBOOK

M. Tech. in Computer Science and Engineering

2020-22

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bangalore - 560 064
Phone No: +91-9021190211/080-46966966

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. ShyamaRaju

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 RevaUniversity.At REVA University, research, consultancy, and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries.

The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of "Technology Incubation Centers" in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.With firm faith in the saying, "Intelligence plus character –that is the goal of education" (Martin Luther King, Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic education to the future generation and playing a positive role in nation building. We reiterate our endeavor to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating "GLOBAL PROFESSIONALS".

Welcome to the portals of REVA University!

Dr. M Dhanamjaya
Vice-Chancellor, REVA University

Director's –Message

I congratulate and welcome all the students to the esteemed School of Computer Science and Engineering. You are in the right campus to become a computer technocrat. The rising needs of automation in Industry 4.0 and improvising living standards have enabled rapid development of computer software and hardware technologies. Thus providing scope and opportunity to generate more human resources in the areas of compute rscience. The B.Tech and M.Techprogram curriculum and Ph.D areas in the school are designed to cater to the requirements of industry and society. The curriculum is designed meticulously in association with persons from industries (TCS, CISCO, AMD, MPHASIS, etc.), academia and research organizations (IISc, IIIT, Florida University, Missouri S & T University, etc).This handbook presents the M. Tech in Computer Science and Engineering program curriculum. The program is of 2 years duration and split into 4 semesters. The courses are classified into foundation core, hard core, and soft core courses. Hard core courses represent fundamentals study requirements of CSE. Soft courses provide flexibility to students to choose the options among several courses as per the specialization, such as, AI, Data Science, and Systems. Theoretical foundations of engineering, science, and computer science are taught in first two Semesters. Later, advanced courses and recent technologies are introduced in subsequent semesters for pursuing specialization.

The important features of the M.TechCSE are as follows: 1) Choice based course selection and teacher selection, 2) Studies in emerging areas like Machine Learning, Artificial Intelligence, Data Analytics, Cloud Computing, Python/R Programming, Genetic Engineering, NLP, Swarm Intelligence, IOT and Cybersecurity, 3) Short and long duration Internships 4) Opportunity to pursue MOOC course as per the interest in foundation and soft core courses, 5) Attain global and skill certification as per the area of specialization, 6) Self-learning components, 7) Experiential, practice, practical, hackathons, and project based learning, 8) Mini projects and major projects with research orientation and publication, 9) Soft skills training and 10) Platform for exhibiting skills in cultural, sports and technical activities through clubs and societies.

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

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

Dr. Sunilkumar S Manvi
Director, School of CSE and CIT

CONTENTS

RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. RukminiShyamaRaju to impart education to millions of underprivileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini ShyamaRaju 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. ShyamaRaju, 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. ShyamaRaju 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.

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

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

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curricula. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business

sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless 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 PradhanMantriKaushalVikasYojana. The Centre conducts several add-on

courses in challenging areas of development. It is always active in facilitating student's variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Okalahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC2, VMware, SAP, Apollo etc, to facilitate student exchange and teacher–scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitates students to study some of the programs partly in REVA University and partly in foreign university, viz, 2.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring the implementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

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

REVA organises various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions, and variety of cultural events. Another important event is Shubha Vidaaya, Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and

are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicate themselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved top ranks and won medals and prizes in academic, cultural and sports activities are also recognised by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga class'severyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

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 THE SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

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

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

Vision

School of Computer Science and Engineering aspires to become an Innovative Technological Education and Research hub in developing excellent human resources through education of global standards that will inculcate technical competence, leadership qualities, ethical, moral values, research and innovative skills, social responsibility and entrepreneurship abilities.

Mission

- To create state of the art- Computing labs infrastructure and research facilities in Computer Science and Engineering.
- To provide student-centric learning environment in Computer Science and Engineering through innovative pedagogy and education reforms.
- To encourage research, innovation and entrepreneurship in Computer Science and Engineering through industry/academia collaborations and extension activities
- Organize programs through club activities for knowledge enhancement in thrust areas of Computer Science and Engineering.

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

Quality Policy

The School of Computer Science and Engineering is committed to excellence through following policies.

1. Impart quality education by providing state of art curriculum, experimental learning, and state of the art labs.
2. Enhance skill set of faculty members through faculty development programmes and interaction with academia and industries.
3. Inculcate the competency in software/hardware design and programming through co-curricular activities like Hackathon, Project exihibition, Internship and Enterpreneuship Programme.
4. Provide soft skill and skill development training for personality development and better placement.
5. Promote innovation and research culture among students and support faculty members for better research and development activity.

MEMBERS OF BOARD OF STUDIES

Sl.NO	Name, Designation and Affiliation	Status	Correspondence Address
1.	**Dr Sunil Kumar S Manvi** Professor and Director School of CSE and CIT, REVA University	Chair Person	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
2.	**Dr Mallikarjuna Shastry P** M Professor, School of CSE, REVA University	Member (Internal)	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
3.	**Dr KiranKumari Patil**, Professor, School of CSE, Director UIIC, REVA University	Member (Internal)	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
4.	**Dr Mallikarjuna M. Kodabagi**, Assistant Director, School of CSE, REVA University	, Member (Internal)	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
5.	**Dr. Ashwin Kumar U M**, Professor and Assistant Director, School of CSE, REVA University	Member (Internal)	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
6.	**Dr. Gopal Krishna Shyam** Professor, School of CSE, REVA University	Member (Internal)	Rukmini Knowledge Park, Kattigenahalli, Yelahanka, Bengaluru, Karnataka 560064
7.	**Mr. Chetan Shivakumar,** CEO & Cofounder, Aikaan Labs Pvt Ltd, Bengaluru	Member	CEO & Cofounder, Aikaan Labs Pvt Ltd, Bengaluru
8.	**Mr. Muralidhar Jahagirdhar**, Practice Head Engineering, ATMECS Technology Pvt Ltd, Hyderabad	Member	Practice Head Engineering, ATMECS Technology Pvt Ltd, Hyderabad
9.	**Mr. Ravikant Soni**, Technical Manager, Solution Architect, Standard Chartered bank, Bengaluru.	Member	Technical Manager, Solution Architect, Standard Chartered bank, Bengaluru.
10.	**Dr Sanjay**, HoD Dept. of ISE, NITTE Meenakshi Institute of Technology, Bengaluru	Member	HoD Dept. of ISE, NITTE Meenakshi Institute of Technology, Bengaluru
11.	**Dr Raghavendra Kulkarni**, Director of Academics, M. S. Ramaiah University of Applied Sciences, Bengaluru	Member	Director of Academics, Ramaiah University of Applied Sciences, Bengaluru

Program Overview

M Tech in Computer Science and Engineering

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

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

Computers have become ubiquitous part of modern life and new applications are introduced everyday. The use of computer technologies is also commonplace in all types of organizations, in academia, research, industry, government, private and business organizations. As computers become even more pervasive, the potential for computer-related careers will continue to grow and the career paths in computer-related fields will become more diverse. Since 2001, global information and communication technologies (ICTs) have

become more powerful, more accessible, and more widespread. They are now pivotal in enhancing competitiveness, enabling development, and bringing progress to all level society.

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

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

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

REVA UNIVERSITY
Bengaluru, India

School of Computer Science and Engineering

Program Educational Objectives (PEO's)

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

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

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

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

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

Program Outcomes (POs)

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

PO-1: Demonstrate in-depth knowledge of specific discipline or professional area, including wider and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge.

PO-2: Analyze complex engineering problems critically, apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.

PO-3: Think laterally and originally, conceptualize and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise.

PO-4: Extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.

PO-5: Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations.

PO-6: Possess knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.

PO-7: Demonstrate knowledge and understanding of engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

PO-8: Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.

PO-9: Recognize the need for and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

PO-10: Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

PO-11: Observe and examine critically the outcomes of one's actions and make corrective measures subsequently and learn from mistakes without depending on external feedback (SELF learning).

Programme Specific Outcomes (PSO's)

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

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

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

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

REVA University Academic Regulations

M Tech., Degree Programs

(Applicable for the programs offered from 2020-21 Batch)

Regulations - MTech., Degree Program
Academic Year 2020-21 Batch

1. Title and Commencement:

1.1 These Regulations shall be called **"REVA University Academic Regulations – M Tech., Degree Program 2020-21 Batch subject to amendments from time to time by the Academic Council on recommendation of respective Board of Studies and approval of Board of Management**

1.2 These Regulations shall come into force from the date of assent of the Chancellor.

2. The Programs:

These regulations cover the following M Tech., Degree programs of REVA University offered during 2020-21

M Tech (Full Time) in:
Artificial Intelligence
Computer Science and Engineering
Computer Aided Structural Engineering
Construction Technology & Management
Digital Communication and Networking
Machine Design
Power Energy & Systems
Transportation Engineering and Management
VLSI and Embedded Systems

Also
M Tech (Part Time) in:
Computer Science and Engineering
VLSI and Embedded Systems

3. Duration and Medium of Instructions:

3.1 **Duration:** The duration of the M Tech degree program shall be **TWO years** comprising of **FOUR** Semesters. A candidate can avail a maximum of 8 semesters - 4 years as per double duration norm, in one stretch to complete M Tech degree. The duration for part time students is **THREE years** and a maximum of 6 years they are required to complete the program.

3.2 The medium of instruction shall be English.

4. Definitions:

4.1 Course: "Course" means a subject, either theory or practical or both, listed under a programme; Example: "Finite Element Method of Analysis" in M Tech Civil Engineering program, "Advanced Theory of Vibration" in M Tech., Mechanical program are examples of courses to be studied under respective programs.

Every course offered will have three components associated with the teaching-learning process of the course, namely:

L	**Lecture**
T	**Tutorial**
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 / Project Based Learning or Course end Project/Self Study/ Online courses from listed portals that equip students to acquire the much required skill component.

4.2 Classification of Courses

Courses offered are classified as: Core Courses, Open Elective Courses, Project work/Dissertation

4.2.1 **Core Course:** A course which should compulsorily be studied by a candidate choosing a particular program of study

4.2.2 **Foundation Course:** The foundation Course is a mandatory course which should be completed successfully as a part of graduate degree program irrespective of the program of study

4.2.3 **Hard Core Course (HC) simply core course:** 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

4.2.4 **Soft Core Course (SC) (also known as Professional Elective Course)**

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

4.2.5 **Open Elective Course (OE):**

An elective course chosen generally from other discipline / subject, with an intention to seek exposure to the basics of subjects other than the main discipline the student is studying is called an **Open Elective Course**

4.2.6 **Project Work / Dissertation:**

Project work / Dissertation work is a special course involving application of knowledge in solving / analysing /exploring a real life situation / difficult problems to solve a multivariable or complex engineering problems.

5. Eligibility for Admission:

5.1. The eligibility criteria for admission to M Tech Program (Full Time) of 2 years (4 Semesters) and (Part Time) of 3 years (6 Semesters) are given below:

Sl. No.	Program	Duration	Eligibility
1	Masters of Technology (M Tech) in Artificial Intelligence	4 Semesters (2 years)	B E / B.Tech. in CSE / ISE / TE / MCA / M. Sc. in Computer Science or Mathematics or Information Science or Information Technology with a minimum of 50% (45% in case of SC/ST) marks in aggregate of any recognized University / Institution or AMIE or any other qualification recognized as equivalent there to.
2	M Tech in Computer Science and Engineering	**Full Time** – 4 Semesters (2 years) **Part Time** – 5 Semesters (3 years)	B E / B.Tech. in ECE / IT / EEE / CSE / ISE / TE / MCA / M.Sc. in Computer Science or Mathematics or Information Science or Information Technology with a minimum of 50% (45% in case of SC/ST) marks in aggregate of any recognized University / Institution or AMIE or any other qualification recognized as equivalent there to.
3	M Tech in Computer Aided Structural Engineering Construction Technology & Management Transportation Engineering and Management	6 Semesters (2 years)	BE/ B.Tech. in Civil Engineering with a minimum of 50% (45% in case of SC/ST) marks in aggregate of any recognized University / Institution or AMIE or any other qualification recognized as equivalent there to.
4	M Tech in Power Energy & Systems	4 Semesters (2 years)	BE/ B.Tech. in EE/ EEE/ ECE/ CSE/ MS / M.Sc. in Mathematics/Physics/Electronics / Information Technology or Information Science with a minimum of 50% (45% in case of SC/ST) marks in aggregate of any recognized University / Institution or AMIE or any other qualification recognized as equivalent there to.
5	M Tech in Digital Communication and Networking Machine Design	4 Semesters (2 years)	B E / B.Tech. in ECE /TE / EEE / CSE / ISE / Instrumentation Technology / Medical Electronics/M Sc in Electronics with a minimum of 50% (45% in case of SC/ST) marks in aggregate of any recognized University/Institution or AMIE or any other qualification recognized as equivalent there to.
6	M Tech in VLSI and Embedded Systems	**Full Time** – 4 Semesters (2 years) **Part Time** – 6 Semesters (3 years)	B E / B.Tech. in ECE /TE / EEE / CSE / ISE / Instrumentation Technology / Medical Electronics/M Sc in Electronics with a minimum of 50% (45% in case of SC/ST) marks in aggregate of any recognized University/Institution or AMIE or any other qualification recognized as equivalent there to.

7	M Tech in Machine Design	4 Semesters (2 years)	BE / B.Tech. in Mechanical/Aeronautical / Automobile / Industrial Production Engineering with a minimum of 50% (45% in case of candidate belonging to SC/ST category) marks in aggregate, of any recognized University / Institution or AMIE or any other qualification recognized as equivalent there to.

5.2 Provided further that the eligibility criteria are subject to revision by the Government Statutory Bodies, such as AICTE, UGC from time to time.

6. Courses of Study and Credits

6.1 Each course of study is assigned with certain credit value

6.2 Each semester is for a total duration of 20 weeks out of which 16 weeks dedicated for teaching and learning and the remaining 4 weeks for final examination, evaluation and announcement of results

6.3 The credit hours defined as below

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.

1 credit = 13 credit hours spread over 16 weeks or spread over the semester

The total duration of a semester is 20 weeks inclusive of semester-end examination.

The following table describes credit pattern

Table -2: Credit Pattern					
Lectures (L)	**Tutorials (T)**	**Practice (P)**	**Credits (L:T:P)**	**Total Credits**	**Total Contact Hours**
4	2	0	4:1:0	5	6
3	2	0	3:1:0	4	5
3	0	2	3:0:1	4	5
2	2	2	2:1:1	4	6
0	0	6	0:0:3	3	6
4	0	0	4:0:0	4	4
2	0	0	2:0:0	2	2

a. The concerned BoS will choose the convenient Credit Pattern for every course based on size and nature of the course

7. Different C**ourses of Study**:

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

a. Core Course (CC)
b. Foundation Course (FC)
c. Hard Core Course (HC)
d. Soft Core Course (SC)
e. Open Elective Course (OE)
f. Minor Project
g. Major Project / Dissertation:

The credits for minor projects, major project/Dissertation will be decided by the respective Schools.

8. Credit and Credit Distributions:

8.1 A candidate has to earn 72 credits for successful completion of M Tech degree with a distribution of credits for different courses as prescribed by the University.

8.2 A candidate can enroll for a maximum of 24 credits per Semester. However s/he may not successfully earn a maximum of 24 credits per semester. This maximum of 24 credits does not include the credits of courses carried forward by a candidate.

8.3 Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to IV semester and complete successfully 72 credits in 4 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for Student Fellowship, Scholarship, Free ships, and such other rewards / advantages which could be applicable for all full time students and for hostel facilities.

9. Assessment and Evaluation

9.1 The assessment and evaluation process happens in a continuous mode. However, for reporting purpose, a Semester is divided into 3 components as IA1, IA2 and SEE. The performance of a candidate in a course will be assessed for a maximum of 100 marks as explained below.

(i) Component IA1:

The first Component (IA1), of assessment is for 25 marks. This will be based on test, assignment / seminar. During the first half of the semester (i.e. by 8th week), the first 50% of the syllabus (Unit 1&2) will be completed. This shall be consolidated during the first three days of 8th week of the semester. A review test based on IA1 will be conducted and completed in the beginning of the 9th week. In case of courses where test cannot be conducted, the form of assessment will be decided by the concerned school and such formalities of assessment will be completed in the beginning of the 9th week. The academic sessions will continue for IA2 immediately after completion of process of IA1.

The finer split - up for the award of marks in IA1 is as follows:

Assignment & Seminars…….. 10 marks for the first 20% of the syllabus
Test (Mid-Term) ……..15 marks for the first 30% of the syllabus
Total …… ……..25 marks

(ii) Component IA2:

The second component (IA2), of assessment is for 25 marks. This will be based on test, assignment /seminar. The continuous assessment and scores of second half of the semester (9th to 16th week) will be consolidated during 16th week of the semester. During the second half of the semester the remaining

units in the course will be completed. A review test based on IA2 will be conducted and completed during 16th week of the semester. In case of courses where test cannot be conducted, the form of assessment will be decided by the concerned school and such formalities of assessment will be completed during 16th week.

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

The finer split - up for the award of marks in IA2 is as follows:

Assignment/Seminar……..10 marks for the second 20% of the syllabus

Review Test (Mid-Term) ……..15 marks for the second 30% of the syllabus

Total ……..25 marks

(iii) Component SEE:

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

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

Component	Period	Syllabus	Weightage	Activity
IA1	1st Week to 8th Week	First 50% (two units)		Instructional process and Continuous Assessment
	Last 3 days of 8th Week		25%	Consolidation of IA1
IA2	9th week to 16th week	Second 50% (remaining two units)		Instructional process and Continuous Assessment
	Last 3 days of 16th week		25%	Consolidation of IA2
SEE	17th and 18th week			Revision and preparation for Semester end examination
	19th week to 20th week	Entire syllabus	50%	Conduct of semester end examination and Evaluation concurrently
	21st week			Notification of Final Grades
***Evaluation shall begin very first day after completion of the conduct of examination of the first course and both examination and evaluation shall continue concurrently. The examination results / final grades be announced latest by 21st week**				

Note: 1. Practical examination wherever applicable shall be conducted before conducting of IA2

examination. The calendar of practical examination shall be decided by the respective school.

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

9.3 The Assessment of MOOC and Online Courses shall be decided by the concerned School Board of Studies (BOS).

9.3.1 **For > 3 credit courses**

I	IA-I	25 marks
Ii	IA-2	25 marks
Iii	Semester end examination by the concern school board (demo, test, viva voice etc)	50 marks
	Total	**100 marks**

9.3.2 **For 1 & 2 credit courses**

I	IA-I	15 marks
Ii	IA-2	15 marks
Iii	Semester end examination by the concern school board (demo, test, viva voice etc)	20 marks
	Total	**50 marks**

9.3.3 The 50 marks meant for Internal Assessment (IA) of the performance in carrying out practical shall further be allocated as under:

I	Conduction of regular practical / experiments throughout the semester	20 marks
Ii	Maintenance of lab records / Activities /Models / charts etc	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**

In case of an integrated course 20% marks be earmarked for laboratory work.

For example:

During IA1

Laboratory work …….. 10 marks

Test (Mid-Term) ……..15 marks for the first 50% of the theory syllabus

Total …… ……..25 marks

During IA2

Laboratory work …….. 10 marks

Test (Mid-Term) ……..15 marks for the second 50% of theory syllabus

Total …… ……..25 marks

SEE to be conducted for theory portions only and assessed for 50 marks

10. Setting Questions Papers and Evaluation of Answer Scripts:

10.1 There shall be three sets of questions papers set for each course. Two sets of question papers shall be set by the internal and one set by external examiner for a course. The Chairperson of the BoE shall get the question papers set by internal and external examiners.

10.2 The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation.

10.3 There shall be double evaluation, viz, first valuation by the internal evaluator who has taught the course and second evaluation shall be an external examiner who is familiar with the course. The average marks of the two evaluations (internal examiner & external examiner) shall be the marks to be considered for declaration of results.

10.4 The examination for Practical work/ Field work/Project work will be conducted jointly by two examiners (internal and external). However, in case of non-availability of external examiner or vice versa, the Chairperson BoE at his discretion can invite internal / external examiners as the case may be, if required.

10.5 If a course is fully of (L=0):T: (P=0) type, then the examination for SEE Component will be as decided by the BoS concerned.

10.6 In case of a course with only practical component a practical examination will be conducted with two examiners and each candidate will be assessed on the basis of: a) Knowledge of relevant processes, b) Skills and operations involved, and c) Results / Products including calculation and reporting.

10.7 The duration for Semester-End practical examination shall be decided by the Controller of Examinations.

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

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

Component – I	(IA1)	Periodic Progress and Progress Reports (25%)
Component – II	(IA2)	Results of Work and Draft Report (25%)
Component– III	(SEE)	Final Evaluation and Viva-Voce (50%). Evaluation of the report is for 30% and the Viva-Voce examination is for 20%.

12. All assessments must be done by the respective Schools as per the guidelines issued by the Controller of Examinations. However, the responsibility of announcing final examination results and issuing official transcripts to the students lies with the office of the Controller of Examinations.

13. Requirements to Pass a Course

13.1 A candidate's performance from all 3 components will be in terms of scores, and the sum of all three scores will be for a maximum of 100 marks (25 + 25 + 50). A candidate who secures a minimum of 40% in the SEE and an overall 40% (IA1+IA2+SEE) in a course is said to be successful.

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

Marks, P	Grade, G	Grade Point (GP=V x G)	Letter Grade
90-100	10	v*10	O
80-89	9	v*9	A+
70-79	8	v*8	A

60-69	7	v*7	B+
55-59	6	v*6	B
50-54	5.5	v*5.5	C+
40-49	5	v*5	C
0-39	0	v*0	F
ABSENT			AB

O - Outstanding; A+-Excellent; A-Very Good; B+-Good; B-Above Average; C+-Average; C-Satisfactory; F – Unsatisfactory.

Here, P is the percentage of marks (P=[(IA1+IA2)+SEE] secured by a candidate in a course which is **rounded to nearest integer**. v is the credit value of course. G is the grade and GP is the grade point.

a. Computation of SGPA and CGPA

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

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

SGPA (Si) = ∑(Ci x Gi) / ∑Ci

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

b. Illustration for Computation of SGPA and CGPA

Illustration No. 1

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade)
Course 1	**3**	**A**	**9**	**3X9=27**
Course 2	**3**	**B**	**8**	**3X8=24**
Course 3	**3**	**C**	**7**	**3X7=21**
Course 4	**3**	**O**	**10**	**3X10=30**
Course 5	**3**	**D**	**6**	**3X6=18**
Course 6	**3**	**O**	**10**	**3X10=30**
Course 7	**2**	**A**	**9**	**2X 9 = 18**
Course 8	**2**	**B**	**8**	**2X 8 = 16**
	22			**184**

Thus, **SGPA = 184 ÷ 22 = 8.36**

c. Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (72) for two year post graduate degree in a specialization is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e

CGPA = ∑(Ci x Si) / ∑Ci

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

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

Illustration:
CGPA after Final Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	22	8.36	22 x 8.36 = 183.92
2	22	8.54	22 x 8.54 =187.88
3	16	9.35	16x9.35=149.6
4	12	9.50	12x9.50=114
Cumulative	**72**		635.4

Thus, **CGPA** = $\frac{22x8.36+22x8.54+16x9.35+12x9.50}{72}$ = 8.83

13.3 **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 8.83 x 10=88.30

14. 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	C	Satisfactory	Pass
< 4 CGPA	0	F	Unsatisfactory	Unsuccessful

Overall percentage=10*CGPA

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

b. **Final Grade Card:** Upon successful completion of the Post Graduate Degree a Final Grade card consisting of grades of all courses successfully completed by the Candidate will be issued by the COE.

15. Attendance Requirement:

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

15.2 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.

15.3 Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc., during a semester shall not be permitted to appear to the end semester examination and such student shall seek re-admission

16. Re-Registration and Re-Admission:

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

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

17. **Absence during Internal Test:**

In case a student has been absent from an internal tests due to the illness or other contingencies he /

she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Director of the School, for conducting a separate internal test. The Director of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher, and arrange to conduct a special internal test for such candidate(s) well in advance before the Semester End Examination of that respective semester. Under no circumstances internal tests shall be held / assignments are accepted after Semester End Examination.

18. Eligibility to Appear for Semester End Examination (SEE)

18.1 Only those students who fulfill 75% attendance requirement and who secure minimum 30% marks in IA1 and IA2 together in a course are eligible to appear for SEE examination in that course.

18.2 Those students who have 75% of attendance but have secured less than 30% marks in IA1 and IA2 together in a course are not eligible to appear for SEE examination in that course. They are treated as dropped the course and they will have to repeat that course whenever it is offered.

18.3 In case a candidate secures more than 30% in IA1 and IA2 together but less than 40% in aggregate of IA1, IA2 and SEE in a course is considered as unsuccessful and such a candidate may either opt to DROP that course or appear for SEE examination during the subsequent semesters / years within the stipulated period.

18.4 In such a case wherein he / she opts to appear for just SEE examination, then the marks secured in IA1 and IA2 shall get continued. Repeat SEE examination will be conducted in respective semesters.

19. Provision for Supplementary Examination

In case a candidate fails to secure a minimum of 40% (20 marks) in Semester End Examination (SEE) and a minimum of 40% marks overall (IA and SEE together), such candidate shall seek supplementary examination of only such course(s) wherein his / her performance is declared unsuccessful. The supplementary examinations are conducted after the announcement of even semester examination results. The candidate who is unsuccessful in a given course(s) shall appear for supplementary examination of odd and even semester course(s) to seek for improvement of the performance.

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

A candidate who secures a minimum of 40% in the SEE and an overall 40% (IA1+IA2+SEE) in a course is said to be successful otherwise considered that the candidate has failed the course. A candidate is required to successfully complete all the courses before submission of major project report or dissertation report.

(It means that the candidate has no restrictions on the number of courses that can be carried forward)

21. **Provision for Appeal**

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

22. **Grievance Committee:**

In case of students having any grievances regarding the conduct of examination, evaluation and announcement of results, such students can approach Grievance Committee for redressal of grievances. Grievance committees will be formed by CoE in consultation with VC

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

- The Controller of Examinations - 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.

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

M. Tech in Computer Science and Engineering

Scheme of Instructions

(Effective from the Academic Year 2020-21)

Sl. No	Course Code	Course Title	Course Type	Credit Pattern and Credit Value				No. of Hrs.
				L	T	P	C	
FIRST SEMESTER								
1	M20TC0101	Advanced Database Management Systems	HC	3	0	0	3	3
2	M20CS0101	Advanced Machine Learning	HC	3	0	1	4	5
3	M20TC0102	Advanced Java Programming	HC	3	0	0	3	3
4	M20TC0103	Advanced Algorithms	HC	3	0	0	3	3
5	M20TC0104	Internet of Things	HC	3	0	1	4	5
6	M20CI0101	Python for Artificial Intelligence	HC	2	0	1	3	4
7	M20TC0105	Mini Project	HC	0	0	2	2	4
Total Credits for the First Semester							**22**	**27**
SECOND SEMESTER								
1	M20TCS211	Cloud Computing Tools	SC	2	0	1	3	4
	M20TCS212	Advanced Web Technologies						
	M20TCS213	Distributed Computing						
2	M20TCS221	Big data Analytics	SC	3	0	1	4	5
	M20TCS222	Wireless and Mobile Networks						
	M20TCS223	User Interface (UI)/ User Experience (UX) Design						
3	M20TCS231	Unix System Programming	SC	3	0	1	4	5
	M20TCS232	Mobile Application Development						
	M20TCS233	Python for Data Analysis						
4	M20TCS241	High Performance Computing	SC	3	0	1	4	5
	M20TCS242	Program Analysis						
	M20TCS243	Block Chain Technology						
5	M20TCS251	Robotic Process Automation	SC	3	0	0	3	3
	M20TCS252	Agile Software Development						
	M20TCS253	Deep Learning						
6	M20TC0206	Cyber Security Lab	HC	0	0	2	2	4
7	M20TC0207	Mini Project	HC	0	0	2	2	4
Total Credits for the Second Semester							**22**	**30**

THIRD SEMESTER								
1	M20TCS311 M20TCS312 M20TCS313	Virtual and Augmented Reality Computer Vision Natural Language Processing	SC	3	0	1	4	5
2	M20TCO302	Open Elective	OE	4	0	0	4	4
3	M20TC0303	Project Work Phase-1	HC	0	0	4	4	8
4	M20TC0304	Internship/ Global Certification	HC	0	0	4	4	8
		Total Credits for the Third Semester					**16**	**25**
FOURTH SEMESTER								
1	M20TC0401	Project-Work Phase-2 and Dissertation	HC	0	0	12	12	28
		Total Credits for the Fourth Semester					**12**	28
Total Credits for all Four Semesters is 72.								

Note:Internship should be carried out in a reputed /Tier-1/R & D organization, preferably, internship should be with stipend. The internship should be approved by the REVA University authorities before completion of 3rd semester and the students should obtain the permission for the same by producing the necessary details of company, selection process, and the offer letter issued by the company. At the end of the Internship, detailed report must be submitted.

Students can take-up the internship only if it is approved by RU authorities.

Project work phase 1 comprises of literature survey, review paper writing, and problem formulation, identification of tools and techniques, and methodology for the project.

Project work phase – 2, in 4thsemester should have an outcome: publication in a reputed National/International Journal or a patent filing to earn 2 credits.

Global Certification programs: Students have to register for global certification programs of their choice such as networking, JAVA, ORACLE, etc. The students can also choose skill development programs conducted by the UIIC or School, which may not be globally certified. However, weightage is more for global certification courses (10% weightage is accounted less for non-global programs).

The registration must happen before beginning of the third semester.

I Year

Detailed Syllabus

I Semester
Syllabus

<table>
<tr><td>Course Title</td><td colspan="4">Advanced Database Management Systems</td><td>Course Type</td><td colspan="2">Theory</td></tr>
<tr><td>Course Code</td><td>M20TC0101</td><td>Credits</td><td colspan="2">3</td><td>Class</td><td colspan="2">I Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>0</td><td>0</td><td>0</td><td rowspan="2">Theory</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>3</td><td>3</td><td>3</td><td>39</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

1. The objectives of this course are to:
2. Explain the concepts of DBMS and SQL
3. Discuss the Object oriented concepts and object relational Databases
4. Demonstrate the use of parallel and distributed databases in real world applications
5. Illustrate the development of Enhanced Data Model for given applications.

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Solve queries using SQL for real world applications	1,2,3,4,5	1,2,3
CO2	Make use of the Object oriented concepts in relational databases for real world applications.	1,2,3,4,5	1,2,3
CO3	Design parallel and distributed databases, Query database and incorporate recovery mechanisms.	1,2,3,4,5	1,2,3
CO4	Develop Enhanced Data Model for given real world applications	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	1							3	3	3
CO2	3	3	2	3	2							3	3	3
CO3	3	2	3	1	2							3	3	3
CO4	3	3	3	2	2							3	3	3

COURSE CONTENTS:

UNIT 1

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

UNIT- 2

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

UNIT -3

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

UNIT- 4

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

SELF-LEARNING COMPONENT:

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

TEXT BOOKS:

1. Raghu Ramakrishnan and Johannes Gehrke " Database Management Systems", McGraw- Hill, 2003.

2. Elmasri and Navathe, "Fundamentals of Database Systems", Pearson Education, 2007.

REFERENCE BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “Database System Concepts”, McGraw Hill, 2010.
2. C J Date, “Database Design and Relational Theory, Normal Forms and All that Jazz”, O ‘Reilly.inc 2012.
3. Jiawei Han, MichelineKamber, Jian Pei, “Data Mining: Concepts and Techniques”, Elsevier, 2011.
4. Connolly and Begg, “Database Systems”, Pearson Education, 2002.

JOURNALS/MAGAZINES

1. IEEE Transactions on Advance Data Base Management
2. Springer Journal of Advance Data Base Management
3. Elsevier Journal of Advance Data Base Management

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/ Data Base Management
2. https://www.coursera.org/learn/ Data Base Management
3. https://nptel.ac.in/courses/106106139/

<table>
<tr><td>Course Title</td><td colspan="4">Advanced Machine Learning</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20CS0101</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">I Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objectives of this course are to:

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

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
C01	Apply the basic blocks of machine learning and the techniques involved	1,2,3,4,5	1,2,3
C02	Analyze the various Learning trees used in real world problems.	1,2,3,4,5	1,2,3
C03	Design simple linear models to solve real world problems.	1,2,3,4,5	1,2,3
C04	Formulate different dimensionality reduction techniques to real world problems.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	3	3							**3**	**3**	**3**
CO2	2	3	3	2	3							**3**	**3**	**3**
CO3	3	2	2	2	3							**3**	**3**	**3**
CO4	3	3	2	2	3							**3**	**3**	**3**

COURSE CONTENTS:

UNIT-1

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

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

UNIT-2

Learning with trees (contd...): Boosting, Bagging, Random Forest, Different ways to combine Classifiers Probabilistic Learning – Gaussian Mixture Models, Nearest Neighbor Methods [2]

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

UNIT-3

Linear models: Perceptron, Linear Separability, Linear Regression.

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

UNIT-4

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

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

Unsupervised learning: Classification, Association

SELF- LEARNING:

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

TEXT BOOKS:

1. Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education (India) Private Limited, 2013.
2. Stephen Marsland,” Machine Learning” – An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

REFERENCE BOOKS:

1. Ethem Alpaydin, “Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)” Third Edition, MIT Press, 2014
2. Peter Flach, “Machine Learning: The Art and Science of Algorithms that Make Sense of Data”, First Edition, Cambridge University Press, 2012.
3. Jason Bell, “Machine learning – Hands on for Developers and Technical Professionals”, First Edition, Wiley, 2014

JOURNALS/MAGAZINES:

1. IEEE Transactions on Pattern Analysis and Machine Intelligence
1. Springer Journal of Machine Learning
2. Elsevier Journal of Machine Learning with Applications

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/machinelearning/
2. https://www.coursera.org/learn/machine-learning
3. https://nptel.ac.in/courses/106106139/

PRACTICE:

Sl.No.	List of Programs
1.	PROCEDURE TO INSTALL R STUDIO: It is an integrated development environment (IDE) for R. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management. Install R studio and Pacakages.
2.	FIND-S ALGORITHM: In Machine Learning, concept learning can be termed as "*a problem of searching through a predefined space of potential hypothesis for the hypothesis that best fits the training examplesl.* Implemrent the Find-S algorithm that starts with the most specific hypothesis.
3.	CANDIDATE ELIMINATION ALGORITTHM: The candidate elimination algorithm incrementally builds the version space from most general hypothesis to most specific hypothesis. Implement candidate elimination algorithm that considers positive instances and negative instances.
4.	LINEAR REGRESSION: It is regression technique which try to fit all possible values. Builds a linear relation. Consider any dataset to implement linear regression for analyze the data, do possible data preprocessing and data exploration.
5.	NAIVE BAYES: It is probabilistic approach undergoes bayes rule. Apply Navie Bayes algorithm using Gethub dataset for classification model on Flowers.
6.	KNN: It is mainly used for classification predictive problems. Select the number K of the neighbors. Calculate the Euclidean distance of K number of neighbors.
7.	K-MEANS: K-Means Clustering is an Unsupervised Learning algorithm, which groups the unlabelled dataset into different clusters.Implement KNN to calculate the variance and place a new centroid of each cluster
8.	APRIORI ALGORITHM: The Apriori algorithm uses frequent item sets to generate association rules, and it is designed to work on the databases that contain transactions. Determine the support of item sets in the transactional database and select the minimum support and confidence.

<table>
<tr><td>Course Title</td><td colspan="4">Advanced Java Programming</td><td>Course Type</td><td colspan="2">Theory</td></tr>
<tr><td>Course Code</td><td>M20TC0102</td><td>Credits</td><td colspan="2">3</td><td>Class</td><td colspan="2">I Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>0</td><td>0</td><td>0</td><td rowspan="2">Theory

Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>3</td><td>3</td><td>3</td><td>39</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objectives of this course are to:

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

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Summarize the fundamentals of Java like object oriented programming, exception handling and multithreading to solve real world problems.	1,2,3,4,5	1,2,3
CO2	Choose proper component, like java servlets, java server pages etc., to develop a web application using J2EE	1,2,3,4,5	1,2,3
CO3	Apply advanced java concepts to manage sessions and cookies for optimal performance	1,2,3,4,5	1,2,3
CO4	Develop an application to establish communication between application and database.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	1	2							3	2	3
CO2	2	3	1	2	3							2	3	3
CO3	3	2	1	3	2							2	2	3
CO4	2	3	1	3	2							2	3	3

COURSE CONTENTS: **UNIT-1**

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

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

UNIT-2

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

UNIT-3

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

UNIT-4

JSP, RMI : Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects. Java Remote Method Invocation: Remote Method Invocation concept; Server side, Client side. IDE: Eclipse IDE, Netbeans IDE &Myeclipse IDE; Servers: Apache Tomcat Glassfish Server, JBoss Server & Weblogic Server. Functional Interfaces, Lambda Expressions, Working with Collections, Stream APIs (Streams and Collectors) and Socket Programming

SELF-LEARNING COMPONENT:

JAVA Model-View-Controller Pattern & Spring Framework.

TEXT BOOKS:

1. Bryan Basham, Kathy Sierra & Bert Bates, “Head First Servlets & JSP”, O’Reilly 2nd Edition.1999
2. Barry J. Holmes and Daniel T. Joyce, “Object-Oriented Programming With Java”, Second Edition, Jones And Bartlett Publishers,2000
3. Dale Skrien, “Object-Oriented Design Using Java”, McGraw-Hill Higher Education,2009
4. Danny Poo, “Object-Oriented Programming and Java”, Second Edition; Springer, 2008.

REFERENCE BOOKS:

1. Cay Horstmann “Big Java”, John Wiley and Sons 2nd Edition, 2001
2. Herbert Schildt, “The Complete Reference Java J2SE”, 5th Edition, TMH Publishing Company Ltd, New Delh

JOURNALS/MAGAZINES:

1. Elsevier Journal on Computer Languages, Systems, and Strucutres
2. ACM Transactions on Programming Languages and Systems

SWAYAM/NPTEL/MOOCS:

1.https://onlinecourses.nptel.ac.in/noc19_cs84/preview

2. https://nptel.ac.in/courses/106/105/106105191/

Course Title	Advanced Algorithms				Course Type	Theory	
Course Code	M20TC0103	Credits	3		Class	I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	3	3	3			
	Practice	0	0	0	Theory	CIE	SEE
	-	0	-	-			
	Total	3	3	3	39	50	50

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain the problem-solving methods and provide a solid foundation in algorithm design and analysis.
2. Discuss sorting & string-matching algorithmic design paradigms.
3. Demonstrate a familiarity with major algorithms and data structures related to graph.
4. Design efficient algorithms for common engineering problems.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Apply iterative and recursive algorithms to model engineering problems in real world	1,2,3,4,5	1,2,3
CO2	Experiment with different sorting and string matching algorithms for real time data sets..	1,2,3,4,5	1,2,3
CO3	Analyse the search and graph algorithms for real world applications	1,2,3,4,5	1,2,3
CO4	Make use of Number Theoretic Algorithms and Probabilistic and Randomized Algorithms in real world applications.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	3							3	3	3
CO2	3	3	3	1	3							3	2	3
CO3	3	3	2	2	3							3	3	2
CO4	3	3	3	2	2							3	3	3

COURSE CONTENTS:

UNIT-1

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

UNIT-2

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

UNIT-3

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

UNIT-4

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

SELF-LEARNING COMPONENT:

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

TEXT BOOKS:

1. T. HCormen, C E Leiserson, R1Rivest and C Stein, " Introduction to Algorithms", Prentice-Hall of India, 2010.
2. M. Kenneth A. Berman, Jerome Paul "Algorithms", Cengage Learning, 2002.
3. Jon Kleinberg and Eva Tardos, "Algorithm Design", Pearson, 2016

REFERENCE BOOKS:

1. AnanyLevitin, “Introduction to the Design & Analysis of Algorithms”, Pearson, 2013
2. Ellis Horowitz, SartajSahni, S. Rajasekharan, “Fundamentals of Computer Algorithms”, Universities Press, 2007.
3. J. Kleinberg and E. Tardos, “Algorithm Design”, Addison Wesley, 2005.
4. V. Aho, J. E. Hopcraft, and J. D. Ullman, “Design and Analysis of Algorithms”, Addison-Wesley, 1974.

JOURNALS/MAGAZINES

1. IEEE Transactions on Advance Algorithms
2. Springer Journal of Advance Algorithms
3. Elsevier Journal of Advance Algorithms
4. ACM Transactions on Algorithms
5. ACM Transactions on Modeling and Computer Simulation (TOMACS)
6. Transactions on Parallel and Distributed Systems

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/ Advance Algorithms
2. https://www.coursera.org/learn/ Advance Algorithms
3. https://nptel.ac.in/courses/106106139/

Course Title	Internet of Things				Course Type		Integrated	
Course Code	M20TC0104	Credits	3		Class		I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	0	-	-				
	Total	3	5	5	39	26	50	50

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objectives of this course are to:

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

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Summarize the foundation in the Internet of Things, including the components, tools, and analysis.	1,2,3,4,5	1,2,3
CO2	Apply Internet-of-Things and design principles in development of real-world applications.	1,2,3,4,5	1,2,3
CO3	Design prototypes forimplementingIoT in Big Data and understand the utilization and modelling of extracted data development of real-world application.	1,2,3,4,5	1,2,3
CO4	Develop embedded IoT Solutions using sensors and components integration for the real time application	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	3	3							**3**	**2**	**3**
CO2	2	1	3	3	2							**3**	**3**	**3**
CO3	3	2	2	3	3							**3**	**3**	**2**
CO4	3	2	2	3	3							**3**	**2**	**3**

COURSE CONTENTS:

UNIT-1

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

UNIT-2

IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, Software Defined Networking, Network Function Virtualization, IoT Platform Design Methodology, Introduction, IoT Design Methodology, Step1: Purpose and requirement specification, Step2: Process Specification, Step 3: Domain Model Specification, Step 4: Information Model Specification, Step 5: Service Specification, Step 6: IoT Level Specification, Step 7: Function View Specification, Step 8: Operational View Specification, Step 9: Device and Component Integration, Step 10: Application Development, IoT System

UNIT-3

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

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

UNIT-4

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

SELF-LEARNING COMPONENT:

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

TEXT BOOKS:

1. Arshdeep Bahga, Vijay audisetti, Internet of Things," A Hands on Approach", University Press, 2014.
2. Michael Millen, "The Internet of Things", Pearson, 2015.

REFERENCE BOOKS:

1. Adrian McEwen & Hakim Cassimally, "Designing the Internet of Things", ISBN 978-81-265-5686-1 Wiley Publication, 2013
2. Dr. OvidiuVermesan, Dr. Peter Friess, "Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems", River Publishers, 2013

JOURNALS/MAGAZINES

1. IEEE Transactions on Internet of Things
2. Springer Journal of Internet of Things
3. Elsevier Journal of Internet of Things
4. IEEE Transactions on Wireless Communications
5. IEEE Sensors Journal
6. IEEE Internet of Things Journal
7. Elsevier, Journal of Network and Computer Applications,
8. Elsevier, Computer Law & Security Review
9. ACM, ACM Transactions on Internet Technology (TOIT)

SWAYAM/NPTEL/MOOCS:

1. https://www.udemy.com/ Internet of Things
2. https://www.coursera.org/learn/ Internet of Things
3. https://nptel.ac.in/courses/106106133/

PRACTICE:

SL.NO	List of Programs
1	There are lots of ways to control DC motors with an Arduino. But one of the easiest and most popular is with an L293D motor driver. The L293D motor driver is designed specifically to control DC motors, stepper motors, solenoids, and any other load with a high impedance. One of its main advantages is that it can control. Design and construct a module to drive DC motor clockwise and anti-clockwise using L293D with Arduino board.
2	Interfacing is the first step to create any useful project. So why don't we create an RFID based Access Control System or an RFID based Door Lock using Arduino? The system I have designed here is a simple version of the project. This project can be enhanced with a lot of features (which I will be doing in the next version of this project – Advanced RFID based Door Lock). Design and construct a module to build a RFID based Access Control System or an RFID based Door Lock using Arduino and display lock status on LCD.
3	The ESP8266 has been a growing star among IoT or WiFi-related projects. It's an extremely cost-effective WiFi module that – with a little extra effort – can be programmed to build a standalone web server. Design a module to control an LED from Webserver using NodeMcu or Esp8266 programming with Arduino IDE.
4	Most new cars today come with a host of advanced safety features including automated systems that assist the drive in maintaining control of the car and warning the driver of possible dangers. The problem, however, is that while these kinds of features greatly increase the safety of a car, they are exorbitantly expensive and only available in new, high-end cars not in old, low-end cars. Design a module for non-contact object detection using Arduino and proximity sensor (Car proximity alert).
5	To designing a intelligent "Graden Computer" with an optional digital plant moisture sensor/water pump controller that lights an LED to alert the user when it is time to water a potted plant, and/or turn on a water pump to quench the thirst, here is an Arduino Primer for you. No doubt, an Arduino can convert your favorite pots into self-watering planters, keeping your plants from drying out and reducing the time you spend watering. Design an intelligent Garden Computer with Arduino and soil moisture sensor that lights an LED to alert the user when it is time to water a potted plant.
	PART-B (IoT Projects)
6	The Arduino Yun solves that problem. The Yun is an Arduino with WiFi built in. Additionally, the Yun has a second microprocessor that runs a lightweight version of Linux and comes with Python preinstalled. This means that for $75, you can have sensors and buttons trigger Python scripts, and Python scripts trigger LEDs, motors and other actuators. And Python's just the language that comes with it — you can install Ruby, Node or PHP if that's your jam. Set up ArduinoYún to connect to WiFi
7	To control your room's temperature, we can build a smart temperature controller. In this case, we use a **PID** (**proportional–integral–derivative**) controller. When you set a certain temperature, a PID controller will change the temperature by turning either cooler or hotter. A PID controller program is developed using Python, which runs on the Raspberry Pi board. Build a smart temperature controller for your room

8	Dedicated control over room temperature is not only a key issue in providing work conditions that ensure employee satisfaction and hence increased work output; it is now a health and safety issue. The design considered the flexibility of using a microcontroller, PIC16F876A along with other peripheral devices such as LM35 temperature sensor, LCD display unit to form all-encompassing single system Build your own decision system based-IoT
9	Tracking multiple objects through video is a vital issue in computer vision. It's used in various video analysis scenarios, such as visual surveillance, sports analysis, robotic navigation, autonomous driving, human-computer interaction, and medical visualization. In cases of monitoring objects of a certain category, such as people or cars, detectors used to make tracking easier. Usually, it is done in two steps: Detecting and Tracking. Build a tracking vision system for moving objects
10	The robot constantly checks to see if it is within 0 meters of the GPS position, if it is then the App display will read "Destination Reached". As you can see sometimes it returns to the correct location and other times it is several feet off. Build a your own car robot based on GPS

Course Title	Python for Artificial Intelligence				Course Type		Integrated	
Course Code	M20CI0101	Credits	3		Class		I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester		Assessment in Weightage	
	Theory	2	2	2				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	0	-	-				
	Total	3	4	4	26	26	50	50

COURSE OVERVIEW:

This course is an introduction to basic concepts of various fields of artificial intelligence like Artificial Neural Networks, Natural Language Processing, Machine Learning and its implementation in Python.

COURSE OBJECTIVES:

The objectives of this course are to

1. Explain the Basics concepts of Python and Artificial Intelligence.
2. Build an Intelligent Agent using AI concepts.
3. Develop a sentiment analyzer using python.
4. Illustrate the Concepts of Reinforcement Learning.

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate fundamental understanding of artificial intelligence (AI) and python.	1,2,3,4,5	1,2,3
CO2	Apply basic principles of AI to solve real world applications.	1,2,3,4,5	1,2,3
CO3	Make use of AI principles to design a Speech recognizer.	1,2,3,4,5	1,2,3
CO4	Make use of python to Implement Q-Learning algorithm.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	3	2							3	3	2
CO2	2	3	2	3	3							2	3	3
CO3	3	2	3	3	2							3	3	2
CO4	3	2	3	2	2							3	2	3

COURSE CONTENTS:

UNIT-1

Python Basics: Introducing Python, Variables and Data Types, Making Choices, Using Lists, Functions, Working with Text, Executable Files.

Introduction to Artificial Intelligence: What is Artificial Intelligence?, Why do we need to study AI?, Applications of AI, Branches of AI, Defining intelligence using Turing Test, Making machines think like humans, Building rational agents, General Problem Solver, Solving a problem with GPS, Building an intelligent agent, Types of models,

UNIT -2

Natural Language Processing: Introduction and installation of packages, Tokenizing text data, Converting words to their base forms using stemming, Converting words to their base forms using lemmatization, Dividing text data into chunks, Extracting the frequency of terms using a Bag of Words model, Building a category predictor, Constructing a gender identifier, Building a sentiment analyzer, Topic modeling using Latent Dirichlet Allocation, Summary.

UNIT-3

Probabilistic Reasoning for Sequential Data: Understanding sequential data, Handling time-series data with Pandas, Slicing time-series data, Operating on time-series data, Extracting statistics from time-series data, Generating data using Hidden Markov Models, Identifying alphabet sequences with Conditional Random Fields, Stock market analysis, Summary.

Building A Speech Recognizer: Working with speech signals, Visualizing audio signals, Transforming audio signals to the frequency domain, Generating audio signals, Synthesizing tones to generate music, Extracting speech features, Recognizing spoken words, Summary.

UNIT-4

Reinforcement Learning: Understanding the premise, Reinforcement learning versus supervised learning, Real world examples of reinforcement learning, Building blocks of reinforcement learning, Creating an environment, Building a learning agent, Summary.

SELF –LEARNING COMPONENTS

Artificial neural networks, Machine Learning Techniques

TEXT BOOKS:

1) Tim Hall and J-P Stacey, “Python 3 for Absolute Beginners”, publishersApress,2009.
2) Prateek Joshi, “Artificial Intelligence with Python”,Packt publishers , 2017.

REFERENCE BOOKS:

1. Stuart Jonathan Russell, Peter Norvig, “Artificial Intelligence For Dummies”, Prentice-Hall, 201

JOURNALS/MAGAZINES:

1. Elsevier Journal of Artificial Intelligence
2. IEEE Transactions on Artificial Intelligence
3. Springer Jounal of Artificial Intelligence

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/Artificial intilligence/
2. https://www.coursera.org/learn/machine-learning
3. https://nptel.ac.in/courses/106106139/

PRACTICE:

Sl.No.	List of programs
1	Machine learning algorithms expect data to be formatted in a certain way before they start the training process. In order to prepare the data for ingestion by machine learning algorithms, we have to preprocess it and convert it into the right format. Apply the following preprocessing techniques on the given data set i) Binarization ii) Normalization iii) Mean removal iv) Scaling The dataset is available in the following website. https://github.com/PacktPublishing/Artificial-Intelligence-with-Python.
2.	Naïve Bayes is a technique used to build classifiers using Bayes theorem. Bayes theorem describes the probability of an event occurring based on different conditions that are related to this event. Build an Naïve Bayes classifier to classify an animal to Cheetah assuming the attributes.
3.	A Support Vector Machine (SVM) is a classifier that is defined using a separating hyperplane between the classes. This hyperplane is the N-dimensional version of a line. Given labeled training data and a binary classification problem, the SVM finds the optimal hyperplane that separates the training data into two classes. Build a Support Vector Machine classifier to predict the income bracket of a given person based on 14 attributes. Our goal is to see where the income is higher or lower than $50,000 per year. The income dataset available at https://archive.ics.uci.edu/ml/datasets/Census+Income.
4	Regression is the process of estimating the relationship between input and output variables. Regression analysis helps us in understanding how the value of the output variable changes when we vary some input variables while keeping other input variables fixed. Build a regression model for a single variable for any given Dataset.
5	A **Decision Tree** is a structure that allows us to split the dataset into branches and then make simple decisions at each level. This will allow us to arrive at the final decision by walking down the tree.Build a classifier using Decision Trees in Python.
6	Clustering is one of the most popular unsupervised learning techniques. This technique is used to analyze data and find clusters within that data. In order to find these clusters, we use some kind of similarity measure such as Euclidean distance, to find the subgroups. This similarity measure can estimate the tightness of a cluster. Apply K-Means clustering on two-dimensional data and analyze the data.
7	Apply unsupervised learning techniques to segment the market, based on customer shopping habits.
8	Build a model to find the relationship between the family members using logic programming.
9.	Build a python program **Predicting traffic** using Extremely Random Forest regressor.
10	Sentiment analysis is the process of determining the sentiment of a given piece of text Build a sentiment Analyzer using NLp concepts to determine whether a movie review is positive or negative.

Course Title	Mini Project				Course Type	Practice	
Course Code	M20TC0105	Credits	2		Class	I Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	2	4	4	Practice	CIE	SEE
	-	0	-	-			
	Total	2	4	4	26	50	50

COURSE OVERVIEW:

Project survey has to be completed and problem identification for the project must be done. Students must meet the guide and discuss with due PPT presentations at least two hours per Wk. and do the necessary ground work for Phase II devoting at least 6 hours per week.

COURSE OBJECTIVE (S):

1. To create an Industrial environment and culture within the department of CSE.
2. To provide students hands on experience on, troubleshooting, maintenance, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education.
3. To promote the concept of entrepreneurship.
4. To inculcate innovative thinking and thereby preparing students for main project.

COURSE OUTCOMES (CO'S):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic.	7 to 11	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	7 to 11	1,2,3
CO3	Design solutions to the chosen project problem.	7 to 11	1,2,3

CO4	Undertake investigation of project problem to provide valid conclusions.	7 to 11	1,2,3
CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work.	7 to 11	1,2,3
CO6	Apply project results for sustainable development of the society.	7 to 11	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7 to 11	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	7 to 11	1,2,3
CO9	Function effectively as individual and a member in the project team.	7 to 11	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	7 to 11	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	7 to 11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√	√	√	
CO2			√	√	√	
CO3			√	√	√	
CO4			√	√	√	
CO5			√	√	√	
CO6			√	√	√	
CO7			√	√	√	
CO8			√	√	√	
CO9			√	√	√	
CO10			√	√	√	
CO11			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1							3	3	3	3	3	3	3	3
CO2							3	3	3	3	3	3	3	3
CO3							3	3	3	3	3	3	3	3
CO4							3	3	3	3	3	3	3	3
CO5							3	3	3	3	3	3	3	3
CO6							3	3	3	3	3	3	3	3
CO7							3	3	3	3	3	3	3	3
CO8							3	3	3	3	3	3	3	3
CO9							3	3	3	3	3	3	3	3
CO10							3	3	3	3	3	3	3	3
CO11							3	3	3	3	3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The following are the guidelines to be followed by the students to complete their research based mini projects.

1. The students can select their guides based on their area of interest in their previous semester.
2. In the beginning of the current semester the students shall corner the problem by performing the literature survey (by choosing the research papers of reputed Journals) in their area of interest.
3. The students shall choose a base paper from the list of papers they would have surveyed.
4. The students shall identify the research gaps in their selected research domain, and finalize their problem statement with objectives for the research based mini project.
5. The students shall be completing the synopsis presentation (phase-1 presentation (progress)), and phase-2 presentation (implementation with demo) as per the calendar set by the concerned coordinator.
6. Finally, the students shall complete their mini projects providing innovative solutions for the selected research problem and apply for patent / copyright / paper publication in SCOPUS indexed journals / research proposals / product development / and or startups.

COURSE CONTENTS:

Sample Mini Projects: (if any) Consider a mini project that includes work in most disciplines, ending in a stable executable for a 3-week iteration (any example of software project of candidate choice). Construct a discipline across iterations diagram considering the sample disciplines i.e., Requirements, Design, Implementation and Test.

Imagine there is ultimatelybe a 20-iteration project for evolutionary and iterative development. Design an evolutionary requirement analysis and show the diagram for the same 20-iteration project for evolutionary and iterative development.

II Semester
Syllabus

<table>
<tr><td>Course Title</td><td colspan="4">Cloud Computing Tools</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS211</td><td>Credits</td><td colspan="2">3</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>2</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>3</td><td>5</td><td>5</td><td>26</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

This course provides a technical description of cloud computing technologies, covering cloud infrastructure and platform services. It describes emerging technologies critical to cloud computing. It also covers the fundamentals of cloud mechanisms. It provides the basics of virtualization, different types of virtualizations. It also provides cloud based application development, and working with OpenNebula and Eucalyptus tools.

COURSE OBJECTIVES:

The main objectives of this course are:

1. Discuss the concepts of Virtualizations and its applications
2. Explain Cloud based application development using AWS
3. Demonstrate Cloud deployment using OpenNebula
4. Illustrate Cloud operations using Eucalyptus.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Understand different virtualization technique through theoretical concepts and practical training	1,2,3,4,5	1,2,3
CO2	Develop Cloud based applications with AWS	1,2,3,4,5	1,2,3
CO3	Experiment applications deployment using OpenNebula	1,2,3,4,5	1,2,3
CO4	Create Cloud based scenarios using Eucalyptus	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	3							3	3	3
CO2	3	2	3	3	3							3	3	2
CO3	3	2	3	2	3							3	3	3
CO4	3	2	2	3	3							3	2	3

COURSE CONTENTS:

UNIT- 1

Introduction To Cloud Computing And Resource Virtualization: Cloud Computing delivery models and services, Introduction to Virtualization, Layering and virtualization, Virtual machine monitors, Virtual machines, Performance and Security Isolation, Full virtualization and para virtualization, Hardware support for virtualization, Case study: Xen, a VMM based on para virtualization.

Unit -2

Cloud Based Application Development: Amazon Web Services: EC2 instances, Connecting clients to cloud instances through firewalls, Application and transport layer protocols in EC2, Launch and connect EC2 Linux instance, Use S3 in Java, Install Simple Notification Service on Ubuntu, Create EC2 Placement Group and use MPI

UNIT- 3

Containers and Cloud Native Computing: Introduction to containers, Overview of Dockers, Dockers Architecture and components (Docker Host – docker daemon, containers, images, Docker Client Docker Registry). Creating an application as docker Docker registry and introduction to dockerhub, Creating a docker image, Sharing images through registry (dockerhub), creating containers using docker, Virtual Machines vs Containers, Overview of Kubernetes , Kubernetes components and architecture.

UNIT- 4

Opennebula-A Cloud On VmwareVcenter: Overview: Open Cloud Architecture, VMware Cloud Architecture, OpenNebula Provisioning Model; OpenNebula Installation: Front-end Installation, MySQL Setup; Authentication Setup: SSH Authentication, x509 Authentication, LDAP Authentication

SELF-LEARNING COMPONENT:

Maintenance, Failures, and Debugging; Network Troubleshooting; Logging and Monitoring; Backup and Recovery; Customization; Upstream OpenStack; Advanced Configuration.

TEXT BOOKS:

1. Dan C. Marinescu, "Cloud Computing - Theory and Practice", Morgan Kaufmann is an imprint of Elsevier, 2013.
2. BirisLublinsky, Kevin T. Smith and Alexey Yakubovich, “Professional Hadoop Solutions”, Wiley, ISBN 13:9788126551071, 2015.
3. The Open Replacement for vCloud - Bring your VMware environment to the Cloud in 5 minutes. http://vonecloud.today/ ,http://docs.vonecloud.com/1.8/
4. A complete Guide to Docker. https:// docs.docker.com/get-started/resources/r Documentation
5. A introduction to Kubernetes. https://kubernetes.io/docs/concepts/

REFERENCE BOOKS:

1. Kevin Jackson, Cody Bunch, “OpenStack Cloud Computing Cookbook”, Packt Publishing, 2013.
2. Cloud services for your virtual infrastructure, Part 1: Infrastructure-as-a-Service (IaaS) and Eucalyptus. http://www.ibm.com/developerworks/library/os-cloud-virtual1/
3. YohanWadia, "The Eucalyptus Open-Source Private Cloud". http://www.cloudbook.net/resources/stories/the-eucalyptus-open-source-privatecloud as on
4. ArshdeepBahga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", University Press, 2016.
5. OpenNebula 5.8 Deployment guide, Ebook available at: http://docs.opennebula.org/pdf/5.8/opennebula_5.8_deployment_guide.pdf

JOURNALS/MAGAZINES:

1. Elsevier Journal of Cloud Computing
2. IEEE Transactions on Cloud Computing
3. Springer Jounal of Cloud Computing

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ Cloud Computing /
2. https://www.coursera.org/learn/ Cloud Computing
https://nptel.ac.in/courses/106106149/

PRACTICE:

SL.NO	LISTOF PROGRAM
1	This directive is a special purpose directive and is used to turn on or off some features. This type of directives are compiler-specific i.e., they vary from compiler to compiler. Some of the #pragma directives are discussed below: **#pragma startup and #pragma exit**: These directives helps us to specify the functions that are needed to run before program startup(before the control passes to main()) and just before program exit (just before the control returns from main()). Design a Program on #pragrma using C.
2	OpenMP is a library for parallel programming in the SMP (symmetric multi-processors, or shared-memory processors) model. When programming with OpenMP, all threads share memory and data. OpenMP supports C, C++ and Fortran. The OpenMP functions are included in a header file called omp.h. Design a Program using Sections, omp for and omp single
3	Throughput computing focuses on delivering high volumes of computation in the form of transactions. Initially related to the field of transaction processing, throughput computing has since been extended beyond that domain. Throughput computing is realized by means of multiprocessing and multithreading, Multiprocessing is the execution of multiple programs in a single machine, where as multithreading relates to the possibility of multiple instruction streams within the same program. Design a Program using thread private directives.
4	Cloud computing is required by modern technology. Task scheduling and resource allocation are important aspects of cloud computing. Design a Program on scheduling.
5	Cloud computing transforms the way information technology (IT) is consumed and managed, promising improved cost efficiencies, accelerated innovation, faster time-to-market, and the ability to scale applications on demand. Design a Program using last private reduction, copying and shared.
6	A point-to-point communication always involves exactly two processes. One process sends a message to the other. This distinguishes it from the other type of communication in MPI, collective communication, which involves a whole group of processes at one time. Design a Program for Point to Point MPI calls
7	Login to the workshop cluster using user workshop username and OTP token. Copy the exercise files to user home directory. Familiarize user with LC's OpenMP environment. Write a simple "Hello World" OpenMP program. Successfully compile your program. Successfully run your program.Modify the number of threads used to run your program.
8	Login to the LC workshop cluster, if you are not already logged in. Sharing DO/for construct examples: review, compile and run. Work-Sharing SECTIONS construct example: review, compile and run.
9	Login to the workshop cluster. Orphaned directive example: review, compile, run. Get OpenMP implementation environment information .Hybrid OpenMP + MPI programs. Check out the "bug" program
10	**Mininet** is a system that supports the creation of lightweight logical nodes that can be connected into networks. These nodes are sometimes called **containers**, or, more accurately, **network namespaces**. Virtual-machine technology is not used. Install and configure Mininet SDN emulator with 2 traffic engineering experiment applications to understand how to program 'flow spaces' within networks to: (i) comply with enterprise network capacity provisioning policies, and (ii) balance the utilization of network resources – Use Iperf and Ping Tools to verify your SDN functionality

Course Title	Advanced Web Technologies				Course Type		Integrated	
Course Code	M20TCS212	Credits	3		Class		II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester		Assessment in Weightage	
	Theory	2	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	**0**	-	-				
	Total	**3**	**5**	**5**	**26**	**26**	**50**	**50**

COURSE OVERVIEW:

This course introduces the current and future forms of the Web, It is necessary to understand the underlying design principles and concepts, relevant issues and techniques. The fast changing nature of the Web means that such a deep understanding is essential to understand the latest developments and their potential. The topics covered in this course includes how to make web sites that serve "dynamic content": content that is based on returning or updating results in a database.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Discuss the fundamentals of Client side caching concepts in the area of web services.
2. Illustrate the design of JavaScript based web based applications.
3. Discuss the PHP based web based applications.
4. Describe optimization and security issues of a web and the mechanisms to make it more secure.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Summarize the fundamentals Client side caching concepts in the area of web services.	1,2,3,4,5	1,2,3
CO2	Design and Develop JavaScript based web based applications.	1,2,3,4,5	1,2,3
CO3	Design and Develop PHP based web based applications.	1,2,3,4,5	1,2,3
CO4	Optimize the web applications and mechanisms to make it more secure.	1,2,3,4,5,8	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	2							3	2	3
CO2	2	3	2	3	1							3	2	3
CO3	3	2	3	2	1							3	3	2
CO4	2	2	3	3	2			3				3	2	3

COURSE CONTENTS:

UNIT-1

Utilizing Client-Side Caching: Introduction, Understanding the Types of Caching, Controlling Caching , Dealing with Intermediate Caches, Cache-Control Revisited, Caching HTTP Responses, DNS caching and prefetching, Search Engines: Searching techniques used by search engines, keywords, advertisements, Search Engine Optimization (SEO) for individual web pages: header entries, selection of URL; SEO for entire website: Hyperlinks and link structure.

UNIT-2

JavaScript: Introduction, Operators, ControlStructures, looping constructs, functions, Array declaration and allocation, Handling Events Using JavaScript, data validation using regular expressions. Object oriented JavaScript, callbacks, closures, modules, AJAX, JQuery.

UNIT-3

PHP: Introduction, Data Types, Operators, Control Flow; Functions; Exception Handling, Storing and Retrieving Data, Arrays, String Manipulation and Regular Expressions, Object-Oriented PHP, Authentication with PHP, Interaction with File System and Server, Form processing, Handling Images, Session Management, Cookies, Debugging, Building CMS application.

UNIT- 4

Optimization: Optimizing images, Load balancers, Tuning MYSQL, query caching, query execution and optimization, traffic generation.

Security: Introduction, Handling user access and user input, Bypassing client-side controls, Authentication, Session hijacking, Attacks on data stores: SQL query log, SQL injections; Attacks on Users: XSS attacks; Cross-site Request Forgery (CXRF), DoS and DDoS attacks, DNS Hijacking.

SELF-LEARNING COMPONENT:

Practical application of the latest evolving web technologies. Topics include HTMLS, CSS/SASS, JavaScript, NodeJS, Polymer, NoSQL, asynchronous programming, functional programming, event driven systems, debugging, testing, workflow optimization, and deployment pipelines.

TEXT BOOKS:

1. Peter Smith, “Professional Website performance”, Wiley India Pvt. Ltd, 2019.
2. Luke Welling Laura Thomson “PHP and MySQL Web Development”, Pearson Education, 2009.

REFERENCE BOOKS:

1. Kogent Learning, “Web Technologies: HTML, JavaScript, PHP, Java, JSP, XML, AJAX – Black Book”, Wiley India Pvt. Ltd, 2009
2. Stuttard D., Pinto M., “The Web Application Hackers Handbook”., Wiley India Pvt. Ltd, 2016.
3. DeitelH.M., Deitel P.J., “Internet & World wide Web: How to program”, Pearson Education, 2007

JOURNALS/MAGAZINES:

1. Elsevier Journal of Advance Web Technology
2. IEEE Transactions on Advance Web Technology
3. Springer Jounal of Advance Web Technology
4. ACM Transactions on Internet Technology
5. ACM Transactions on Information Systems.

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ Advance Web Technology/
2. https://www.coursera.org/learn/ Advance Web Technology
3. https://nptel.ac.in/courses/106106149/

PRACTICE:

Sl. No.	List of Programs
1	Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, lines and words in the text entered using an alert message. Words are separated with white space and lines are separated with new line character
2	Write a JavaScript program which takes user input as name, stores it in array and sort them alphabetically and displays it using alert box
3	Exception handling is the process of responding to exceptions when a computer program runs. An exception occurs when an unexpected event happens that requires special processing. create an html page named to demonstrate exception handling in JavaScript
4	Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. (i). Create a Cookie and add these four user id's and passwords to this Cookie. (ii). Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ". Finding Related Forum Posts through Content Similarity over Intention-based Segmentation
5	JavaScript is mainly designed to add interactivity in the HTML pages. A JavaScript can be executed when an event occurs, like when a user clicks on an HTML element. To execute code when a user clicks on an element, add JavaScript code to an HTML event attribute Simple web application such as calculator, calendar can be developed using JavaScript. Design a scientific calculator using java script
6	Install a database (Mysql or Oracle). Create a table which should contain at least the following fields: name, password, email-id, phone number Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page
7	User authentication is very common in modern web application. It is a security mechanism that is used to restrict unauthorized access to member-only areas and tools on a site. In this context, write a program to create a simple registration and login system using the PHP and MySQL and validate the user's authenticity
8	Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP
9	The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same WEB TECHNOLOGIES LAB MANUAL jdirectoryjkmaterialzjkd thing at a time (i.e., from different systems in the LAN using the IP-address instead of local host). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated, modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions
10	Create appropriate web page for the following self-descriptive user friendly services. E-Visa Processing & Follow Up System

Course Title	Distributed Computing				Course Type		Integrated	
Course Code	M20TCS213	Credits	3		Class		II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester		Assessment in Weightage	
	Theory	2	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	**0**	-	-				
	Total	**3**	**5**	**5**	**26**	**26**	**50**	**50**

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain the various distributed systems and its architectures
2. Discuss various communication aspects in the distributed systems
3. Describe the consistency and replication, fault tolerance and security aspects
4. Illustrate the use of Distributed-Object based Systems, Distributed File Systems and Distributed Web-based Systems in real world applications.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Apply the concepts of distributed computing systems	1,2,3,4,5	1,2,3
CO2	Analyze the various communication aspects in the distributed systems	1,2,3,4,5	1,2,3
CO3	Design applications for consistency and replication, fault tolerance and security aspects	1,2,3,4,5	1,2,3
CO4	Make use of Distributed-Object based Systems, Distributed File Systems and Distributed Web-based Systems in real world applications	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	3	2							3	3	3
CO2	3	2	3	3	2							3	2	3
CO3	3	3	1	2	2							3	3	2
CO4	3	2	3	1	2							3	2	3

COURSE CONTENTS:

UNIT-1

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

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

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

UNIT-2

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

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

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

UNIT-3

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

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

Security: Introduction; secure channels; access control; security management

UNIT-4

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

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

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

SELF-LEARNING COMPONENT:

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

TEXT BOOKS:

1. Andrew S. Tanenbaum, "Distributed Operating System*",* Pearson, 2008.
2. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems: Concepts and design*",*Pearson*,* 2011.

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, Maarten Van Steen, "Distributed Systems*: Principles and Paradigms"*, Pearson, 2007.
2. Pradeep K. and Sinha, "Distributed Operating System*: Concepts and Design"* , PHI, 2009.

JOURNALS/MAGAZINES:

1. Elsevier Journal of Distributed Computing
2. IEEE Transactions on Distributed Computing
3. Springer Jounal of Distributed Computing

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ Distributed Computing/
2. https://www.coursera.org/learn/ Distributed Computing
3. https://nptel.ac.in/courses/106106149/

PRACTICE:

Sl. No.	List of Programs
1	In Distributed systems, we neither have shared memory nor a common physical clock and there for we can not solve mutual exclusion problem using shared variables. To eliminate the mutual exclusion problem in distributed system approach based on message passing is used. Write a program in c for implementation of non token base algorithm for distributed mutual exclusion.
2	The Lamport timestamp algorithm is a simple logical clock algorithm used to determine the order of events in a distributed computer system. As different nodes or processes will typically not be perfectly synchronized, this algorithm is used to provide a partial ordering of events with minimal overhead, and conceptually provide a starting point for the more advanced vector clock method. The algorithm is named after its creator, Leslie Lamport. Write a program in C to implement Lamports logical clock
3	In computer science, edge-chasing is an algorithm for deadlock detection in distributed systems. Developed by ChandyMisra Hass. Whenever a process *A* is blocked for some resource, a probe message is sent to all processes *A* may depend on. The probe message contains the process id of *A* along with the path that the message has followed through the distributed system. If a blocked process receives the probe it will update the path information and forward the probe to all the processes it depends on. Non-blocked processes may discard the probe. Write a program to implement edge chasing distributed deadlock detection algorithm.
4	The purpose of a lock is to ensure that among several nodes that might try to do the same piece of work, only one actually does it (at least only one at a time). That work might be to write some data to a shared storage system, to perform some computation, to call some external API, or suchlike. At a high level, there are two reasons why you might want a lock in a distributed application: for efficiency or for correctness . Write a program in C to implement locking algorithm.
5	The **RMI** (Remote Method Invocation) is an API that provides a mechanism to create distributed application in java. The RMI allows an object to invoke methods on an object running in another JVM.The RMI provides remote communication between the applications using two objects *stub* and *skeleton*. Write a program to implement Remote Method Invocation
6	RPC is a powerful technique for constructing distributed, client-server based applications. It is based on extending the notion of conventional or local procedure calling, so that the called procedure need not exist in the same address space as the calling procedure. The two processes may be on the same system, or they may be on different systems with a network connecting them. By using RPC, programmers of distributed applications avoid the details of the interface with the network. The transport independence of RPC isolates the application from the physical and logical elements of the data communications mechanism and allows the application to use a variety of transports. Write a Program to implement Remote Procedure Call.
7	A simple date time server was created which handled multiple user requests at the same time using threading. It explains the basic concepts of threading in network programming. The same concepts can

	be used with very slight modification to extend the above idea and create a chatting application similar to facebook messenger, whatsapp etc. Write a program to implement Chat Server
8	Algorithms for the detection of termination in a distributed system and analyzes them for effectiveness and efficiency. The algorithms are analyzed for the overhead and conclusions are made about the situations in which they can be used, i.e. an operating system, a real-time system, or a user application. An original algorithm is presented for the asynchronous case with first-in-first-out message ordering. It allows any process to initiate detection of termination and makes use of multiple tokens. Write a Program to implement termination detection
9	SOAP is an XML-based protocol for accessing web services over HTTP. It has some specification which could be used across all applications.SOAP is known as the Simple Object Access Protocol, but in later times was just shortened to SOAP v1.2. SOAP is a protocol or in other words is a definition of how web services talk to each other or talk to client applications that invoke them. Monitor SOAP request and response packets. Analyze parts of it and compare them with the operations (java functions) headers.
10	The Java Remote Method Invocation (RMI) mechanism and the Common Object Request Broker Architecture (CORBA) are the two most important and widely used distributed object systems. Each system has its own features and shortcomings. Both are being used in the industry for various applications ranging from e-commerce to health care. Selecting which of these two distribution mechanisms to use for a project is a tough task. Implement CORBA mechanism by using C++program at one end and Java program on the other.

<table>
<tr><td>Course Title</td><td colspan="4">Big Data and Analytics</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS221</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

1. Discuss the fundamentals of Hadoop distributed file system and Big Data Analytics.
2. Demonstrate Big Data Processing with MapReduce and Batch Analytics with Apache Spark.
3. Describe the implementation of Real-Time Analytics with Apache spark in real world Applications.
4. Illustrate the working of Stream Processing and also discuss the fundamentals of Cloud Computing

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Summarize the fundamentals of Hadoop distributed file system and Big Data Analytics	1,2,3,4,5	1,2,3
CO2	Apply Big Data Processing with MapReduce and Batch Analytics with Apache Spark to simple real world problems.	1,2,3,4,5	1,2,3
CO3	Implement Real-Time Analytics with Apache spark in real world Applications.	1,2,3,4,5	1,2,3
CO4	Develop data models for real world stream processingApplications	1,2,3,4,5	1,2,3

.**BLOOM'S LEVELOF THECOURSE OUTCOMES**

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	2	3	2	2	3							3	3	3
CO2	2	3	1	3	1							3	2	3
CO3	3	3	1	2	2							2	3	3
CO4	1	3	3	2	2							3	3	2

COURSE CONTENTS:

UNIT–1

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

UNIT-2

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

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

UNIT–3

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

Batch Analytics with Apache Flink: Introduction to Apache Flink.

UNIT-4

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

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

SELF-LEARNING COMPONENT:

Concept of AWS and its Services.

TEXT BOOKS:

1.Sridhar Alla, “Big Data Analytics with Hadoop 3”, Packt Publishing Ltd, 2018

2. SeemaAcharya, SubhashiniChellappan, “Big Data and Analytics”, Wileyindia pvt ltd, 2015.

REFERENCE BOOKS:

1.Deka, Ganesh Chandra Mazumder, Sourav Singh Bhadoria, Robin " Distributed Computing in Big Data Analytics – Concepts", Springer International Publishing 2017.

2. Arthur Zhang, "Data Analytics Practical Guide to Leveraging the Power of Algorithms, Data Science, Data Mining, Statistics, Big Data, and Predictive Analysis to Improve Business, Work, and Life", CreateSpace Independent Publishing Platform, 2017.

JOURNALS/MAGAZINES:

1. Elsevier Journal of Big Data and Anbalytics
2. IEEE Transactions on Big Data and Anbalytics
3. Springer Jounal of Big Data and Anbalytics
4. ACM Transactions on Knowledge Discovery in Data (TKDD).
5. SIGKDD Explorations, a magazine of the SIGKDD, the data miners professional group.
6. Data Mining and Knowledge Discovery journal (now published by Springer).

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ Big Data and Anbalytics
2. https://www.coursera.org/learn/ Big Data and Anbalytics
3. https://nptel.ac.in/courses/106106129/

PRACTICE:

Sl. No.	List of Programs
1	Hive is a data warehousing infrastructure tool built on the top of Hadoop. This article helps you to start quickly with the Hive by providing guidance about downloading Hive, setting and configuring Hive and launching HiveServer2, and the Beeline Command shell to interact with Hive. Installing Hadoop 3, Hive, Derby, R, Anaconda, Python, Apache Spark, Apache Flink, Tableu
2	As datasets grow and analytic algorithms become more complex, the typical workflow of analysts launching an analytic, waiting for it to complete, inspecting the results, and then re-launching the computation with adjusted parameters is not realistic for many real-world tasks. This paper presents an alternative workflow, progressive visual analytics, which enables an analyst to inspect partial results of an algorithm as they become available and interact with the algorithm to prioritize subspaces of interest. Progressive visual analytics depends on adapting analytical algorithms to produce meaningful partial results and enable analyst intervention without sacrificing computational speed. As datasets grow and analytic algorithms become more complex, the typical workflow of analysts launching an analytic,waiting for it to complete, inspecting the results, and then re-launching the computation with adjusted parameters is not realistic for many real-world tasks. Progressive visual analytics depends on adapting analytical algorithms to produce meaningful partial results and enable analyst intervention without sacrificing computational speed. Download any data sets from UCI Machine Learning Repositories or Kaggle. Perform Exploratory data analytics that include: Study of data through pairplots, heatmaps, histograms, finding correlations amongst data, and so on
3	MapReduce is a kind of processing large scale data sets distributed Google proposed parallel programming model, also is Isthe current cloud computing core calculation model. Many scientific research institutions and companies are R & D design of a parallel processing system for massive data specification MapReduce based on their technology. Install R on a shared server and connect to Hadoop. Demonstrate execution of R programming constructs inside MapReduce using RMR2. Hence, develop any application using R and Hadoop Streaming by choosing data sets from Internet-bound big data repositories
4	PIPELINE.In machine learning, it is common to run a sequence of algorithms to process and learn from data. E.g., a simple text document processing workflow might include several stages: • Split each document's text into words. • Convert each document's words into a numerical feature vector. • Learn a prediction model using the feature vectors and labels. A Pipeline is specified as a sequence of stages, and each stage is either a Transformer or an Estimator. These stages are run in order, and the input DataFrame is transformed as it passes through each stage. Perform Machine Learning Clustering Task using SparkML in Python by choosing public datasets that are openly available for the task identified. Then, perform experiments and interpret the results obtained
5	Use Map Reduce framework to perform big data analytics on distributed clusters. by choosing public datasets that are openly available for the task identified.

	Perform experiments and interpret the results obtained.
6	Use Spark framework to perform big data analytics on distributed clusters. by choosing public datasets that are openly available for the task identified. Perform experiments and interpret the results obtained.
7	Perform big stream data analytics on using spark framework using SparkML in Python by choosing public datasets that are openly available for the task identified. Perform experiments and interpret the results obtained.
8	Perform big stream data analytics on using Flink framework using SparkML in Python by choosing public datasets that are openly available for the task identified. Perform experiments and interpret the results obtained.
9	Hadoop requires external memory for processing big data applications, whereas, it suffers from its poor processing time due to this limitation. Apache Spark is found to overcome the limitations of Hadoop by performing in-memory data processing. Develop a) Batch Analytics application using Apache Spark. b) Real time-Analytics application using Apache Spark. (Note: choose data sets from Internet-bound big data repositories)
10	Develop any Batch-Analytics application using Apache Flink.

<table>
<tr><td>Course Title</td><td colspan="4">Wireless and Mobile Networks</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS222</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
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<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

This course will introduce to wireless communication and mobile computing. It covers the fundamentals of wireless transmission and telecommunication system such as GSM, GPRS, DECT, and UMTS. Mobile network layer and transport layers covers about mobile IP, Traditional TCP and the architecture of LTE and its protocol.

COURSE OBJECTIVES:

The objectives of this course are to

1. Explain the basic concepts of wireless communication.
2. Describe wireless network architecture and concepts of Ad-hoc network.
3. Demonstrate the working of wireless Local area networks and wireless ad-hoc networks.
4. Discuss various applications using the wireless technologies

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Outline the fundamental concepts of wireless communication.	1,2,3,4,5	1,2,3
CO2	Analyse the working of wireless network and wireless Ad-hoc network.	1,2,3,4,5	1,2,3
CO3	Make use of the Wireless Application protocol in a real world application.	1,2,3,4,5	1,2,3
CO4	Develop applications using the wireless technologies.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	1	3	2	3	2	-	-	-	-	-	-	3	3	3
CO2	3	3	3	2	2	-	-	-	-	-	-	3	2	3
CO3	2	3	2	3	3	-	-	-	-	-	-	3	2	2
CO4	2	3	2	3	2	-	-	-	-	-	-	3	3	2

COURSE CONTENTS:

UNIT -1

Introduction: Fundamentals of wireless communication: Wireless communication system, Wireless media, Frequency spectrum, Wireless communication channel specifications, Types of wireless communication systems.

Basics of wireless networks: Wireless network architecture, Wireless network reference model, Wireless networking issues.

UNIT -2

Telecommunication System: Global system for mobile communications (GSM) Services, System Architecture, Radio interface, protocol, handover, General packet radio service (GPRS). DECT System Architecture, protocol, TETRA, UMTS System Architecture.

Wireless Body Area Networks, Properties, Network architecture, Components, Network Protocols, Bluetooth and Zigbee, Applications.

UNIT -3

Wireless Local Area Networks: Network Components, Network architecture, WLAN standards, WLAN protocols, IEEE 802.11p, WLAN applications.

Wireless Ad Hoc Networks: Wireless Ad Hoc Networks, Mobile Ad Hoc networks, Wireless sensor networks, Vehicular Ad Hoc networks (VANETs).

UNIT -4

Wireless Application protocol: Version 1.X Architecture, WAP 2.0.

4G LTE Networks: Introduction, LTE, LTE Architecture, Protocol layer Architecture, LTE Advanced, 5G Networks overview.

SELF-LEARNING COMPONENTS:

Network Function Virtualization (NFV),Capability-based Security,5G,Cyber Physical Systems (CPS), **and Capability-based Security.**

TEXT BOOKS:

1. Sunil Kumar S.Manvi, MahabaleshwarS.Kakkasageri, “Wireless and mobile networks concepts and protocols”, Wiley,2016.
2. Jochen3. Schillier, “Mobile Communications”, Pearson publishers,2004.

REFERENCE BOOKS:

1. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, “Mobile computing technology, Application and service creation”, Tata McGraw Hill Education Private limited, 2010.

JOURNALS/MAGAZINES:

1. IEEE Transactions on Vehicular Technology
2. 3. IEEE Transactions on Wireless Communications
3. 4. Springer Wireless Networks Journal
4. Elsevier Journal of Wireless and Mobile Networks
5. IEEE Transactions on Wireless and Mobile Networks
6. Springer Jounal of Wireless and Mobile Networks

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ Wireless and Mobile Networks
2. https://www.coursera.org/learn/ Wireless and Mobile Networks
3. https://nptel.ac.in/courses/106106129/

PRACTICE:

Sl. No.	List of Programs
1	Today's network simulators are widely used in the mobile world. Simulation networks are valuable tools with which to investigate the behavior and performance of new protocol designs, while reinforcing their understanding of networking concepts. Network simulation tools save money and time by offering researchers the possibility to test network protocols in virtual environments that might be difficult or expensive to emulate using real hardware, such as routers, computers, or switches. Introduction to: (a) discrete event simulation, (b) ns3, (c) ns3 Installation, (d) NetAnim.
2	The *ns-3* CSMA device models a simple network in the spirit of Ethernet. A real Ethernet uses CSMA/CD (Carrier Sense Multiple Access with Collision Detection) scheme with exponentially increasing backoff to contend for the shared transmission medium. Write a NS3 program to connect two nodes with a point to point link, which have unique interface. Analyze the network performance using UDP client server.
3	Token ring in token bus the ring topology is virtually created and maintained by the protocol. A node can receive data even if it is not part of the virtual ring, a node joins the virtual ring only if it has data to transmit. In token bus data is transmitted to the destination node only where as other control frames is hop to hop. After each data transmission there is a solicit_successsor control frame transmitted which reduces the performance of the protocol. Write a NS 3 program to demonstrate bus topology. Analyze the performance using UDP based applications.
4	The star topology reduces the damage caused by line failure by connecting all of the systems to a central node. When applied to a bus-based network, this central hub rebroadcasts all transmissions received from any peripheral node to all peripheral nodes on the network, sometimes including the originating node. All peripheral nodes may thus communicate with all others by transmitting to, and receiving from, the central node only. Write a NS 3 program to demonstrate star topology. Analyze the performance using UDP based applications.
5	The Transmission Control Protocol (TCP) is one of the main protocols of the Internet protocol suite. It originated in the initial network implementation in which it complemented the Internet Protocol (IP). Therefore, the entire suite is commonly referred to as TCP/IP. TCP provides reliable, ordered, and error-checked delivery of a stream of octets (bytes) between applications running on hosts communicating by an IP network. Major Internet applications such as the World Wide Web, email, remote administration, and file transfer rely on TCP. Write a NS3 program to implement FTP using TCP bulk transfer, Analyze the performance
6	At the lower levels of the protocol stack, due to network congestion, traffic load balancing, or unpredictable network behaviour, IP packets may be lost, duplicated, or delivered out of order. TCP detects these problems, requests re-transmission of lost data, rearranges out-of-order data and even helps minimize network congestion to reduce the occurrence of the other problems. If the data still remains undelivered, the source is notified of this failure. Write a NS3 program to connect two nodes with a point to point link, which have unique interface. Analyse the traffic control using TCP by changing suitable parameters.

7	A mobile ad hoc network or MANET does not depend on a fixed infrastructure for its networking operation. MANET is an autonomous and short-lived association of group of mobile nodes that communicate with each other over wireless links. A node can directly communicate to the nodes that lie within its communication range. If a node wants to communicate with a node that is not directly within its communication range, it uses intermediate nodes as routers. Write NS 3 Program to configure two nodes on an 802.11b physical layer, with802.11b NICs in adhocmode, and by default, sends one packet of 1000 (application) bytes to the other node. The physical layer is configured to receive at a fixed RSS (regardless of the distance and transmit power); therefore, changing position of the nodes has no effect. Analyze the performance.
8	To find troubleshooting network issues, and to inspect individual packets, Wireshark is needed. Wireshark is the de facto, go-to, you-need-to-know-how-to-use, application to capture and investigate network traffic. Since Wireshark is the be-all-end-all tool for this job, – like where to download, how to capture network packets, how to use the Wireshark filters, and more. Install wireshark, and analyze the packets using it on a selected interface. Apply filters and check the packets.
9	Modern switches use virtual local-area networks (VLANs) to improve network performance by separating large Layer 2 broadcast domains into smaller ones. VLANs can also be used as a security measure by controlling which hosts can communicate. In general, VLANs make it easier to design a network to support the goals of an organization. Install packet tracer, and consider a topology and configure VLAN
10	Nmap, short for Network Mapper, is a free, open-source tool for vulnerability scanning and network discovery. Network administrators use Nmap to identify what devices are running on their systems, discovering hosts that are available and the services they offer, finding open ports and detecting security risks. Nmap can be used to monitor single hosts as well as vast networks that encompass hundreds of thousands of devices and multitudes of subnets. Install NMAP, and execute atleast 10 commands to demonstrate the scanning of networks hosts and ports.

<table>
<tr><td>Course Title</td><td colspan="4">User Interface (UI)/User Experience (UX) Design</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS223</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="6">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
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<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

This course aims at providing knowledge of basic concepts of UI and UX. UX design refers to user experience design, while UI design stands for user interface design. Both of these are crucial to an IT product and need to work closely together. Despite being very integral to each other, the roles themselves are quite different, involving distinct processes.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain the new technologies that provide interactive devices and interfaces.
2. Illustrate the UI/UX design process.
3. Describe various Interaction styles including Direct Manipulation and Virtual Environment
4. Discuss the command, natural languages and issues in design for maintaining QoS

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Understand the new technologies that provide interactive devices and interfaces in real world applications	1,2,3,4,5	1,2,3
CO2	Implement the UI/UX design process and evaluate UID.	1,2,3,4,5	1,2,3
CO3	Develop applications using various Interaction styles including Direct Manipulation and Virtual Environment..	1,2,3,4,5	1,2,3
CO4	Elaborate the command, natural languages and issues in design for maintaining QoS.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	3							3	3	3
CO2	3	3	2	2	1							2	3	3
CO3	3	3	2	2	3							3	2	3
CO4	2	3	2	3	3							3	3	2

COURSE CONTENTS:

UNIT- 1

Introduction: Usability of Interactive Systems: Introduction, Usability Goals and Measures, Usability Motivation, Universal Usability, Goals for our profession. Guideline, principles, and theories: Introduction, Guidelines, principles, Theories.

UNIT -2

Development Process: Managing Design Processes- Introduction, Organizational Design to support Usability, The Four Pillars of Design, and Development methodologies: Ethnographic Observation, Participatory Design, Scenario Development, and Social Impact statement for Early Design Review, Legal Issues.

Evaluating Interface Design- Introduction, Expert Reviews, Usability Testing and Laboratories, Survey Instruments, Acceptance tests, Evaluation during Active Use, Controlled Psychologically Oriented Experiments

UNIT- 3

Interaction Styles: Direct Manipulation and Virtual Environments- Introduction, Examples of Direct Manipulation, Discussion of direct manipulation, 3D Interfaces, Tele-operation, Virtual and Augmented Reality.

Menu Selection, Form Filling and Dialog Boxes- Introduction, Task-Related Menu Organization, Single Menus, Combination of Multiple Menus, Content Organization, Fast Movement Through Menus, Data Entry With Menus, Form Filling, Dialog Boxes and Alternatives, Audio Menus and Menus for Small Displays.

Command and Natural Languages- Introduction, Command-organization functionality strategies and structure, Naming and Abbreviations, Natural Language in computing.

Interaction Devices- Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory interfaces, Displays-Small and Large

UNIT- 4

Design Issues: Quality of Service- Introduction, Models of Response-Time Impacts, Expectations and Attitudes, User Productivity, Variability in Response time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display design, web page design, Window Design, Colour User Documentation and Online Help- Introduction, Online versus paper documentation, Reading from paper versus Displays, Shaping the content of the Manuals, Accessing the Documentation, Online Tutorials and animated demonstrations, Online Communities for User Assistance, The Development Process.

SELF-LEARNING COMPONENT:

Information Search and Visualization- Introduction, Search in Textual Documents and Database Querying, Multimedia document searches, Advanced filtering and Search Interfaces, Information Visualization: Introduction, Data type by task taxonomy, Challenges for information visualization.

TEXT BOOKS:

1. Ben Shneiderman, Plaisant, Cohen, Jacobs," Designing the User Interface", Pearson Education, 2010.
2. Alan Dix, Janet Finalay, Gregory D AbiwdmRusselBealel, "Human-Computer Interaction, Pearson Education, 2008.

REFERENCE BOOKS:

1. Eberts. " User Interface Design", Prentice Hall, 1994.
2. Wilber O Galitz, " The Essential Guide to User Interface Design- An Introduction to GUI Design, Principles and Techniques", Wiley-Dreamtech India Pvt Ltd, 2011

JOURNALS/MAGAZINES:

1. Elsevier Journal of User Interface / User Experience
2. IEEE Transactions on User Interface / User Experience
3. Springer Jounal of User Interface / User Experience

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ User Interface / User Experience
2. https://www.coursera.org/learn/ User Interface / User Experience
3. https://nptel.ac.in/courses/106106129/

Practice:

Sl. No.	List of Programs
1	Suppose you need to design a system for users in two countries that are very different from each other culturally. What are some of the design concerns that you should be aware of to create a successful design?
2	Don Norman suggests organizing screens and menus functionally, designing commands and menu choices to be distinctive, and making it difficult for users to take irreversible actions. Norman also says to provide feedback about the state of the interface (e.g., changing the cursor to show whether a map interface is in zoom- in or select mode) and designing for consistency of actions (e.g., ensuring that Yes/No buttons are always displayed in the same order). State one example you have seen where you know these rules have been violated . Although this is crucial to a user interface's success, suggest why there may be challenges to implement some of Norman's guidelines
3	You are the new Chief Design Officer (COO) of a start-up, DTUI Inc. The project is to design a system for selling pottery. The aim is to develop an interface that meets the needs of both the potters and the customers. Describe in detail a design methodology of four stages to facilitate the proper design of such a system. Write your answer in the form of a management plan for this project. For each stage, indicate the number of weeks that should be allocated. Hint: Note the four phases of the design process: 1. Requirements analysis 2. Preliminary (conceptual) and detailed design 3. Build and implementation 4. Evaluation
For questions 4-6, refer to the following scenario: The State of Maryland is developing a web-voting interface. For selecting the candidates, one design (RB) is a set of radio buttons and another is (CB) a combo-box (drops down when selecting the scroll arrow icon), both using standard fonts at 10-point size.	
4	Compare these two designs when there are four candidates and predict the relative speed of performance and error rates. Support your choice by a thoughtful argument.
5	An expert reviewer complains that both designs may work with young users who are familiar and expert in using a mouse, but that there will be problems for elderly and motor-impaired users who have difficulty controlling a mouse. The reviewer recommends a new design that includes a larger font (20-point size) and a numbered list to allow selection by keyboard easily. Describe a participatory design or social imp act statement process that might clarify this issue with elderly users.
6	Design an experiment to help resolve the issue brought up in question 5. Assume you have substantial resources and access to subjects.
7	Consider a system that does not yet exist; for example, a totally automated fast-food restaurant , where customers order via touch screen interactions, pay by swiping their debit or credit cards, and then pick

	up their food analogous to the self-check-out at some supermarkets, but even more extreme. Discuss how you would conduct a co11textual inquiry for a system that does not yet exist.
8	An airline company is designing a new online reservation system. They want to add some direct-manipulation features. For example, they would like customers to click a map to specify the departure cities and the destinations, and to click on the calendar to indicate their schedules. From your point of view, list four benefits and four problems of the new idea compared with their old system, which required the customer to do the job by typing text.
9	A company is designing a kiosk that can display weather information in public locations. The kiosk will feature a touch screen so users can select a city by pointing on a map. Give three reasons why a touch screen is an effective device for this application.
10	Your documentation team has developed an online help support for instant messaging client. You are hiring a usability testing firm to evaluate the online help and recommend improvements. Prepare a contract that specifies how you want the usability test to be performed and what reports you would like to receive. Your schedule gives them one week to prepare the study, one week to run it, plus one week to write up the final report. In your contract, specify the details of your requirements, including such information as the number of subjects required, test plans, and the types of reports.

SELF LEARNING:

A group decision system is being built over a network, which has inherent delays due to network lag. Suggest the longest acceptable amount of time the delay could last without affecting the user negatively. Provide an argument for the time you selected.

1. System confirming the user's password when logging on.
2. Synchronous group editing of a document.
3. Asynchronous critiquing of other participants' work.

<table>
<tr><td>Course Title</td><td colspan="4">Unix System Programming</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS231</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
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</table>

COURSE OVERVIEW:

This course is an introduction to basic concepts of various fields of UNIX operating system is called the kernel . The kernel denes the application programming interface and provides all of UNIX's services, whether directly or indirectly. The kernel is a program, or a collection of interacting programs, depending on the particular implementation of UNIX, with many entry ointsp15 .

COURSE OBJECTIVES:

Objectives of this course are to:

1. Discuss the UNIX, ANSI Standardsand POSIX API'S forfiles.
2. Describe the API's for implementing process control and to Identify System call interface for process management, multitaskingprograms.
3. Demonstrate the use of Signals and Daemon processes inUNIX.
4. Explain different API's and IPCmethods.
5. On completion of this course; the student will be able to:

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Make use of POSIX API'S to work with files.	1,2,3,4,5	1,2,3
CO2	Apply the API's for implementing UNIX commands, process control and processmanagement.	1,2,3,4,5	1,2,3
CO3	Utilize Signals and Daemon processes in UNIX.	1,2,3,4,5	1,2,3
CO4	Develop programs for message queues, FIFO programs and data transfer socket using appropriate API's, IPC methods and Sockets.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	2	1	3	3	2							3	2	3
CO2	3	2	1	3	1							3	3	3
CO3	3	2	3	3	1							3	3	2
CO4	3	3	2	3	2							3	2	3

COURSE CONTENTS:

UNIT-1

UNIX and ANSI Standards: ANSI C standard, ANSI/ISO C++ standards, Difference between ANSICandC++,POSIXstandards,POSIX.1FIPSstandard,X/Openstandards.UNIXandPOSIX APIs:POSIXAPIs,UnixandPOSIXdevelopmentEnvironment,APIcommoncharacteristics

Files: File types, Unix and POSIX file system, Unix and POSIX file attributes, INODES in Unix SystemV,Applicationprograminterfacetofiles,Unixkernelsupportforfiles,Relationshipof Cstreampointersandfiledescriptors,DirectoryFiles,HardandSymboliclinks.

UNIX File APIs: General File APIs, File and Record locking, Directory File APIs, Device file APIs, FIFO file APIs, Symbolic Link File APIs.

UNIT- 2

UNIX Processes: Environment of Unix process: Introduction to main function, Process Termination, Command Line Argument, Environment list.

Process Control: Introduction, Process identifiers, fork, vfork, exit, wait, waitpid, wait3, wait4 functions, Raceconditions, execfunctions, changing UsersIDs and GroupIDs, Interpreterfiles, Systemfunction, Process accounting, User identification, Process times, I/O Redirection.

Process Relationship: Introduction, Terminallogin, Networklogin, process groups, sessions,job control, Shell execution of programs, Orphaned processgroups.

UNIT -3

Signals: Unix Kernel support for signals, signal, Signal mask, Sigaction, SIGCHLD signal and waitpid function, sigsetjmp and siglongjmp functions, Kill, Alarm, Interval Times, POSIX.lb timers,

Daemon processes: Introduction, Daemon characteristics, Coding Rules, Error logging, Client server mod

UNIT-4

Inter Process Communication: Overview of IPCmethods, Pipes, Popen, Pclosefunctions, Co- processes, FIFOs system V IPC, Message Queues, Semaphores, Shared Memory, Client server properties, Streampipes, Passing Filede scriptors, Anopenserverversion1 and Clientserver connections functions.

SELF LEARNING COMPONENT

OPENMP, OPENMPI, Sockets

TEXT BOOKS:

1. Terrence Chan “Unix System Programming Using C++”,Prentice Hall India,2011.
2. Stephen A. Rago, W. Richard Stevens, “Advanced Programming in the UNIX Environment”, Pearson Education / PHI,2013.

REFERENCE BOOKS:

1. Kay A. Robbins and Steven Robbins, “UNIX Systems Programming: Communication, Concurrency, and Threads”,Prentice Hall,2015.
2. W.Richard Stevens, “UNIX Network Programming, Interprocess Communications(Paperback)”, Addison-Wesley. 2014.

JOURNALS/MAGAZINES:

1. Elsevier Journal of Unix Sytem Programming
2. IEEE Transactions on Unix Sytem Programming
3. Springer Jounal of Unix Sytem Programming

SWAYAM/NPTEL/MOOCs:

1. https://www.udemy.com/ Unix Sytem Programming
2. https://www.coursera.org/learn/ Unix Sytem Programming
3. https://nptel.ac.in/courses/106107129/

Practice:

Sl. No.	List of Programs
1	POSIX allows an application to test at compile or run time whether certain options are supported, or what the value is of certain configurable constants or limits.At compile time this is done by including <unistd.h> and/or <limits.h> and testing the value of certain macros. Write a C/C++ POSIX compliant program to check the following limits: (i) No. of clock ticks (ii) Max. no. of child processes (iii) Max. path length (iv) Max. no. of characters in a file name (v) Max. no. of open files/ process
2	king provides a very simple yet incredibly useful mechanism for coordinating file accesses. flock - manage locks from shell scripts.fcntl(used to manipulate the file descriptors) file commands can be used to support record locking, which permits multiple cooperating programs to prevent each other from simultaneously accessing parts of a file in error-prone ways.fcntl() performs the operations on the open file descriptor fd. Consider the last 100 bytes as a region. Write a C/C++ program to check whether the region is locked or not. If the region is locked, print pid of the process which has locked. If the region is not locked, lock the region with an exclusive lock, read the last 50 bytes and unlock the region.
3	Pipes are the oldest form of UNIX System IPC and are provided by all UNIX systems. Pipes have two limitations. 1. Historically, they have been half duplex (i.e., data flows in only one direction). Some systems now provide full-duplex pipes, but for maximum portability, we should never assume that this is the case. 2. Pipes can be used only between processes that have a common ancestor. Normally, a pipe is created by a process, that process calls fork, and the pipe is used between the parent and the child. A pipe is created by calling the pipe function. Write a C/C++ program which demonstrates interprocess communication between a reader process and a writer process. Use mkfifo, open, read, write and close APIs in your program.
4	Environment variables are a set of dynamic named values that can affect the way running processes will behave on a computer. They are part of the operating environment in which a process runs. For example, a running process can query the value of the TEMP environment variable to discover a suitable location to store temporary files, or the HOME or USERPROFILE variable to find the directory structure owned by the user running the process. Write a C/C++ program that outputs the contents of its Environment list
5	Links are created by giving alternate names to the original file. The use of links allows a large file, such as a database or mailing list, to be shared by several users without making copies of that file. Not only do links save disk space, but changes made to one file are automatically reflected in all the linked files. The ln command links the file designated in the SourceFile parameter to the file designated by the TargetFile parameter or to the same file name in another directory specified by the TargetDirectory parameter. By default, the ln command creates hard links Write a C /C++ program to emulate the unixlncommand

6	A race condition occurs when multiple processes are trying to do something with shared data and the final outcome depends on the order in which the processes run. The fork function is a lively breeding ground for race conditions, if any of the logic after the fork either explicitly or implicitly depends on whether the parent or child runs first after the fork. In general, we cannot predict which process runs first. Even if we knew which process would run first, what happens after that process starts running depends on the system load and the kernel's scheduling algorithm Write a C/C++ program to illustrate the race condition.
7	In unix terminology, a process that has terminated, but whose parent has not yet waited for it, is called a zombie. Write a C/C++ program that creates a zombie and then calls system to execute the pscommand to verify that the process is zombie.
8	If we want to write a process so that it forks a child but we don't want to wait for the child to complete and we don't want the child to become a zombie until we terminate, the trick is to call fork twice. Write a C/C++ program to avoid zombie process by forking twice.
9	System() executes a command specified in command by calling /bin/sh -c command, and returns after the command has been completed. The exec() family of functions replaces the current process image with a new process image. The execl() function is one among the exec() family of functions. The waitpid() system call suspends execution of the calling process until a child specified by pid argument has changed state. Write a C/C++ program to implement the systemfunction.
10	First, every signal has a name. These names all begin with the three characters SIG. For example SIGABRT is the abort signal that is generated when a process calls the abort function. SIGALRM is the alarm signal that is generated when the timer set by the alarm function goes off.Use the alarm API for generating a signal after certain time interval as specified by the user. Write a C/C++ program to set up a real-time clock interval timer using the alarmAPI.

Course Title	Mobile Application Development				Course Type		Integrated	
Course Code	M20TCS232	Credits	4		Class		II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	0	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objectives of this course are to:

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

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Analyse Android Platform, its architecture and features.	1,2,3,4,5	1,2,3
CO2	Design and implementation of user interface, database and content providers.	1,2,3,4,5	1,2,3
CO3	Make use of activities, layouts and Graphics in the development of apps for android	1,2,3,4,5	1,2,3
CO4	Evaluate multimedia, camera and location based services in Android application..	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2							3	2	3
CO2	2	3	2	3	1							3	3	2
CO3	3	2	3	2	3							3	2	3
CO4	2	3	3	3	1							3	3	3

COURSE CONTENTS:

UNIT-1

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

UNIT-2

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

UNIT-3

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

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

UNIT-4:

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

SELF-LEARNING COMPONENT:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

JOURNALS/MAGAZINES:

1. Springer Journal on Mobile Networks and Applications
2. Springer Journal on Multimedica and Applications
3. Elsevier Journal on Systems and Software

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/noc20_cs52/preview
2. https://www.classcentral.com/course/swayam-introduction-to-modern-application-development-7908
3. https://nptel.ac.in/courses/106/106/106106156/

PRACTICE:

Sl.NO	List of Programs
1	Introduction to Android platform. Introduction to the tools used in the Android emulator. Create a simple application.
2	Create an Android UI with one text field, centered at the top of the screen, and one button. The text field display the text "**You tapped 0 times**". For every user 's tap the button, will increment a counter and update the text field accordingly.
3	Program a **"<username>DemoSuite**" app that allows a user to retrieve and display an internet resource (an xkcd cartoon), trigger a simple custom animation, play video, convert text to speech, and enter text via speech. The main structure that developer must follow is that of a "TabLayout + ViewPager " skeleton, and five different fragments that are started from tabs in the TabLayout. The five fragments will implement the above mentioned functionalities, and they can be tested individually, and need not interact with each other, other than being started from the same framework.
4	The Developer can use skeleton code to get started with the development. Unzip the file and rename the "BoilerPlateHW3" folder to **"<username>DemoSuite**", which can then import to Android Studio. Refactor this code to rename the package name to your usual package name, and the app name to **"<username>DemoSuite**" (as shown in class). The skeleton code displays a package name in the Activity's **onCreate method**. Include the code if app is created from scratch. The TAs will rely on this Toast while grading. Fragments are added, using Android Studio menu actions. The app must handle orientation switches from Portrait to Landscape and back. State should be saved in all cases. The video player should have a special landscape layout. When the app is opened for the first time it should display a view of the first tab (the xkcd viewer), with an empty page and a text field to enter a number and a send button.
5	RFID BASED AUTOMATIC TRAFFIC VIOLATION TICKETING The "Traffic Violation Ticketing Automation using RFID" can be used easily anytime, anywhere and ticket will be present in the customer's phone in the form of "RFID". GPS facility is used for validation of the ticket at the source and deletion at the destination. The main objective for this project is developing an android application so that passengers can book the tickets online directly from their smart phones and a received message to their own phones is enough for travelling a desired distance. Thus, the process of standing in lines to book the tickets and after that carrying the tickets is curdled. For security reasons the information about every user is stored in CLOUD which is to be accessed for each ticket booking for validation purpose. This change of paradigm benefits from the fact that cloud ticketing services can be accessed through the Internet and they can be elastically grown or shrunk, providing easier scalability and high availability. There are two modes of ticket payment. Firstly, a customer can pay using their wallet and secondly user can request ticket checker to load some amount in the wallet. The information for each user is stored in a SQL database for security purpose. Also the ticket checker is provided with an application to search for the user's ticket with the ticket number in the cloud database for checking purposes.
6	CHILD MONITORING SYSTEM APPLICATION PROJECT The application uses two main services that is GPS and telephonic services. For location services is GPS and telephony services is SMS, call logs and contacts. Android is a widely used OS used by a lot of masses globally. Internet is used for communicating between children and parent side. The System can be designed in a simple way. The application developed to make user-friendly approach on both sides. The parents and children both should have GPS Based smart phones. The application is used to

	track the Child's location as well as call logs, messages and contact from their smartphone. Reason for choosing android OS is that to target more users.
7	ANDROID DABBAWALA PROJECT This system is made with the view point of managing the Mumbai Dabbawala's who provide homemade food to the respective people working in an organization. With the help of this system the dabbawala can deliver the food at correct time. This system is developed in android where user can easily order their food with their hand held devices. As this system is developed in android user can easily use dabba service anywhere at anytime. This application is built to be beneficial to student knowledge as well as help Mumbai dabbawala's. This system allows the user to order the dabba service based on weekly, monthly or quarterly basis. System will calculate the cost based on the service user had selected. In this system android user can select dabba service or catering service. In dabba service he can get food delivered from his home by the dabbawala's at specified timing. In catering service he can order thali by mentioning certain details required for the dabbawala's such as food type, quantity, time etc. User can view the orders he had placed. User can make payment online by mentioning the details required for the payment. Admin can view order of various users. Admin can make dabba order as well as catering order in case user had informed through call. Admin can even view various user details. This system helps to manage the whole dabbawala system. This system helps to deliver food faster and at right time to the respective users.
8	ANDROID VOTING SYSTEM PROJECT This application provides is a new technique of casting votes using mobile phones. Android voting system is an application developed for android devices to deploy an easy and flexible way of casting votes anytime and from anywhere. The application is especially developed for organizations to get employees votes for any new policy regulation or issues. The issues or arguments are fed into the system by the admin. Employees can then cast their vote as yes or no. One voter can only post one vote for an argument. Each and every vote casted is stored in the database for the respective argument. At the end of the voting process the system counts the total votes and generates a brief report of it to the admin. Thus the app helps the company to get proper feedback of the employees
9	ANDROID VOTING SYSTEM PROJECT This application provides is a new technique of casting votes using mobile phones. Android voting system is an application developed for android devices to deploy an easy and flexible way of casting votes anytime and from anywhere. The application is especially developed for organizations to get employees votes for any new policy regulation or issues. The issues or arguments are fed into the system by the admin. Employees can then cast their vote as yes or no. One voter can only post one vote for an argument. Each and every vote casted is stored in the database for the respective argument. At the end of the voting process the system counts the total votes and generates a brief report of it to the admin. Thus the app helps the company to get proper feedback of the employees
10	CLASSROOM AUTOMATION USING ANDROID APP PROJECT In this Classroom Automation project, we are using an android app by which the user can select the classroom or group multiple classrooms to announce script, with this system human effort and time is reduced. Announcement from control room is captured with mic and feeded into the amplified box, from that amplifier box sound signal is sent into relay switching box, from relay switching box sound is switched into the respective classroom based on user inputs from android app

<table>
<tr><td>Course Title</td><td colspan="4">Python for Data Analysis</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS233</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
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<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

Python has become one of the most popular dynamic, programming languages, along with Perl, Ruby, and others. Python and Ruby have become especially popular in recent years for building websites using their numerous web frameworks, like Rails (Ruby) and Django (Python). Among interpreted languages Python is distinguished by its large and active scientific computing community. Adoption of Python for scientific computing in both industry applications and academic research has increased significantly since the early 2000s.

Python's improved library support (primarily pandas) has made it a strong alternative for data manipulation tasks. Combined with Python's strength in general purpose programming, it is an excellent choice as a single language for building data-centric applications.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Understand Python, data structures, functions;
2. Demonstrate the knowledge on numpy and pandas for data analysis techniques;
3. Illustrate the use of concepts of Reading and Writing Data, data cleaning and preparation for data analysis;
4. Apply data wrangling and to plot and visualize data.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Understand the concepts of Python, data structures, functions;	1,2,3,4,5	1,2,3
CO2	Make use of inbuilt packages like numPy and pandas to perform operations on dataset	1,2,3,4,5	1,2,3
CO3	Experiment with various pre processing techniques for data analysis .	1,2,3,4,5	1,2,3
CO4	Apply data wrangling and to plot and visualize data.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2	2	-	-	-	-	-	-	3	2	3
CO2	2	3	2	3	3		-	-	-	-	-	3	3	3
CO3	3	1	3	2	2		-	-	-	-	-	3	3	2
CO4	2	3	1	3	3		-	-	-	-	-	3	2	3

COURSE CONTENTS:

UNIT- 1

Preliminaries: Why Python for Data Analysis?Essential Python Libraries.Python Language Basics, IPython and Jupyter Notebooks: The python interpreter, IPython basics, Python language basics

Built in Data Structures, functions and Files: Data srructures and sequences, Functions, Files and operating system

UNIT- 2

NumPy Basics: Arrays and Vectorized Computation: The NumPyndarray: A Multidimensional Array Object, Universal Functions: Fast Element-wise Array Functions, Array oriented Programming with Arrays, File Input and Output with Arrays,

Getting started with pandas: Introduction to pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics, Correlation and Covariance, Unique Values, Value Counts, and Membership

UNIT- 3

Data Loading, Storage, and File Formats: Reading and Writing Data in Text Format, Interacting with HTML and Web APIs, Interacting with Databases.

Data Cleaning and Preparation: Handling missing data, Data Transformation, String Manipulation

UNIT- 4

Data Wrangling: Hierarchical indexing, Combining and Merging Datasets, Reshaping and pivoting.

Plotting and Visualization: Plotting using matplotlib, pandas and seaborn, other python visualization Tools.

SELF-LEARNING:

Advanced Numpy, Advanced Pandas, Data Aggregation

TEXT BOOKS:

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

REFERENCE BOOKS:

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

JOURNALS/MAGAZINES:

1. Springer Journal on Python for Data Analysis
2. Springer Journal on Python for Data Analysis
3. Elsevier Journal on Python for Data Analysis

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Python for Data Analysis
2. https://www.classcentral.com/course/swayam- Python for Data Analysis
3. https://nptel.ac.in/courses/106/106/106106156/

PRACTICE:

Sl. No.	**List of Programs**
1	Anaconda is a free and open-sourcedistribution of the Python and R programming languages for data science, machine learning applications, large-scale data processing, predictive analytics, etc.. Anaconda makes package management and deployment very simple. Download and Install of Anaconda Distribution of Python, understanding of Jupyter Notebook and various menu items in it, importing modules like Pandas, Numpy, SciPy etc.
2	Data frames in Python Pandas are excellent objects to handle tabular data from various sources. Write a python program to demonstrate creation of data frame using various formats of input data
3	Any real time project involves data munging and data wrangling which involves selecting required rows and columns of data and manipulations on them. Write a python program to demonstrate following operations on rows and columns of a data frame: a. Selection b. Insertion c. Deletion
4	In order to explore the dataset and understand insights from it, the measures of central tendency play a crucial role, python has a strong set of functions that help you explore data. Write a python program to compute descriptive statistics for measures of central tendency from given data: - Mean, Geometric Mean, Harmonic Mean, Median, and Mode
5	Measuring descriptive statistics in data helps you decide what kind of processing to perform on it to gain useful information from data. Write a python program to compute descriptive Statistics for Measures of Variability from given data- Variance, Standard Deviation, Skew, Percentiles
6	Correlation is a statistical technique that can show whether and how strongly pairs of variables are related. For example, height and weight are related; taller people tend to be heavier than shorter people. Write a python program to compute measures of Correlation in given data - using Pearson, Spearman correlation coefficients.
7	Data Visualization is visually representing the data using different plots/graphs/charts to find out the pattern, outliers, and relation between different attributes of a dataset. It is a graphical representation of data that helps human eye to detect patterns in data hence helps give a direction to data analysis tasks. Write a python program to plot following graphs using Matplotlib – Scatter plot, Box Plot, Bar Chart, Pie Chart
8	Often a data analyst needs to combine data in a data frame by some criteria. This is done by providing a label to group data in the table. The pandas functions allow us to merge as well group data along rows

	and columns as per various criteria. Write a python program to demonstrate following operations on two data frames: a. Merging b. GroupBy
9	Hypothesis testing is a core concept in inferential statistics and a critical skill in the repertoire of a data scientist. The t-test is statistical hypothesis test in which the test statistic follows a Student's t-distribution under the null hypothesis. It is applied for normally distributed test statistic. Write a python program to demonstrate Hypothesis testing using Student's T Test.
10	Regression is a technique for searching relationships among variables in data. E.g. trying to understand relationship between salary and experience in years for employees in a data set containing employee information. Linear regression involves relation between one dependent and one independent variable. Write a python program to apply simple linear regression on data

<table>
<tr><td>Course Title</td><td colspan="4">High Performance Computing</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS241</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
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</table>

COURSE OVERVIEW:

The goal of this course is to give students solid foundations for developing, analyzing, and implementing parallel and locality-efficient algorithms. This course focuses on theoretical underpinnings. To give a practical feeling for how algorithms map to and behave on real systems and will supplement algorithmic theory with hands-on exercises on modern HPC systems, such as Cilk Plus or OpenMP on shared memory nodes, CUDA for graphics co-processors (GPUs).

COURSE OBJECTIVES:

The objectives of the course are:

1. Explain the basics of processors and parallel computing
2. Discuss the different models of parallel systems.
3. Demonstrate Shared-memory parallel programming with OpenMP for real world Applications
4. Describe the fundamental Distributed-memory parallel programming with MPI.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Summarize the basics of processors and parallel computing	1,2,3,4	1,2,3
CO2	Apply the different models of parallelism to real world applications.	1,2,3,4	1,2,3
CO3	Develop Shared-memory parallel programming with OpenMP for real world Applications	1,2,3,4	1,2,3
CO4	Make use of the concepts of fundamental Distributed-memory parallel programming with MPI.	1,2,3,4	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	2								3	3	3
CO2	2	3	2	3								2	3	3
CO3	3	2	3	3								3	3	2
CO4	2	3	3	3								3	3	3

COURSE CONTENTS:

UNIT-1

Modern Processors: Stored-program computer architect; General-purpose cache-based microprocessor architecture; Memory hierarchies; Multicore processors; Multithreaded processors; Vector processors.

Parallel computers: Taxonomy of parallel computing paradigms; Shared-memory computers; Distributed-memory computers; Hierarchical (hybrid) systems; Networks.

UNIT -2

Basics of parallelization: Why parallelize; Parallelism; Parallel scalability.

UNIT-3

Shared-memory parallel programming with OpenMP: Introduction to OpenMP; Case study: OpenMP-parallel Jacobi algorithm; Advanced OpenMP: Wavefront parallelization.

Efficient OpenMP programming: Profiling OpenMP programs; Performance pitfalls; Case study: Parallel sparse matrix-vector multiply.

UNIT-4

Distributed-memory parallel programming with MPI: Message passing; A short introduction to MPI; Example: MPI parallelization of a Jacobi solver.

Efficient MPI programming: MPI performance tools; Communication parameters; Synchronization, serialization, contention; Reducing communication overhead; Understanding intranode point-to-point communication.

SELF-LEARNING COMPONENT:

More Recent Applications: Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

TEXT BOOKS:

1. Chapman and Hall, “Introduction to High Performance Computing for Scientists and Engineers”, CRC Press,2011.

REFERENCE BOOKS:

1. Georg Hager, Gerhard Wellein, Rohit Chandra, Leo Dagum, DrorMaydan, David Kohr, Jeff McDonald, Ramesh Menon. “Parallel Programming in OpenMP”, Morgan Kaufmann Publisher, 2000
2. Shameem Akhter and Jason Roberts 6, “Multi-core programming, Increase performance through software multi Threading”, IEEE Transactions on Knowledge and Data Engineering, 2001
3. Kai Hwang , “Advanced Computer Architecture: Parallelism, Scalability, Programmability”, McGraw Hill, 1993
4. George S. Almasi and Alan Gottlieb , “Highly Parallel Computing”, Benjamin/Cummings Publisher, 1994

5. Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar, “Introduction to Parallel Computing”, Addison-Welsey, © 2003.

JOURNALS/MAGAZINES:

1. Springer Journal on High Performance Computing
2. Springer Journal on High Performance Computing
3. Elsevier Journal on High Performance Computing

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ High Performance Computing
2. https://www.classcentral.com/course/ High Performance Computing
3. https://nptel.ac.in/courses/106/106/106106156/

PRACTICE:

SL.NO	List of Programs
1	Program which is composed of three parts executed consecutively: 1. A part which you can not parallelize, responsible for a fraction $\alpha 1 = 0.01$ of the total running time. 2. A part which you can parallelize with only 2 processors. This part is responsible for $\alpha 2 = 0.04$ of the time. 3. A part that can be parallelizable with many processors, occupying the remaining time of the program execution. According to the above information, what maximum speedup can you achieve, if you had no limitations on the number of processors n? How many processors do you need to obtain a speedup of at least 8?
2	Determine the asymptotic bounds on the operational intensity I(n) for the following matrix/vector operations, where n is the dimension of the vector. State your assumptions. 1. DAXPY: $y = \alpha x + y$ $\alpha \in R$; $x, y \in R^n$, double precision, 2. SGEMV: $y = Ax + y$ $x, y \in R^n$; $A \in R^{n \times n}$, single precision, 3. DGEMM: $C = AB + C$ $A, B, C \in R^{n \times n}$, double precision. Hint: Assume that A, B and C fit into the cache at the same time
3	Write a program that calculates the sum of numbers from 1 to 1000 in a parallel fashion while executing on all the cluster nodes and providing the result at the end on only one node. It should be noted that the print statement for the sum is only executed on the node that is ranked zero (0) otherwise the statement would be printed as much time as the number of nodes in the cluster.
4	Write an MPI code where array on each process is created. initialize it on process 0. Once the array has been initialized on process 0, then send it out to each process.
5	Implement and demonstrate the sharing of work among threads in an OpenMP program. using 'Sections Construct'
6	Non-blocking point-to-point operation allows overlapping of communication and computation to use the common parallelism in modern computer systems more efficiently. This enables the user to use the CPU even during ongoing message transmissions at the network level. Demonstrate the understanding of MPI Non-Blocking operation.
7	Sequential simulations frequently use a single random number generator. What must a parallel simulation do in this context? Some desirable properties are: 1. Each worker process must draw from a distinct random number sequence. 2. Repeatability between parallel runs when using the same random seed. 3. Repeatability in comparing a parallel run with n slaves and a parallel run with only 1 slaves, when using the same random seed. 4. Repeatability between the parallelized simulation and the original (unmodified) sequential simulation.
8	For this exercise study basic MPI functions such as: For MPI management MPI_Int(),MPI Final()

	Each MPI program should start with MPI_Int and finish with MPI_Final() Each process can fetch the number of processes in the default communicator MPI_COMM_WORLD (the application) by calling MPI_Comm_size Process in a MPI application are identified by so called ranks ranging from 0 to n-1 where n is the number of processs returned by MPI_Comm_size(). Based on the rank each process can perform a part of all required computations so that all process contribute to final goal and process all required data.
9	For Point-to-point communication: MPI-Send(), MPI_Recv() Int MPI_Send(void * buf, int count,MPI_Datatype dtype, int dest, int tag, MPI_Count(comm) MPI_Send sends data pointed by buf to process with with rank dest. There should be count elements of data type dtype. For instance, when sending 5 doubles, count should be 5 and dtype should be MPI_DOUBLE tag can be any number which additionally describe thwe message and comm. Can be MPI_COMM-WORLD for the default communications. Int MPI_ Recv(void *buf , int count, MPI_Datatype dtype Int src, int tag, MPI_Comm comm., MPI-Status *star) MPI-Recv is a blocking receive which waits for message with tag from process with rank src in communicator comm.. Dtype and count denote the type and the number of elements which are to be received and stored in buf. Stat holds information about the received message.
10	For collective communication MPI_Barrier (), MPI_Gather(), MPI_Scatter(),MPI_Allgather() As an example : Int MPI_Reduce(void *sbuf, void * rbuf, int count MPI_Datatype dtype, MPI_Op op, int root MPI_Comm comm) Reduce all values given by processes in communicator comm to a single value in process with rank root. See the code below for adding numbers given by all process to a single value in process 0

<table>
<tr><td>Course Title</td><td colspan="4">Program Analysis</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS242</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

Data flow analysis in a program is used to discover information for a wide variety of useful applications, ranging from compiler optimizations to software engineering and verification. Modern compilers apply it to produce performance-maximizing code, and software engineers use it to re-engineer or reverse engineer programs and verify the integrity of their programs. The course will mainly cover topics: Introduction, compiler architecture, intermediate representations, Dataflow analysis, Control flow analysis, control-flow graphs, basic blocks, Pointer and alias analysis, Interprocedural analysis, Advanced Topics: Program Synthesis, Program Testing, & Types and Programming.

COURSE OBJECTIVES:

The objective of this course is to:

1. Explain the basic concepts of data flow analysis through a contemporary optimization.
2. Describe common properties of program analysis at an abstract level.
3. Discuss the Complexity of Iterative Data Flow Analysis.
4. Illustrate the Data Flow Analysis in GCC

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Summarize the basic concepts of data flow analysis and common properties of variables and expressions.	1,2,3,4,5	1,2,3
CO2	Apply graph properties to data flow analysis, framework, assignments, functions and equations.	1,2,3,4,5	1,2,3
CO3	Design data flow analysis algorithm in round robin and iterative methods.	1,2,3,4,5	1,2,3
CO4	Develop various data flow analysis algorithms using the concept of GCC.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	1	1							3	3	1
CO2	3	3	2	1	3							3	2	3
CO3	3	2	1	3	3							2	3	3
CO4	3	2	3	1	3							3	3	2

COURSE CONTENTS:

UNIT-1

An Introduction to Data Flow Analysis: A Motivating Example, Program Analysis: The Larger Perspective, Characteristics of Data Flow Analysis, Classical Bit Vector Data Flow Analysis: Basic Concepts and Notations, Discovering Local Data Flow Information, Discovering Global Properties of Variables, Discovering Global Properties of Expressions.

UNIT-2

Theoretical Abstractions in Data Flow Analysis: Graph Properties Relevant to Data Flow Analysis, Data Flow Framework, Data Flow Assignments, Computing Data Flow Assignments, General Data Flow Frameworks: Non-Separable Flow Functions, Discovering Properties of Variables.

UNIT-3

Complexity of Iterative Data Flow Analysis: Generic Flow Functions and Data Flow Equations, Generic Round-Robin Iterative Algorithm, Complexity of Round-Robin Iterative Algorithm

UNIT 4

An Introduction to GCC: About GCC, Building GCC, Implementing Data Flow Analysis in GCC : Specifying a Data Flow Analysis, An Example of Data Flow Analysis

SELF-LEARNING COMPONENT:

Discovering Properties of Pointers, Liveness Analysis of Heap Data, Implementing the Generic Data Flow Analyzer gdfa.

TEXT BOOKS:

1. Uday P. Khedker, AmitabhaSanyal, and BageshriKarkare, “Data Flow Analysis: Theory and Practice”, CRC Press,2009

REFERENCE BOOKS:

1. M. S. Hecht, “Flow Analysis of Computer Programs”, ElsevierNorth-Holland Inc, 1977.
2. F. Nielson, 3. R. Nielson, and C. Hankin, “ Principles of Program Analysis”, Springer-Verlag, 1998.

JOURNALS/MAGAZINES:

1. Springer Journal on Program Analysis
2. Springer Journal on Program Analysis
3. Elsevier Journal on Program Analysis

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Program Analysis
2. https://www.classcentral.com/course/ Program Analysis
3. https://nptel.ac.in/courses/106/266/106106156/

PRACTICE:

Use any of the following programming languages Java, C++, C# and Python to implement the list of following programming task and use any of the following tools to analyze the code developed by you.

SL.NO	List of Tools
1	PVS-Studio: PVS-Studio is a tool for detecting bugs and potential vulnerabilities in the source code of programs written in C, C++, C#, or Java, and is also a Static Application Security Testing (SAST) tool. It is meant to be used as part of the CI practice and allows the user to detect bugs at the earliest development stages, where they cost almost nothing to fix.
2	Kiuwan: Automatically scan your code to identify and remediate vulnerabilities. Compliant with the most stringent security standards, such as OWASP and CWE, Kiuwan Code Security covers and integrates languages with leading DevOps tools.
3	Embold: Embold is a static analysis platform that offers AI-assisted code testing that not only identifies weak code and vulnerabilities, but also suggests solutions to rectify them.
4	CodeScene Behavioral Code Analysis: CodeScene is different from the traditional code analysis tools you might have come across earlier. So follow along as we explain how you use the analysis information and how you integrate CodeScene in your organization's daily work to get the most out of the tool.
5	Visual Expert: Visual Expert is a static program analyzer, extracting design and technical information from software source code by reverse-engineering, used by programmers for software maintenance, modernization or optimization.
6	Veracode: The Veracode REST and XML APIs mirror the major steps you complete on the Veracode Platform, automating the scanning, reviewing, mitigating, and administrative tasks.
7	Fortify Static Code Analyzer: Fortify Static Code Analyzer Fortify SCA is a **static application security testing** (SAST) offering used by development groups and security professionals to analyze the source code for security vulnerabilities. It reviews code and helps developers identify, prioritize, and resolve issues with less effort and in less time.
8	Parasoft: ParasoftSOAtest is a Web API Automation tool that makes use of two services i.e. SOAP and REST to perform Functional, Regression, Unit Testing, Runtime error detection, static code analysis, service virtualization
9	Coverity: Coverity is a **proprietary static code analysis tool** from Synopsys. This product enables engineers and security teams to find and fix software defects.
10	CodeSonar: CodeSonar is a **static code analysis tool** from GrammaTech. CodeSonar is used to find and fix bugs and security vulnerabilities in source and binary code. It performs whole-program, inter-procedural analysis with abstract interpretation on C, C++, C#, Java, as well as x86 and ARM binary executable and libraries.

SL.NO	List of Programs
1	Develop a program to multiply two given matrices of any order.
2	Create a program that would simulate stack operations.
3	Create a program that would simulate Queue operations.
4	Develop a program code to create and traverse a binary search tree.
5	Create a code to sort a list of items in ascending order, use merge sort logic.
6	Program to implement linear and binary search.
7	Develop a code to solve 0-1 Knapsack Problem
8	Create a code to implement dijkstra's algorithm.
9	Develop a code to solve the N Queens problem
10	Program to find all Permutations of a given string

<table>
<tr><td>Course Title</td><td colspan="4">Blockchain Technology</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS243</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">II Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
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</table>

COURSE OVERVIEW:

This course introduces the concept of digital crypto currencies using Blockchain, which is fundamentally a public digital ledger to share information in a trustworthy and secure way. The course also discuss the concept and applications of Blockchain that have now spread from crypto currencies to various other domains, including business process management, smart contracts, IoT and so on. This includes the fundamental design and architectural primitives of Blockchain, the system and the security aspects, along with various use cases from different application domains.

COURSE OBJECTIVES:

The objective of the course is to:

1. Explain the underlying technology of transactions, blocks, proof-of-work, and consensus building
2. Discuss Hyperledger to build applications on blockchain
3. Describe the architecture of bit coins and to give the working of the bit coin
4. Illustrate the design and implementation of new ways of using blockchain technology

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Describe the usage of block chain in terms of the underlying technology	1,2,3,4,5	1,2,3
CO2	Make use of Hyperledger to build applications on blockchain	1,2,3,4,5	1,2,3
CO3	Explore working of the bit coin	1,2,3,4,5	1,2,3
CO4	Implement new ways of using blockchain for applications in various aspects	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	3							3	3	2
CO2	2	2	3	3	2							3	3	3
CO3	3	2	3	2	2							3	2	3
CO4	3	2	3	3	3							3	3	2

COURSE CONTENTS:

UNIT-1

Introduction to Blockchain: History: Digital Money to Distributed Ledgers; Design Primitives: Protocols, Security, Consensus, Permissions, Privacy; Blockchain Architecture and Design: Basic crypto primitives: Hash, Signature; Hashchain to Blockchain; Basic consensus mechanisms; Consensus: Requirements for the consensus protocols, Proof of Work (PoW), Scalability aspects of Blockchain Consensus, consensus protocols.

UNIT-2

Permissioned Blockchains: Design goals, Consensus protocols for Permissioned BlockchainsHyperledger Fabric I: Decomposing the consensus process, Hyperledger fabric components, Chaincode Design and Implementation; Hyperledger Fabric II: Beyond Chaincode: Fabric SDK and Front End Hyperledger composer tool.

UNIT-3

Use case I: Blockchain in Financial Software and Systems (FSS): Settlements, KYC, Capital markets, Insurance; Use case II: Blockchain in trade supply chain: Provenance of goods, visibility, trade supply chain finance, invoice management discounting, etc Use case III: Blockchain for Government: Digital identity, land records and other kinds of record keeping between government entities, public distribution system, social welfare systems.

UNIT-4

Blockchain Cryptography, Privacy and Security on Blockchain; Research aspects I: Scalability of Blockchain consensus protocols, Case Study of various recent works on scalability; Research aspects II: Secure cryptographic protocols on Blockchain; Case Study of Secured Multi-party Computation, Blockchain for science: making better use of the data-mining network; Case Studies: Comparing Ecosystems - Bitcoin, Hyperledger, Ethereum and more.

SELF-LEARNING COMPONENT:

Explore the architecture and design of Ethereum

TEXT BOOKS:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder “Bitcoin and Cryptocurrency Technologies” , Princeton University Press,2016
2. https://github.com/bitcoinbook/bitcoinbook

REFERENCE BOOKS:

1. "Hyperledger Fabric" - https://www.hyperledger.org/projects/fabric
2. Bob Dill, David Smits ,"Zero to Blockchain", An IBM Redbooks course, 2000

JOURNALS/MAGAZINES:

1. Springer Journal on Blockchain Technology
2. Springer Journal on Blockchain Technology
3. Elsevier Journal on Blockchain Technology

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Blockchain Technology
2. https://www.classcentral.com/course/ Blockchain Technology
3. https://nptel.ac.in/courses/106/266/106106156/
4. https://www.redbooks.ibm.com/Redbooks.nsf/RedbookAbstracts/crse0401.html
5. http://cs251crypto.stanford.edu/18au-cs251/syllabus.html

PRACTICE:

SL.NO	List of Programs
1	Remix: Develop Smart Contracts for the EthereumBlockchain. Remix is a Solidity IDE that's used to write, compile and debug Solidity code. Solidity is a high-level, contract-oriented programming language for writing smart contracts. It was influenced by popular languages such as C++, Python and JavaScript. Develop your first program that prints "Hello Blockchain" using the remix sandbox for Etherium.
2	Hyperledger Fabric is an enterprise-grade, distributed ledger framework that aims to provide two core features for Blockchain use cases – modularity and versatility. Configure your machine and development environment to run hyper ledger fabric programs and test the set up by writing a program that computes squares of input numbers.
3	The blockchain is an innovative technology that overcomes these threats and allows to decentralize sensitive operations while preserving a high level of security. It eliminates the need for trusted intermediaries. The blockchain is accessible to all network nodes and keeps track of all transactions already made. Write a program that enables a user to send a signed message to other user on blockchain.
4	All transactions are recorded on the blockchain network and rely on user verification to be fully authenticated. The transactions executed during a given period of time are recorded into files Write a program that retrieves transaction details associated with a specific block on the chain.
5	Step-by-step guide to building a smart contract on Ethereum Step #1: Introducing two parties to an Ethereum smart contract Step #2: Enabling a client to transfer money to a smart contract Step #3: Allowing a smart contract to transfer money to a tasker Step #4: Deploying your smart contract Write a program to demonstrate how to deploy a blockchain smart contract.
6	A block chain is an application of cryptographic functions, namely hash functions, to create a system where participants are discouraged from behaving "bad". Simulate a simple blockchain in python – demonstrating mining, transaction, communication between nodes.
7	Instead of having a network, a central server, and a database, *the blockchain is a network and a database all in one*. A blockchain is a peer-to-peer network of computers, called nodes, that share all the data and the code in the network. Write a program to simulate simplified steps in decentralized election process.
8	Blockchain also has other applications outside the world of cryptocurrencies, including copyright law, anti-piracy practices, and automated cash transfers. As long as distrust exists in the world, there will be a purpose for blockchain. Write a program to simulate creation your own crypto currency and demonstrate its usage in a transaction.
9	Supply chain is happening all around you. If your company somehow makes a product, or procures a product, or procures then makes a product that you then sell to a customer, you have an end-to-end supply chain that might need optimizing. Write a program to simulate agricultural supply chain from farmer to end customer.
10	Blockchain Firm is primarily aimed at resolving the current issues prevailing in the electronic commerce line of businesses. We leverage your enterprises by boosting blockchain e-commerce platforms. Our trending and innovative ideas aid you in incorporating this profitable tech into your business. Write a program to create a very basic e-commerce platform for trading.

Course Title	Robotic Process Automation				Course Type	Theory	
Course Code	M20TCS251	Credits	3		Class	II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	3	3	3			
	Practice	0	0	0	Theory	CIE	SEE
	-	0	-	-	Practical		
	Total	**3**	**3**	**3**	**39**	**50**	**50**

COURSE OVERVIEW:

Robotic Process Automation (RPA) offers many challenges for software developers and scientists. This course introduces the UiPath Robotic Process Automation concepts through UiPath Studio and UiPath Orchestrator where a student gains knowledge of how to build a bot to automate required tasks. he objectives of this course are to

COURSE OBJECTIVES:

The objectives of this course are to:

1. Discuss the concepts of Robotics Process automation
2. Describe the sequence, flowchart and control flow in automation tool
3. Demonstrate the data manipulation techniques
4. Demonstrate the usage of UI Explorer and Screen scraping

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Make use of recording features in UiPath Studio to automate the repetitive tasks.	1,2,3,4,5	1,2,3
CO2	Apply appropriate Workflow Activities in UiPath Studio to automate the complex tasks using Flowchart and Sequence.	1,2,3,4,5	1,2,3
CO3	Build data table and data manipulation techniques in UiPath Studio to automate CSV / Excel workbook applications	1,2,3,4,5	1,2,3
CO4	Design and Develop bot process using UI Explorer and Automate using Screen Scraping for applications in	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	2							3	3	3
CO2	3	2	1	3	3							3	2	3
CO3	3	3	1	2	3							3	3	2
CO4	1	3	2	3	3							3	2	3

COURSE CONTENT:

UNIT-1

What Is Robotic Process Automation: Scope and techniques of automation, Robotic process automation, About UiPath, Future of Automation. Record and Play: UiPath stack, Downloading and installing UiPath Studio, Learning UiPath Studio, Task recorder, Step-by-step examples using the recorder.

UNIT-2

Sequence. Flowchart and Control Flow: Sequencing the Workflow, Activities, Control Flow, various types of loops, and decision making, Step-by-step example using Sequence and Flowchart, Step-by-step example using Sequence and Control Flow

UNIT-3

Data Manipulation: Variables and Scope, Collections, Arguments-Purpose and use, Data table usage and examples, Clipboard management, File operation with step-by-step example, CSV/Excel to data table and vice versa with a step-by-step example

UNIT-4

Taking Control of the Controls: Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls-mouse and keyboard activities, Working with UI Explorer, Handling events, Screen Scraping, When to use OCR, Types of OCR available, How to use OCR

SELF-LEARNING COMPONENTS:

Handling User Events and Assistant Bots

TEXT BOOKS:

1. Alokmani Tripathi, “Learning Robotic Process Automation”, Packt Publishing, 2018

2.E. Turban, R. Sharda, D. Delen, David King, “Business Intelligence”, Pearson India, 2010.

REFERENCE BOOKS:

1. Marlon Dumas et. al., “Fundamentals of Business Process Management”, Springer, ebook, 2012.

2. Van der Aalst, “Process Mining: Discovery, Conformance and Enhancement of Business Processes”, Third edition, 2011.

JOURNALS/MAGAZINES:

1. Springer Journal on Robotic Process and Automation
2. Springer Journal on Robotic Process and Automation
3. Elsevier Journal on Robotic Process and Automation

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Robotic Process and Automation
2. https://www.classcentral.com/course/ Robotic Process and Automation
3. https://nptel.ac.in/courses/106/266/106106156/

Course Title	Agile software development				Course Type	Theory	
Course Code	M20TCS252	Credits	3		Class	II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	3	3	3			
	Practice	0	0	0	Theory	CIE	SEE
	-	**0**	-	-			
	Total	**3**	**3**	**3**	**39**	**50**	**50**

COURSE OVERVIEW:

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

COURSE OBJECTIVES:

The objective of this course is to:

1. Explain the basics of Agile Software Development and Software Development Rhythms.
2. Demonstrate the unique features related to traditional agile software practices.
3. Describe the core principles of a DevOps implementation and culture.
4. Discuss the enormous benefits of DevOps practices and culture.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Develop applications using traditional Agile Software practices	1,2,3,4,5	1,2,3
CO2	Outline the fundamental principles and practices of Agile Software in real world problem	1,2,3,4,5	1,2,3
CO3	Analyze the agile principles and values to a given situation.	1,2,3,4,5	1,2,3
CO4	Make use of Building Blocks of DevOps methods in real world problems.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	3	2							3	3	3
CO2	3	2	2	2	3							2	3	3
CO3	3	2	3	2	1							3	3	2
CO4	3	2	2	3	3							3	2	3

COURSE CONTENTS:

UNIT-1

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

UNIT-2

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

UNIT-3

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

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

UNIT 4

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

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

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

SELF-LEARNING COMPONENT:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Jeff Sutherland, " Scrum: A revolutionary approach to building teams, beating deadlines, and boosting productivity", Random House Business Books, 2014.
2. Mitch Lacey, "The Scrum Field Guide: Agile Advice for Your First Year", Addison Wesley, 2012.
3. Martin C. Robert, Martin Micah, "Agile Principles, Patterns, and Practices in C#", Prentice Hall, 2006.
4. Michael Huttermann, "DevOps for Developers, Integrate Development and Operations, the Agile Way", Apress Publications. 2000(https://books.google.co.in/

JOURNALS/MAGAZINES:

1. Springer Journal on Agile Software Development
2. Springer Journal on Agile Software Development
3. Elsevier Journal on Agile Software Development
4. IEEE transactions on Agile Software Development Using Scrum.
5. ACM Transactions on DevOps.

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Agile Software Development
2. https://www.classcentral.com/course/ Agile Software Development
3. https://nptel.ac.in/courses/188/255/106106156/

Course Title	Deep Learning				Course Type	Theory	
Course Code	M20TCS253	Credits	3		Class	II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	3	3	3			
	Practice	0	0	0	Theory	CIE	SEE
	-	**0**	-	-			
	Total	**3**	**3**	**3**	**39**	**50**	**50**

COURSE OVERVIEW:

This course introduces to deep learning, a branch of machine learning concerned with the development and application of modern neural networks. Deep learning algorithms extract layered high-level representations of data in a way that maximizes performance on a given task. Deep learning is behind many recent advances in AI, including Siri's speech recognition, Facebook's tag suggestions and self-driving cars.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Illustrate the use of Mathematical model for a real world application.
2. Explain learning algorithm for a real world application.
3. Demonstrate the deep learning neural network in a real world application.
4. Discuss the deep learning techniques in neural networks and natural language processing

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Apply the basic concepts of mathematics to solve problems based on deep learning concepts.	1,2,3,4,5	1,2,3
CO2	Make use of suitable machine learning algorithms on real world problems (classification, clustering).	1,2,3,4,5,8	1,2,3
CO3	Utilize deep learning neural network model on real time applications like(face recognition, speech recognition)	1,2,3,4,5,8	1,2,3
C04	Apply object detection and recognition techniques to solve real world problems.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	2	3							3	2	3
CO2	2	3	3	2	1			1				2	3	3
CO3	3	3	1	2	2			1				3	3	3
CO4	2	1	3	2	3							3	3	2

COURSE CONTENTS:

UNIT-1

Introduction: Applied math and Machine Learning Basics: Linear Algebra-Scalors, Vectors, Matrices and Tensors, Eigen Decomposition, SVD, PCA Probability and Information Theory-Probability Distribution, Conditional Probability, Chain Rule of Conditional Probability, Bayes' Rule.

UNIT-2

Numerical Computation: Overflow, Underflow, Gradient Based Optimization, Constrained Optimization, Linear Least Squares, Machine Learning Basics- Learning Algorithms, Overfitting and Underfitting, Maximum Likelihood Estimation, Supervised and Unsupervised Learning Algorithms, Building Machine Learning Algorithm, Challenges Motivating Deep Learning

UNIT-3

Deep Networks: Modern Practices-Example: Learning XOR, Gradient-Based Learning, Hidden Units, Architectural Design, Back-Propagation Algorithm.

UNIT-4

Convolutional Networks: Recurrent Neural Networks, Applications- Natural Language Processing, Recommender Systems.

SELF-LEARNING COMPONENT:

Linear factor Models, Structured probabilistic Models, Monte-Carlo Methods, Deep generativeModels.

TEXT BOOKS:

1. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville. "Deep learning." MIT Press book in preparation,2015.
2. Duda, R.O., Hart, P.E., and Stork, "Pattern Classification", Wiley-Interscience,2001.

REFERENCES:

1. Theodoridis, S. and Koutroumbas, " Pattern Recognition", Academic Press, 2008.
2. Russell, S. and Norvig, N, "Artificial Intelligence: A Modern Approach", Prentice Hall Series in Artificial Intelligence. 2003.

JOURNALS/MAGAZINES:

1. Springer Journal on Deep Learning
2. Springer Journal on Deep Learning
3. Elsevier Journal on Deep Learning
4. Springer Journal of Machine Learning.

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Deep Learning
2. https://www.classcentral.com/course/ Deep Learning
3. https://nptel.ac.in/courses/106/266/106106156/

Course Title	Cyber Security Lab				Course Type	Practice	
Course Code	M20TC0206	Credits	2		Class	II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	2	4	4	Practice	CIE	SEE
	-	**0**	-	-			
	Total	**2**	4	4	**26**	**50**	**50**

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Implement the cipher techniques	1,2,3,4,5,10	1,2,3
CO2	Develop the various security algorithms	1,2,3,4,5,9	1,2,3
CO3	Design different open source tools for network security and analysis	1,2,3,4,5,10	1,2,3
CO4	Demonstrate intrusion detection system using various open tools	1,2,3,4,5,10,11	1,2,3

Practice:

Sl. No.	List of Program
1	Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts: a) Caesar Cipher b) Playfair Cipher c) Hill Cipher d) Vigenere Cipher e) Rail fence – row & Column Transformation
2	Implement the following algorithms a) DES b) RSA Algorithm c) Diffiee-Hellman d) MD5 e) SHA-1
3	Implement the Signature Scheme - Digital Signature Standard
4	Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG)
5	Setup a honey pot and monitor the honeypot on network (KF Sensor)
6	Installation of rootkits and study about the variety of options
7	Perform wireless audit on an access point or a router and decrypt WEP and WPA. (Net Stumbler)
8	Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

COURSE ARTICULATION MATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	3	3					1		3	3	3
CO2	1	3	2	3	2				1			3	3	2
CO3	3	3	1	2	1					1		3	2	3
CO4	3	3	3	1	2					1	2	2	3	3

Course Title	Mini Project				Course Type	Practice	
Course Code	M20TC0207	Credits	2		Class	II Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	2	4	4	Practice	CIE	SEE
	-	0	-	-			
	Total	2	4	4	26	50	50

COURSE OVERVIEW:

Project survey has to be completed and problem identification for the project must be done. Students must meet the guide and discuss with due PPT presentations at least two hours per Wk. and do the necessary ground work for Phase II devoting at least 6 hours per week.

COURSE OBJECTIVE (S):

1. To create an Industrial environment and culture within the department of CSE.
2. To provide students hands on experience on, troubleshooting, maintenance, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education.
3. To promote the concept of entrepreneurship.
4. To inculcate innovative thinking and thereby preparing students for main project.

COURSE OUTCOMES (CO'S):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic.	7 to 11	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	7 to 11	1,2,3
CO3	Design solutions to the chosen project problem.	7 to 11	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	7 to 11	1,2,3

CO5	Use the appropriate techniques, resources and modern engineering tools necessary for project work.	7 to 11	1,2,3
CO6	Apply project results for sustainable development of the society.	7 to 11	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7 to 11	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	7 to 11	1,2,3
CO9	Function effectively as individual and a member in the project team.	7 to 11	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	7 to 11	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	7 to 11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√	√	√	
CO2			√	√	√	
CO3			√	√	√	
CO4			√	√	√	
CO5			√	√	√	
CO6			√	√	√	
CO7			√	√	√	
CO8			√	√	√	
CO9			√	√	√	
CO10			√	√	√	
CO11			√	√	√	

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1							3	3	3	3	3	3	3	3
CO2							3	3	3	3	3	3	3	3
CO3							3	3	3	3	3	3	3	3
CO4							3	3	3	3	3	3	3	3
CO5							3	3	3	3	3	3	3	3
CO6							3	3	3	3	3	3	3	3
CO7							3	3	3	3	3	3	3	3
CO8							3	3	3	3	3	3	3	3
CO9							3	3	3	3	3	3	3	3
CO10							3	3	3	3	3	3	3	3
CO11							3	3	3	3	3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The following are the guidelines to be followed by the students to complete their research based mini projects.

1. The students shall form groups (max 4) and select their guides based on their area of interest in their previous semester.
2. In the beginning of the current semester the students shall corner the problem by performing the literature survey (by choosing the research papers of reputed Journals) in their area of interest.
3. The students shall choose a base paper from the list of papers they would have surveyed.
4. The students shall identify the research gaps in their selected research domain, and finalize their problem statement with objectives for the research based mini project.
5. The students shall be completing the synopsis presentation (phase-1 presentation (progress)), and phase-2 presentation (implementation with demo) as per the calendar set by the concerned coordinator.
6. Finally, the students shall complete their mini projects providing innovative solutions for the selected research problem and apply for patent / copyright / paper publication in SCOPUS indexed journals / research proposals / product development / and or startups.

COURSE CONTENTS

A mini project is an assignment that student try to complete at the end of every semester, especially in engineering to strengthen the understanding of your fundamentals through effective application of theoretical concepts. There are separate credits for each mini project you complete at college although I have seen many students taking up a project out of their own interest and passion. Mini project can help you boost your skills and widen your horizon of your thinking.

Mini projects form a middle ground for all segments of electronics engineers looking to build. Students work on various mini project ideas topics to improve their skills, whereas hobbyists like the fun in meddling with technology.

Mini project is based on small scale which can benefit the society or any organization on a small scale. Students work on various mini project ideas topics to improve their skills, whereas hobbyists like the fun in meddling with technology. Mini projects form a middle ground for all segments of electronics engineers looking to build.

SAMPLE MINI PROJECTS:

Consider a mini project that includes work in most disciplines, ending in a stable executable for a 3-week iteration (any example of software/hardware project of candidate choice). Construct a disciplines across iterations diagram considering the sample disciplines i.e., Requirements, Design, Implementation and Test.

1. Make Your Own Dual-Voltage Rechargeable Torch Light Line Follower
The purpose of this circuit is to create a new topology with good power factor maintained at AC voltage input, to provide good efficiency output to the battery and to increase its life.

2. GPS On ATmega
This electronics mini project idea might be something to get your hands on. Based on ATmega 16A, this uses a GPS receiver.

3. PC Based GPS
If working with ATmega gets too much for you, we have an alternative as well. This project designs a system that connects a GPS module to a PC com port, which enables you to use the navigation on a PC.

4. Low Power Inverter
Here is a simple low power inverter that converts 12V DC into 230-250V AC. It can be used to power light loads like window chargers, night lamps, or simply give a shock to keep the intruders away.

5. LPG Leakage Detector
This mini project is for a low-cost circuit for an LPG detector that you can build easily. The next time there is a leakage, you can easily be on top of things.

II Year

Detailed Syllabus

III Semester
Syllabus

<table>
<tr><td>Course Title</td><td colspan="4">Virtual and Augmented Reality</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS311</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">III Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
<tr><td>-</td><td>0</td><td>-</td><td>-</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

This Course provides the knowledge on Virtual reality concepts, multiple modal interaction, visual-auditory-haptic, interaction inmersion and imagination, visual computation and environmental modeling; geometric behavior and physically based simulation; management of large scale environment, VR development tools, augmented reality, mixed reality, digital entertainment

COURSE OBJECTIVES:

The objectives of this course are to

1. Explain the principles and multidisciplinary features of virtual reality.
2. Illustrate the technology for multimodal user interaction and perception in VR, in particular the visual, audial and haptic interface and behavior.
3. Describe the objects using technology for managing large scale VR environment in real time.
4. Demonstrate the design of the solutions using VR system framework and development tools.

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Summarize the fundamentals of Augmented Reality and Virtual Reality.	1,2,3,4,5	1,2,3
CO2	Apply multimodal user interaction and perception techniques involved in Virtual Reality.	1,2,3,4,5	1,2,3
CO3	Design different objects using Simulation and Interactive techniques for real world applications.	1,2,3,4,5	1,2,3
CO4	Develop innovative Virtual Reality solutions for industrial and Social relevant applications..	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	3	1							3	3	3
CO2	3	3	2	1	3							3	3	2
CO3	3	2	1	3	3							3	2	3
CO4	3	1	3	2	1							2	3	3

COURSE CONTENTS: **UNIT- 1**

Introduction to Virtual Reality (VR): Fundamental Concept and Components of VR, Primary Features and Present Development on VR.

Multiple Modals of Input and Output Interface in VR: Input – Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus and 3D Scanner. Output – Visual, Auditory, Haptic Devices.

UNIT -2

Visual Computation in VR: Fundamentals of Computer Graphics; Real time rendering technology; Principles of Stereoscopic Display; Software and Hardware Technology on Stereoscopic Display.

Environment Modeling in VR: Geometric Modeling, Behavior Simulation, Physically Based Simulation

UNIT- 3

Haptic & Force Interaction in Virtual Reality: Concept of haptic interaction; Principles of touch feedback and force feedback; typical structure and principles of touch/force feedback facilities in applications. Interactive Techniques in VR: Body Track, Hand Gesture, 3D Manus, Object Grasp.

Development Tools and Frameworks in VR: Frameworks of Software Development Tools in VR, X3D Standard, Vega, MultiGen, Virtools, Unity.

UNIT- 4

Augmented Reality: System Structure of Augmented Reality; Key Technology in AR; General solution for calculating geometric & illumination consistency in the augmented environment.

Application of VR in Digital Entertainment: VR Technology in Film and TV Production, VR Technology in Physical Exercises and Games, Demonstration of Digital Entertainment by VR.

SELF-LEARNING COMPONENT:

Unity 3D, Manus VR

TEXT BOOKS:

1. Burdea, G. C. and P. Coffet, “Virtual Reality Technology”, Wiley-IEEEPress, 2003/2006.

REFERENCE BOOKS:

1. Sherman, William R. and Alan B. Craig, “Understanding Virtual Reality – Interface,Application, and Design”, Morgan Kaufmann, 2002.
2. Fei GAO, “Design and Development of Virtual Reality Application System”, TsinghuaPress, March 2012.
3. Guangran LIU, “Virtual Reality Technology”, Tsinghua Press, Jan. 2011.

JOURNALS/MAGAZINES:

1. Springer Journal on Virtual and Augmented Reality
2. Springer Journal on Virtual and Augmented Reality
3. Elsevier Journal on Virtual and Augmented Reality
4. International Journal of Virtual and Augmented Reality (IJVAR).
5. Springer, Virtual Reality.

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Virtual and Augmented Reality
2. https://www.classcentral.com/course/ Virtual and Augmented Reality
3. https://nptel.ac.in/courses/136/166/1116106156/

PRACTICE:

Sl. No.	List of Programs
1	Build a Virtual Reality application for the promotion of a tourist destination of your choice. This could be an application providing information about a particular destination, providing 360-degree pictures and videos of the location. The user should be able to navigate scene-by-scene through the destination that you have built the tour for.
2	Build an Augmented Reality application for making your syllabus topics interactive and fun to learn. This could be an application providing information about particular topics or subject.
3	Build a Virtual Reality application that allows prospective students, parents or elderly person to actually see a campus without having to physically be there.
4	Build a Virtual Reality application for athletics or the spectators by providing real-life images of what it's like to sit in certain seats during a game, to offering behind-the-scenes VR tours of pre-game and the athletics facilities, so it's easy to get people excited about the athletics.
5	Build an Augmented Reality application that can bring changes in the Education sector by enabling Augmented triggers around the Laboratory so when students scan through them, they can learn different safety procedures and protocols of the laboratory equipment.
6	Build an Augmented Reality application that makes the teachers to have augmented their field trips and added layers of learning and interaction to the day's activity.
7	Build an Augmented Reality application that uses face filters – a mask-like augmented reality that adds virtual objects to an individual's face during video call.
8	Build an Augmented Reality application that uses your mobile device's camera to visualize how virtual items like furnitures, home appliances, kitchen utensils would look and fits in any given space.
9	Build a Virtual Reality gaming application to play virtual Holi with colors by avoiding harmful chemicals and wastage of water
10	Build an Augmented Reality food menu application that displays virtual food

<table>
<tr><td>Course Title</td><td colspan="4">Computer Vision</td><td colspan="2">Course Type</td><td colspan="2">Integrated</td></tr>
<tr><td>Course Code</td><td>M20TCS312</td><td>Credits</td><td colspan="2">4</td><td colspan="2">Class</td><td colspan="2">III Semester</td></tr>
<tr><td rowspan="5">Course Structure</td><td>TLP</td><td>Credits</td><td>Contact Hours</td><td>Work Load</td><td colspan="2" rowspan="2">Total Number of ClassesPer Semester</td><td colspan="2" rowspan="2">Assessment in Weightage</td></tr>
<tr><td>Theory</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Practice</td><td>1</td><td>2</td><td>2</td><td rowspan="2">Theory</td><td rowspan="2">Practical</td><td rowspan="2">CIE</td><td rowspan="2">SEE</td></tr>
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<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>39</td><td>26</td><td>50</td><td>50</td></tr>
</table>

COURSE OVERVIEW:

The course, introduces a number of fundamental concepts in computer vision, expose students to a number of real-world applications that are important to our daily lives. More importantly, students will be guided through a series of well-designed projects such that they will get to implement using few interesting and cutting-edge computer vision algorithms. The course benefit is to apply computer vision algorithms to solve real world problems Computer Vision is one of the fastest growing and most exciting AI disciplines in today's academia and industry. This course is designed to open the doors for students who are interested in learning about the fundamental principles and important applications of computer vision.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain the fundamentals of Computer vision
2. Describe different segmentation techniques
3. Illustrate registration and classification of images.
4. Discuss the concepts of object detection in real world problem

COURSE OUTCOMES:

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

CO#	Course Outcomes	Pos	PSOs
CO1	Utilize linear filters to enhance the quality of images.	1,2,3,4,5	1,2,3
CO2	Develop Segmentation technique to solve real world problems.	1,2,3,4,5	1,2,3
CO3	Design and Develop program for registration and classification of images.	1,2,3,4,5	1,2,3
C04	Apply object detection and recognition techniques to solve real world problems.	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	3	3							3	3	2
CO2	3	2	2	2	3							3	3	3
CO3	3	2	1	3	3							2	3	3
CO4	3	2	3	3	1							3	3	2

COURSE Contents:

UNIT-1

Introduction and overview to computer vision: Introduction :What is computer vision? A brief history ,Image formation: Geometric primitives and transformations, Geometric primitives, 2D transformations ,3D transformations, 3D rotations, 3D to 2D projections, Lens distortions, Photometric image formation, Lighting, Reflectance and shading, The digital camera, Sampling and aliasing, Color, Compression,

UNIT-2

Image processing: Point operators, Linear filtering, More neighborhood operators, Fourier transforms, Pyramids and wavelets, Geometric transformations, Global optimization

Feature detection and matching , Points and patches, Feature detectors , Feature descriptors, Feature matching, Feature tracking, Edges, Edge detection, Edge linking, Application: Edge editing and enhancement, Lines, Successive approximation, Vanishing points, Hough transforms, Application: Rectangle detection

UNIT-3

Segmentation : Active contours, Snakes, Dynamic snakes and CONDENSATION, Scissors, Level Sets, Application: Contour tracking and rotoscoping, Split and merge, Watershed, Region splitting (divisive clustering), Region merging (agglomerative clustering) , Graph-based segmentation, Probabilistic aggregation, Mean shift and mode finding, Normalized cuts Graph cuts and energy-based methods .

UNIT-4

HIGH-LEVEL VISION Registration: Registering Rigid Objects, Model-based Vision: Registering Rigid Objects, Registering Deformable Objects .Learning to Classify: Classification, Error, and Loss, Major Classification Strategies, Practical Methods for Building Classifiers, Classifying Images: Building Good Image Features, Classifying Images of Single, Image Classification in Practice

Detecting Objects in Images: The Sliding Window Method, Detecting Deformable Objects, The State of the Art of Object Detection Topics in Object Recognition: What Should Object Recognition Do?

SELF-LEARNING COMPONENT:

Implementation of segmentation using different techniques and evaluation of performance between the methods. Implementation of Registration of non rigidobjects , Classification using ensemble methods, object detection in images, localization of images, image captioning

TEXT BOOKS:

1. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach", Pearson, 2012.
2. Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer,2010

REFERENCE BOOKS:

1. David Marr, Tomaso A. Poggio, Shimon Ullman "A Computational Investigation into the Human Representation and Processing of Visual Information", MIT Press Scholarship Online: August 2013 eBook - Amazon.com

JOURNALS/MAGAZINES:

1. Springer Journal on Computer Vision
2. Springer Journal on Computer Vision
3. Elsevier Journal on Computer Vision
4. International Journal of Computer Vision, Springer

SWAYAM/NPTEL/MOOCS:

1. https://onlinecourses.nptel.ac.in/ Computer Vision
2. https://www.classcentral.com/course/ Computer Vision
3. https://nptel.ac.in/courses/443/766/2346106156/

PRACTICE:

Implement the list of programs using any relevant tool like Matlab, Scilab, Octave, Python,

Sl. No.	List of Programs
1	Image processing has lot of basic operations also called as preprocessing. Preprocessing involves conversion of color images to gray images. Implement conversion of colour to gray to black and white and vice versa.
2	Image classifications needs efficient feature extraction. Basic features could be edges. Implement various edge detection algorithm.
3	Histogram equalization is a method in image processing of contrast adjustment using the image's histogram. Histogram equalization often produces unrealistic effects in photographs. Write the code for obtaining histogram, and also perform histogram equalization.
4	Filtering is a technique for modifying or enhancing an image. Implement smoothing or averaging filter in spatial domain.
5	The Canny edge detector is an edge detection operator that uses a multistage algorithm to detect a wide range of edges in images. Implement the program for edge detection algorithm
6	Segmentation of certain applications need background detection. Implement the various methods for background detection.
7	Clustering has become very popular as they are used to group things having similar attributes. There are various clustering techniques used for segmentation. Implement the following: i) The Watershed Algorithm ii) Segmentation Using K-means iii) Agglomerative Clustering with a Graph iv) Divisive Clustering with a Graph
8	Image registration involves aligning of images of the same thing taken at different time. Given two images captured at different time slots. Perform Image registration.
9	When images are being captured, there could be deformation. Implement the techniques used when there is deformation.
10	Classifiers are used to classify the given image. UCI machine learning repository is a hub of datasets related to computer vision. Using any dataset from Kaggle, Apply decision tree, SVM and random forest. Compare the performance.

Course Title	Natural Language Processing				Course Type		Integrated	
Course Code	M20TCS313	Credits	4		Class		III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester		Assessment in Weightage	
	Theory	3	3	3				
	Practice	1	2	2	Theory	Practical	CIE	SEE
	-	0	-	-				
	Total	**4**	**5**	**5**	**39**	**26**	**50**	**50**

COURSE OVERVIEW:

The intent of the course is to give introduction to Natural Language Processing (NLP, a.k.a. computational linguistics), the study of computing systems that can process, understand, or communicate in human language. The primary focus of the course will be on understanding various NLP tasks as listed in the course syllabus, algorithms for effectively solving these problems, and methods for evaluating their performance. There will be a focus on statistical algorithms to acquire the knowledge needed to perform language processing.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Explain the fundamentals of natural language processing and python
2. Discuss how to access the text corpora and Lexical Resources
3. Demonstrate the writing the structured programs to process the raw text
4. Describe role of Classifiers in Text processing.

COURSE OUTCOMES:

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

CO#	Course Outcomes	POs	PSOs
CO1	Summarize the fundamentals of natural language processing and python	1,2,3,4,5	1,2,3
CO2	Learn how to access the text corpora and Lexical Resources	1,2,3,4,5	1,2,3
CO3	Acquiring the skills for writing the structured programs to process the raw text	1,2,3,4,5	1,2,3
C04	Analyze the role of different classifiers in Text processing	1,2,3,4,5	1,2,3

BLOOM'S LEVELOF THECOURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1			√			
CO2			√			
CO3			√			
CO4			√			

COURSE ARTICULATIONMATRIX

Course Outcomes	Program Outcomes													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	1	3	2							3	3	3
CO2	2	3	3	2	2							3	2	3
CO3	3	2	3	2	3							2	3	3
CO4	3	3	2	2	3							3	2	3

COURSE CONTENTS:

UNIT-1

Language Processing and python, Accessing Text corpora and Lexical Analysis: Computing with language: Texts and words,a closer look at python: texts as list of words, computing with language: simple statistics, Automatic natural language understanding; Accessing Text Corpora, Conditional Frequency Distributions, Lexical Resources, WordNet, Introduction to NLTK Tool.

UNIT-2

Processing Raw Text: Accessing Text from the Web and from Disk, Strings: Text Processing at the Lowest Level, Text Processing with Unicode,Regular Expressions for Detecting Word Patterns, Useful Applications of Regular Expressions, Normalizing Text, Regular Expressions for Tokenizing Text, Segmentation, Formatting: From Lists to Strings,

UNIT-3

Categorizing and Tagging words: Using a Tagger, Using a Tagger, Mapping Words to Properties Using Python Dictionaries, Automatic Tagging, N-Gram Tagging, Transformation-Based Tagging, How to Determine the Category of a Word.

UNIT-4

Classifying Text: Supervised Classification: Examples, Evaluation; Decision Trees, Naive Bayes Classifiers, Maximum Entropy Classifiers, Modelling Linguistic Patterns.

SELF-LEARNING COMPONENT:

Extracting information from Text, Exploring the 20 Newsgroups with Text Analysis Algorithms, Stock Price prediction with Regression Algorithms, Best Practices: i) Data preparation stage ii)Training sets generation stage iii) Model training, evaluation and selection stage.

TEXT BOOKS:

1. Steven Bird, Ewan Klein and Edward Loper, “Natural Language Processing with Python”, OReilly Media, 2009.
2. Yuxi (Hayden) Liu, “Python Machine Learning by Example”, Packt publisher, 2017.

REFERENCES:

1. James Allen , “Natural Language Understanding”, Benjamin-Cummings Publishing Co, Inc., 1995.
2. Christopher D. Manning and Hinrich Schutze , “Foundations of Statistical Natural Language Processing”, The MIT Press, 1999.
3. Randolf Quirk, Sidney Greenbaum, Geoffrey Leech, Jan Svartvik, “A Comprehensive Grammar of English Language”, Cambridge University Press,1987.

JOURNALS/MAGAZINES:

1. Springer Journal on Natural Language Process
2. Springer Journal on Natural Language Process
3. Elsevier Journal on Natural Language Process
4. ACM Transactions on Language Processing
5. Elsevier Journal of cognitive systems research

SWAYAM/NPTEL/MOOCS:

4. https://onlinecourses.nptel.ac.in/ Natural Language Process
5. https://www.classcentral.com/course/ Natural Language Process
6. https://nptel.ac.in/courses/476/876/3323106156/

PRACTICE:

Sl. No.	List of Programs
1	NLTK is a leading platform for building Python programs to work with human language data. It provides easy-to-use interfaces to over 50 corpora and lexical resources such as WordNet, along with a suite of text processing libraries for classification, tokenization, stemming, tagging, parsing, and semantic reasoning, wrappers for industrial-strength NLP libraries, and an active discussion forum. Write a python program to extract tokens from the input sentence of English language using python NLTK toolkit.
2	An incredible amount of unstructured text data is generated every day by social media, web pages, and a variety of other sources. But without the ability to tame and harness that data, you'll be unable to glean any value from it. In this course, learn how to translate messy text data into powerful insights using Python. Instructor Derek Jedamski begins with a quick review of foundational NLP concepts, including how to clean text data and build a model on top of vectorized text. He then jumps into more complex topics such as word2vec, doc2vec, and recurrent neural networks. Develop a python program to create social network structure of LinkedIn profile using python NLTK toolkit.
3	Analysing movie reviews data and try to predict whether the review is positive or negative. Familiarity with some machine learning concepts will help to understand the code and algorithms used. Develop a program to analyze the review comments of a movie trailer to provide rating using Python NLTK Toolkit
4	Cluster is a process of grouping similar items together. Ecah group, also called as a cluster, contains items that are similar to each other. Clustering algorithms are unsupervised learning algorithms Develop a program to cluster similar text documents using Python NLP Toolkit.
5	A popular NLP application called Machine Translation . In Machine Translation, you take in a bunch of words from a language and convert these words into another language. Develop a NLP program to convert simple sentences from one language to another.
6	Sentiment Analysis is the process of 'computationally' determining whether a piece of writing is positive, negative or neutral. It's also known as **opinion mining**, deriving the opinion or attitude of a speaker. Analyse twitter sentimental data set to predict the sentiments.
7	While the voice of an individual is unique, secure authentication through voice recognition can be a challenge in some cases – for instance, if the user has a sore throat or cold. It is therefore important to prevent unauthorized users from hacking into the database by mimicking someone else's voice. Develop program to recognize speech for authentication.
8	Text summarization is the process of creating a short, accurate, and fluent summary of a longer text document. It is the process of distilling the most important information from a source text. Automatic text summarization is a common problem in machine learning and natural language processing (NLP). Automatic text summarization methods are greatly needed to address the ever-growing amount of text data available online to both better help discover relevant information and to consume relevant information faster. Perform document summarization using NLP toolkit.
9	An IVR system's effectiveness is rated by the percentage of callers who ask to speak to a live operator. The lower the percentage, the more successful the system. Of course there are some IVR systems that never give you the option of speaking to a live operator.

	Develop an IVR system for REVA University.
10	Again, for services and email clients not mentioned here, you can almost always prevent emails from getting sent to spam simply by adding the sender to your address book or contacts. If it has an option to mark as “Not Spam”, “Remove From Spam”, or something similar, you can always click that too. However, it’s generally better to add a sender Develop a program to classify mails to spam.

Course Title	Open Elective				Course Type	Theory	
Course Code	M20TC0302	Credits	4		Class	III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	4	4	4			
	Practice	0	0	0	Theory	CIE	SEE
	-	**0**	-	-			
	Total	**4**	**4**	**4**	**52**	**50**	**50**

An **Open Elective** is a powerful tool introduced in engineering syllabus which allows allows university students to study the syllabus by picking subjects, usually from another stream. Apart from that, it's a chance for students to gain skills they feel they are lacking or need to improve.

Course Title	Project Work Phase – I				Course Type	Practice	
Course Code	M20TC0303	Credits	4		Class	III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	4	4	4	Practice	CIE	SEE
	-	0	-	-			
	Total	4	4	4	52	50	50

COURSE OVERVIEW

The major project is a two semester-long practical project with the main objective that students show their ability to apply theoretical concepts learned in lectures to solve (complex) practical problems. The results are to be presented in a project report and as an oral presentation.

COURSE OBJECTIVE (S):

1. To allow students to demonstrate a wide range of the skills learned during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation.
2. To encourage multidisciplinary research through the integration learned in a number of courses.
3. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
4. To encourage teamwork.
5. To improve students' communication skills by asking them to produce both a professional report and to give an oral presentation

COURSE OUTCOMES (CO'S):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3

CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3
CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3						√
CO4				√		
CO5			√			
C06			√			
CO7		√				
CO8		√				
CO9	√			√		
CO10			√			√

CO11		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3											3	3	3
CO2		3										3	3	3
CO3			3									3	3	3
CO4				3								3	3	3
CO5					3							3	3	3
C06						3						3	3	3
CO7							3					3	3	3
CO8								3				3	3	3
CO9									3			3	3	3
CO10										3		3	3	3
CO11											3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Capstone-Project Phase-1:

- Student should carry out project work in V semester. Student must select a faculty member from department of CSE as an internal project guide based on research domain and expertise. Student may optionally also select external guide bearing domain expertise from different departments within University and Industry to carry out multidisciplinary project.
- Student must propose a project title, after consultation with guides and after carrying out a literature survey. The proposed title must be submitted in form a document (synopsis) that contains the proposed title of the project, an abstract, Introduction, Survey, Feasibility, and cost estimation to carry out the project.
- Further with the help of respective guide, each student have to the literature review based on the literature survey, identify the research gaps in the selected research/project domain, and then finalize the problem statement and objectives for the project.
- Each student shall be reviewed and evaluated in two reviews through the semester.

- Review 1 shall be on the presentation of the synopsis and justification of the title and feasibility of the project
- Review 2 shall be on the presentation on the literature survey carried out.

Finally, the Capstone-Project Phase-1 shall conclude with each project apply for idea patent or copyright and publish a survey paper in SCOPUS indexed journals, write research proposals for fundings from various governmental organizations or industries

Course Title	Internship/Global Certification				Course Type	Practice	
Course Code	M20TC0304	Credits	4		Class	III Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	o			
	Practice	4	0	0	Practice	CIE	SEE
	-	0	-	-			
	Total	4	4	4	52	50	50

Internship

COURSE OVERVIEW

An internship can present students with new skills and opportunities. Interns not only gain technical knowledge within the industry of their choice, but they also learn how to interact with professionals in a workplace setting, and develop essential soft skills like time management, organization, adaptability, problem-solving and teamwork.

COURSE OBJECTIVE (S):

1. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
2. To encourage teamwork.
3. To help students to gain exposure into industries.
4. To improve students' communication skills by asking them to produce both a professional report and to give an oral presentation

COURSE OUTCOMES (CO'S):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3

CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3						√
CO4				√		
CO5			√			
C06			√			
CO7		√				
CO8		√				
CO9	√			√		
CO10			√			√
CO11		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3

CO1	3											3	3	3
CO2		3										3	3	3
CO3			3									3	3	3
CO4				3								3	3	3
CO5					3							3	3	3
C06						3						3	3	3
CO7							3					3	3	3
CO8								3				3	3	3
CO9									3			3	3	3
CO10										3		3	3	3
CO11											3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Internship:

- The internship should be paid internship in IT industry.
- The internship should be for minimum of three months.
- The project title must be submitted in form a document (synopsis) that contains the proposed title of the project, an abstract, Introduction and their roles and responsibilities in company.
- Each student shall be reviewed and evaluated in two reviews through the semester.
- Review 1 shall be on the presentation of the synopsis.
- Review 2 shall be on the presentation on the roles and responsibilities carried out with module competion results(as applicable).

Global Certification

COURSE OVERVIEW

The Global Certification is a one semester intensive project based learning approach to cater with the Industry requirement. It prepares the students to up skill their knowledge base to compete in terms of latest technology and become competent enough to the industry requirment. In this, students will be able to solve complex real world problems pertaining to the

domain chosen and gain confidence. It is an individual course and students have to earn the certificate based on their performances in terms of project assignment and aptitude. Student have to choose two Global certification courses.

COURSE OBJECTIVE (S):

1. To allow students to learn skills of their choice required in the current Industry perspective.
2. To encourage building multidisciplinary skill set through the integration of courses learned.
3. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
4. To prepare them to face the interview as professionals by improving communication skills.

COURSE OUTCOMES (CO'S):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3
CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3						√
CO4				√		
CO5			√			
C06			√			
CO7		√				
CO8		√				
CO9	√			√		
CO10			√			√
CO11		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3											3	3	3
CO2		3										3	3	3
CO3			3									3	3	3
CO4				3								3	3	3
CO5					3							3	3	3
C06						3						3	3	3
CO7							3					3	3	3
CO8								3				3	3	3
CO9									3			3	3	3

CO10										3		3	3	3
CO11											3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Global Certification

- Student should choose two Global certifications among the available Industry ready courses to cope up with the vast changing software world.
- Student should register for the course having minimum of 39 hours of teaching and should have 100 percent attendance for all the sessions.
- Each student shall be reviewed and evaluated in two reviews through the semester.
- Review 1 shall be on the presentation of the course, assignment completed followed by viva.
- Review 2 shall be on the presentation of their overall skills learned in the course followed by their certificate verification.

IV Semester
Syllabus

Course Title	Project Work Phase – 2 and Dissertation				Course Type	Practice	
Course Code	M20TC0401	Credits	12		Class	IV Semester	
Course Structure	TLP	Credits	Contact Hours	Work Load	Total Number of ClassesPer Semester	Assessment in Weightage	
	Theory	0	0	0			
	Practice	12	12	12	Practice	CIE	SEE
	-	0	-	-			
	Total	12	12	12	208	50	50

COURSE OVERVIEW

Project Phase-2 is continuation of Project Phase-1 from semester III.

COURSE OBJECTIVE (S):

1. To allow students to demonstrate a wide range of the skills learned during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation.
2. To encourage multidisciplinary research through the integration learned in a number of courses.
3. To allow students to develop problem solving, analysis, synthesis and evaluation skills.
4. To encourage teamwork.
5. To improve students' communication skills by asking them to produce both a professional report and to give an oral presentation

COURSE OUTCOMES (CO'S):

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

CO#	Course Outcomes	POs	PSOs
CO1	Demonstrate in-depth knowledge on the project topic	1	1,2,3
CO2	Identify, analyze and formulate complex problem chosen for project work to attain substantiated conclusions.	2	1,2,3
CO3	Design solutions to the chosen project problem.	3	1,2,3
CO4	Undertake investigation of project problem to provide valid conclusions.	4	1,2,3
CO5	Use the appropriate techniques, resources, and modern engineering tools necessary for project work.	5	1,2,3

CO6	Apply project results for sustainable development of the society.	6	1,2,3
CO7	Understand the impact of project results in the context of environmental sustainability.	7	1,2,3
CO8	Understand professional and ethical responsibilities while executing the project work.	8	1,2,3
CO9	Function effectively as individual and a member in the project team.	9	1,2,3
CO10	Develop communication skills, both oral and written for preparing and presenting project report.	10	1,2,3
CO11	Demonstrate knowledge and understanding of cost and time analysis required for carrying out the project.	11	1,2,3

BLOOM'S LEVEL OF THE COURSE OUTCOMES

CO#	Bloom's Level					
	Remember (L1)	Understand (L2)	Apply (L3)	Analyze (L4)	Evaluate (L5)	Create (L6)
CO1		√				
CO2			√			
CO3						√
CO4				√		
CO5			√			
C06			√			
CO7		√				
CO8		√				
CO9	√			√		
CO10			√			√
CO11		√		√		

COURSE ARTICULATION MATRIX

CO#/ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3											3	3	3
CO2		3										3	3	3
CO3			3									3	3	3
CO4				3								3	3	3
CO5					3							3	3	3
C06						3						3	3	3
CO7							3					3	3	3
CO8								3				3	3	3
CO9									3			3	3	3
CO10										3		3	3	3
CO11											3	3	3	3

Note: 1-Low, 2-Medium, 3-High

The students are informed to follow the following instructions to complete the Project Phase-2:

- Each student shall conduct the required experiment to implement the proposed project with the consultation of respective guides.
- Each student shall be reviewed and evaluated in two reviews through the semester and finally each student shall demonstrate the completed project to a team of examiners.
- Review 1 shall be on the presentation of the methodology employed and model created.
- Review 2 shall be on the presentation on the functional project.
- Finally, the Project Phase-2 shall conclude with each project apply for patent or copyright and publish a paper in SCOPUS indexed journals.
- In Semester end examination, each student shall be evaluated, based on the course outcomes.

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

WILLINGNESS TO LEARN

SELF MOTIVATION

TEAM WORK

COMMUNICATION SKILLS AND APPLICATION OF THESE SKILLS TO REAL SCENARIOS

REQUIREMENT OF GATHERING, DESIGN AND ANALYSIS, DEVELOPMENT AND TESTING SKILLS

ANALYTICAL AND TECHNICAL SKILLS

COMPUTER SKILLS

INTERNET SEARCHING SKILLS

INFORMATION CONSOLIDATION AND PRESENTATION SKILLS

ROLE PLAY

GROUP DISCUSSION, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Commerce is efficient leaders of repute, who can deal the real time problems with a flavour of innovation. This kept in focus, the CDC has designed the training process, which will commence from second semester along with the curriculum. Special coaching in personality development, career building, English proficiency, reasoning, puzzles, leadership, and strategic management and communication skills to every student of REVA University is given with utmost care. The process involves continuous training and monitoring the students to develop their soft skills including interpersonal skills that will fetch them a job of repute in the area of his / her interest and march forward to make better career.

The University has recognized skill development and industry relationship as its very important activities. Therefore, the University-Industry Interaction and Skill Development Centre headed by a Senior Professor &Director has been established to facilitate skill related training to REVA students and other unemployed students around REVA campus. The center conducts variety of skill development programs to students to suite to their career opportunities. Through this skill development centre the students shall compulsorily complete at least two skill / certification based programs before the completion of their degree. The University has collaborations with Industries, Corporate training organizations, research institutions and Government agencies like NSDC (National Skill Development Corporation) to conduct certification programs. REVA University has been recognised as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under PradhanMantriKaushalVikasYojana.

The various skill/certification programs identified are as follows:

Big-data and Cloud Computing, Internet of Things (IOT), ORACLE, MYSQL, Advanced Java and Internals of LINUX/UNIX

Red-hat certified programs on LINUX,

Management related programs like SAP, ERP and Business Analytics

Open Source software/hardware, Software Testing

Advanced networking based CISCO / Microsoft technology.

Web designing, System administration

IBM certified programs.

The University has signed MOU's with Multi-National Companies, research institutions, and universities abroad to facilitate greater opportunities of employability, students' exchange programs for higher learning and for conducting certification programs.

Registrar
REVA University
Bengaluru - 560 064

REVA UNIVERSITY
Bengaluru, India

(School of Arts, Humanities and Social Sciences)

BA JEP

HANDBOOK

2020-23

Registrar
REVA University
Bengaluru - 560 064

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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 am 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 practise 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 of 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 Honorable 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. Benchmarked 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 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 relevance 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 overall personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Vice-Chancellor, REVA University

Message from the Director of the School

“For last year‟s words belong to last year‟s language/ And next year‟s words await another voice/ and to make an end is to make a beginning.” (T.S. Eliot) A hearty welcome to this „new beginning‟!

The School of Arts, Humanities and Social Sciences at REVA University, one of the most sought-after schools, has cut a niche for itself by building a prominent academic record. The School offers Undergraduate, Postgraduate, and Ph.D. programs to scholars from all over the world, initiating in them the continuous urge to delve into the vast arena of creative and critical thinking.

The programs of study offered in the school foster cultural, social and political understanding and enhance the creative abilities of the scholars. Here, students not only develop knowledge in their area of specialization but also acquire practical skills useful for their future careers. We are at a wonderful phase when the domain of Arts, Humanities and Social Sciences all over the world is taking very meaningful and innovative turns. With various new career opportunities and specializations coming to the forefront, young enthusiasts have the boon of limitless career choices. We, at REVA University, deem it fit to channelize the potential of the young minds towards newer horizons. With the expertise of the highly qualified and committed teaching faculty members of the School, we continuously strive to provide the best practical knowledge to our students.

This academic year, keeping in mind our trend, our goals are set very high. Focusing primarily on Research and Development, the School will initiate every scholar under our wings to take a step forward in their specialized areas by engaging in collaborative and individual research projects. Research collaboration with other prestigious organizations is also in the pipeline. Many external subject specialists from the teaching fraternity as well as industry will bring in their expertise to our scholars, providing them with current scenarios of the entire world.

I invite you to participate in the many opportunities offered by the School of Arts, Humanities and Social Sciences join our hands to strengthen our participation in the international global Humanities forum.

The curriculum caters to and has relevance to Local, Regional, National, and Global developmental needs.

Maximum number of courses are integrated with cross-cutting issues with relevant to professional ethics, gender, human values Environment & Sustainability.

With Best Wishes,

Dr. Payel Dutta Chowdhury
Director
School of Arts, Humanities and Social Sciences

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 out of the philanthropic instincts of Dr. P. Shyama Raju to engage in public welfare, quite in keeping with his support to other socially relevant charitable works, 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 Ph.D. degrees. REVA has well qualified experienced teaching faculty members of whom majority are doctorates. The faculty members are supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA‟s three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette dated 27th February, 2013. The University is empowered by UGC to award degrees in 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, central computer center, a well-planned sports facility with cricket ground, running track and variety of indoor and outdoor sports activities, and facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and support staff.

The University is presently offering 26 Post Graduate Degree programs, 34 Undergraduate Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 410 scholars pursuing research leading to Ph.D. in 19 disciplines. It has 900+ well qualified, experienced and committed faculty members of whom majority are doctorates in their respective areas and most of them are guiding students pursuing research leading to Ph.D.

The programs offered by the REVA University are well planned and designed after detailed study with emphasis on knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty members and scholars from reputed universities / institutions, experts from industries and business sectors have contributed in preparing the scheme of instruction and detailed curricula for various programs. 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 members 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 the 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 recognizes the fact that research, development and innovation are the important functions of any university and has therefore, 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. Interdisciplinary and multidisciplinary research is given the topmost 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.

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 various skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor and Dean, and supported by well experienced Trainers, Counselors and Placement Officers is one of the highlights of the university.

The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating students a 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 facilitate students to study some of the programs partly in REVA University and partly in foreign university, viz, MS 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 the faculty members 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 University 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 Defense Dr. Sathish Reddy, Scientific Advisor, Ministry of Defense, 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 the 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 awards instituted by REVA University is **„Life Time Achievement Award‟** to be awarded to successful personalities who have made a mark in their field of work. This award is presented on the occasion of the **“Founders‟ Day Celebration”** at REVA University on 6th January every year in the presence of dignitaries, faculty members and students. The first “REVA Lifetime Achievement Award” for the year 2015 has been awarded to Shri. Kiran Kumar, Chairman ISRO, followed by Shri. Shekhar Gupta, renowned Journalist for the year 2016, Dr. K J Yesudas, renowned playback singer for the year 2017. REVA has also introduced the “**REVA Award of Excellence”** in the year 2017 and the first awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA University organizes various cultural programs to promote culture, tradition, ethical and moral values to our students. During such cultural events the students are given opportunities to unfold their hidden talents and motivate them to contribute innovative ideas for the progress of the society. One of such cultural events is REVOTHSAVA 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 discussions, seminars, exhibitions and a variety of cultural events. Another important event is the 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 sphere 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 with awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes everyday for students, faculty members, administrative staff and their family members and organises yoga camps for villagers in the vicinity.

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 honours and recognitions.

SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES

The School of Arts, Humanities and Social Sciences, established in the year 2014, is one of the most sought-after Schools for Humanities programmes. At present the School offers three under-graduate programmes - B.A. in Journalism, English and Psychology; B.A. in Political Science, Economics and Journalism and B.A. in Tourism, History and Journalism and three post-graduate programmes – M.A. in English, M.A. in Journalism and Communication and M.Sc. in Psychology. The School offers programs that prepare graduates who are aware of and can interact with contemporary thought and research in their respective specializations and utilize the same in their professional lives. The graduates will also be equipped with foundation of subjects and variety of skills required to compete in the global job market. The School also facilitates research leading to Ph.D. in humanities disciplines in English, Psychology, Hindi and Kannada.

Why Arts, Humanities and Social Sciences @ REVA University?

The UG and PG programs offered by the school are designed with an extremely contemporary curriculum, where learners get a variety of choices to select electives and specializations that they desire.

In **B.A. (JEP), B.A. (PEJ) and B.A. (THJ)** programs, students can experience a contemporary curriculum in a triple major scheme. In B.A. JEP, the focus is on equipping learners with various journalistic skills as well as creating a strong foundation of Psychology. The courses in English enable them to hone their communication which is the very basis of any career that they may choose in future. The triple combination opens wider avenues of career choices and ensures that students can decipher their own specialties in each stream. The needs of employers today are very global and intersperse different areas. Journalism provides opportunities in content writing, editing, filmmaking, photography, animation, print media, advertising, public relations etc. Psychology opens new areas in mental health such as counseling, clinical psychology, criminal psychology, human resources, personnel training etc. English is rudimentary to every aspect of the media field, particularly to writing, editing, publishing, content development, communication and teaching. The opportunities provided are limitless and with the emergence of New Media various individuals and associations are making their foray into blogging, vlogging, webcasting, podcasting and digital media marketing. Internships, research projects and placement trainings are integrated with the program to make it a full-fledged one. In B.A. PEJ, the students will gain an understanding of three major core disciplines associated with humanities and social sciences - Political Science, Economics and Journalism and gather proficiency and eligibility to pursue higher studies in any of the branch of studies and also allied branches. They will also be equipped to prepare for various

competitive exams for banking sector, central and state administrative government jobs. A Bachelor‟s Degree in Political Science, Economics and Journalism can help students to gain insights in various fields like media, management and administration in the public and private sectors. Career opportunities are available in academia, banking, economic consultancy, political campaign manager, politician, political consultant, international business specialist, PR specialist, and market researcher. The programme takes amulti-disciplinary approach to enlighten the students on the integral working of the significant three core subjects of the programme. In B.A. THJ program, the students will gain an understanding of three major core disciplines associated with humanities and social sciences -Tourism, History and Journalism and gather proficiency and eligibility to pursue higher studies in any of the branch of studies and also allied branches. A Bachelor‟s Degree in Tourism, Journalism & History addresses the requirements in the key sectors like hotels, restaurants, retailing, transportation, travel agencies, tour companies, tourist attractions, leisure, recreation and sport, and cultural industries. Besides these, students can also find scope in the industry as Travel Journalist, Travel Photographer, Blogger & Vlogger Archivist, Heritage manager, Historic buildings conservation officer, Museum or gallery curator, academia and research. The forte of this program is its multi-faceted approach to prepare skilled, confident, well-groomed and diligent aspirants who are well versed in the integral workings of the Tourism & Hospitality industry.

The PG programs in English; Journalism and Communication, and M.Sc. Psychology are designed to make students ready for their future career. The focus in **M.A. English** program is to equip students with a complete knowledge of recent trends and concerns in literature and language in a global context. Emphasis is on building research skills in the learners and the courses are also exposed from that perspective. Learners are mentored and guided to take up various MOOC and other certification programs in their areas of interest. A compulsory research project is carried out by all students which is a preparation for serious research in the future. Various placement trainings in content writing, teaching pedagogy, etc. are designed within the curriculum. The **M.A. in Journalism & Communication** at REVA University is outlined with subtle observation on the contemporary advancements in the field of journalism and mass communication. The curriculum is precisely refined to promote an innovative learning platform to assimilate the fundamentals of journalism & communication aspects. Students studying this influential discipline learn the usage of the various media i.e. print, radio, television, internet, photography, visual communication, graphics and animation, content writing, technical writing, media research and so on. They gain an insight into the history and organizational structure of these media which in turn aids them in evaluating the policies of media and how they are affecting and influencing the masses. The students of this program gain a firsthand knowledge of all such skills through real-life experiences,

internships, projects, and so on. **M.Sc. Psychology** (Dual Specialization in Clinical Psychology and Organizational Psychology) program at REVA University is an extensive program which provides students an in-depth knowledge and training in the application of psychological theories and principles to the areas of Clinical and Organizational Psychology. The course for M.Sc. Psychology is well-structured in terms of academics and also combine the training and practical skills to equip for the present job market.

M.Sc. Psychology program is designed for students in such a way that it enhances their skills and competencies of an individual which is required for professional psychologists in the areas of Research, Assessment, Mental Health, Counselling, and Organizational Behavior.

USP of the Programmes Run by the School of Arts, Humanities and Social Sciences:

- Hi-tech State of the Art Media Lab and Studio with recording facility, radio room and editing room
- Well-equipped Psychology Labs
- Language Labs
- Contemporary curriculum
- Ample scope to gain practical exposure through internships. Present batch students are undergoing internships at Star Sports, Adzu Advertising, Red Advertisement, and so on.
- Academia-industry interface – expert lectures and workshops by resource persons from various industries, media houses, authors and academicians.
- Chance to participate in Vox Pops conducted by various TV Channels
- Chance to participate in various extension activities, such as, road shows, street theatre, educative programs, etc. in association with newspapers like *The Hindu* and other media houses.
- Training in event management – both in-house events and outside events, such as, International Film Festival conducted by Innovative Film City
- Training in anchoring for in-house events and outside events, such as, the Edu Expo by *The Hindu*
- Practical exposure through visits to various news channels, High Court, Press Clubs, etc.
- Certification programs, such as, Pearson Global English, Certification in Animation, Certification in Photography, etc.
- Certificate programs in foreign languages – French, German, Mandarin and Japanese
- Certification and training program for CBSE UGC NET exam
- Demo classes in teaching
- Training in placement/ employability skills integrated within the curriculum
- Complete guidance in research activities – students are trained by their mentors on presenting their research papers in conferences and seminars. They are also trained to publish their research papers in reputed journals. Many students have received “Best Paper” awards during conferences.
- Compulsory research project with complete guidance by teachers; deserving projects are published in the form of book or papers in journals.

VISION

To promote excellence in advancement of Arts, Humanities and Social Sciences disciplines, professions, and services through education, research, innovation, extension and collaboration.

MISSION

- Impart quality education to meet the needs of profession and society, and achieve excellence in teaching-learning and research in the area of communication, Journalism and Psychology through student-centric learning, interdisciplinary approach and innovative pedagogies;

- Attract and develop talented and committed human resource, and provide an environment conducive to research, innovation, creativity, and team-spirit;

- To establish collaborations, promote industry-university partnership, encourage entrepreneurship, and involve in community development services;

- Develop excellent infrastructural facilities, facilitate effective interaction among faculty and students with other schools, and foster networking with alumni, industries, institutions and other stake-holders; and

- To practice and promote high standards of professional ethics, enrich personality traits, promote patriotism and moral values.

ADVISORY BOARD

Board of Studies Members

Sl. No.	Name, Designation & Affiliation	Status	Address of Correspondence
1	**Dr. Payel Dutta Chowdhury** Director	**Chair Person**	School of Arts, Humanities and Social Sciences, Rukmini Knowledge Park, Yelahanka, Bangalore-560 064
2	**Dr. Sapna** Assoc.Professor	**Member**	Dr. Sapna, Assoc.Professor, DOS in Journalism & Communication, University of Mysore, Karnataka
3	**Dr. Nandini Lakshmikantha** Assoc.Professor	**Member**	Manipal University, Manipal, Karnataka
4	**Mr. Ravindra Sathwick,** Line Producer	**Invited Member**	Star Sports, Bangalore, Karnataka
5	**Ms. Nidhi Krishnan** Independent Market Research Consultant & Former Associate Director	**Invited Member**	Bangalore, Karnataka
6	**Dr G VenkateshKumar,** Professor	**Member**	DOS in Psychology, University of Mysore, Karnataka
7	**Dr Ashok H S,** Retired Professor,	**Member**	Bangalore University, Bangalore, Karnataka
8	**Dr Triveni,** Professor	**Invited Member**	Dept. of Psychology, Karnataka University, Dharwad, Karnataka
10	**Dr HemanthaKumara V**, Asst. Professor (Psychology)	**Member (Internal)**	School of Arts and Humanities, Rukmini Knowledge Park, Yelahanka, Bangalore-560 064
11	**Dr. Prathibha MV**, Asst. Professor (Psychology)	**Member (Internal)**	School of Arts and Humanities, Rukmini Knowledge Park, Yelahanka, Bangalore-560 064
12	**Mr. Manjunatha M,** Asst. Professor (Media)	**Member (Internal)**	School of Arts and Humanities, Rukmini Knowledge Park, Yelahanka, Bangalore-560 064
13	**Ms. Sudeshna Das** Asst. Professor (Media)	**Member (Internal)**	School of Arts and Humanities, Rukmini Knowledge Park, Yelahanka,Bangalore-560 064
14	**Mr. Manoj B A** Asst. Professor(Media)	**Member (Internal)**	School of Arts and Humanities, Rukmini Knowledge Park, Yelahanka,Bangalore-560 064
15	**Dr. Abhisarika** Asst. Professor (English)	**Member (Internal)**	School of Arts and Humanities, Rukmini Knowledge Park, Yelahanka,Bangalore-560 064
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REVA University Academic Regulations

Bachelor Degree (3 years) Programs

(Applicable for the programs offered from 2020-21 Batch)

(Framed as per the provisions under Section 35 (ii), Section 7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

1. Title and Commencement:

1.1 These Regulations shall be called **"REVA University Academic Regulations – Bachelor Degree Programs 2020-21 Batch subject to amendments from time to time by the Academic Council on recommendation of respective Board of Studies and approval of Board of Management**

1.2 These Regulations shall come into force from the date of assent of the Chancellor.

2. The Programs:

These regulations cover the following Bachelor Degree Programs of REVA University offered during 2020-21:

B Com (Industry Integrated)
B Com (Honors)
BBA (Industry Integrated)
BBA (Honors)
BBA (Entrepreneurship)
BA - Journalism, English, Psychology
BA - Tourism, History & Journalism
BA - Political Science, Economics & Journalism
BA - Performing Arts, English Psychology
BCA
BSc (Honours) Cloud Computing & Big Data
BSc in Physics, Chemistry, Maths
BSc in Maths, Statistics, Comp Sci.
BSc in Bioinformatics Biology, Maths, Computer Science
BSc in Biotechnology, Biochemistry, Genetics
BSc in Medical Lab Technology
BSc in Physics, Maths, Computer Science

3. Duration and Medium of Instructions:

3.1 **Duration:** The Bachelor Degree program is of 6 Semesters duration. A candidate can avail a maximum of 12 semesters - 6 years as per double duration norm, in one stretch to complete the Bachelor Degree, including blank semesters, if any. Whenever a candidate opts for blank semester, s/he has to study the prevailing courses offered by the School when s/he resumes his/her studies.

3.2 The medium of instruction shall be English.

4. Definitions:

4.1 **Course: "Course" means a subject, either theory or practical or both, listed under a program;** Example: "Business Research Methodology" in BBA (Honors) program, "Auditing and Corporate Governance" in B Com (Industry Integrated) program are examples of courses to be studied under respective programs.

Every course offered will have three components associated with the teaching-learning process of the course, namely:

L	**Lecture**
T	**Tutorial**
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 / Project Based Learning or Course end Project/Self Study/ Online courses from listed portals that equip students to acquire the much required skill component.

4.2 Classification of Courses

Courses offered are classified as: Foundation Courses, Core Courses, Hard Core Courses, Soft Core Courses, Open Elective Courses, Project work/Dissertation

4.2.1 **Foundation Course:** The foundation Course is a mandatory course which should be completed successfully as a part of graduate degree program irrespective of the program of study

4.2.2 **Core Course:** A course which should compulsorily be studied by a candidate choosing a particular program of study

4.2.3 **Hard Core Course (HC) simply core course:** 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

4.2.4 Soft Core Course (SC) (also known as Professional Elective Course)

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

4.2.5 Open Elective Course (OE):

An elective course chosen generally from other discipline / subject, with an intention to seek exposure to the basics of subjects other than the main discipline the student is studying is called an **Open Elective Course**

4.2.6 Project Work / Dissertation:

School can offer project work/dissertation as a course. Depending on the duration required for completing the project/dissertation work, credits can be assigned. Normally 26 hours of practical work/project work/dissertation work is considered to be equivalent to a credit. School can classify project as a minor or a major project depending on the credits allotted. Normally, a minor project carries 4-6 credits and a major project carries double the number of credits of a minor project.

4.2.7 **"Program"** means the academic program leading to a Degree, Post Graduate Degree, Post Graduate Diploma or such other degrees instituted and introduced in REVA University.

5. Eligibility for Admission:

5.1. The eligibility criteria for admission to **Three Years Bachelor Degree** Programs (6 Semesters) is given below:

Sl. No.	Program	Duration	Eligibility
1	Bachelor of Commerce (Industry Integrated)	6 Semesters (3 years)	Pass in PUC/10+2 with minimum 50% marks of any recognized Board / Council or any other qualification recognized as equivalent there to.
2	Bachelor of Commerce (Honours)		Pass in PUC/10+2 with minimum 75% marks of any recognized Board / Council or any other qualification recognized as equivalent there to.

3	Bachelor of Business Administration (Industry Integrated)	6 Semesters (3 years)	Pass in PUC/10+2 with minimum 50% marks of any recognized Board / Council or any other qualification recognized as equivalent there to.
4	Bachelor of Business Administration (Honours)	6 Semesters (3 years)	Pass in PUC/10+2 with minimum 75% marks of any recognized Board / Council or any other qualification recognized as equivalent there to.
5	Bachelor of Business Administration (Entrepreneurship)	6 Semesters (3 years)	
6	**Bachelor of Arts in** a) Journalism, English & Psychology (JEP) b) Political Science, Economics, Journalism (PEJ) c) Tourism, Journalism & History (TJH)	6 Semesters (3 years)	Pass in PUC /10+2 of any recognized Board / Council or any other qualification recognized as equivalent there to.
7	Bachelor of Arts in Performing Arts, English & Psychology	6 Semesters (3 years)	
8	Bachelor of Computer Applications	6 Semesters (3 years)	Pass in PUC/10+2 with at least 45% marks (40% in case of candidate belonging to SC/ST category) of any recognized Board/Council of any other qualification recognized as equivalent there to.
9	Bachelor of Science (Hons.) in Computer Science (with specialization in Cloud Computing & Big Data)	6 Semesters (3 years)	Pass in PUC/10+2 examination with Mathematics / Computer Science / Statistics as compulsory subject along with other subjects and obtained minimum 45% marks (40% in case of candidates belonging to SC/ST category) in the above subjects taken together from any Board recognized by the respective State Government /Central Government/Union Territories or any other qualification recognized as equivalent thereto.
10	**B Sc in** a) Physics, Chemistry and Mathematics (PCM) b) Mathematics, Statistics and Computer Science (MStCs) c) Physics, Mathematics and Computer Science (PMCs)	6 Semesters (3 years)	Pass in PUC/10+2 with Mathematics as compulsory subjects and at least 45% marks (40% in case of candidate belonging to SC/ST category) of any recognized Board/Council or any other qualification recognized as equivalent there to.
11	**B Sc in** a) Bioinformatics – Biology, Computer Science &	6 Semesters (3 years)	Pass in PUC/10+2 with Biology as compulsory subject and at least 45% marks (40% in case of candidate belonging to SC/ST

	Mathematics (BCsM) b) Biotechnology, Biochemistry, Genetics c) Medical Laboratory Technology (BMLT)		category) of any recognized Board/Council or any other qualification recognized as equivalent there to.

5.2 Provided further that the eligibility criteria are subject to revision by the Government Statutory Bodies, University from time to time.

6. Courses of Study and Credits

6.1 Each course of study is assigned with certain credit value

6.2 Each semester is for a total duration of 20 weeks out of which 16 weeks dedicated for teaching and learning and the remaining 4 weeks for IAs and final examination, evaluation and announcement of results.

6.3 The credit hours defined as below

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.

1 credit = 13 credit hours spread over 16 weeks or spread over the semester

The total duration of a semester is 20 weeks inclusive of semester-end examination.

For Example: The following table describes credit pattern

Table -2: Credit Pattern

Lectures (L)	Tutorials (T)	Practice (P)	Credits (L:T:P)	Total Credits	Total Contact Hours
4	2	0	4:1:0	5	6
3	2	0	3:1:0	4	5
3	0	2	3:0:1	4	5
2	2	2	2:1:1	4	6
0	0	6	0:0:3	3	6
4	0	0	4:0:0	4	4
2	0	0	2:0:0	2	2

a. The concerned BoS will choose the convenient Credit Pattern for every course based on size and nature of the course

7. Different C**ourses of Study**:

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

a. Foundation Course (FC)
b. Core Course (CC)
c. Hard Core Course (HC)
d. Soft Core Course (SC)
e. Open Elective Course (OE)
f. Project Work / Dissertation: School can offer project work/dissertation as a course. Depending on the duration required for completing the project/dissertation work, credits can be assigned. Normally 26 hours of practical work/project work/dissertation work is considered to be equivalent to a credit. School can classify project as a minor or a major project depending on the credits allotted. Normally, a minor project carries 4-6 credits and a major project carries double the number of credits of a minor project.

These are defined under Section 4 of these regulations.

8. Credits and Credit Distribution

Registered candidates are required to earn the credits stated in the below table for the award of degree in the respective program:

Credits	Programs
120	**B.Com (Industry Integrated) degree, BBA (Industry Integrated) degree, and BCA**
140	**B.Com (Honors), BBA (Honors), BBA (Entrepreneurship) and B Sc (Honors)**
144	**BA - Journalism, English, Psychology, BA - Tourism, History & Journalism, BA - Political Science, Economics & Journalism, BA - Performing Arts, English Psychology, BSc in Physics, Chemistry, Maths, BSc in Maths, Statistics, Comp Sci., BSc in Bioinformatics Biology, Maths, Computer Science, BSc in Biotechnology, Biochemistry, Genetics, BSc in Medical Lab Technology, and BSc in Physics, Maths, Computer Science**

The following courses are foundation courses and they are mandatory courses. Students registering for any of the programs mentioned in the table above are required to successfully complete the courses for the award of the degree.

1. Communicative English

2. Languages K / H / Additional English
3. Indian Constitution
4. Human Rights

8.2. The concerned BoS 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 and classify the courses as **Foundation Course (FC), Hard Core (HC), Soft Core (SC) and Open Elective (OE).**

8.3. The concerned BoS shall specify the desired Program Educational Objectives, Program Outcomes, Program Specific Outcomes and Course Outcomes while preparing the curriculum of a particular program.

8.4. A candidate can enrol during each semester for credits as prescribed in the scheme of the program.

8.5 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 prescribed number of credits for the award of the degree for three year program 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.

8.6 Add on Proficiency Diploma / Minor degree/ Honor Degree:

To acquire Add on Proficiency Diploma/ Minor degree/ Honor Degree:, a candidate can opt to complete a minimum of 18-20 extra credits either in the same discipline /subject or in different discipline / subject in excess to prescribed number of credits for the award of 3 year degree in the registered program.

The Add on Proficiency Certification / Diploma/ Minor degree/ Honor Degree: so issued to the candidate contains the courses studied and grades earned.

9 Assessment and Evaluation

9.1 The Scheme of Assessment will have two parts, namely;

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

9.2 Assessment and Evaluation of each Course shall be for 100 marks. The Internal Assessment (IA) and Semester End Examination (SEE) of for 3 year programs shall carry 50:50 marks respectively (i.e., 50 marks internal assessment; 50 marks semester end examination).

9.3 The 50 marks of internal assessment shall comprise:

Internal Test	30 marks
Assignments / Seminars / Quizzes / Presentations / Case Studies etc.	20 marks

9.4 There shall be **two Internal Tests** conducted as per the schedule announced below. **The Students" shall attend both the Tests compulsorily.**

- 1st test is conducted for 15 marks during **8th week** of the Semester;
- 2nd test is conducted for 15 marks during **16th week** of the of the Semester;
- Suitable number of Assignments/quizzes/presentations are set to assess the remaining 20 marks of IA at appropriate times during the semester

9.5 The coverage of syllabus for the said tests shall be as under:

- Question paper of the **1st test should be based on first 50% of the total syllabus**;
- Question paper of the **2nd test should be based on second 50% of the total syllabus**;

9.6 The Semester End Examination for 50 marks shall be held in the 18th and 19th week of the beginning of the semester and the syllabus for the semester end examination shall be entire syllabus.

9.7 A test paper is set for a maximum of 30 marks to be answered as per the pre-set time duration (1 hr / 1 hr 15 minutes / 1 hr 30 minutes). Test paper must be designed with School faculty members agreed pattern and students are assessed as per the instructions provided in the question paper. Questions must be set using Bloom"s verbs. The questions must be set to assess the students outcomes described in the course document.

9.8 The question papers for internal test shall be set by the internal teachers who have taught the course. If the course is taught by more than one teacher all the teachers together shall devise a

common question paper(s). However, these question papers shall be scrutinized by School specific Question Paper Scrutiny Committee formed by the respective School Head /Director to bring in the uniformity in the question paper pattern and as well to maintain the necessary standards.

9.9 The evaluation of the answer scripts shall be done by the internal teachers who have taught the course and set the test paper.

9.10 Assignment/seminar/Project based learning/simulation based problem solving/field work should be set in such a way, students be able to apply the concepts learnt to a real life situation and students should be able to do some amount self-study and creative thinking. While setting assignment care should be taken such that the students will not be able to plagiarise the answer from web or any other resources. An assignment / Quiz or combination thereof can be set for a maximum of 20 marks. Course instructor at his/her discretion can design the questions as a small group exercise or individual exercise. This should encourage collaborative learning and team learning and also self-study.

9.11 Internal assessment marks must be decided well before the commencement of Semester End examinations

9.12 Semester End Examination: The Semester End Examination is for 50 marks shall be held in the 18^{th} and 19^{th} week of the semester and the entire course syllabus must be covered while setting the question paper.

9.13 Semester End Examination paper is set for a maximum of 100 marks to be answered in 3 hours duration. Each main question be set for a maximum of 25 marks, main questions can have 3-4 sub questions. A total of 8 questions are set so that students will have a choice. Each question is set using Bloom‟s verbs. The questions must be set to assess the students outcomes described in the course document. (Please note question papers have to be set to test the course outcomes)

9.14 There shall be three sets of question papers for the semester end examination of which one set along with scheme of examination shall be set by the external examiners and two sets along with scheme of examination shall be set by the internal examiners. All the three sets shall be scrutinized by the Board of Examiners. It shall be responsibility of the Board of Examiners particularly Chairman of the BOE to maintain the quality and standard of the question papers and as well the coverage of the entire syllabus of the course.

9.15 There shall be single evaluation by the internal teachers who have taught the subject. However, there shall be moderation by the external examiner. In such cases where sufficient number of external examiners are not available to serve as moderators internal senior faculty member shall be appointed as moderators.

9.16 Board of Examiners, question paper setters and any member of the staff connected with the examination are required to maintain integrity of the examination system and the quality of the question papers.

9.17 There shall also be an **Program Assessment Committee (PAC)** comprising at-least 3 faculty members having subject expertise who shall after completion of examination process and declaration of results review the results sheets, assess the performance level of the students, measure the attainment of course outcomes, program outcomes and assess whether the program educational objectives are achieved and report to the Director of the School. **Program Assessment Committee (PAC)** shall also review the question papers of both Internal Tests as well Semester End Examinations and submit reports to the Director of the respective School about the scope of the curriculum covered and quality of the questions.

9.18 The report provided by the **Program Assessment Committee (PAC)** shall be the input to the Board of Studies to review and revise the scheme of instruction and curriculum of respective program

9.19 During unforeseen situation like the Covid-19, the tests and examination schedules, pattern of question papers and weightage distribution may be designed as per the convenience and suggestions of the board of examiners in consultation with COE and VC

9.20 University may decide to use available modern technologies for writing the tests and SEE by the students instead of traditional pen and paper

9.21 Any deviations required to the above guidelines can be made with the written consent of the Vice Chancellor

9.22 Online courses may be offered as per BACHELOR norms.
For online course assessment guidelines would be as follows:

1. If the assessment is done by the course provider, then the School can accept the marks awarded by the course provider and assign the grade as per REVA University norms.

2. If the assessment is not done by the course provider then the assessment is organized by the concerned school and the procedure explained in the regulation will apply

3. In case a student fails in an online course, s/he may be allowed to repeat the course and earn the required credits

IAs for online courses could be avoided and will remain at the discretion of the School.

9.23 The online platforms identified could be SWAYAM, NPTEL, Coursera, Edx.org, Udemy, Udacity and any other internationally recognized platforms like MIT online, Harvard online etc.

9.24 Utilization of one or two credit online courses would be:

4 week online course – 1 credit – 15 hours
8 week online course / MOOC – 2 credits – 30 hours
12 week online course / MOOC – 3 credits – 45 hours

9.25 **Summary of Internal Assessment, Semester End Examination and Evaluation** Schedule is provided in the table given below.

Summary of Internal Assessment and Evaluation Schedule

S. No	Type of Assessment	when	Syllabus Covered	Max Marks	Reduced to	Date by which the process must be completed
1	Test-1	During 8th week	First 50%	30	15	8th week
2	Assignment / quiz / presentation / any other assessment method as decided by the School	On or before 8th week (10 marks)				
3	Test -2	During 16th Week	Second 50%	30	15	16th Week
4	Assignment / quiz / presentation / any other assessment method as decided by the School	On or before 16th Week (10 marks)				
5	SEE	19/20th Week	100%	100	50	20th Week

Note: 1. Examination and Evaluation shall take place concurrently and Final Grades shall be announced as per the notification from COE.

2. 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 Controller of Examination who will notify the same immediately

10 Assessment of Students Performance in Practical Courses

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.

10.1 The 50 marks meant for Internal Assessment (IA) of the performance in carrying out Practical shall further be allocated as under:

i	Conduction of regular practical / experiments throughout the semester	20 marks
ii	Maintenance of lab records	10 marks
iii	Performance of mid-term test (to be conducted while conducting second test for theory courses); the performance assessments of the mid-term test includes performance in the conduction of experiment and write up about the experiment.	20 marks
	Total	**50 marks**

10.2 The 50 marks meant for Semester End Examination (SEE), shall be allocated as under:

i	Conducting 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**

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

10.3 For MOOC and Online Courses assessment shall be decided by the BOS of the School.

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

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

Component – I	Periodic Progress and Progress Reports (25%)
Component – II	Demonstration and Presentation of work (25%)
Component – III	Evaluation of Report (50%)

All assessments must be done by the respective Schools as per the guidelines issued by the

Controller of Examinations. However, the responsibility of announcing final examination results and issuing official transcripts to the students lies with the office of the Controller of Examinations.

12. Requirements to Pass a Course:

A candidate"s performance from IA and SEE will be in terms of scores, and the sum of IA and SEE scores will be for a maximum of 100 marks (IA = 50 , SEE = 50) and have to secure a minimum of 40% to declare pass in the course. However, a candidate has to secure a minimum of 25% (13 marks) in Semester End Examination (SEE) which is compulsory.

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

Marks, P	**Grade, G**	**Grade Point (GP=V x G)**	**Letter Grade**
90-100	10	v*10	O
80-89	9	v*9	A+
70-79	8	v*8	A
60-69	7	v*7	B+
55-59	6	v*6	B
50-54	5.5	v*5.5	C+
40-49	5	v*5	C
0-39	0	v*0	F
ABSENT			AB

O - Outstanding; A+-Excellent; A-Very Good; B+-Good; B-Above Average; C+-Average; C-Satisfactory; F – Unsatisfactory.

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

a. Computation of SGPA and CGPA

The Following examples describe computation of Semester Grade Point Average (SGPA).

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e : **SGPA (Si) = ∑(Ci x Gi) / ∑Ci** where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

Examples on how SGPA and CGPA are computed

Example No. 1

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	3	A+	9	3X9=27
Course 2	3	A	8	3X8=24
Course 3	3	B+	7	3X7=21
Course 4	4	O	10	4X10=40
Course 5	1	C	5	1X5=5
Course 6	2	B	6	2X6=12
	16			129

Thus, **SGPA = 129 ÷ 16 = 8.06**

Example No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
	20			141

Thus, **SGPA = 141 ÷ 20 = 7.05**

b. Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits for the respective programs are calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e : **CGPA = ∑(Ci x Si) / ∑Ci**

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

Example:

CGPA after Final Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	20	6.83	20 x 6.83 = 136.6
2	19	7.29	19 x 7.29 = 138.51
3	21	8.11	21 x 8.11 = 170.31
4	20	7.40	20 x 7.40 = 148.00
5	22	8.29	22 x 8.29 = 182.38
6	18	8.58	18 x 8.58 = 154.44
Cumulative	**120**		**930.24**

Thus, **CGPA** = 930.24/120 = 7.75

c. Conversion of grades into percentage:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Example: CGPA Earned 7.75 x 10=77.5

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

13. 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	C	Satisfactory	Pass
< 4 CGPA	0	F	Unsatisfactory	Unsuccessful

Overall percentage=10*CGPA

a. **Provisional Grade Card**: The tentative / provisional grade card will be issued by the

Controller of Examinations 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 three year Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Controller of Examinations.

14. Attendance Requirement:

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

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

14.3 Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc., during a semester shall not be permitted to appear to the end semester examination and such student shall seek re-admission

15. Re-Registration and Re-Admission:

15.1 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 semester end examination and S/he shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

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

16. Absence during Internal Test:

In case a student has been absent from an internal tests due to the illness or other contingencies s/he may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Director of the School, for conducting a separate internal test. The Director of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher,

and arrange to conduct a special internal test for such candidate(s) well in advance before the Semester End Examination of that respective semester. Under no circumstances internal tests shall be held / assignments are accepted after Semester End Examination.

17. Provision for Appeal

If a candidate is not satisfied with the evaluation of Internal Assessment components (Internal Tests and Assignments), s/he can approach the Grievance Cell with the written submission together with all facts, the assignments, and test papers, which were evaluated. S/he can do so before the commencement of respective semester-end examination. The Grievance Cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the University on the candidate if his/her submission is found to be baseless and unduly motivated. This Cell may recommend for taking disciplinary/corrective action on an evaluator if s/he is found guilty. The decision taken by the Grievance committee is final.

18. Grievance Committee:

In case of students having any grievances regarding the conduct of examination, evaluation and announcement of results, such students can approach Grievance Committee for redressal of grievances. Grievance committees will be formed by CoE in consultation with VC.

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

- The Controller of Examinations - 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.

19. Eligibility to Appear for Semester End Examination (SEE)

Only those students who fulfil a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc., as part of the program shall be eligible to appear for Semester End Examination

20. Provision for Supplementary Examination

In case a candidate fails to secure a minimum of 25% (13 marks) in Semester End Examination (SEE) and a minimum of 40% marks together with IA and SEE to declare pass in the course, such candidate shall seek supplementary examination of only such course(s) wherein his / her performance is declared unsuccessful. The supplementary examinations are conducted after the announcement of even semester examination results. The candidate who is unsuccessful in a given course(s) shall appear for supplementary examination of odd and even semester course(s) to seek for improvement of the performance.

21. 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, s/he shall have to clear all courses of all semesters within the double duration, i.e., with six years of admission of the first semester failing which the student has to re-register to the entire program.

22. Challenge Valuation:

a. A student who desires to apply for challenge valuation shall obtain a photo copy of the answer script(s) of semester end examination by paying the prescribed fee within 10 days after the announcement of the results. S/he 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 Controller of Examinations within 10 days after the announcement of the results. This challenge valuation is only for semester end examination.

b. The answer scripts (in whatever form) 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.

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

Program Overview

Humanities deal with human life and human experience qualitatively. Humanities investigates how do human beings behave? Why do they behave this way? How do human beings interact with each other? How do human beings interpret the world around them? And what kind of political, social and cultural institutions do they form?

The field of humanities include Modern languages, Classical languages, Linguistics, Literature, History, Jurisprudence, Philosophy, Archaeology, Comparative religion, Ethics, History, criticism and theory of the arts, Journalism, Psychology, Political science and such subject areas.

Bachelor of Arts programme in Journalism, English and Psychology is a triple major programme, offered by School of Arts and Humanities at REVA UNIVERSITY. It intends to develop English language skills, Journalism as a profession and application of Psychology knowledge in dealing with the life issues amongst its students.

Journalism is all about collecting information and disseminating the facts and figures to the public via print, television and Internet. Journalists present the news in a manner that is useful, informative and thought provoking. Journalism careers include reporter, feature writer, intern, sub editor, designer, proof reader, newsreader, news presenter, news analyst, news editor, editor and many such.

English Literature and Language is offered as a subject to empower communication skills to polish the aspects of English language through the study of literature that enable the candidate to explore their critical and creative faculties. The subject ranging from British, American, European and Non-European literature to Literature from India and Theory and Criticism, provide the learner a vast saga of various Sociopolitical contexts and issues of local and global concerns that propels the student to enterprise in their chosen literary or non-literary endeavors with a better idea of the relevance of human values and to locate an ethical environment in day today professional and personal life. A comprehensive study of English literature instills human concerns, triggers a zeal for innovative ideas and enhances cognitive skills that refines the theory of mind.

Psychology is the scientific approach to understand human and animal behavior and applying the knowledge to solve day to day problems. General psychology is offered to orient the students to the general concepts of human behavior in the first year. Socialpsycholgy aims to better understanding of social behaviors and factors the influences it. Child development focuses on various developmental milestones of early years of life. To bring in research interest among the students‟, research is introduced as mandatory paper with research project. To equip the students for higher education the specialization papers such as Abnormal Psychology, Health Psychology

and Industrial Psychology is offered. The course aims at Self-development and Psychological wellbeing of students across their journey.

The language skills and understanding psychology of people helps a Journalist to gain expertise in his/her profession.

As per the data available with the Government, a total of 1, 05,443 newspapers/periodicals are registered with the Registrar of Newspapers for India as on 31st March, 2015. There are more than 120 TV News channels and in addition there are huge opportunities to write blogs and news on internet. There are thousands of opportunities in corporate sector for compiling corporate news and publication. The media and entertainment sector is expected to cross Rs. 2 trillion by 2020 at a CAGR of 11.6%.

In this context, an undergraduate University Programme offered by **REVA UNIVERSITY** in Journalism, English and Psychology is relevant to meet the future human resources requirement of News and Media enterprises.

The programme focusses on Journalism, media studies, psychology, critical theory, English language and literature, in addition to various transferable skills particularly writing skills that are required for successful career development in Journalism.

Program Educational Objectives:

After few years of graduation, the graduates of B.A. (Journalism, English, Psychology) will be able to:

PEO-1: Step into Higher Education and take up research in Universities at national and global level.

PEO-2: Become a team member in Public, Private, Corporate and Government Sector as techno managers, academicians, administrator or entrepreneurs, investigative agencies with efficient Communication and ethics.

PEO-3: Set up own enterprise and communicate with customers proficiently and adapt life skills for enhancing Business.

Program Specific Outcomes

On successful completion of the program, the graduates of B.A. (Journalism, English, Psychology) will be able to:

PSO – 1: Demonstrate the knowledge in Journalism, English and Psychology.

PSO - 2: Analyze and apply skills in Journalism with effective communication by understanding the psychology of the people.

PSO - 3: Use different techniques to gather information in Journalism and report effectively.

Program Outcomes

After successful completion of the program, the graduates the graduates of B.A. (Journalism, English, Psychology) will be able to:

- **PO 1: Disciplinary knowledge**: Demonstrate comprehensive knowledge and in understanding Journalism, English and Psychology study.
- **PO 2: Reasoning**: Analyze, interpret and draw conclusions from evidence and experiences from an open-minded and reasoned perspective.
- **PO 3: Problem solving**: Extrapolate and apply their competencies to solve different kinds of non-familiar problems and apply one‟s learning to real life situations using curriculum content knowledge.
- **PO 4: Environment and Sustainability**: Understand the issues of environmental contexts and **sustainable development**.
- **PO 5: Research-related skills**: Be inquisitive with a sense of inquiry and capability for asking relevant/appropriate questions, and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
- **PO 6: Ethics**: Recognize different value systems including your own, understand the **moral dimensions** of your decisions, and accept responsibility for them.
- **PO 7: Cooperation/Team work**: 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**: Express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one‟s views and express herself/himself; 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.

BA (Journalism, English, Psychology – JEP) Program
Scheme of Instructions

(Effective from 2020-2023)

Sl. No	Course Code	Title of the Course	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	Credits	
FIRST SEMESTER								
1	B20BJ1010	Environmental Science	FC	Noncredit compulsory course				2
2	B20BJ1020	Communicative English – I	CC	2	1	0	3	4
3	B20BJ1031	Language – I Kannada	CC	2	1	0	3	4
	B20BJ1032	Language – I: Hindi	CC	2	1	0	3	4
	B20BJ1033	Language – I: Additional English	CC	2	1	0	3	4
4	B20BJ1040	Journalism - I (Introduction to Media & Communication)	HC	2	1	0	3	4
5	B20BJ1040(P)	Journalism Practical - I	HC	0	0	2	2	4
6	B20BJ1050	English Literature (Chaucer – Pope) & Language – I	HC	4	0	0	4	4
7	B20BJ1060	Psychology - I (Basic Psychological Process-I)	HC	2	1	0	3	4
8	B20BJ1060(P)	Psychology Practical-I	HC	0	0	2	2	4
		Total Credits		**12**	**4**	**4**	**20**	**30**
SECOND SEMESTER								
1	B20BJ2010	Indian Constitution and Human Rights	FC	Noncredit compulsory course				2
2	B20BJ2020	Communicative English – II	CC	2	1	0	3	4
3	B20BJ2031	Language – II: Kannada	CC	2	1	0	3	4
	B20BJ2032	Language – II: Hindi	CC	2	1	0	3	4
	B20BJ2033	Language – II: Additional English	CC	2	1	0	3	4

4	B20BJ2040	Journalism - II (Reporting & Editing)	HC	2	1	0	3	4
5	B20BJ2040(P)	Journalism Practical-II	HC	0	0	2	2	4
6	B20BJ2050	English Literature (The Romantic Age) & Language – II	HC	4	0	0	4	4
7	B20BJ2060	Psychology - II (Basic Psychological Process-II)	HC	2	1	0	3	4
8	B20BJ2060(P)	Psychology Practical-II	HC	0	0	2	2	4
9	B20BJ2070	MOOC/SWAYAM	RULO	0	0	2	2	Self-Study
		Total Credits		**12**	**4**	**6**	**22**	**30**
1	B20BJ3011	Language – III: Kannada	CC	1	1	0	2	3
	B20BJ3012	Language – III: Hindi	CC	1	1	0	2	3
	B20BJ3013	Language – III: Additional English	CC	1	1	0	2	3
2	B20BJ3020	Journalism - III (Audio-Visual Production)	HC	2	1	0	3	4
3	B20BJ3020(P)	Journalism Practical - III	HC	0	0	2	2	4
4	B20BJ3030	English Literature (Victorian & Modern Ages) & Language - III	HC	4	0	0	4	4
5	B20BJ3040	Psychology - III (Social Psychology)	HC	2	1	0	3	4
6	B20BJ3040(P)	Psychology Practical-III	HC	0	0	2	2	4
7	B20BJ3051	Media Studies**	OE	4	0	0	4	4
8	B20BJ3052	Life Skills and Personal Development	OE	4	0	0	4	4

9	B20BJ3060	Employability Skills – I (Placement)	RULO	Noncredit compulsory course				2
10	B20BJ3070	MOOC/SWAYAM	RULO	0	0	2	2	Self-Study
11	B20BJ3080	Internship/ Certificate Courses	HC	2	0	2	4	-
		Total Credits		**15**	**3**	**8**	**26**	**29**
1	B20BJ4011	Language IV: Kannada	CC	1	1	0	2	3
	B20BJ4012	Language IV: Hindi	CC	1	1	0	2	3
	B20BJ4013	Language IV: Additional English	CC	1	1	0	2	3
2	B20BJ4020	Journalism – IV (Fundamentals of Media Research)	HC	2	1	0	3	4
3	B20BJ4020(P)	Journalism Practical-IV	HC	0	0	2	2	4
4	B20BJ4030	American Literature	HC	4	0	0	4	4
5	B20BJ4040	Psychology - IV (Child Development)	HC	2	1	0	3	4
6	B20BJ4040(P)	Psychology Practical-IV	HC	0	0	2	2	4
7	B20BJ4050	Minor Research Project	HC	0	0	6	6	6
8	B20BJ4060	Employability Skills – II (Placement)	RULO	Non credit compulsory course				2
		Total Credits		**09**	**3**	**10**	**22**	**31**
1	B20BJ5010	Journalism -V (Media Laws & Ethics)	HC	3	1	0	4	4
2	B20BJ5021	Journalism -VI (A) (Brand Ecology)	SC	2	1	0	3	4
	B20BJ5022	Journalism -VI (B) (Fundamentals of Photography						
3	B20BJ5021(P) / B20BJ5022(P)	Journalism Practicals - VI (A)/Journalism Practical-VI(B)	SC	0	0	2	2	4

4	B20BJ5030	Literary Criticism	HC	4	0	0	4	4
5	B20BJ5041	Literatures of India – I	SC	4	0	0	4	4
	B20BJ5042	European & Non-European Writings - I						
6	B20BJ5050	Psychology – V (Measurement and Research Methods in Psychology)	HC	2	1	0	3	4
7	B20BJ5050(P)	Psychology Practical-V	HC	0	0	2	2	4
8	B20BJ5061	Psychology – VI (A) (Abnormal Psychology - I)	SC	2	1	0	3	4
	B20BJ5062	Psychology –VI (B) (Health Psychology - I)						
9	B20BJ5061(P) / B20BJ5062(P)	Psychology Practical-VI(A)/Psychology Practical VI(B)	SC	0	0	2	2	4
10	B20BJ5070	Employability Skills – III	RULO	Non credit compulsory course				2
		Total Credits		**17**	**4**	**6**	**27**	**38**
1	B20BJ6010	Journalism -VII (Advertising & Corporate Communication)	HC	3	1	0	4	4
2	B20BJ6021	Journalism -VIII (A) (New Media)	SC	2	1	0	3	4
	B20BJ6022	Journalism - VIII (B) (Development Communication)						
3	B20BJ6021(P) / B20BJ6022(P)	Journalism Practical-VIII(A)/ Journalism Practical-VIII(B)	SC	0	0	2	2	4
4	B20BJ6030	Literary Theory and Criticism	HC	4	0	0	4	4
5	B20BJ6041	Literatures of India – II	SC	4	0	0	4	4
	B20BJ6042	European & Non-European Writings - II						

6	B20BJ6050	Psychology – VII (Industrial Psychology)	HC	2	1	0	3	4
7	B20BJ6050(P)	Psychology Practical-VII	HC	0	0	2	2	4
8	B20BJ6061	Psychology-VIII (A) (Abnormal Psychology - II)	SC	2	1	0	3	4
	B20BJ6062	Psychology-VIII (B) (Health Psychology - II)						
9	B20BJ6061(P) / B20BJ6062(P)	Psychology Practical-VIII(A)/Psychology Practical-VIII(B)	SC	0	0	2	2	4
		Total Credits		**17**	**4**	**6**	**27**	**36**
		Total Credits of All Semesters					**144**	

Note: *Students have to undergo internship of 4 weeks duration after the Second Semester examination; the marks of internship are calculated in the Third Semester.

Semester-wise Summary of Credit Distribution

Semesters	No. of Credits

First Semester	20
Second Semester	22
Third Semester	26
Fourth Semester	22
Fifth Semester	27
Sixth Semester	27
Total Credits	**144**

Distribution of Credits Based on Type of Courses

Semester	HC	SC	OE	RULO	FC	CC	Credits
I	14	0	0	0	**0**	**6**	**20**
II	14	0	0	2	**0**	**6**	**22**
III	18	0	4	2	**0**	**2**	**26**
IV	20	0	0	0	**0**	**2**	**22**
V	13	14	0	0	**0**	**0**	**27**
VI	13	14	0	0	**0**	**0**	**27**
Total	**92**	**28**	**4**	**4**	**0**	**16**	**144**

Distribution of Credits Based on L:T:P

Semester	L	T	P	Credits
I	12	4	4	20
II	12	4	6	22
III	15	3	8	26
IV	09	3	10	22
V	17	4	6	27
VI	17	4	6	27
Total	**82**	**22**	**40**	**144**

TYPICAL CURRICULUM MAP

Sl no	Course	Effective Communication	Ethics, Values and Social Responsiveness	Critical Thinking, Analysis ,Problem solving	Global Exposure and cross cultural understanding	Domain Knowledge	Self Development, Leadership and Team work	Entrepreneurial thinking , creativity and Innovation	Research Orientation
1.	Environmental Science		√						
2.	Communicative English - I	√							
3.	Language – I: Kannada	√							
4.	Language – I: Hindi	√							
5.	Language – I: Additional English	√					√		
6.	Journalism - I (Introduction to Media & Communication)	√	√		√	√			
7.	Journalism Practicals-I	√						√	
8.	English Literature (Chaucer – Pope) & Language - I					√			
9.	Psychology - I (Basic Psychological Processes-I)			√	√	√			
10.	Psychology Practicals-I			√			√		
11.	Indian Constitution and Human Rights		√				√		
12.	Communicative English – II	√					√		
13.	Language – II: Kannada	√							
14.	Language – II: Hindi	√							
15.	Language – II: Additional English	√			√				

16	Journalism - II (Reporting & Editing)	√	√	√			√	√	
17	Journalism Practicals-II	√	√	√			√	√	
18	English Literature (The Romantic Age) & Language – II					√			
19	Psychology - II (Basic Psychological Process - II)			√		√	√		
20	Psychology Practicals-II			√			√		
21	Language – III: Kannada	√							
22	Language – III: Hindi	√							
23	Language – III: Additional English	√							
24	Journalism - III (Audio-Visual Production)	√				√	√	√	
25	Journalism Practicals - III	√				√	√	√	
26	English Literature (Victorian & Modern Ages) & Language – III				√	√			
27	Psychology - III (Social Psychology)			√		√			√
28	Psychology Practicals- III			√		√			
29	Media Studies	√	√	√					
30	Life Skills and Personal Development			√			√		
31	Language IV: Kannada	√							
32	Language IV: Hindi	√							
33	Language IV: Additional English	√					√		
34	Journalism – IV (Fundamentals of		√	√		√			√

	Media Research)								
35	Journalism Practicals-IV		√	√		√			√
36	American Literature				√	√			
37	Psychology - IV (Child Development)			√		√			√
38	Psychology Practicals- IV			√			√		
39	Minor Research Project			√					√
40	Journalism –V (Media Laws & Ethics)		√	√		√			
41	Journalism -VI (A) (Brand Ecology)	√	√			√	√		
42	Journalism -VI (B) (Fundamentals of Photography)	√	√			√		√	
43	Journalism Practicals -VI (A)/Journalism Practicals-VI(B)	√	√			√		√	
44	Literary Criticism			√		√			
45	Literatures of India – I					√			
46	European & Non-European Writings – I				√	√			
47	Psychology – V (Measurement and Research Methods in Psychology)			√					√
48	Psychology Practicals-V						√		
49	Psychology – VI (A) (Abnormal Psychology - I)		√		√	√			
50	Psychology –VI (B) (Health Psychology - I)			√	√	√			√
51	Psychology Practicals-						√		

	VI(A)/Psychology Practicals VI(B)								
52	Journalism -VII (Advertising & Corporate Communication)	√	√		√				
53	Journalism -VIII (A) (New Media)	√				√		√	
54	Journalism - VIII (B) (Development Communication)	√	√	√		√			√
55	Journalism Practicals-VIII(A)/ Journalism Practicals-VIII(B)	√	√	√		√			√
56	Literary Theory and Criticism			√		√			
57	Literatures of India – II					√			
58	European & Non-European Writings – II				√	√			
59	Psychology – VII (Industrial Psychology)			√		√			
60	Psychology Practicals-VII			√		√			
61	Psychology-VIII (A) (Abnormal Psychology - II)		√	√	√				
62	Psychology-VIII (B) (Health Psychology - II)			√		√	√		
63	Psychology Practicals-VIII(A)/Psychology Practicals-VIII(B)			√		√			

BA – Journalism, English, Psychology Programme
DETAILED SYLLABUS
(Effective from 2020-2023)

FIRST SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ1010	Environmental Science	FC	0	0	0	0	2

Course Description
This course caters to the students to engage in resolving the current environmental issues in the world and develop a positive approach towards environmental protection. Eventhough it does not have any credits as per the course curriculum it helps the students to understand the multidimensional nature of the issues and respond to the most important challenges that the world is facing today.
Prerequisites: Basic knowledge of Environmental Science studied at higher secondary & school level.
Pedagogy: Direct instruction method
Course Objectives:

1. To be familiar with current and emerging environmental trends and global issues, and have an understanding of ethical and societal responsibilities.
2. To find the need of various types of energy (conventional& non-conventional) resources and natural resources.
3. To acquire knowledge with respect to biodiversity, threats, conservation and appreciate the concept of ecosystem.
4. To explore the ways for protecting the environment.

Course Outcomes:
On completion of this course the students will be able to:

1. Analyze the environmental conditions and protect it.
2. Identify the role of individual, government and NGO in environmental protection.
3. Analyze the ecological imbalances and protect it.
4. Design pollution controlled products.

Course Content:

Unit-I **8 hours**
Multidisciplinary Nature of Environmental Studies: Introduction to Environment, objectives and guiding principles of environmental education, Components of environment, Structure of atmosphere, Sustainable environment/Development, Impact of technology on the environment in terms of modern agricultural practices and industrialization, Environmental Impact Assessment

Environmental protection – Role of Government-Assignments of MOEF, Functions of central and state boards, Institutions in Environment and People in Environment, Initiative and Role of Non-government organizations in India and world.
Self study: Need for public awareness on the environment, Gaia Hypothesis

Unit-II **6 hours**

Environmental pollution, degradation & Waste management: Environmental Pollution – Definition, sources and types, Pollutant-Definition & classification, Concepts of air pollution, water pollution, Soil pollution, Automobile pollution-Causes, Effects & control measures.

Self study: Case studies of London smog, Bhopal gas tragedy, marine pollutions and study of different waste water treatment processes.
Environmental degradation – Introduction, Global warming and greenhouse effect,
Acid rain-formation & effects, Ozone depletion in stratosphere and its effect.
Solid Waste management – Municipal solid waste, Biomedical waste, Industrial solid waste and Electronic waste (E-Waste).
Self study: Disaster management, early warning systems-bio indicators for Tsunami and other natural disasters.

Unit-III **6 hours**

Energy & Natural resources: Energy – Definition, classification of energy resources, electromagnetic radiation-features and applications,Conventional/Non-renewable sources – Fossil fuels based(Coal, petroleum & natural gas), nuclear energy.
Non-conventional/renewable sources – Solar, wind, hydro, biogas, biomass, geothermal, ocean thermal energy, Hydrogen as an alternative as a future source of energy.
Self-study: Remote sensing and its applications, Chernobyl (USSR) nuclear disaster and Fukushima (Japan) nuclear disaster.
Natural resources –water resource (Global water resource distribution, Water conservation methods, Water quality parameters, Uses of water and its importance), Mineral resources (Types of minerals, Methods of mining & impacts of mining activities),Forest wealth (Importance‟s, Deforestation-Causes, effects and controlling measures)
Self-study: Hydrology & modern methods adopted for mining activities.

Unit-IV **6 hours**

Ecology and ecosystem: Ecology-Definition, branches, objectives and classification, Concept of an ecosystem – Structure and functions, Characteristics of an Ecosystem-Ecosystem Resilience, Ecological succession and productivity, Balanced ecosystem, Components of ecosystem-abiotic and biotic, biological diversity.
Biogeochemical cycles and its environmental significance – Carbon, nitrogen and phosphorus cycle, Energy flow in ecosystem, food chains –types, food web & Ecological Pyramids.

Self-study: Need for balanced ecosystem and restoration of degraded ecosystems.

Reference Books:

1. R.J. Ranjit Daniels and JagadishKrishnaswamy, *Environmental Studies*, (2017)
2. Co-authored &Customised by Dr.MS Reddy & Chandrashekar, REVA University. Wiley India Private Ltd., New Delhi.
3. R.J. Ranjit Daniels and JagadishKrishnaswamy, *Environmental Studies*,Wiley India Private Ltd., New Delhi. 2009.
4. Benny Joseph. *Environmental Studies* Tata McGraw – Hill Publishing Company Limited
5. Dr.S.M.Prakash.*Environmental Studies* Elite Publishers Mangalore, 2007
6. Rajagopalan R.*Environmental Studies – from Crisis to cure*, Oxford University Press. 2005.
7. Arvind walia. *Environmental Science.* Kalyani Publications, 2009.

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ1020	**Communicative English – I**	**CC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This 3-credit course focuses on improving the spoken and written communication of the learners. The course develops personal, inter-personal and group skills among learners. It also addresses the functional aspects of language usage while providing specific linguistic tools through professional language learning software. The widespread reach of this course makes it highly practical and applicable.
Prerequisites: The student must have knowledge of intermediate English Grammar and LSRW skills.
Pedagogy: Directmethod, ICT, Collaborative learning, Flipped Classroom.
Course Objectives

- To enhance functional communication skills.
- To develop functional use of language in professional contexts.
- To utilize oral presentations in multiple contexts.
- To apply effective written skills in formal communication.

Course Outcomes

After the completion of the course, students will be able to:

- Identify pressing issues relating to society, environment and media.
- Develop a process-oriented approach to writing.
- Apply the grammatical skills developed during the course aptly.
- Demonstrate a good command over language usage and refined interpersonal skills.

Course Contents

Unit-I: Functional English **9 Hours**
Remedial Grammar: Past Simple; Past Continuous; Irregular Verbs

Writing Skills: Paragraph Writing
Activities: Conversations; Leaving Phone Messages
Literature: Chief Seattle – The End of Leaving and Beginning of Survival

Unit-II: Interpersonal Skills **10 Hours**

Remedial Grammar: Present Simple & Present Continuous; Activity & State Verbs
Writing Skills: Official Letters
Activities: Making Apologies; Invitations & Making Arrangements
Literature: Ruskin Bond – Tiger in the Tunnel

Unit-III- Multitasking Skills **10 Hours**

Remedial Grammar: Present Perfect; For, Since & How Long; -ed & -ing adjectives; Prefix & Opposites of Adjectives
Writing Skills: Note Making
Activities: Agreeing & Disagreeing with Opinions
Literature: Jesse Owens - My Greatest Olympic Prize

Unit-IV: Communication Skills **10 Hours**

Remedial Grammar: Collocations; Prepositions
Writing Skills: Precise Writing
Activities: Offers, Suggestions & Requests
Literature: Avijit Pathak – Onscreen Magic

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.
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Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ1031	**Language- I: Kannada**	**CC**	**2**	**1**	**0**	**3**	**4**

Course Description:

¨sÁµÉAiÀÄ£ÀÄß vÀiÁvÀ£ÁqÀÄvÀ §gÉAiÀÄÄvÀ PË±À®¿, uÁ»vÀåzÀ §UÉÎ uÀsÜ®vÁV ¥ÀjZÀ¬ÄuÀÄvÀ vÀÄs®PÀ «zÁ¸ÀyðUÀ¼À vÀåQÛvÀé «PÁuÀ ºÁUÀÄ uÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀålÄÖPÉsAqÀÄ, ¥ÀæuÁÄÛvÀ uÀAzÀ¨sÀðPÉÌ «zÁ¸ÀyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀ®Ä ¥ÀoÀåvÀ£ÀÄß gÀs¸uÀeÁVzÉ. uÁ»vÀå, PÀeÉ, vÁtÂdå, DqÀ½vÁv¸ÀPÀ vÀÄvÀÄ «eÁ£ÀzÀ «ZÁgÀUÀ½UÉ Mv¸À£ÀÄß ¤ÃqÀeÁVzÉ. EzÀÄ vÉszÀ® JgÀqÀÄ uÉ«ÄuÀÖgï vÀÄsgÀÄ PÉærmïUÀ¼À£ÀÄß; vÀÄsgÀÄ vÀÄvÀÄ £Á®Ì£ÉÃ uÉ«ÄuÀÖgï JgÀqÀÄ PÉærmïUÀ¼À£ÀÄß ºÉsA¢zÉ.

Pre-requisites:

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉU ¥ÁæxÀ«ÄPÀ w¼Ä ª À½PÉ CU¼Åå..
- ¨sÁµÉAiÀÄ£ÀÄ NzÀ®Ä ª ¼vÀÄ §gÉAi¼®Ä w½¢g¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥Às ª ð ²PÀëtzÀ9 PÀ£ÀßqÀ ¨sÁµÉAiÀÄ£ÀÄ N¢g¨ÉÃPÀÄ.

Pedagogy: ICT/Blended learning/Direct method/Collaborative/Flipped Classroom.

Course Objectives:
¤Á®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄÙà PÀ¤ßqÀ ¸Á»vÀåªÀ¤ßÀåß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ¤ßÀåß ºÉsA¢zÉ. CzÀgÀAvÉ ªÉszÀ® ¢ÁAiÀÄ ¸É«Ä¸ÀÖgï¤À°è d£ï¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀ¤PÁ°Ã À PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀU¢ ÀqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ ¤ÁlPÀ ¸Á»vÀåªÀ¤ßÀåß ¥ÀoÀåªÀ¤ßÁlV DAiÉÄÌ ªÀiÁrPÉsAqÀÄ, «zÁ¸ÀyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©gÀÄaAiÀÄ¤ßÀåß ªÀÄsr¸ÀeÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉsvÉUÉ ªÀåQÛvÀ «PÀ¸À¤ßzÀ PÀqÉUÉ UÀªÀÄ¤ß ¤ÃqÀeÁUÀÄvÀÛzÉ.

- ¨ÁµÉ, uÁ»vÀå, EwºÁuÀ vÀÄvÀÄÛ uÀAuÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ uÀA§A¢¹zÀAvÉ ¥ÀjZÀ¬ÄuÀeÁUÀÄvÀÛzÉ.
- «zÁåyðUÀ¼À uÀvÀðvÉsÃvÀÄÄR ¨É¼ÀvÀtÂUÉUÉ C£ÀÄvÁUÀÄvÀAvÉ ºÁUÀs CvÀgÀå vÀiÁ£ÀvÀ uÀA§AzÀUÀ¼À §UÉÎ UËgÀvÀ, uÀvÀiÁ£ÀvÉ vÀÄsr¹, ¨É¼ÉuÀÄvÀ ¤nÖ£Àå ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
- CvÀgÀå uÀÈd£À²Ã®vÉ, ±ÀÄzÀ¸ ¨ÁµÉ, Gv¸ÀvÄ «vÄÀ±Áð UÀÄt, ¤gÀUÀð¼À uÀA¨ÁµÀuÉ, ¨ÁµÀt PÀeÉ ºÁUÀs §gÀºÀ PË±À®UÀ¼À£ÀÄß ¨É¼ÉuÄÀvÀçzÀÄ UÀÄ jAiÀiÁVzÉ
- uÀàzÁðv¸ÀPÀ ¥ÀjÃPÉUÀ½UÉ C£ÀÄPÀs®vÁUÀÄvÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀå lÄÖPÉsAqÀÄ uÀs¸ÀÜ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ vÀiÁr¬PÉs¼ÀîeÁVzÉ.

Course Outcomes:
d£ï À¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀ¤PÁ°Ã ÀzÀ ««zsÀ ¥ÀæPÁgÀzÀ PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀU¢ ÀqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ¤ßÁlPÀ ¸Á»vÀåªÀ PÀ°PÉAiÀÄ ªÀÄs®PÀ PÁ®zÀ AÜvÀåAvÀgÀUÀ¼À¤ßÀåß CzÀgÀ M¼À¤ßsÃlU¼À ¤ßÀåß ¨É¼É¸ÀÄvÀÛzÉ.

- uÁvÀiÁfPÀ, gÁdQÃAiÀÄ, zÁ«ÄðPÀ, uÁAuÀÌøwPÀ, ¥ÁjuÁgÀ ºÁUÀs åAUÀuÀAA§A¢ «ZÁgÀUÀ¼ÉqÉ UÀvÀÄ£À ºÀjuÀÄvÀçzÀgÉsA¢UÉ «zÁåyðUÀ¼Àå ZÀZÁð vÀÄ£ÉsÃ¨ÁvÀvÀç ¨É¼ÉAiÀÄÄvÀÛzÉ.
- fÃvÀ£ÀzÀå §gÀÄvÀ C©¥ÁæAiÀÄ ¨ÉÃzÀUÀ¼ÀÄ, uÀvÀÄuÉåUÀ¼À£ÀÄß DzÀÄ¤PÀ uÀAzÀ¨ÁðzÀå vÀiÁ£À«ÃAiÀÄvÉAiÉsA¢UÉ ¤vÀð»uÀÄvÀAvÉ ¥Ëæ gÉÃ¦uÀÄv¸ÀvÛzÉ.
- Gv¸ÀvÄ uÀAvÀºÀ£À PÀeÉAiÀÄ£ÀÄß ¨É¼ÉuÄÀvÀ GzÉÝÃ±ÀvÀ£ÀÄß FqÉÃj uÄÀv¸ÀvÛzÉ.

- uÀA±ÉsÃzÀ£Á vÀÄ£ÉsÃ¨ÁvÀ vÀÄvÀÌÜ uÀ¼zÁðvÀPÀ ¥ÀjÀPÉëUÀ½UÉ «zÁåyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀÄvÀÜzÉ.

Course Content:

Unit I **dªÀ¥ÀzÀ ªÀåvÀÄÌÜ ¥ÁæaÃªÀ PÁªÀi** **7 Hours**

1. uÀvÀåvÀAvÉ ºÀqÉzÀvÀé — d£À¥ÀzÀ VÃvÉ
2. £Ë®QjvË£ËAzÀÄ §UË«gË bA®QjvËA — gÁ£Áß
3. avÀævÀÄ¥ÁvÉæ gÀvÀÄvÉ £Á**j** — d£Àß

Unit II **ªÀÄzsÀåPÁ°Ãªï PÁªÀiï** **6 Hours**

1. C©ÞAiÀÄÄvÉsvÉÄð PÁ®vÀ±À¢A vÀÄgÁ¡zÉAiÀÄA zÁAlzÉÀ .. £ÁUÀZÀAzÀ
2. vAZA£AUA¼AA — §uAvAtU
3. wgÀÄ¤Ã®PÀAoÀgÀ gÀUÀ¼É — ºÀjºÀgÀ

Unit III **¸Àt PÀxÉUÀ¼ÀÄ** **7 Hours**

1. PÀeÁärAiÀÄ PÉsÃt — vÀiÁ¹Û
2. Ai¡iÁgÁs CjAiÀÄAzÁ «ÁgA — PÁÄvËA¥ÁÄ
3. uÀvÀÄuÉåAiÀÄ vÀÄUÀÄ — wævÉÃtÂ

Unit IV **ªÁlPÀ** **6 Hours**

1. mÉs¼ÀÄîUÀnÖ — n.¦. PÉÊeÁuÀA

References:

- vÀÄÄUÀ½ gÀA.²æÃ., PÀ£À®qÀ uÁ»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºËuï, vÉÆÃÊuÀsgÀÄ. 2014
- uÀAUÀæºÀ. £ÁUÉÃUËqÀ **JZï.Jeï.,** ZÁjwæPÀ d£À¥ÀzÀ PÀxÀ£À PÁvÀ¯ÁUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÁðlPÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀsgÀÄ. 2008
- ¹ÀvÀiÁwÃvÀ PÀ£À®qÀ uÁ»vÀå ZÀjvÀ¯ uÀA¥ÀÄl 1,2,3,4,5 vÀÄvÀÌÜ 6, PÀÄvÉA¥ÀÄ PÀ£À®qÀ CzÀ¯AiÀÄ£À uÀAuÉï, vÉÆÃÊuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ, vÉÆÃÊuÀsgÀÄ. 2014
- uÀAUÀæºÀ. £ÁUÉÃUËqÀ **JZï.Jeï.,** PÀ£À®qÀ d£À¥ÀzÀ PÀxÀ£À PÁvÀ¯ÁUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÁðlPÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀsgÀÄ. 2007
- £ÁgÁAiÀÄÄt ¦.«, ZÀA¥Às PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ uÁé¥À® §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- PÁ¼ÉÃUËqÀ £ÁUÀvÁgÀ, wæ¥Ä¢, gÀUÀ¼É vÀÄvÀÌÜ eÁ£À¥ÀzÀ uÁ»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ uÁé¥À® §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- uÀA. ¨É£ÀUÀeï gÁvÀÄ gÁvï vÀÄvÀÌÜ ¥Á£ÀåA uÀÄAzÀgÀ ±Á¹çÃ, ¥ÀÄgÁt £ÁvÀÄ ZÀsqÁvÀÄtÂ, ¥ÀæPÁ±ÀPÀgÀÄ ¥ÀæµÁgÁAUÀ, vÉÆÃÊuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ. 2010
- qÁ. azÁ£ÀAzÀ vÀÄswð, vÀZÀ£À uÁ»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ uÁé¥À® §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2013

- uÀA vÀÄgÀÄ¼À¹zÀ¥À PÉ, £ÁUÀgÁd Q.gÀA. vÀZÀ£À PÀvÀÄ1, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2016
- vÀÄgÀÄ¼À¹zÀ¥À PÉ, µÀlà¢ uÁ»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- uÀA. uÉÃvÀÄgÁvÀÄ gÁvï C.gÁ., ²æÀ ®Që ÃÀ±À£À eÉÊ«Ä¤ ¨ÁgÀvÀ(vÀÄs®–vÁvÀiÀÄð–uÀavÀæ), ¥ÀæPÁ±ÀPÀgÀÄ PÁvÀÄzÉÃ£ÀÄ ¥ÀÄuÀPÀ ¨ÀvÀ£À, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- uÀA. uÉÃvÀÄgÁvÀÄ gÁvï C.gÁ., ²±ÀÄ£Á¼À ±ÀjÃ¥ÀgÀ £ÀsgÀgÀÄ vÀvÀé¥ÀzÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÁvÀÄzÉÃ£ÀÄ ¥ÀÄuÀÛPÀ ¨ÀvÀ£À, ¨ÉAUÀ¼ÀsgÀÄ. 2007
- uÀA. f.Juï.¨Àmï., PÀÄvÀiÁgÀvÁåuÀ£À PÀuÁð1 ¨ÁgÀvÀ PÀxÁvÀÄÄdj ¥ÀævÉÃ±À, ¥ÀæPÁ±ÀPÀgÀÄ CPÀëgÀ ¥ÀæPÁ±À£À, ºÉUÉsÎÃqÀÄ, uÁUÀgÀ. 2006
- gÀAeÁ£ï zÀUÁð, ±ÀgÀtgÀ uÀvÀÄUÀ PÁæAw, ¥ÀæPÁ±ÀPÀgÀÄ. eÉsÃ»AiÀiÁ ¥ÀæPÁ±À£À, §¼Áîj. 2015
- QÃvÀð£ÁxÀ PÀÄvÀðPÉsÃn, PÀ£ÀßqÀ uÁ»vÀå uÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉsÃn vÉÃvÉsÃj AiÀÄeï 1æïÖ, zÁgÀvÁqÀ. 2009
- ±ÁvÀÄgÁAiÀÄ vÀ.uÀÄ., PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À vÉAPÀtÚAiÀÄå uÁ¡gÀPÀ UÀæAxÀvÀiÁeÉ, vÉÃÊuÀsgÀÄ –2014
- ²vÀgÀÄzÀæ¥À f.Juï. PÀ£ÀßqÀ uÁ»vÀå uÀ«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2013
- uÀA.f.Juï.CvÀÄsgÀ, PÀ£ÀßqÀ uÀtÚ PÀxÉUÀ¼ÀÄ, £ÁµÀ£Àeï §ÄPï 1æïÖ, £ÀvÀzÉºÀå, 2000
- uÀA. qÁ. ¨ÉÊgÀvÀÄAUÀ® gÁvÉÄÃUËqÀ, vÀvÀðvÀiÁ£ÀzÀ PÀxÉUÀ¼ÀÄ, PÀ£ÀßqÀ uÁ»vÀå ¥ÀjµÀvÀÄ, ¨ÉAUÀ¼ÀsgÀÄ 2011
- uÀA. qÁ. gÁvÀÄåAUÀ¥À n. ¨ÉÃUÀsgÀÄ, vÀvÀðvÀiÁ£ÀzÀ PÀxÉUÀ¼ÀÄ, PÀté ¥ÀæPÁ±À£À, ¨ÉAUÀ¼ÀsgÀÄ, 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ1032	Language I: Hindi	CC	2	1	0	3	4

Course description: अध्ययन वर्ान :

यह पाठ्यक्रम नौसिखिया, अपनी भाषा की क्षमता को सिकाि करने हेतु तथा सिसभन्न िसहखिक प्रसक्रयाओं द्वारा िमाज, िंस्कृ सत एिं जीिन के मूल्यं कय िमझने हेतु असभकखित है |

Prerequisites/Pre reading for the course: पूवापेक्षव:

- अध्येता, पी.यु.िी के स्तर पर स्द्वतीय भाषा के रूप में सहन्दी का अध्ययन करना चासहए |

- सहन्दी िासह ि के इसतह ाि क ा ि ंसक्षप्त ज्ञान क ी आि श्यकत ा ह ै |
- सहन्दी व्याकरण का अिबयधन आिश्यक है |
- अ ंग्र ेज़ी – सहन्दी अन ुि ाद ि े ि ंब ंसधत जानक ारी जर ुरी ह ै |

c) Pedagogy: सिक्षशवस्त्र :

- Direct method
- ICT and Digital support
- Collaborative and Cooperative learning
- Differentiated Instruction
- Flipped Classroom

Objectives:पवठ्यक्रम उद्देश्य :

- ि ंदभ ान ुि ार उसचत भ ाष ा क ा प्रययग करन े क ी दक्षत ा कय छ ात्र ं मे ं उत्पन्न करन ा |
- िासह ि के माध्यम ि े ि माज एि ं मानि ीय म ूल्य ं कय ि मझ ाकर, उन म ूल्य ं क ी रक्ष ा ह ेत ु प्र ेरत करना |
- छात्र ं मे ं प ुस्तक पठन एि ं ल े ि न क ी अक ृ सतम प्र ि ृसि स्थ ासपत करना |
- अध्य ेत ाओ ं मे ं िासह ि के माध्यम ि े प्रभाि ी एि ं क ु शल ि ंचार क ा सिक ाि करना |

Course Outcomes:अिसगम पररवम :

अध्ययन की िाखप्त पर अध्येता –

- िामासजक म ूल् एि ं नैसतक ज ि ाबद े ह ी कय स्वीक ार कर ि कत ा ह ै |
- िासह ि क ी प्र ाि ि ंसगकत ा कय ज ीि न मे ं ि मझन े क ी दक्षत ा र ि त ा ह ै |
- ि माज मे ं अ ंतसनसहत पद्दसतय ा एि ं सिचारध ाराओ ं क ा व्य ाख्य ान करन े मे ं ि क्षम बन ि कत ा ह ै |
- िासहि के माध्यम ि े प्रभाि ी एि ं क ु शल ि ंचार क ा सिक ाि करिकत ह ै |

Coursecontent : <u>अध्ययन सवषय ि ूच ी /पवठ्यक्रम</u>

इकवई –1 :कहानी, ि ं स्मरण **10 hours**

1.कहानी – नशा – प्रेमचंद
2.कहान ी – ि ु ि मय जीि न – च ंद्रधर शम ा ग ुल ेरी
3.ि ंस्मरण – शरत के ि ाथ सबताय ा क ु छ ि मय–अम ृतल ाल नागर

इकवई –2:कहानी, आत्मकथा **10 hours**

4.कहानी – मरने ि े पहले – भीष्म ि ाहनी
5.कहानी – लाल हिली – सशिानी
6. र े ि ासचत् – घीि ा – मह ादे ि ी ि म ा

इकवई –3:एकांकी, व्यंग्य रचना **10 hours**

7. एकांकी – आज का नीलाम – धर्मवीर भारती
8.व्यंग्य रचना – भेड़े और भेसियें – हररशंकर परिाई

इकवई –4:अनुवाद, सिंक्षेपण **9 hours**
अनुववद : अंग्रेज़ी – सहन्दी(शब्द एि अनुच्छेद)

िंक्षेपर् : पररच्छे द का एक सतहाई भाग मेंं |

िूचनव : प्रत्येकइकवई 25 अंकके सिएसनिररतहै |

d) Suggested Text Books and References

Text book/s:पठ्य पुस्तक :

1. सहन्दी पाठ्य पुस्तक – रे िा सिश्वसिद्यालय |

References:िन्दर् ग्रन्थ :

1. िुबधव्यिहाररक सहन्दी – िॉ. कु ु लदीप गुप्त
2. असभनि व्यिहाररक सहन्दी – िॉ.परमानन्द गुप्त
3. सहन्दी िासहि का इसतहाि - िॉ. नागेन्द्र
4. आधुसनक सहन्दी िासहि का इसतहाि - िॉ. बच्चन सिंह
5. सहन्दी िासहि का निीन इसतहाि - िॉ. लाल िाहब सिंह
6. शुद्ध सहन्दी कै िे बनले कै िे सलिे- पृथ्वीनाथ पाण्डे
7. कायालय अनुिाद स्नदे सशका
8. िंक्षेपण और पल्लिन - के.िी.भासिया&तुमन सिंग

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ1033	**Language I: Additional English**	**CC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This is a 3-credit course designed to help the learner gain competency in language through the introduction of various genres of literature. The course aims to inculcate a critical view among learners while sensitizing them to the contemporary issues around. It facilitates creative learning and helpstoappreciate, assimilate and research on the various dimensions of society, culture and life.

Prerequisites: The student must possess fundamentals of language skills and be aware of social issues.

Pedagogy: Direct method / ICT / Collaborative Learning / Flipped Classroom.

Course Objectives

- To develop linguistic prowess of the students.
- To appraise different genres of literature.
- To illustrate the fundamentals of creative language.
- To enhanceconsistentreading habits.

Course Outcome

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

- Demonstrate a thorough understanding of sensitive and critical social issues.
- Developreading skills and a wide range of vocabulary.
- Critically analyze a piece of prose or poetry.
- Explain their opinion in a coherent and communicable manner.

Course Contents

Unit-I:Values & Ethics **9 hours**

Literature: Rabindranath Tagore - Where the Mind is Without Fear
William Wordsworth – Three Years She Grew in Sun and Shower
Saki – The Lumber-room
William Shakespeare – Extract from Julius Caesar (Mark Antony‟s Speech)
Language: Vocabulary Building

Unit-II: Natural & Supernatural **10 hours**

Literature: John Keats – La Belle Dame Sans Merci
Charles Dickens – The Signal Man
Hans Christian Anderson - The Fir Tree
William Shakespeare – An Excerpt from The Tempest
Language: Collective Nouns

Unit-III: Travel & Adventure **10 hours**

Literature: R.L. Stevenson – Travel
Elizabeth Bishop - The Question of Travel
H.G. Wells – The Magic Shop
Jonathan Swift – Excerpt from Gulliver‟s Travels Book – I
Writing Skills: Travelogue

Unit-IV: Success Stories **10 hours**

Literature: Emily Dickinson – Success is Counted Sweetest
Rupert Brooke – Success
Dr. Martin Luther King - I Have a Dream
Helen Keller – Excerpt from The Story of My Life
Writing Skills: Brochure &Leaflet

Reference Books:

- Tagore, Rabindranath. Gitanjali. Rupa Publications, 2002.
- Wordsworth, William. The Complete Works of William Wordsworth. Andesite Press, 2017.
- Munro, Hector Hugh. The Complete Works of Saki. Rupa Publications, 2000.

- Shakespeare, William. The Complete Works of William Shakespeare. Sagwan Press, 2015.
- Chindhade, Shirish. Five Indian English Poets: Nissim Ezekiel, A.K. Ramanujan, ArunKolatkar, DilipChitre, R. Parthasarathy. Atlantic Publications, 2011.
- Dickens, Charles. The Signalman and Other Horrors: The Best Victorian Ghost Stories of Charles Dickens: Volume 2. Createspace Independent Publications, 2015.
- Anderson, Hans Christian. The Fir Tree. Dreamland Publications, 2011.
- Colvin, Sidney (ed). The Works of R. L. Stevenson. (Edinburgh Edition). British Library, Historical Prints Edition, 2011.
- Bishop, Elizabeth. Poems. Farrar, Straus and Giroux, 2011.
- Swift, Jonathan. Gulliver‟s Travels. Penguin, 2003.
- Dickinson, Emily. The Complete Poems of Emily Dickinson. Createspace Independent Publications, 2016.
- Brooke, Rupert. The Complete Poems of Rupert Brooke. Andesite Press, 2017.
- King, Martin Luther Jr. &James M. Washington. I Have a Dream: Writings And Speeches That Changed The World. Harper Collins, 1992.
- Keller, Helen. The Story of My Life. Fingerprint Publishing, 2016.
- Green, David. Contemporary English Grammar Structures and Composition. New Delhi: MacMillan Publishers, 2010.
- Thorpe, Edgar and Showick Thorpe. Basic Vocabulary. Pearson Education India, 2012.
- Leech, Geoffrey and Jan Svartvik. A Communicative Grammar of English. Longman, 2003.
- Murphy, Raymond. Murphy‟s English Grammar with CD. Cambridge University Press, 2004.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ1040	**Journalism – I (Introduction to Media and Communication)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:
The course titled Introduction to Media and Communication provides students the opportunity to explore the various elements in the communication process as well as get acquainted with communication models that explain how and why we communicate the way we do. Students explore the models that explain how communication influences our perspective of others, the world and ourselves. By examining media messages from print, electronic media and new media, students explore how the media create meaning and how technology shapes the ways we communicate.

Prerequisites: Exposure to different types of media in daily life.

Pedagogy: Direct instruction and collaborative learning method

Course Objectives:

1. To help the students explore the process of communication and study the various models of communication
2. To delve into the history and aspects of print, electronic and new media
3. To generate awareness of students about the media messages and their impact on everyday life.
4. To create an awreness about the current issues in media.

Course Outcomes:

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

1. Articulate detailed understanding about process and elements in communication
2. Explain the process, models and levels of communication
3. Relate to the various types of mass media
4. Discuss the issues in media in the present context

Course Content:

Unit I: Process and Elements of Communication **10 Hours**

Communication-Definition, nature, scope, process and elements of communication; Types of communications-verbal, non-verbal, intrapersonal, interpersonal, group, mass communication; Functions of communication; Models of communication: Aristotle‟s Rhetoric Model, The Lasswell model, Shannon and Weaver model, Osgood and Schramm circular model, Berlo‟s model; Gerbner‟s Model of Communication

Unit II: Folk and Print Media **10 Hours**

Folk media, Types of Folk Media; Print media; Content pattern and characteristics of dailies and periodicals, tabloids, magazines; Brief history of Indian Journalism; Language press; News Agencies in India; Kannada Journalism.

Unit III: Broadcast Media & Films **10 Hours**

Broadcast Media - Radio as a medium of communication- Brief history of radio; Programme pattern of Radio; FM Radio; Community radio; Television as a medium of communication- Brief history of TV; Satellite communication; DTH; Cinema – Cinema as a medium of communication; Types of cinema- Documentary, Commercial Cinema, Short Films; CBFC and FTII

Unit IV: Issues in Journalism **9 Hours**

Current Issues in Media - New Media – Blogs, websites and social media; Citizen Journalism; Media Convergence; Mobile Journalism; Role of Media in a Democracy- Yellow Journalism; Breaking News; Trial by media; Media Literacy; Fake News; Media and Children; Media and Youth; Media and Gender

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ1040 (P)	**Journalism Practical I**	**HC**	**0**	**0**	**2**	**2**	**4**

- Coverage of local issues in the media- Print/TV/Radio
- Case Study
- Group Discussion
- Wall Magazine
- Collage Making
- Glossary Terms
- **Media Visit:** Theatre festival/ Film festival/ Literary festival/ Poets meet/ Political rally/ Seminars/ Museums.

Reference Books:

1. Vivian John. *The Media of Mass Communication*. New Delhi:PHI learning private limited.2012.
2. J Kumar Keval. *Mass communications in India*. Mumbai: Jaico Publication.2006.
3. Devi Meena. *Fundamentals Of Mass Media AndCommunication*. New Delhi: Alfa Publication.2006.
4. Mcquail Denis. *Mass Communication Theory*. New Delhi: Sage Publication.2004.
5. Chandra Ramesh. *Analysis of Media and CommunicationTrends*. New Delhi :
6. Gyan Books publishers Pvt Ltd.2004.
7. S Baran Stanly and K. Davis ,Dennis. *Mass Communication Theory*: *Foundations Ferment and Future*. Singapore :Thomson Wads Worth.1999.
8. PC Chatterji . *Broadcasting in India*. New Delhi: Sage Publications. 1991.
9. BN Ahuja . *History of Indian Press*. New Delhi: Surjeeth Publication.1988.
10. Krishnamurthy Nadige. *Indian Journalism*. University of Mysore Prasaranga.1966.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ1050	**English Literature (Chaucer – Pope) & Language – I**	**HC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

English literature and language is one of the most significant subjects for the concerned UG program. This course is designed to introduce the students to the basic ideas of literature, mostly focused on the British canon in order to develop their literary as well as cognitive skills which would be surely beneficial for them in their future literary as well as non-literary endeavours.

Prerequisites:

- The student must possess basic English language skills.
- The student should possess basic writing skills.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To outline the framework of different literary genres.
- To relate to the idea of literary ages and its significance.
- To analyze the works of important authors from the medieval age to the neo-classical age.
- To enhance the language skills of the students.

Course Outcomes:

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

- Apply the learnt poetic sensibilities in the creation of poetry.
- Formulate the process of reading prose and enriching literary & non-literary writing.
- Develop dramatic sensibilities.
- Illustrate a good understanding of speech sounds in English and the structure of words.

Course Contents:

Unit – I: Poetry **13 hours**

The Medieval Age:

1. Chaucer - "The Squire" (from *General Prologue to the Canterbury Tales*)

The Elizabethan Age:

2. Edmund Spencer – Sonnet 75 (from the *Amoretti*)
3. William Shakespeare – Sonnet 118

The Puritan Age:

4. John Milton – On His Blindness

Metaphysical Poetry:

5. John Donne – A Valediction: Forbidding Mourning
6. George Herbert – The Collar
7. Andrew Marvell – To His Coy Mistress

The Neoclassical Age:

8. Alexander Pope – Extract from *The Rape of the Lock* (Belinda‟s Toilette)

Unit – II: Prose **13 hours**

1. Francis Bacon – Of Travel; Of Studies
2. Joseph Addison – Silence
3. Dr. Samuel Johnson – Extract from *Preface to Shakespeare* (Three Unities)
4. Oliver Goldsmith – Extract from *The Citizen of the World* ("Letter XXVI. The Character of the Man in Black; With Some Instances of His Inconsistent Conduct")

Unit – III: Drama **13 hours**

1. William Shakespeare – *Othello*
2. Christopher Marlowe – *Dr. Faustus* (Film Text)

Unit – IV: Language **13 hours**

1. Language
2. Speech Sounds in English
3. The Structure of Words

REFERENCES:

- Chaucer, Geoffrey. *The Canterbury Tales*. Harper Press, 2012.
- Warren, Robert Penn. *Six Centuries of Great Poetry*. Dell, 1992.
- Shakespeare, William. *The Sonnets*. Macmillan, 2016.
- Quiller-Couch, Sir Arthur. "On His Blindness" *The Oxford Book of English Verse 1250 - 1900 - Volume I*, ed.1919.
- Ricks, Christopher. *Metaphysical Poetry*. Penguin, 2006.
- Kaul, RK. *The Rape of the Lock*. Oxford, 1997.
- Bacon, Francis. *The Essays*. Penguin, 1985.
- Addison, Joseph. *Addison and Steele*. Forgotten Books, 2018.
- Sen, S. *Dr. Johnson: Preface to Shakespeare*. Unique Publishers, 1989.
- Goldsmith, Oliver. *The Citizen of the World*. University Press of the Pacific, 2002.
- Shakespeare, William. *Othello*. Maple Classics, 2013.
- Marlowe, Christopher, *Dr. Faustus*. Oxford University Press, 2010.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ1060	**Psychology – I (Basic Psychological Process-I)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:

This is a 3 credit course for first semester consisting of 3 hours of teaching learning per week. This course aims to introduce basic concepts of General Psychology and application of it in understanding normal human behavior.

Prerequisites: Basic skills like listening and observation and keen interest in understanding human behavior.

Pedagogy: Direct learning, Kinesthic learnings, ICT, Case Studies.

Course Objectives:

In accordance with the American Psychological Association (APA) recommendations for undergraduate psychology learning objectives and outcomes, students will (1) learn the basic principles of traditional psychological content areas and (2) use the scientific method as an approach to critical thinking and sceptical inquiry. Accomplishing this objective involves:

1. To demonstrate knowledge and understanding of theory and research in the general domains of psychology
2. To explore the biological basis of behavior
3. To understanding the process receiving the sensory information and making meaning out of it.
4. To understand the basic concepts of motivation, Emotions and Sleep and its application for self growth

Course Outcomes:

After the successful completion of the course, students will be able to-

1. Apply the nature, scope, theoretical perspective and reseach methods in Psychology
2. Discover the biological basis of human behavior
3. Develop the mechanism of processing of sensory information and perception.
4. Identify the function of Sleep, motivation and emotions of human beings

Course Contents:

Unit-I: The Science of Psychology **10 hours**

a) Meaning, Definition and goals of Psychology.
b) Psychology is a Science or an Art, Debate.
c) Psychology Vs Psychiatry: Difference in nature, education, treatment and scope.
d) Branches of Psychology: General psychology, Educational Psychology, Industrial psychology, clinical psychology, counseling psychology, social psychology, developmental psychology, Para psychology, Positive psychology.
e) History of Psychology: Wundt, Titchener and James
f) Modern Perspectives: Psychodynamic perspectives, Behavioral perspectives, Cognitive perspectives, Humanistic perspectives, Gestalt theory, Positive Psychology.
g) Psychology in Modern India: Status, Education, Licencing and Scope.
h) Scientific Research: Steps in scientific approach, Descriptive methods: Observation, Case Study, Survey methods. Correlational studies. Experimental method: Variables, Experimental and control group, single and double blinded studies, placebo effect, single and double blinded studies.

Unit-II: The Biological Perspective **10 hours**

a. Neurons: Structure and functions of neuron and glial cells, types of neuron and glial cells.
b. The neural impulse: Action potential and Resting potential, synaptic transmission.
c. Neurotransmitter: types, functions.

d. Nervous system: CNS: Brain-forebrain, midbrain, hindbrain;hemispheres, four lobes, and Spinal cord- structure and functions,
e. PNS-Somatic and autonomic nervous system- divisions and functions.
f. Methods for studying Brain: Lesioning, stimulation: invasive and non-invasive, neuroimaging: CT, MRI, EEG, PET, FMRI, MEG.
g. Glands: Endocrine and Exocrine glands; Endocrine Glands: types and functions.

Unit-III: Basic Conginitive Process. 10 hours

Attention: Definition, types.

a. **Sensation**: Definition, types of sensation, sensory receptors, transduction, Absolute threshold, Differential threshold, habituation, sensory adaptation, sensory integration.
b. Vision: structure of eye, light and eye, visual accommodation. Retina-rods and cones. Visual pathway. Perception of color-trichromatic theory, opponent-process theory, color blindness.
c. Hearing: Structure of ear, Sound and ear, sound localization, vestibular organ.
d. **Perception**: Definition, Gestalt laws of organization, Figure-ground relationship, top-down and bottom-up process.
e. Constancies: size, shape, Brightness
f. Depth Perception: Monocular and Binocular cues. Perceptual illusions.

Unit-IV: Sleep, Motivation and Emotions. 9 hours

a. Consciousness, Altered states of consciousness, Sleep
b. **Sleep**: biology of sleep-circadian rhythm, function of sleep, stages of sleep.
c. Sleep disorders: nightmares and REM sleep behavior disorder, Night terrors, sleep walking, insomnia, sleep apnea, Narcolepsy.
d. Motivation: definition, types-intrinsic, extrinsic motivation; Physiological Motives-Hunger, thirst, sex; Social motives-Achievement, Power Affiliation.
e. Theories: Drive –reduction theory, Mcclelland‟s theory, Maslow‟s theory.
f. Emotion: Definition, three elements of emotion.
g. Types of Emotions
h. Theories: James-Lange theory, Cannon-Bard Theory, Facial feedback hypothesis, Schachter-singer cognitive arousal theory, Lazarus and Cognitive-mediational Theory.
i. Emotional Intelligence: definition, nature, importance.

References Books:

1. Robert S. *Feldman*U*nderstanding Psychology* 6th *Edition* Tata MrGram – Hill. 2004.
2. Saundra K Ciccarelli and Glenn E Meyer. *Psychology*, South Asia Edition, 2008.
3. Robert A Baron. *Psychology*. III Edition, Prentice Hall Publications. 2001.
4. John. W. Santrock. *Psychology Essentials*, 2nd Edition Tata Mc Graw Hill. 2006.
5. Hillgord& Atkinson. *Introduction to Psychology* Oxford IBH publishing Co. Pvt. Ltd.2009.
6. Morgan, King. *Introduction to Psychology*, VII Edition, 1989, Mc Graw Hill IBH Publication. 2004.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ1060 (P)	**Psychology Practical I**	**HC**	**0**	**0**	**2**	**2**	**4**

Descriptive Statistics: Measures of Central Tendency: Grouped Data and Ungrouped Data.

1. Directed observation and accuracy of report.
2. Stroop Effect
3. Emotional Intelligence
4. Muller lyer Illusion
5. Signal Detection

SECOND SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ2010	**Indian Constitution and Human Rights**	**FC**	**0**	**0**	**0**	**0**	**2**

Course Description:
This is a foundation course, which gives a basic understanding about the various aspects of the Indian constitution. As the citizens, the students should understand the main philosophy of the constitution and the functions of the various organs of the democracy. Human Rights is the most debated issue in the world and the students will be able to gain a rudimentary knowledge about it.

Prerequisites: A preliminary understanding of the constitution and human rights.

Pedagogy: Direct instruction and collaborative learning method

Course Objectives:

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications
4. To create awareness on Electoral Process and its impliactions

Course Outcomes:

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

1. Build general knowledge and legal literacy and thereby to take up competitive examinations
2. Summarize state and central policies, fundamental duties
3. Examine Electoral Process, special provisions
4. Analyze powers and functions of Municipalities, Panchayats and Co-operative Societies, and have an awareness about basic human rights in India

Course Content:

Unit-1: Indian Constitutional Philosophy **8 Hours**

a) Features of the Constitution and Preamble
b) Fundamental Rights and Fundamental Duties
c) Directive Principles of State Policy

Unit-2: Union and State Executive, Legislature and Judiciary **6 Hours**

a) Union Parliament and State Legislature: Powers and Functions
b) President, Prime Minister and Council of Ministers
c) State Governor, Chief Minister and Council of Ministers
d) The Supreme Court and High Court: Powers and Functions

Unit-3: Concept and Development of Human Rights **6 Hours**

a) Meaning Scope and Development of Human Rights
b) United Nations and Human Rights- UNHCR
c) UDHR 1948, ICCR 1996 and ICESCR 1966

Unit-4: Human Rights in India **6 Hours**

a) Protection of Human Rights Act, 1993 (NHRC & SHRC)
b) First, Second and Third Generations- Human Rights
c) Judicial Activities and Human Rights

Reference

Constitutional law.

1. H.M.Seervai,*ConstitutionalLawofIndia*,4thEdition,UniversalPublicatio n2013ISBN- 9788175344037
2. D.D.Basu,*IntroductiontotheConstitutionofIndia*,21stEdition,Wadhwa2 013,ISBN- 9788180389184
3. M.P. Jain , *Indian Constitutional Law*, 7th Edition, Lexis Nexis Wadhwa publication ,2014, ISBN-9789351430643.
4. V.N. Shukla, Constitution of India, Eastern BookCompany
5. M.P. Jain , Constitutional Law, Lexis Nexis Wadhwapublication
6. Mamta Rao, Constitutional Law, Eastern BookCompany.
7. AnilMalhotraIndia,NrisandLaw,EasternBookPublishers,NewDelhi.2009.

Human rights:

1. Bajwa, G.S. and D.K. Bajwa, Human Rights in India: Implementation and Violations, D.K. Publishers, New Delhi.1996.
2. Basu,D.D.,HumanRightsinConstitutionalLaw,PrenticeHall,NewDelhi(1994).
3. Sehgal, B.P.Singh, ed., Human Rights in India: Problems and Perspectives, Deep and Deep Publications, New Delhi. 1999.
4. S.K.Avesti and R.P.Kataria, Law Relating to Human Rights, Orient Publications, New Delhi. 2000.
5. SK Kapoor, Human Rights under International and Indian Law, Central Law Agency, Allahabad, 1999
6. Symmonides,J.,HumanRight:InternationalProtection,MonitoringandEnfor cement,Rawat publications, New Delhi. 2005.
7. MamataRao,LawRelatingtoWomanandChildren,EasternBookCo.,Lucknow. 2008
8. G B Reddy, Woman and the Law, Gogia Law Agency, Hyderabad(2001). SC Tripathi, Law Relating to Woman and Children, Central Law Publishers, Allahabad, 2001.

Course code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B20BJ2020	Communicative English – II	CC	2	1	0	3	4

Course Description:

This 3-credit course focuses on enhancing written proficiency required for professional enhancement. It also polishes the spoken skills of the learners to make them effective and confident presenters. It also addresses the functional aspects of language usage while providing specific linguistic tools through professional language learning software. The practical components discussed in this course enable a fruitful transition from academia to the industry of their choice.

Prerequisites: The student must possess functional knowledge of LSRW skills.

Pedagogy: Direct method, ICT, Collaborative learning, Flipped Classroom.

Course Objectives

- To build skills essential for corporate communication.
- To enhance context specific language skills.
- To discover the creative linguistic potential through language and literature.
- To develop communication skills necessary for employability.

Course Outcomes:

After the completion of the course, students will be able to:

- Apply acquired skills to communicate effectively in a corporate scenario.
- Demonstrate command over rhetoric of language.
- Develop critical and creative thinking through assimilated language skills.
- Utilize the communication skills learnt to match industry standards.

Course Contents:

Unit-I: Language Acquisition **9 Hours**

Remedial Grammar: Questions& Negatives; Questions Tags
Writing Skills: Email Writing
Activities: Group Discussions
Literature: Alphonse Daudet - The Last Lesson

Unit-II: Persuasive Skills **10 Hours**

Remedial Grammar: Past Simple & Past Perfect
Writing Skills: Report Writing
Activities: Book & Movie Reviews
Literature: Lord Alfred Tennyson – Ulysses

Unit-III: Cognitive Skills **10 Hours**
Remedial Grammar: Present & Past Passive; Conditionals
Writing Skills: Creative Writing
Activities: Role Plays
Literature: O. Henry – The Gift of the Magi

Unit-IV: Employability Skills **10 Hours**
Remedial Grammar: Reported Speech; Idioms
Writing Skills: Cover Letter & CV
Activities: Exchanging Information
Literature: Saki – The Open Window

Reference Books:

1. Bansal, R.K. and J.B. Harrison. *Spoken English*. Orient Blackswan, 2013.
2. Raman, Meenakshi and Sangeeta Sharma. *Technical Communication*. Oxford University Press, 2015.
3. Thorpe, Edgar and Showick Thorpe. *Objective English*. Pearson Education, 2013.
4. Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
5. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
6. Samson, T. (ed.) *Innovate with English.* Cambridge University Press, 2010.
7. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.
8. Goodale, Malcolm. *Professional Presentation*. Cambridge University Press, 2013.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ2031	**Language II: Kannada**	**CC**	**2**	**1**	**0**	**3**	**4**

Course Description:
¨sÁµÉAiÀÄÄ£ÀÄß vÀiÁvÀ£ÁqÀÄvÀ §gÉAiÀÄÄvÀ PË±À®¡, uÁ»vÀåzÀ §UÉÎ uÀsÜ®vÁV ¥ÀjZÀ¬ÄuÀÄvÀ vÀÄs®PÀ «zÁ¡yðUÀ¼À vÀåQÛvÀé «PÁuÀ ºÁUÀÄ uÀàzsÁðvÀäPÀ ¥ÀjÃPëUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀålÄÖPÉsAqÀÄ, ¥ÀæuÀÄÛvÀ uÀAzÀ¨sÀðPëï «zÁ¡yðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀ®Ä ¥ÀoÀåvÀ£ÀÄß gÀs¡uÀeÁVzÉ. uÁ»vÀå, PÀeÉ, vÁtÂdå, DqÀ½vÁvÀäPÀ vÀÄvÀÄ «eÁ£ÀzÀ «ZÁgÀUÀ½UÉ Mv¡£ÀÄß ¤ÃqÀeÁVzÉ. EzÀÄ vÉszÀ® JgÀqÀÄ uÉ«ÄuÀÖgï vÀÄsgÀÄ PÉærmïUÀ¼À£ÀÄß; vÀÄsgÀÄ vÀÄvÀÄ £Á®Ì£ÉÃ uÉ«ÄuÀÖgï JgÀqÀÄ PÉærmïUÀ¼À£ÀÄß ºÉsA¢zÉ.

Pre-requisites:

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉU ¥ÁæxÀ«ÄPÀ w¼Ä ª À½PÉ CUÀvÀå..

- ¨sÁµÉAiÀÄ£ÀÄß NzÀ®Ä ªÀÄvÀÄÛ §gÉAiÀÄ®Ä w½¢gÀ¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥Às ªð ²PÀëtzÀ9 PÀ£Àßqà ¨sÁµÉAiÀÄ£ÀÄß N¢gÀ¨ÉÃPÀÄ.

Pedagogy: ICT/Blended learning/Direct method/Collaborative/Flipped Classroom.

Course Objectives:
ÉÆÁ®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉsA¢zÉ. CzÀgÀAvÉ ªÉszÀ®£ÉAiÀÄ ¸É«Ä¸ÀÖgïÀ°è dÉ ÀÄ¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀåPÁ°Ã À PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀUÀ ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ ÉÆÁlPÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÌ ªÀiÁrPÉsAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©gÀÄaAiÀÄ£ÀÄß ªÀÄsr¸ÀeÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉsvÉUÉ ªÀåQÛvÀ «PÀ¸À£ÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀeÁUÀÄvÀÛzÉ.

- ¨ÁµÉ, uÁ»vÀå, EwºÁuÀ vÀÄvÀÛ uÀAuÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£Áð1PÀPÉÌ uÀA§A¢¹zÀAvÉ ¥ÀjZÀ¬ÄuÀeÁUÀÄvÀzÉ.
- «zÁåyðUÀ¼À uÀvÀðvÉsÃvÀÄÄR ¨É¼ÀvÀtÂUÉUÉ C£ÀÄvÁUÀÄvÀAvÉ ºÁUÀs CvÀgÀå vÀiÁ£ÀvÀ uÀA§AzÀUÀ¼À §UÉÎ UËgÀvÀ, uÀvÀiÁ£ÀvÉ vÀÄsr¹, ¨É¼ÉuÀÄvÀ ¤nÖ£Àå ¥ÀoÀåUÀ¼À DAiÉÌAiÀiÁVzÉ.
- CvÀgÀå uÀÈd£À²Ã®vÉ, ±ÀÄzÀ ¨ÁµÉ, GvÀvÀÄ «vÀÄ±Áð UÀÄt, ¤gÀUÀð¼À uÀA¨ÁµÀuÉ, ¨ÁµÀt PÀeÉ ºÁUÀs §gÀºÀ PË±À®UÀ¼À£ÀÄß ¨É¼ÉuÀÄvÀçzÀÄ UÀÄj AiÀiÁVzÉ
- uÀàzÁðvÀPÀ ¥ÀjÃPÉUÀ½UÉ C£ÀÄPÀs®vÁUÀÄvÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀå1ÄÖPÉsAqÀÄ uÀsPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÌ vÀiÁrPÉs¼ÀîeÁVzÉ.

Course Outcomes:
dÉ ÀÄ¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀåPÁ°Ã ÀzÀ ««zsÀ ¥ÀæPÁgÀzÀ PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀUÀ ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ ÉÆÁlPÀ ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄs®PÀ PÁ®zÀ ÀÛvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉsÃlUÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀzÉ.

- uÁvÀiÁfPÀ, gÁdQÃAiÀÄ, zÁ«ÄðPÀ, uÁAuÀÌøwPÀ, ¥ÀjuÀgÀ ºÁUÀs åAUÀuÀA§A¢ «ZÁgÀUÀ¼ÉqÉ UÀvÀÄ£À ºÀjuÀÄvÀçzÀgÉsA¢UÉ «zÁåyðUÀ¼Àå ZÀZÁð vÀÄ£ÉsÃ¨ÁvÀvÀç ¨É¼ÉAiÀÄÄvÀzÉ.
- fÃvÀ£ÀzÀå §gÀÄvÀ C©¥ÁæAiÀÄ ¨ÉÃzÀUÀ¼ÀÄ, uÀvÀÄuÉåUÀ¼À£ÀÄß DzÀÄ¤PÀ uÀAzÀ¨ÀðzÀå vÀiÁ£À«ÃAiÀÄvÉAiÉsA¢UÉ ¤vÀð»uÀÄvÀAvÉ ¥ÉæÃgÉÃ¦uÀÄvÀzÉ.
- GvÀvÀÄ uÀAvÀºÀ£À PÀeÉAiÀÄ£ÀÄß ¨É¼ÉuÀÄvÀ GzÉÝÃ±ÀvÀ£ÀÄß FqÉÃjuÀÄvÀzÉ.
- uÀA±ÉsÃzÀ£Á vÀÄ£ÉsÃ¨ÁvÀ vÀÄvÀÛ uÀàzÁðvÀPÀ ¥ÀjÃPÉëUÀ½UÉ «zÁåyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀÄvÀzÉ.

Course Content:

Unit-I	ªÀÄzsÀåPÁ°Ã£À PÁªÀå		**7 Hours**
	1. ZÀÄzÀæÀÄw «eÁ¥À	gÁWÀvÁAPÀ	
	2. ºÀUÉUÀ¼À£ÀÄ »ArzÀ£ÀÄ vÀÄ£ÀzÉs¼ÀUÉ	PÀÄvÀiÁgÀvÁåuÀ	
	3. UÉsÃgÀPÀë ¥ÀæuÀAUÀ	ZÁvÀÄgÀuÀ	

Unit II	ªÀÄzsÀåPÁ°Ã£À PÁªÀå		**6 Hours**

1. wæ¥À¢UÀ¼ÀÄ uÀvÀðdÕ
2. V½AiÀÄÄ ¥ÀAdgÀzÉs½®è ¥ÀÄgÀAzÀgÀ zÁuÀgÀÄ
3. PÀgÉzÀÄ PÉslÖ£ÀÄ ±Á¥ÀvÀ£ÀÄ PÀ£ÀPÀzÁuÀgÀÄ

Unit III eÉÃR À¢UÀ¼ÀÄ **7 Hours**

1. DvÀä²æÃUÁV ¤gÀAPÀÄ±ÀvÀÄwUÀ¼ÁV PÀÄvÉA¥ÀÄ
2. vÀiÁ£À«ÃAiÀÄvÉ CAvÁgÀeÁ zÉÃvÀ£ÀsgÀÄ vÀÄºÁzÉÃvÀ
3. ¨sÀsvÁ¬Ä vÀÄÄ¤zÁ¼ÀÄ vÀÄÄgÁj §eÁ¼À

Unit IV ¥ÀªÁ¸À PÀxÀ **6 Hours**

1. £À£ÉsB¼ÀV£À ºÁqÀÄ PÀsi¨Á (uÀAUÀæºÀ) f.J£ï. vÉsÃºÀ£ï

References:

- vÀÄÄUÀ½ gÀA.²æÀ., PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºËuï, vÉÃÊuÀsgÀÄ. 2014
- uÀAUÀæºÀ. £ÁUÉÃUËqÀ JZï.Jeï., ZÁjwæÀ d£À¥ÀzÀ PÀxÀ£À PÁvÀåUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£Áð1PÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀsgÀÄ. 2008
- ¹ÃvÀiÁwÃvÀ PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉ uÀA¥ÀÄl 1,2,3,4,5 vÀÄvÀÄÛ 6, PÀÄvÉA¥ÀÄ PÀ£ÀßqÀ CzÀåAiÀÄ£À uÀAuÉ, vÉÃÊuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ, vÉÃÊuÀsgÀÄ. 2014
- uÀAUÀæºÀ. £ÁUÉÃUËqÀ JZï.Jeï., PÀ£ÀßqÀ d£À¥ÀzÀ PÀxÀ£À PÁvÀåUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£Áð1PÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀsgÀÄ. 2007
- £ÁgÁAiÀÄt ¦.«, ZÀA¥Às PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- PÁ¼ÉÃUËqÀ £ÁUÀvÁgÀ, wæ¥À¢, gÀUÀ¼É vÀÄvÀÄÛ eÁ£À¥ÀzÀ uÁ»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- uÀA. ¨É£ÀUÀeï gÁvÀÄ gÁvï vÀÄvÀÄÛ ¥Á£ÀåA uÀÄAzÀgÀ ±Á¹çÃ, ¥ÀÄgÁt £ÁvÀÄ ZÀsqÁvÀÄtÂ, ¥ÀæPÁ±ÀPÀgÀÄ ¥ÀæuÁgÁAUÀ, vÉÃÊuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ. 2010
- qÁ. azÁ£ÀAzÀ vÀÄswð, vÀZÀ£À uÁ»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2013
- uÀA vÀÄgÀÄ¼À¹zÀÝ¥Àà PÉ, £ÁUÀgÁd Q.gÀA. vÀZÀ£À PÀvÀÄã1, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2016
- vÀÄgÀÄ¼À¹zÀÝ¥Àà PÉ, µÀlà¢ uÁ»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- uÀA. uÉÃvÀÄgÁvÀÄ gÁvï C.gÁ., ²æÀ ®Që ÃÃ±À£À eÉÊ«Ä¤ ¨ÁgÀvÀ(vÀÄs®–vÁvÀåAiÀÄð–uÀavÀæ), ¥ÀæPÁ±ÀPÀgÀÄ PÁvÀÄzsÉÃ£ÀÄ ¥ÀÄuÀÛPÀ ¨ÀvÀ£À, ¨ÉAUÀ¼ÀsgÀÄ. 2010
- uÀA. uÉÃvÀÄgÁvÀÄ gÁvï C.gÁ., ²±ÀÄ£Á¼À ±ÀjÃ¥ÀgÀ £ÀsgÁgÀÄ vÀvÀé¥ÀzÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÁvÀÄzÉÃ£ÀÄ ¥ÀÄuÀÛPÀ ¨ÀvÀ£À, ¨ÉAUÀ¼ÀsgÀÄ. 2007
- uÀA. f.Juï.¨Àmï., PÀÄvÀiÁgÀvÁåuÀ£À PÀuÁð1 ¨ÁgÀvÀ PÀxÁvÀÄÄdj ¥ÀævÉÃ±À, ¥ÀæPÁ±ÀPÀgÀÄ CPÀëgÀ ¥ÀæPÁ±À£À, ºÉUÉsÎÃqÀÄ, uÁUÀgÀ. 2006

- gÀAeÁ£ï zÀUÁð, ±ÀgÀtgÀ uÀvÀÄÜÀ PÁæAw, ¥ÀæPÁ±ÀPÀgÀÄ. eÉsÃ»AiÀiÁ ¥ÀæPÁ±À£À, §¼Áîj. 2015
- QÃvÀð£Áx À PÀÄvÀðPÉsÃn, PÀ£ÀßqÀ uÁ»vÀÌ uÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉsÃn vÉÄvÉsÃj AiÀÄÄeï lªïÖ, zÁgÀvÁqÀ. 2009
- ±ÁvÀÄgÁAiÀÄ vÀ.uÀÄ., PÀ£ÀßqÀ uÁ»vÀÌ ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À vÉAPÀtÚAiÀÄå uÁ¡gÀPÀ UÀæAxÀvÀiÁeÉ, vÉÆÃÊuÀsgÀÄ –2014
- ²vÀgÀÄzÀæ¥Àì f.Juï. PÀ£ÀßqÀ uÁ»vÀÌ uÀ«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ2032	**Language – II: Hindi**	**CC**	**2**	**1**	**0**	**3**	**4**

Course description: अध्ययन वर्ण :

यह पाठ्यक्रम नौसिखिया, अपनी भाषा की क्षमता का सिकाि करने हेतु तथा सिसभन्न िासहखिक प्रसक्रयाओ द्वारा िमाज, िंस्कृ सत एिं जीिन के मूल्यं कय िमझने हेतु असभकखित है |

Prerequisites/Pre reading for the course:

- अध्येता,पी.यु.िी के स्तरपरसद्वतीयभाषाके रूपमेंसहन्दीकाअध्ययनकरनाचासहए|
- सहन्दीिासहिके इसतहाि का िंक्षप्तज्ञानकीआिश्यकताहै|
- सहन्दीव्याकरणकाअिबयधनआिश्यकहै|
- सहन्दी-अंग्रेजीअनुिादिे िंबंसधतजानकारीजरुरीहै|

c) Pedagogy: सिक्षशवस्त्र :

- Direct method
- ICT and Digital support
- Collaborative and Cooperative learning
- Differentiated Instruction
- Flipped Classroom

Objectives: पवठ्यक्रम उद्देश्य:

- िंदभानुिार उसचतभाषाकाप्रययगकरनेकीदक्षताकयछात्रमेंउत्पन्नकरना|

- िासहिके माध्यमिेिमाजएिंमानीय मूल्यक यिमझाकर, उनमूल्यक ीरक्षाहेतुप्रेररतकरना।

- छात्रमेंपस्तु कपठनएिंलि नकीअकृ सतमप्रिसिस्थासपतृ करना|
- अध्येताओमेंिासहिके माध्यमिप्रभाीिएे कु शलिं ारकासिकािकरना|

Learning Outcomes: असिगम पररर्वम:

अध्ययनकीिमाखप्तपरअध्येता –

- िामासजकमूल्एिनैसतकजिाबदेहीकयस्वीकारकरिकताहै|
- िासहिकीप्राींसगकताकयजीिनमेंिमझनेकीदक्षतारिताहै|
- िमाजमेंअंतसनसहतपद्दसतयाएंसिचारधाराओकाव्याख्यानकरनेमिक्षें मबनािकताहै|
- िासहिके माध्यमिेप्रभाीिएंकु शलिंचारकासिकािकरिकताहै|

Course Content: अध्ययन सवषय िूची /पवठ्यक्रम

इकवई – **1**कसिता: प्राचीन एि आधुसनक **10 hours**

1.कबीर के दयहे

2.कसिता –जसलयािाला बाग मे बिंत- िुभद्राकु मारी चौहान

3.कसिता –िुभाष की मृिु पर - धमीर भारती

इकवई – **2**कसिता: प्राचीन एि आधुसनक **10 hours**

4.तुलिीदि के पद

5.कसिता – पाषाणी – नागाजन

6.कसिता –चलना हमारा काम है- सशिमंगल सिंह िुमन

इकवई – **3**कसिता: प्राचीन एि आधुसनक **10 hours**

7.मीराबाई के पद

8.कसिता –मेरे िपने बहुत नहीं हैं-सगरराज कु मार माथुर

9.कसिता – अभी न हयगा मेरा अंत – सनराला

इकवई – **4** **9 hours**

अनुववद : शब्द एि अनुच्छेद (सहन्दी िे अंग्रेज़ी)

मीसियाा लेिन

िूचनव : प्रत्येकइकवई 25 अंकके ससएसनिवररतहै |

Suggested Text Books and References

Text book/s: पवठ्य पुस्तक :

1. सहन्दी पाठ्य पुस्तक – रेिा सिश्वसिद्यालय |

References: िन्दर् ग्रन्थ :

1. िुबयध व्यिहाररक सहन्दी – िॉ. कु लदीप गुप्त

2. असभिनि व्यिहाररक सहन्दी – िॉ.परमानन्द गुप्त. सहन्दी िासहत्य का इसतहास - िॉ. नागेन्द्र
4. आधुसनक सहन्दी िासहत्य का इसतहास - िॉ. बच्चन सिंह
5. सहन्दी िासहत्य का निीन इसतहास - िॉ. लाल िाहब सिंह
6. शुद्ध सहन्दी कै से बोलें कै से सलखें- पृथ्वीनाथ पाण्डेय
7. िंक्षेपण एिं पल्लिन

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ2033	**Language II: Additional English**	**CC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This is a 3-credit course designed to help the learner gain competency in language through an exploration to the various genres of literature. The syllabus is designed to encourage critical ability of the learner to guide them towards career opportunities. This course is intended to develop the capacity to appreciate and assess the various dimensions of society, culture and life.
Prerequisites: The student must possess fair knowledge of language and literature.
Pedagogy: Direct method / ICT / Collaborative Learning / Flipped Classroom.

Course Objectives:

- To assess ecological and environmental concerns through literature.
- To identify the inequal structures of power in society.
- To compare and relate the position of men and women in society.
- To interpret the representation of society in popular culture.

Course Outcome:

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

- Demonstrate a thorough understanding of sensitive and critical ecological and environmental issues.
- Analyze the rigid structure of center and margin in our society.
- Criticize the subordinate position of women in society.
- Justify the depiction of society in popular culture.

Course Contents:

Unit-I:Ecology & Environment **9 hours**
Literature: ToruDutt - Casuarina Tree
Robert Frost – Stopping by Woods on a Snowy Evening
Gordon J.L. Ramen – Daffodils No More

C.V. Raman – Water – The Elixir of Life
Language: Degrees of Comparison

Unit-II: Voices from the Margin **10 hours**
Literature: TadeuszRozewicz – Pigtail
Jyoti Lanjewar – Mother
Sowvendra Shekhar Hansda – The Adivasi Will Not Dance
Harriet Jacobs – Excerpt from Incidents in the Life of a Slave Girl
Language: Prefix and Suffix

Unit-III: Women & Society **10 hours**
Literature: Kamala Das – An Introduction
UshaNavrathnaram – To Mother
Rabindranath Tagore – The Exercise Book
Jamaica Kincaid – Girl
Writing Skills: Dialogue Writing

Unit-IV: Popular Culture **10 hours**
Literature: Rudyard Kipling – The Absent-minded Beggar
Sir Arthur Conan Doyle – The Hound of the Baskervilles
Aldous Huxley – The Beauty Industry
Writing Skills: Story Writing

Reference Books:

- Agrawal, K.A. *Toru Dutt the Pioneer Spirit of Indian English Poetry - A Critical Study*. Atlantic Publications, 2009.
- Latham, Edward Connery (ed). *The Poetry of Robert Frost*. Holt Paperbacks, 2002.
- Gale, Cengage Learning. *A Study Guide for Tomas Rivera's The Harvest*. Gale, Study Guides, 2017.
- Basu, Tejan Kumar. *The Life and Times of C.V. Ram*an. PrabhatPrakashan, 2016.
- Rozewicz, Tadeusz. *New Poems*. Archipelago, 2007.
- Manohar, Murli. *Critical Essays on Dalit Literature*. Atlantic Publishers, 2013.
- Hansda, SowvendraShekhar. *The Adivasi Will Not Dance: Stories*. Speaking Tiger Publishing Private Limited, 2017.
- Jacobs, Harriet. *Incidents in the Life of a Slave Girl*. Createspace Independent Publication, 2014.
- Das, Kamala. *Selected Poems*. Penguin Books India, 2014.
- Tagore, Rabindranath. *Selected Short Stories of Rabindranath Tagore*. Maple Press, 2012.
- Gale, Cengage Learning.*A Study Guide for Jamaica Kincaid's Girl*. Gale, Study Guides, 2017.
- Kipling, Rudyard. *The Absent-Minded Beggar*. Hardpress Publishing, 2013.
- Doyle, Arthur Conan. *The Hound of the Baskervilles*. General Press, 2017.

- Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
- Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
- Samson, T. (ed.) *Innovate with English.* Cambridge University Press, 2010.
- Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ2040	**Journalism – II (Reporting & Editing)**	HC	2	1	0	3	4

Course Description:
The course Reporting & Editing is structured to prepare students for careers in newspaper, magazine, convergence, or journalism education. It caters to students who want to gain proficiency on the content-providing side of the media. By offering hands-on, engaging courses such as Reporting, Interview, Press Conference, Computer Assisted Reporting and Design for Print media, the Reporting and Editing program readies students to be leaders in their chosen field upon graduation.

Prerequisites: Good newspaper reading habits.

Pedagogy: Direct instruction and inquiry based learning

Course Objectives:

1. To help the students understanding the process of news gathering or print media
2. To impart skills in writing and editing media content- news story, press release, headlines, photo-captions
3. To gain knowledge about the various beats of journalism
4. To gain awareness of different issues of journalism

Course Outcomes:

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

1. Develop skill in reporting for different beats and editing
2. Develop practical knowledge on editing and proof reading
3. Demonstrate the visual elements in print media
4. Compare the workings of the different print and publishing houses in India

Course Content:

Unit I: Attributes of Print Journalism; 10 Hours

Journalism- Definition, nature and scope; News- Definition, values, Structure of a news story- lead, body, tail; Methods of writing news; we will be discussing it in the methods of writing) Types of leads; Newsroom structure; Qualities of a reporter.

Unit II: Techniques of Reporting: **10 Hours**

Techniques of Reporting: Types and techniques; Beats of reporting-crime investigative, development, politics, sports, court, legislature, environment, business; Sources of news: Attribution and verification; Interviews – preparation and Techniques

Unit III: Principles of Editing **10 Hours**

Introduction to editing; Principles of editing- Checking facts, correcting language, rewriting news stories, condensing stories; Headlines, Functions of headlines, Types of Headlines; Editorial page: structure, purpose, middles; Editorial Writing; Letters to the editor, Opinion pieces on OP. ED page; Style sheet.

Unit IV: Design Elements in Newspapers: **9 Hours**

Cartoons and Caricatures: Political and Social; Info-graphics; Photo journalism-Types of photography: news, sports, profiles; photo editing; Typography; Caption writing; Principles of Page Designing.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ2040 (P)	**Journalism Practical II**	**HC**	**0**	**0**	**2**	**2**	**4**

1. Reporting Exercise
2. Interview
3. Re-writing and Editing
4. Photo Editing and caption writing
5. Head Line writing
6. Page Lay out
7. News Letter
8. **Media Visit:** News paper/ Television channel offices.

References Books:

1. Desh Pandey, B.K. *Photo journalism*. New Delhi: SonaliPubication.2007.
2. Carole Rich. *Writing and Reporting news*. Wadsworth Thompson Learning Inc.2005.
3. Pilger John (Edt). *Tell me no lies*. London :Vintage Publishers.2004.
4. Jon &Lawis(Eds).2003. *The Mammoth Book of Journalism*.London:Robinsm Publishers.
5. R. Smith, Schumeman(Edt). *Photographic Communication: Principles Problem and challenges of Photo Journalism*,New York : Hasing House.2000.
6. Kamath MV. *Professional Journalism*, Vikas Publication.1991.

7. Desai M V and NinanSevanti. *Beyond Those Headlines*.Bangalore: Allied Publishers Limited.1996.
8. Westley Bruce. *News Editing*, Oxford IBH.1980.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ2050	**English Literature (The Romantic Age) & Language – II**	**HC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

The course is designed to elevate the level of the initial learning of the UG students. The students by now are well acquainted with the basic concepts of literature and language and therefore can address complex literary themes and topics to equip themselves, to deal with hard core academic texts in the current as well as the upcoming semesters. The main focus is given to the literature falling under the umbrella domain of Romantic period with special reference to the romantic school of poetry. The completion of the course will ensure an overarching competence in Romantic poetry and prose amongst the students.

Prerequisites:

- The student must possess basic insights of Romantic poetry.
- The student must have elementary understanding of Romantic prose.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To relate to the context of the literary ages.
- To develop aesthetic understanding of the text.
- To identify the new genres in British literature.
- To interpret the discourses of literature and to comprehend the idea of liberty, equality and fraternity.

Course outcomes

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

- Develop creative skills and human values through aesthetics of literature.
- Demonstrate the knowledge and incorporate the proficiency of language skills through prose.
- Deduct historical aspects from literature to develop mastery over social skills.

- Construct coherent sentences in English.

Course Contents:

Unit – I: Poetry **13 hours**

***The Age of Transition*:**

1. William Blake – The Chimney Sweeper

***The Romantic Age*:**

2. William Wordsworth – The Solitary Reaper
3. Samuel Taylor Coleridge – *Extract from* The Rime of the Ancient Mariner (Part I – lines 1-82)
4. Lord Byron – On This Day I Complete My Thirty-Sixth Year
5. Percy Bysshe Shelley – Stanzas Written in Dejection, near Naples
6. John Keats – Ode to a Nightingale

Unit – II: Prose **13 hours**

1. Charles Lamb – Dream-Children: A Reverie
2. William Hazlitt – On the Feeling of Immortality in Youth
3. Percy Bysshe Shelley – Extract from *A Defense of Poetry* (Shelly‟s views on Nature of Poetry*)*
4. Mary Wollstonecraft – Extract from *A Vindication of the Rights of Women* (Chapter 5*)*

Unit – III: Fiction **13 hours**

1. Ann Radcliffe – *The Mysteries of Udolpho*
2. Jane Austen – *Pride and Prejudice* (film text)

Unit – IV: Language **13 hours**

1. The Structure of Sentences
2. Discourse

REFERENCES:

- Wordsworth, Jonathan. *The Penguin Book of Romantic Poetry*. Penguin, 2006.
- Coleridge, Samuel Taylor, *The Rime of the Ancient Mariner.* Macmillan Collector‟s Library, 2017
- Applebaum, Stanley. *English Romantic Poetry: An Anthology*. Dover, 1996.
- Driver, Paul. *Poetry of the Romantics*. Penguin, 2000.
- Blaisdell, Bob. *Great English Essays: From Bacon to Chesterton*. Dover, 2005.
- Wollstonecraft, Mary, *Vindication of the Rights of Women*. Penguin, 2010.
- Sinha, Susanta K. *English Essayists*. Oxford University Press, 1997.
- Austen, Jane. *Pride and Prejudice*. Penguin, 2009.
- Radcliffe, Ann. *The Mysteries of Udolpho*. Penguin, 2001.
- Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.

- Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ2060	Psychology - II (Basic Psychological Process - II)	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This course is designed to give students an overview of Higher Mental process and Personality development and its application in understanding human behaviour. This course is designed to introduce the basic concepts of psychology such as Learning, Memory, Cognition, Intelligence and Personlaity.
Prerequisites: Basic concepts of Psychology.
Pedagogy: Kinesthetic Learning, Direct Learning, ICT, Analytical Reasoning, Case Discussion
Course Objectives:

1. To introduce the student to the different approaches toLearning
2. To introduce the mechanisms of formation of memory and factors influencing our memory
3. To help the student to understanding cognitive process and Intelligence
4. To orient the students about Personality Development.

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

1. Discover the ways different behaviors are learnt and its application to change the behavior.
2. Apply the mechanism of Human memory process and apply the knowledge in improving one‟s memory.
3. Eloborate and understandthemechinsm behind human thought process, intelligence and related concepts
4. Analyze and evaluate the concept personality, factors influencing, and different components of personality.

Course Contents:

Unit-I: Learning **10 hours**

a) Definition.
b) Theories of Learning: Classical Conditioning- Experiment, Basic Concepts-Neutral stimulus, Conditional Stimulus, Unconditional Stimulus, Conditional response, Unconditional Response, Stimulus Generalization, Discrimination, Extinction, Spontaneous Recovery, Higher Order Conditioning, Application to Human Behavior-systematic desensitization, aversion therapy.

c) Operant Conditioning: Basic Concepts-Reinforecement, Punishment-positive and negative, Experiments, Schedules of Reinforcement. Stimulus control, extinction, generalization and spontaneous recovery. Application: Shaping, Token Economy.
d) Cognitive Learning theory: Latent Learning-Tolman, Insight learning-Kohler, Learned Helplessness-Seligman.
e) Observatioal Learning: Bobo doll experiment, Basic concepts.
f) Learning in Classroom and Study skills.

Unit-II: Memory **10 hours**

a) Defintion, Three processes of Memory-Encoding, Storage, Retrieval
b) Three memory System- Sensory memory-iconinc, echoic, Short-term memory-working memory, long-term memory- Declarative-episodic, semantic, nondeclarative memory.
c) Retrieval cues: encoding specificity. Recall and Recognition.
d) Forgetting: reasons, theories-memory trace decay theory, interference theory.
e) Biological Bases of Memory.
f) Relationship between learning and memory
g) Memory startegies: mnemonic, peg-word, method of loci, music and rhythm.
h) Memory disorders: Amnesia, Alzhemer‟s.

Unit-III: Higher Cognitive process **10 hours**

a) Thinking: Defintion, types: convergent, divergent; concept formation.
b) Problem solving- definition, types: analogy, heuristics, trial and error, algorithms.
c) Reasoning- definition, types: inductive and deductive.
d) Decision making,
e) Intelligence: Definition, IQ, IQ distribution and interpretation
f) Broader conceptions of Intelligence: Spearman‟s two factor theory, Sternberg‟s triarchic theory, Multiple Intelligences, Guilford‟s theory.
g) Types of intelligence tests- individual, group, veral, non verabal and performance tests with examples.
h) Role of Heredity and Environment in intelligence
i) Extremes of Intelligence.
j) Creativity: Definition, stages, charaterstics.

Unit-IV: Personality **9 hours**

a) Nature and definition of personality (Allport‟s definition).
b) Factors influencing on development of personality.
c) Approaches to personality theories.
d) Psychodynamic Perspectives: Freud and Jung‟s thoery
e) Trait approaches: NEO-5 theory.
f) Social Learning theory: Bandura‟s theory of Personality.
g) Humanistic Approach: Roger‟s Theory.
h) Measurement of personality: Objective Measurement: Questionnaires, rating scales. Projective Techniques.

References Books:

1. Robert S. Feldman. U*nderstanding Psychology* 6th *Edition* Tata MrGram – Hill.(2004).
2. Saundra K Ciccarelli and Glenn E Meyer. Psychology, South Asia Edition, (2008).
3. Robert A Baron. Psychology, III Edition, Prentice Hall Publications. (2001).
4. John. W. Santrock. Psychology Essentials, 2nd Edition Tata Mc Graw Hill. (2006).
5. Hillgord& Atkinson. Introduction to Psychology Oxford IBH publishing Co. Pvt. Ltd.(2009).
6. Morgan, King. Introduction to Psychology, VII Edition, 1989, Mc Graw Hill IBH Publication. (2004).

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ2060 (P)	**Psychology Practical II**	**HC**	**0**	**0**	**2**	**2**	**4**

Statistics: Measures of Variance: Range, S. D, Quartile deviation.

1. Cueing
2. Chunking
3. Maze-learning
4. Bilateral Transfer
5. Concept Formation

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ2070	**MOOC /Swayam**	**RULO**	**0**	**0**	**2**	**2**	**Self-Study**

MOOC/ SWAYAM:

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering MOOC courses.

A student shall register and successfully complete any of the courses available on SWAYAM. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the

MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

THIRD SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ3011	Language III: Kannada	CC	1	1	0	2	3

Course Description:
¨sÁµÉAiÀÄ£ÀÄß vÀiÁvÀ£ÁqÀÄvÀ §gÉAiÀÄÄvÀ PË±À®, uÁ»vÀåzÀ §UÉÎ uÀsÜ®vÁV ¥ÀjZÀ¬ÄuÀÄvÀ vÀÄs®PÀ «zÁåyðUÀ¼À vÀåQÛvÀé «PÁuÀ ºÁUÀÄ uÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀå1ÄÖPÉsAqÀÄ, ¥ÀæuÀÄÛvÀ uÀAzÀ¨sÀðPÉÌ «zÁåyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀ®Ä ¥ÀoÀåvÀ£ÀÄß gÀs¦uÀeÁVzÉ. uÁ»vÀå, PÀeÉ, vÁtÂdå, DqÀ½vÁvÀäPÀ vÀÄvÀÄ «eÁ£ÀzÀ «ZÁgÀUÀ½UÉ MvÀÄ£ÀÄß ¤ÃqÀeÁVzÉ. EzÀÄ vÉszÀ® JgÀqÀÄ uÉ«ÄuÀÖgï vÀÄsgÀÄ PÉærmïUÀ¼À£ÀÄß; vÀÄsgÀÄ vÀÄvÀÄ £Á®Ì£ÉÃ uÉ«ÄuÀÖgï JgÀqÀÄ PÉærmïUÀ¼À£ÀÄß ºÉsA¢zÉ.

Pre-requisites:

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉÎ ¥ÁæxÀ«ÄPÀ w¼ÀªÀ½PÉ CUÀvÀå..
- ¨sÁµÉAiÀÄ£ÀÄß NzÀ®Ä ªÀÄvÀÄ §gÉAiÀÄ®Ä w½¢gÀ¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥Àsªð ²PÀëtzÀ9 PÀ£ÀßqÀ ¨sÁµÉAiÀÄ£ÀÄß N¢gÀ¨ÉÃPÀÄ.

Pedagogy: ICT/Blended learning/Direct method/Collaborative/Flipped Classroom.

Course Objectives:
gÁ®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉsA¢zÉ. CzÀgÀAvÉ ªÉszÀ® ªÀiÁÌ ¸É«Ä¸ÀÖgïUÀ°è d£À¥ÀzÀ, ¥ÁaãÀ, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀUÀ£ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ gÁlPÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÌ ªÀiÁrPÉsAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©gÀÄaAiÀÄ£ÀÄß ªÀÄsr¸ÀeÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉsvÉUÉ ªÀåQÛvÀ «PÀ¸ÀªÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀeÁUÀÄvÀÛzÉ.

- ¨ÁµÉ, uÁ»vÀå, Ew°ÁuÀ vÀÄvÀÄÛ uÀAuÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£Áð1PÀPÉÌ uÀA§A¢¹zÀAvÉ ¥ÀjZÀ¬ÄuÀeÁUÀÄvÀÛzÉ.
- «zÁåyðUÀ¼À uÀvÀðvÉsÃvÀÄÄR ¨É¼ÀvÀtÂUÉUÉ C£ÀÄvÁUÀÄvÀAvÉ °ÁUÀs CvÀgÀå vÀiÁ£ÀvÀ uÀA§AzÀUÀ¼À §UÉÎ UËgÀvÀ, uÀvÀiÁ£ÀvÉ vÀÄsr¹, ¨É¼ÉuÀÄvÀ ¤nÖ£Àå ¥ÀoÀåUÀ¼À DAiÉÌAiÀiÁVzÉ.
- CvÀgÀå uÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨ÁµÉ, GvÀÛvÀÄ «vÀÄ±Áð UÀÄt, ¤gÀUÀð¼À uÀA¨ÁµÀuÉ, ¨ÁµÀt PÀeÉ °ÁUÀs §gÀ°À PË±À®UÀ¼À£ÀÄß ¨É¼ÉuÀÄvÀçzÀÄ UÀÄj AiÀiÁVzÉ
- uÀàzÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀs®vÁUÀÄvÀAvÀ°À «µÀAiÀÄUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀå1ÄÖPÉsAqÀÄ uÀsPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÌ vÀiÁrPÉs¼ÀîeÁVzÉ.

Course Outcomes:

dÀ¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀåPÁ°Ã ÀzÀ ««zsÀ ¥ÀæPÁgÀzÀ PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀUÀ ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄs®PÀ PÁ®zÀ ÀÜvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉsÃlUÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

- uÁvÀiÁfPÀ, gÁdQÃAiÀÄ, zÁ«ÄðPÀ, uÁAuÀÌøwPÀ, ¥ÀjuÀgÀ ºÁUÀs åAUÀuÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀvÀÄ£À ºÀjuÀÄvÀçzÀgÉsA¢UÉ «zÁåyðUÀ¼Àå ZÀZÁð vÀÄ£ÉsÃ¨ÁvÀvÀç ¨É¼ÉAiÀÄÄvÀÛzÉ.
- fÃvÀ£ÀzÀå §gÀÄvÀ C©¥ÁæAiÀÄ ¨ÉÃzÀUÀ¼ÀÄ, uÀvÀÄuÉåUÀ¼À£ÀÄß DzÀÄ¤PÀ uÀAzÀ¨ÀðzÀå vÀiÁ£À«ÃAiÀÄvÉAiÉsA¢UÉ ¤vÀð»uÀÄvÀAvÉ ¥ÉæÃgÉÃ¦uÀÄvÀÛzÉ.
- GvÀÛvÀÄ uÀAvÀºÀ£À PÀeÉAiÀÄ£ÀÄß ¨É¼ÉuÀÄvÀ GzÉÝÃ±ÀvÀ£ÀÄß FqÉÃjuÀÄvÀÛzÉ.
- uÀA±ÉsÃzÀ£Á vÀÄ£ÉsÃ¨ÁvÀ vÀÄvÀÀÜ uÀàzÁðvÀåPÀ ¥ÀjÃPÉëUÀ½UÉ «zÁåyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀÄvÀÛzÉ.

Course Content:

Unit I **£ÀªÉÇÃzÀAiÀÄ PÀ«vÉUÀ¼ÀÄ** **7 Hours**

1. ¨É¼ÀUÀÄ	zÀ.gÁ. ¨ÉÃAzÉæ
2. PÀå	PÀÄvÉA¥ÀÄ
3. PÀ£ÀßqïÄ ¥ÀzÀUÉs¼ï	f. ¦. gÁdgÀvÀßA

Unit II **£ÀªÉÇÃzÀAiÀÄ ºÁUÀÄ £ÀªÀå PÀ«vÉUÀ¼ÀÄ** **6 Hours**

1. CvÀzsÀsvÀ	uÀÄ.gÀA.JPÀÄÌAr
2. vÀÄ£É¬ÄAzÀ vÀÄ£ÉUÉ	PÉ.Juï.£À
3. £À£ÀÀß ºÀtvÉ	f.Juï.Juï.

Unit III **¸Àt PÀxÉUÀ¼ÀÄ** **7 Hours**

1. zÁ½ £ÀqÉzÁvÀ CuÁ	CvÀÄgÉÃ±À £ÀÄUÀqÉsÃtÂ
2. PÉs£ÉAiÀÄ VgÁQ	¤gÀAd£À
3. vÀiÁ¤Ãlgï	vÉÃd¹

Unit IV **£ÁlPÀ** **6 Hours**

1. «ÄÃrAiÀiÁ (uÀAUÀæºÀ)	AiÀÄÄÄj¦rÃuï C£ÀÄvÁzÀ: PÉ. vÀÄgÀÄ¼À ¹zÀÞ¥À

References:

- vÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºËuï, vÉÄÊuÀsgÀÄ. 2014
- ¹ÃvÀiÁwÃvÀ PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ uÀA¥ÀÄl 1,2,3,4,5 vÀÄvÀÀÜ 6, PÀÄvÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À uÀAuÉÜ, vÉÄÊuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ, vÉÄÊuÀsgÀÄ. 2014
- qÁ. CgÀ«AzÀ vÀiÁ®UÀwÛ, uÁ»vÀå uÀAuÀÌøw vÀÄvÀÀÜ zÀåvÀ ¥ÀæeÉÕ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÀßqÀ uÁ»vÀå ¥ÀjµÀvÀÄ, ¨ÉAUÀ¼ÀsgÀÄ. 2014

- qÁ. F.Juï. DvÀÄsgÀ, PÀ£ÀßqÀ PÀxÀ£À uÁ»vÀå : PÁzÀA§j, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2016
- zÉÃ±À¥ÁAqÉ Juï.Jeï., ¨ÉÀAzÉæ ±ÀjÃ¥ÀgÀ PÁvÁåAiÀiÁ£À, ¥ÀæPÁ±ÀPÀgÀÄ zÉÃ¹ ¥ÀÄuÀPÀ, ¨ÉAUÀ¼ÀsgÀÄ. 2013
- QÃvÀð£Áx PÀÄvÀðPÉsÃn, PÀ£ÀßqÀ uÁ»vÀå uÀAUÁw, ¥ÀæÁ±ÀPÀgÀÄ PÀÄvÀðPÉsÃn vÉÄvÉsÀj AiÀÄeï lïÖ, zÁgÀvÁqÀ. 2009
- ±ÁvÀÄgÁAiÀÄ vÀ.uÀÄ., PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À vÉAPÀtÚAiÀÄå uÁ¡gÀPÀ UÀæAxÀvÀiÁeÉ, vÉÆÃuÀsgÀÄ –2014
- uÀA. qÁ! ¹. Dgï. ZÀAzÀæ±ÉÀRgï, vÀÄÄAzÁ¼ÀÄvÀ£ÀzÀ ®PÀëtU¼À£ÀÄß ¨É¼É¹PÉs¼ÀÄîvÀçzÀÄ ºÉÃUÉ?, ¥ÀæPÁ±ÀPÀgÀÄ £ÀvÀPÀ£ÁðlPÀ ¥À©PÉÃµÀ£ï ¥É ÊvÉmï å«ÄmÉqï. 2010
- DzÀÄ¤PÀ PÀ£ÀßqÀ PÁvÀå ¨ÁUÀ–2, PÀÄvÉA¥ÀÄ PÀ£ÀßqÀ CzÀåiÀiÁ£À uÀAuÉÜ, vÉÆÃuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ, vÉÆÃuÀsgÀÄ. 2004
- ²vÀgÀÄzÀæ¥Àå f.Juï. PÀ£ÀßqÀ uÁ»vÀå uÀ«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ3012	**Language-III: Hindi**	**CC**	**1**	**1**	**0**	**2**	**3**

Course description: अध्ययन वर्ण :

यह पाठ्यक्रम नौसिखिया, अपनी भाषा की क्षमता का सिकाि करने हेतु तथा सिसभन्न िासहखिक प्रसक्रयाओं द्वारा िमाज, िंस्कृ सत एिं जीिन के मूल्यं कय िमझने हेतु असभकखित है |

Prerequisites/Pre reading for the course: पूवापेक्षव:

- अध्येता कय, सहन्दी नाटक िासहि का िंसक्षप्त ज्ञान आिश्यक है |
- सहन्दी िासहि के इसतहाि का िंसक्षप्त ज्ञान की आिश्यकता है |
- सहन्दी व्याकरण का अिबयधन आिश्यक है |
- मीसिया लेिन की बुसनयादी जानकारी चासहए |
- अंग्रेज़ी – सहन्दी अनुिाद िे िंबंसधत जानकारी जरुरी है|

c) Pedagogy: सिक्षशवस्त्र :

- Direct method
- ICT and Digital support

- Collaborative and Cooperative learning

- Differentiated Instruction
- Flipped Classroom

Course Objectives: पवठ्यक्रम उद्देश्य:

- िंदभ ान ुि ारउसचतभाष ाकाप्रययगकरन े ेंउत्पन्नकरना| क ीदक्षताकयछ ात ्यम
- ि ासहिके यिमझाकर, ीरक्षाहेतुप्रेररतकरना| माध्यम ि े ि म ाजए िंमानीय उनम ूल्यक म ूल्यक
- छात ्यमे ेंपस्तु कपठनए िंल ि नक ीअक ृ सतमप्रिसिस ्थासपत ृ करन ा|
- अध्य ेताओम े ंि ासहिके माध्यम ि प्रभा ि ीए ि े क ु शल ि चं ारकासिक ा ि करन ा|

Course Outcomes : अस ि गम पररर्वम :

अध्ययनकी ि माखप्तपरअध्येता –

- ि ामासजकमूल्एिनैसतकजिाबदेहीकयस्वीकारकरिकताहै|
- ि ासहिकीप्रा िं सगकताकयज ी ि नम े ंि मझन े क ीदक्षतारिताह ै|
- ि म ाजम े ंअ ंतसनसहतपद्दसतय ाए ि ंसिच ारधार ाओक ाव्य ाख्य ानकरन े मि क्षे ं मबन ि कत ाह ै|
- ि ासहिके माध्यम ि े प्रभा ि ीए िंक ु शल ि ंच ारकासिक ा ि करिकत ाह ै|

इकवई –1:न ा ि क **:** एक और द्रयणाच ाय – ि ॉ. श ंकर श े ष ल े ि क **7 hours**

पररचय प्रथम दृश्य

सद्वतीय दृश्य

इकवई –2 :न ा ि क **:** एक और द्रयणाच ाय **7 hours**

तृतीय दृश्य

चत ुथ दृश्य

इकवई –3:न ा ि क **:** एक और द्रयणाच ाय **6 hours**

पंचम दृश्य

छठा दृश्य

इकवई –4: **6 hours**

अन ुववद : अ ंग्र े जी - सहन्द ी-ि म ाचार पत ् ि ंब ंध

भारत म े ं सहन्दी मीसिय ा क ी ि मस्याए, ररपयस ि ग, ि ाक्ष ात्क ार

िूचनव : प्रत्येकइकवई 25 अंकके सिएसनिवरतहै |

Suggested Text Books and References

Text book/s:पठ्य पुस्तक :

1. **एक और द्रोर्वचवय – डॉ. शंकर शेष**

References: हिन्दी ग्रन्थ :

1. मीसिया लेखन एवं जनसंचार – डॉ.संजीव कुमार
2. .सहन्दी साहित्य का इसतहास - डॉ. नागेन्द्र
3. आधुसनक सहन्दी साहित्य का इसतहास - डॉ. बच्चन सिंह
4. सहन्दी साहित्य का नवीन इसतहास - डॉ. लाल साहब सिंह
5. शुद्ध सहन्दी कैसे बोलें कैसे सलखें- पृथ्वीनाथ पाण्डेय
6. कार्यालय अनुवाद सनदेसशका
7. मीसिया सिमश – रामशरण जयशी
8. संस्कृसत– बाजार और जनसंचार , नन्द भरद्वाज

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3013	**Language III: Additional English**	**CC**	**1**	**1**	**0**	**2**	**3**

Course Description:
This 2-credit course allows the learners to explore the various socio-political aspects represented in literature. The concepts discussed in the course provide learning exposure to real life scenarios. The course is designed to develop critical thinking ability among learners, through the socio-political aspects discussed in literature. Thus, the aim is to produce responsible and sensitive individuals.
Prerequisites: The student must possess fair knowledge of language, literature and society.
Pedagogy: Direct method / ICT / Collaborative Learning / Flipped Classroom.

Course Objectives:

- To outline the global and local concerns of gender and identity.
- To identify the complexities of human emotions through literature.
- To assess the struggles of human survival throughout history.
- To compare and contrast between the various dimensions of childhood.

Course Outcome:

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

- Evaluate the pressing gender issues within our society.
- Criticize human actions through a humane and tolerant approach.
- Perceive the human conflicts with an empathetic perspective.
- Disprove the assumption of a privileged childhood.

Course Contents:

Unit-I:Gender & Identity **6 hours**

Anne Sexton – Consorting with Angels
Eugene Field – The Doll‟s Wooing
Vijay Dan Detha – Double Life
Charlotte Perkins Gilman – The Yellow Wallpaper

Unit-II: Love & Romance **6 hours**

Alfred Noyes – The Highway Man
William Shakespeare – Sonnet 116
Frank Richard Stockton – The Lady or the Tiger?
Oscar Wilde – The Nightingale and the Rose

Unit-III: War & Trauma **7 hours**

Lord Alfred Tennyson – The Charge of the Light Brigade
TaufiqRafat – The Medal
Guy de Maupassant – Two Friends
Sadaat Hasan Manto – Toba Tek Singh

Unit-IV: Children‟s Literature **7 hours**

William Blake – The Chimney Sweeper
D.H. Lawrence – Discord in Childhood
Anna Sewell – The Black Beauty (Extract)
Rudyard Kipling – The Jungle Book (Extract)

Reference Books:

- Sexton, Anne. *The Complete Poems*. Houghton Mifflin, 1999.
- Namjoshi, Suniti. *Feminist Fables*. Spinifex Press, 1998.
- Vanita, Ruth &SaleemKidwai (ed.) *Same Sex Love in India*. Penguin India, 2008.
- Gilman, Charlotte Perkins. *The Yellow Wallpaper*. Rockland Press, 2017.
- Gale, Cengage Learning. *A Study Guide for Alfred Noyes's "The Highwayman"*. Gale, Study Guides, 2017. (Kindle Edition Available)
- Shakespeare, William. *Poems and Sonnets of William Shakespeare*. Cosimo Classics, 2007.
- Stockton, Frank Richard. *The Lady, or the Tiger?*Createspace Independent Publications, 2017.
- Wilde, Oscar. *The Collected Works of Oscar Wilde*. Wordsworth Editions Ltd., 1997.
- Tennyson, Lord Alfred. *The Complete Works of Alfred Tennyson*. Forgotten Books, 2017.
- Blake, William Erdman, David V. (ed.). *The Complete Poetry and Prose* (Newly revised ed.). Anchor Books, (1988).
- Maupassant, Guy de. *Guy de Maupassant-The Complete Short Stories*. Projapati, 2015.

- Manto, SadaatHasan. *Manto: Selected Short Stories*. RHI, 2012.

- Ricks, Christopher. *Metaphysical Poetry*. Penguin, 2006.
- Sewell, Anna. *The Black Beauty*. Maple Press, 2014.
- Kipling, Rudyard. *The Jungle Book*. Amazing Reads, 2018.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ3020	**Journalism-III (Audio-Visual Production)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:
The course Audio-Visual Production is devised for students to become trained in the nuances of electronic media. Students acquire skill in various media types like radio, television, film, etc. By gaining theoretical exposure with hands on demonstration of the practical components, the students will become proficient Radio Jockey, Script-writer for TV and Radio, film-maker for short-films, etc.

Prerequisites: Exposure to different programmes of Ausio-Visual media.

Pedagogy: Direct instruction, Collaborative and Kinesthetic method

Course Objectives

1. To help the students understanding the process of generating content for electronic media
2. To impart skills in script-writing, radio jockeying, conceptualizing and producing audio-visual packages
3. To impart the aspects of aesthetics
4. To convey visual grammar alongside the technicalities of producing the content

Course Outcomes:
On completion of this course, the student would be able to:

1. Apply skill in script-writing for radio and television
2. Outline the aesthetics and visual grammar in the audio-visual medium
3. Assess the various genres of film
4. Discuss the role and progress of different organizations related to cinema in India

Course Content

Unit I: Radio Production **10 Hours**

Introduction to radio production; Writing for radio, Programme formats news, talk, features, interviews, discussions, documentaries, plays; Audio recording – types of microphones; Studio set up.

Unit II: Script-writing for Radio and TV **10 Hours**

Scripting: Scripting for radio and television programs – storyboard; logging the shots; Screen play: Classical, A/v script.

Unit III: Basics in TV Production **10 Hours**

Visual Grammar: Composition, subject, light; Camera control devices- Attributes of a good picture; Different types of shots- shot composition- scenes- sequence; Camera perspectives camera angles- camera movements; Electronic News Gathering

Unit IV: Introduction to Film Studies **9 Hours**

Introduction to Film - Film as an art form; aesthetics of film; Types of films; documentary; newsreel; Educational film; Animation film; Feature film; Mainstream cinema; Cinema and society.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3020 (P)	**Journalism Practical III**	**HC**	**0**	**0**	**2**	**2**	**4**

- Know Your camera
- Script writing- Radio news, Television news
- TV script/Radio Script/ Film Script
- Short Movie/Documentary Making

References Books:

1. Singhal Arvind and Rogers Everett M., *India's Communication Revolution*, Sage Pub. 2007
2. Kumar Keval J., *Mass Communication in India*, Jaico Publishing House, Mumbai.1994.
3. Chatterji, P.C. *Broadcasting in India* New Delhi: Sage Pub,1987.
4. Hasan Seema, Mass *Communication: Principles And Concepts*. CBS Publishers & Distributors, 2010.
5. Shamsi Nayyar, *Encyclopedia of Electronic Media*, Anmol Publications Pvt. Limited

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ3030	**English Literature (Victorian & Modern Ages) & Language – III**	**HC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

This course is designed to familiarize the students with literary works of significant authors from the Victorian and Modern period of the British literary canon. In order to master the history of English literature, this course is extremely important. After completion of this course, the students will have a wholesome grasp over British literature in its full demeanor and he/she will be able to apprehend and appreciate other literary texts from multiple literary periods competently.

Prerequisites:

- The student must possess basic insights of Romantic age of English Literature.
- The student must possess the fundamental skills of writing, reading and analyzing.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To examine the literary works from Victorian and Modern period.
- To analyze the key concepts of Victorianism and Modernism.
- To assess the basic social and cultural theories of modern age.
- To develop professional skills in speech and writing.

Course Outcomes:

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

- Identify the major poets of the Victorian and Modern periods and their works in English Literature.
- Outline the various issues presented in the prose of the Victorian and Modern periods.
- Demonstrate complete familiarity with the features of novels of the Victorian period.
- Illustrate a good understanding of the various components of Speech and Writing and Tenor and Domain.

Course Contents:

Unit – I: Poetry **13 hours**

The Victorian Age:

1. Alfred Tennyson – Ulysses
2. Robert Browning – My Last Duchess
3. Christina Rossetti – Goblin Market
4. Mathew Arnold – Dover Beach

Modern Poetry:

5. W.B. Yeats – An Acre of Grass

6. W.H. Auden – The Shield of Achilles
7. T.S. Eliot – Prelude

Unit – II: Prose **13 hours**

1. D.H. Lawrence – The Rocking-Horse Winner
2. R.L. Stevenson – An Apology for Idlers
3. Virginia Woolf – Extract from *A Room of One"s Own*
4. Lewis Carroll – Excerpt from *Alice"s Adventures in Wonderland*

Unit – III: Fiction **13 hours**

1. Charles Dickens – *The Adventures of Oliver Twist*
2. Charlotte Bronte – *Jane Eyre*

Unit – IV: Language **13 hours**

1. Speech and Writing
2. Tenor and Domain
3. Introduction to Style
4. Stylistic Analysis: A Framework

REFERENCES:

- Cunningham, Valentine. *Victorian Poetry*. Blackwell, 2003.
- Negri, Paul. *English Victorian Poetry: An Anthology*. Dover, 1998.
- Yeats, W.B. *WB Yeats: Collected Poems*. Vintage, 1990.
- Eliot, T.S. *The Complete Poems and Plays of T.S. Eliot*. Faber, 2004.
- Sen, S. *W.H. Auden: Selected Poems*. Unique Publishers, 2015.
- Lawrence, D.H. *The Rocking Horse Winner*. Perfection Learning, 1982.
- Woolf, Virginia. *A Room of One"s Own*. Penguin, 2002.
- Dickens, Charles. *Oliver Twist*. Norton, 2009.
- Bronte, Charlotte. *Jane Eyre*. Penguin, 2002.
- Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
- Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3040	**Psychology – III (Social Psychology)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:

Social Psychology will provide you with an introduction to the field of social psychology. Social psychology is a subfield of the science of psychology that focuses on the perceptions, thoughts, feelings, and behaviors of individuals and groups within a social context. This course introduces students to the theory and research on the social factors that influence individual and group

behavior. Social perception, The Self, Interpersonal Relationship are among the topics covered in the course. The course will include both individual and group work to facilitate awareness, understanding and application of social psychological principles and concepts. As this is a survey course, this class will give you a broad overview of the major theories and findings within social psychology.

Prerequisites: Basic knowledge about society, culture and values

Pedagogy: Direct Learning, ICT method, Case Discussion

Course Objectives:

1. To introduce the historical and scientific origin, theories and development of the Social Psychology in the western and Indian context
2. To introduce the basic concepts in Social Perception
3. To help the students in understanding one‟s Self and self development
4. To introduce the dynamics of interpersonal relationships.

Course Outcomes:

After the completion of this course, a student will be able to:

1. Express and evaluate the ability to articulate factors contributing to human Social Behavior and the cultural influences.
2. Demonstrate the factors that contribute to Social Perceptions of individuals.
3. Express and understand One‟s Self
4. Outline and elaborate the dynamics of Interpersonal relationship.

Course Contents:

Unit-I: Introduction **10 Hours**

a) Definition; History- Origin and Development.
b) Social psychology in India
c) Theories - Cognitive, Decision making, Interdependence, Socio-cultural, Evolutionary, and Mid-range theories.
d) Research in Social Psychology: goals of research, selecting participants, Research design-correlations, Experimental-field, laboratory, data collection: self-report, observation, internet research.
e) Bias in research- experimenter bias, subject bias, replication.
f) Ethics in Research-informed consent, debriefing, minimal risk.

Unit-II: Social Perception **10 Hours**

a) Social Perception: definition
b) Non-verbal Communication: the visible channel- distance, gestures, eye contact, facial expression, paralanguage; multiple channels.
c) Impression formation- information used: roles, physical cues, salience, from behaviors to traits, central traits, categorization, context effects; continuum model of Impression formation.
d) Integrating Impressions: Evaluation, negativity effect, positive bias, emotional information, the averaging principle, imputing meaning, and resolving inconsistencies.
e) Impression management.

f) Attribution: definition, types, theory- Jones and Davis‟s Correspondent Inference Theory, Kelley‟s Covariation theory. Biases in the Attribution Process-Fundamental attribution error, actor-observer effect, false consensus. Self-serving attributional bias.

Unit –III: The Self **10 Hours**

a) Self-presentation: accuracy in predicting our behavior, self-presentation tactics, ineffective self-presentation, self-handicapping.
b) Self-knowledge: Sources-socialization, reflected appraisal, feedback from others, self-perception, labeling arousal states, introspection, Self-identity, Culture, cognition and emotions; Aspects of Self-knowledge: self-schemas, self-discrepancies.
c) Self-regulation: Working Self-concept, Self-complexity, self-efficacy, personal control, behaviors, self-awareness.
d) Social Comparison: goals, theory, process.
e) Self-esteem: definition, measurement, gender difference, factors influencing self esteem
f) Culture and Self: in Indian and western context.

Unit-IV: Interpersonal Relationships **9 Hours**

a) Need to belong: loneliness, social rejection.
b) Liking: definition, Social exchange theory, Sources-internal, external, social interaction.
c) Internal sources of Liking others: need to belong, role of affect.
d) External Sources: proximity, familiarity, physical beauty.
e) Social Interaction sources of Liking: similarity, reciprocal liking or disliking, social skills, personality, desires, gender differences.
f) Mate Selection: Gender differences
g) Love: Definition, types, triangular theory of love.
h) Romantic Love: cultural variations in marriage.
i) Interdependency theory: rewards and costs, evaluating outcomes, coordinating outcomes, Fair exchange, beyond exchange.
j) Self- disclosure: definitions, reasons, hazards, cultural differences, gender differences.
k) Intimacy: definition, model, gender difference.

Reference Books:

1. Taylor, S E, Peplau, L A and Sears, D O. *Social Psychology,* 12th edition.New Delhi: Pearson Prentice-Hall of India Pvt Ltd.2017
2. Branscombe, N R and Baron, R ASocial Psychology, 14th edition, Pearson India Education Services Pvt. Ltd. .2018
3. Crisp, R.J. and Turner, R.N. *Essential Social Psychology. N*ew Delhi: Sage Publications India Pvt Ltd.2007,
4. Misra,G. and Dalal,A.K. *Social Psychology in India: Evolution and Emerging trends.* Edited by Ajit.K.Dalal and GirishwarMisra.New Directions in IndianPsychology,Volume I:Social Psychology.New Delhi: Sage Publications India Pvt.Ltd.2001.
5. Myers, D.G *Social Psychology,* 7th international edition.New York: McGraw Hill Companies.2002

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3040 (P)	Psychology Practical III	HC	0	0	2	2	4

Statistics: Correlation-Paramentric and non parametric data.

a. Self-concept
b. Self-esteem
c. Free Association
d. Assessment of Love
e. Learning styles

Please Note: Media Studies & Life Skills and Personal Development as OE are offered to other School III Sem. UG Non-Engineering students

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3051	Media Studies	OE	4	0	0	4	4

Course Description:
This course serves to provide an introduction to the various facets of media studies. Students will examine the significance and impact of media in the society. They will understand and assess current scientific debates in the field and appreciate the relationships between communication, media, culture and evolution of humankind. Students will understand the wide-ranging influences of media and thereby critically analyze how it is shaping the society of present times.

Prerequisite: Basic understanding of communication and media.

Pedagogy: Direct Method, ICT and Collaborative Method.

Course Objectives:

1. To introduce the students to the field of media studies
2. To familiarize the students with the concepts of media and freedom.
3. To know how the different kind of pressures and controls influence the media functioning.
4. To make the students understand the different concepts of media.

Learning Outcomes:

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

1. Appraise the basic concepts related to Communication and media studies
2. Determine the relationship between media and freedom.
3. Analyze the functioning of media considering the threats and pressures on media.

4. Interpret the different concepts of media.

COURSE CONTENT

Unit I: Communication and Mass media **13 Hours**

Communication meaning, definition and process; principles and functions; Importance of media, Kinds of Mass Media, New Media Technology; functions of media; Mass Media and Culture; social responsibility of media

Unit II: **Media and Freedom** **13 Hours**

Freedom of speech and expression: Article 19(1)a and Reasonable restrictions 19(2); Article 21; Right to information, functions of media in Indian Democracy and other political systems.

Unit III: **Controls and Issue** **13 Hours**

Ownership of media, controls: Internal and external threats, pressures on media; Scams, Page-3, Paid News, Sting Operation, fake news

Unit IV: Concepts of Media **13 Hours**

Media and Public Sphere, Media Convergence, Media and development; Media credibility, digital divide, online journalism, citizen journalism, Influence of social media

References Books

1. Richard Campbell, Media and culture an introduction to mass communication.
2. George Oddman,Mass media issues analysis and debate.
3. Media and Democracy in Asia - An AMIC compilation, 2000
4. Joseph Dominick,Dynamics of mass communication: Media in Transition -
5. Ross Howard,Conflict sensitive journalism -
6. Graber, Doris. Media power in politics - 1980
7. Asa Berger,Media and Society - Arthur
8. VirBala Aggarwal, Media and Society: challenges and opportunities
9. New Media and Society - Ed: Nicholas Jankowski - Pub: Sage Publications

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3052	**Life Skills and Personal Development**	**OE**	**4**	**0**	**0**	**4**	**4**

Course Description:

Life skills have been defined by the World Health Organization (WHO) as "abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life". They represent the psycho-social skills that determine valued behavior and

include reflective skills such as problem-solving and critical thinking, personal skills such as self-awareness, and interpersonal skills. Practicing life skills leads to qualities such as self-esteem, sociability and tolerance, competencies to take action and generate change, and the capability to have the freedom to decide what to do and who to be.

Prerequisites: Keen interest to Self-development

Pedagogy: Direct learning, Activities, ICT, Kinesthetic method, games, discussion and interactions.

Course Objectives:

1. To develop self-awareness
2. To improve Interpersonal communication
3. To learn goal setting and strategizing to reach them
4. To learn team work and leadership roles.

Course Outcomes:

After the completion of this course, a student will be able to:

1. Discover One‟s Self and explores abilities and skills
2. Develop better Interpersonal skills
3. Interpret and understand the skills required for goal setting and learns the skills of reaching them.
4. Apply the skills required for team building and leadership skills.

Course Contents:

Unit-I: Personal Development **13 hours**

Me and My Assets, Stages of Adolescence, Self, awareness, Building Self-Confidence, Self Esteem, Self image, Self Concept, Choosing Positive Values, Understanding Mental Models, Stress and Emotions, Surviving Tough Times.

Unit-II: Interpersonal Development **13 hours**

Active Listening, Assertive communication, Problem solving, Decision making, Critical thinking, Interpersonal Skills, Time management, Coping with Emotions, Conflict management, Coping with stress.

Unit-III: Goal Setting and Action Planning **13 hours**

Goal setting-the basics, SMART goals, Steps for action, setting priorities, Short term goals, Long term goals, Time management.

Unit-IV: Team work and Leadership **13 hours**

Team building, Team cycle, Team leadership, My leadership role, The project cycle, Celebration and reflection, Negotiation skills, Conflict management, Entrepreneurship skills.

References:

1. Adkins, W.R. Life skills counseling. In R. Herink (Ed.) The Psychotherapy Handbook. New York, NY: New American Library.l980.

2. Adkins, W. R. Life skills education: A video-based counseling/ learning delivery system. In D. Larson (Ed.) Teaching Psychological Skills: Models for giving psychology away. Monterey, CA: Brooks/ Cole.l984.
3. Burton, J. Career development series at the Ft. George Head Start Center. New York, NY: Institute for Life Coping Skills.1996.

Resources

www.education.gov.uk

www.tes.co.uk/ks1-citizenship-primary-teaching-resources

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.
B20BJ3060	**Employability Skills**	**RULO**	**0**	**0**	**0**	**0**	**2**
Course Code	**Course Title**	**Course Type**	**L**	**T**	**P**	**C**	**Hrs./Wk.**
B20BJ3070	**MOOC / Swayam**	**RULO**	**2**	**0**	**2**	**2**	**Self-Study**

MOOC/ SWAYAM:

Globally, MOOC (Massive Open Online Course) platforms are gaining much popularity. Considering the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering MOOC courses.

A student shall register and successfully complete any of the courses available on SWAYAM. Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

Course Code	Course Title	Course Type	L	T	P	C	Hrs./Wk.

B20BJ3080	**Internship/ Certificate courses**	**HC**	**2**	**0**	**2**	**4**	

FOURTH SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ4011	Language – IV: Kannada	CC	1	1	0	2	3

Course Description:
¨sÁµÉAiÀÄ£ÀÄß vÀiÁvÀ£ÁqÀÄvÀ §gÉAiÀÄÄvÀ PË±À®, uÁ»vÀåzÀ §UÉÎ uÀsÜ®vÁV ¥ÀjZÀ¬ÄuÀÄvÀ vÀÄs®PÀ «zÁåyðUÀ¼À vÀåQÛvÀé «PÁuÀ ºÁUÀÄ uÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀåIÄÖPÉsAqÀÄ, ¥ÀæuÀÄÛvÀ uÀAzÀ¨sÀðPÉÌ «zÁåyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀ®Ä ¥ÀoÀåvÀ£ÀÄß gÀs¦uÀeÁVzÉ. uÁ»vÀå, PÀeÉ, vÁtÂdå, DqÀ½vÁvÀäPÀ vÀÄvÀÄ «eÁ£ÀzÀ «ZÁgÀUÀ½UÉ Mv̈£ÀÄß ¤ÃqÀeÁVzÉ. EzÀÄ vÉszÀ® JgÀqÀÄ uÉ«ÄuÀÖgï vÀÄsgÀÄ PÉærmïUÀ¼À£ÀÄß; vÀÄsgÀÄ vÀÄvÀÄ £Á®Ì£ÉÃ uÉ«ÄuÀÖgï JgÀqÀÄ PÉærmïUÀ¼À£ÀÄß ºÉsA¢zÉ.

Pre-requisites:

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉU ¥ÁæxÀ«ÄPÀ w¼ÀªÀ½PÉ CUÀvÀå..
- ¨sÁµÉAiÀÄ£ÀÄ NzÀ®Ä ªÀÄvÀÄ §gÉAiÀÄ®Ä w½¢gÀ¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥Às ªð ²PÀëtzÀ9 PÀ£ÀßqÀ ¨sÁµÉAiÀÄ£ÀÄ N¢gÀ¨ÉÃPÀÄ.

Pedagogy: ICT/Blended learning/Direct method/Collaborative/Flipped Classroom.

Course Objectives:
ÉÁ®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉsA¢zÉ. CzÀgÀAvÉ ªÉszÀ® ÉAiÀÄ ¸É«Ä¸ÀÖgïÉÀ°è d¤À¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀåPÁ°Ã À PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀUÀ ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ ÉÁlPÀ ¸Á»vÀåªÀÉÀÄß ¥ÀoÀåªÀÉÁV DAiÉÌ ªÀiÁrPÉsAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©gÀÄaAiÀÄÉÀÄß ªÀÄsr¸ÀeÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉsvÉUÉ ªÀåQÛvÀ «PÀ¸À ÉÀzÀ PÀqÉUÉ UÀªÀÄ É ¤ÃqÀeÁUÀÄvÀÛzÉ.

1. ¨ÁµÉ, uÁ»vÀå, EwºÁuÀ vÀÄvÀÄÛ uÀAuÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðIPÀPÉÌ uÀA§A¢¹zÀAvÉ ¥ÀjZÀ¬ÄuÀeÁUÀÄvÀÛzÉ.
2. «zÁåyðUÀ¼À uÀvÀðvÉsÃvÀÄÄÄR ¨É¼ÀvÀtUÉUÉ C£ÀÄvÁUÀÄvÀAvÉ ºÁUÀs CvÀgÀå vÀiÁ£ÀvÀ uÀA§AzÀUÀ¼À §UÉÎ UËgÀvÀ, uÀvÀiÁ£ÀvÉ vÀÄsr¹, ¨É¼ÉuÀÄvÀ ¤nÖ£Àåè ¥ÀoÀåUÀ¼À DAiÉÌAiÀiÁVzÉ.
3. CvÀgÀå uÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨ÁµÉ, Gv̈vÀÄ «vÀÄ±Áð UÀÄt, ¤gÀUÀð¼À uÀA¨sÁµÀuÉ, ¨ÁµÀt PÀeÉ ºÁUÀs §gÀºÀ PË±À®ÀUÀ¼À£ÀÄß ¨É¼ÉuÀÄvÀçzÀÄ UÀÄjAiÀiÁVzÉ
4. uÀàzÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀs®vÁUÀÄvÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀvÀÄ£ÀzÀåIÄÖPÉsAqÀÄ uÀsPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÌ vÀiÁrPÉs¼ÀîeÁVzÉ.

Course Outcomes:

d¤À¥ÀzÀ, ¥ÁaÃ À, ªÀÄzsÀåPÁ°Ã ÀzÀ ««zsÀ ¥ÀæPÁgÀzÀ PÁªÀåUÀ¼ÀÄ, ºÉs¸ÀUÀ ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÆ ÁlPÀ ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄs®PÀ PÁ®zÀ ÀÛvÀåAvÀgÀUÀ¼À ÀÄß CzÀgÀ M¼ÀÀsÃlUÀ¼À ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

1. uÁvÀiÁfPÀ, gÁdQÃAiÀÄ, zÁ«ÄðPÀ, uÁAuÀÌøwPÀ, ¥ÀjuÀgÀ ºÁUÀs åAUÀuÀA§A¢ «ZÁgÀUÀ¼ÉqÉ UÀvÀÄ£À ºÀjuÀÄvÀçzÀgÉsA¢UÉ «zÁåyðUÀ¼Àå ZÀZÁð vÀÄ£ÉsÃ¨ÁvÀvÀç ¨É¼ÉAiÀÄÄvÀÛzÉ.
2. fÃvÀ£ÀzÀå §gÀÄvÀ C©¥ÁæAiÀÄ ¨ÉÃzÀUÀ¼ÀÄ, uÀvÀÄuÉåUÀ¼À£ÀÄß DzÀÄ¤PÀ uÀAzÀ¨ÀðzÀå vÀiÁ£À«ÃAiÀÄvÉAiÉsA¢UÉ ¤vÀð»uÀÄvÀAvÉ ¥ÉæÃgÉÃ¦uÀÄvÀÛzÉ.
3. GvÀÛvÀÄ uÀAvÀºÀ£À PÀeÉAiÀÄ£ÀÄß ¨É¼ÉuÀÄvÀ GzÉÝÃ±ÀvÀ£ÀÄß FqÉÃjuÀÄvÀÛzÉ.
4. uÀA±ÉsÃzÀ£Á vÀÄ£ÉsÃ¨ÁvÀ vÀÄvÀÄÛ uÀàzÁðvÀåPÀ ¥ÀjÃPÉëUÀ½UÉ «zÁåyðUÀ¼À£ÀÄß uÀdÄÓUÉs½uÀÄvÀÛzÉ.

Course Content:

Unit I ÀªÀå–ÀÛçÃªÁ¢ PÀ«vÉUÀ¼À **7 Hours**

1. §Ä¢ÞvÀAvÀjUÉ PÀ£ÀuÀÄ ©zÀÝgÉ J.PÉ.gÁvÀÄ£ÀÄd£ï
2. PÀÄjUÀ¼ÀÄ uÁgï PÀÄjUÀ¼ÀÄ PÉ.Juï.¤uÁgï CºÀvÀÄzï
3. CPÀÌ ºÉÃ½zÀÄ uÀ. GµÁ

Unit II zÀºvÀ–§AqÁAiÀÄ **6 Hours**

1. £À£À ß PÀvÀ£ÀUÀ¼Àåè ºÀÄqÀÄPÀ¢gÀÄ £À£Àß ZÀA¥Á
2. zÀåvÀgÀÄ §gÀÄvÀgÀÄ zÁj©r ¹zÀÞåAUÀAiÀÄå
3. PÀlÖqÀzÀ PÉ®uÀUÁgÀgÀÄ JZï Juï ²vÀ¥ÀæPÁ±À

Unit III eÉÃR ÀUÀ¼ÀÄ **7 Hours**

1. ºÀ¹gÀÄ ºÉsuÀPÀÄvÀ UÀtÂUÀ¼ÀÄ AiÀÄ®¥Àà gÉrØ
2. eÁUÀwÃPÀgÀtzÀ »£ÉßeÉAiÀÄåè UÁA¢üÃ ƒAiÀÄ ¥ÀæuÀÄÛvÀvÉ ¹. £ÁUÀtÚ
3. ZÁvÁðPÀgÀÄ : MAzÀÄ n¥ÀàtÂ ¦ J£ï gÀAUÀ£ï

Unit IV PÁzÀA§j **6 Hours**

1. uÀAuÁgÀ (DAiÀÄÝsÁUÀ) AiÀÄÄ.Dgï. C£ÀAvÀvÀÄswð

References:

- vÀÄÄUÀ½ gÀA.²æÀ., PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºËuï, vÉÄÊuÀsgÀÄ. 2014
- ¹ÃvÀiÁwÃvÀ PÀ£ÀßqÀ uÁ»vÀå ZÀjvÉæ uÀA¥ÀÄl 1,2,3,4,5 vÀÄvÀÄÛ 6, PÀÄvÉA¥ÀÄ PÀ£ÀßqÀ CzÀåAiÀÄ£À uÀAuÉÜ, vÉÄÊuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ, vÉÄÊuÀsgÀÄ. 2014
- qÁ. CgÀ«AzÀ vÀiÁ®UÀwÛ, uÁ»vÀå uÀAuÀÌøw vÀÄvÀÄÛ zÀåvÀ ¥Àæeë, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÀßqÀ uÁ»vÀå ¥ÀjµÀvÀÄ, ¨ÉAUÀ¼ÀsgÀÄ. 2014
- qÁ. F.Juï. DvÀÄsgÀ, PÀ£ÀßqÀ PÀxÀ£À uÁ»vÀå : PÁzÀA§j, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥Àß §ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2016

- zÉÃ±À¥ÁAqÉ **Juï.Jeï.,** ¨ÉÃAzÉæ ±ÀjÃ¥ÀgÀ PÁvÁåAiÀiÁ£À, ¥ÀæPÁ±ÀPÀgÀÄ zÉÃ¹ ¥ÀÄuÀPÀ, ¨ÉAUÀ¼ÀsgÀÄ. 2013
- QÃvÀð£Áx PÀÄvÀðPÉsÃn, PÀ£ÀßqÀ uÁ»vÀ uÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉsÃn vÉÄvÉsÃj AiÀÄeï **l**ïÖ, zÁgÀvÁqÀ. 2009
- ±ÁvÀÄgÁAiÀÄ vÀ.uÀÄ., PÀ£ÀßqÀ uÁ»vÀ ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À vÉAPÀtÚAiÀÄ uÁgÀPÀ UÀæAxÀvÀiÁeÉ, vÉÆÃuÀsgÀÄ –2014
- uÀA. qÁ! ¹. Dgï. ZÀAzÀæ±ÉÃRgï, vÀÄÄAzÁ¼ÀÄvÀ£ÀzÀ ®PÀëtUÀ¼À£ÀÄß ¨É¼É¹PÉs¼ÀÄîvÀçzÀÄ ºÉÃUÉ?, ¥ÀæPÁ±ÀPÀgÀÄ £ÀvÀPÀ£ÁðlPÀ ¥À©PÉÃµÀ£ï ¥É ÊvÉmï å«ÄmÉqï. 2010
- DzÀÄ¤PÀ PÀ£ÀßqÀ PÁvÀ ¨ÁUÀ–2, PÀÄvÉA¥ÀÄ PÀ£ÀßqÀ CzÀiAiÀÄ£À uÀAuÉÜ, vÉÆÃuÀsgÀÄ «±Àé«zÁå¤®AiÀÄ, vÉÆÃuÀsgÀÄ. 2004
- ²vÀgÀÄzÀæ¥À f.Juï. PÀ£ÀßqÀ uÁ»vÀ uÀ«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ uÀé¥À§ÄPï ºËuï, ¨ÉAUÀ¼ÀsgÀÄ. 2013

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ4012	**Language – IV: Hindi**	**CC**	**1**	**1**	**0**	**2**	**3**

Course description: अध्ययन वर ्न :

यह पाठ्यक्रम नौसिखिया, अपनी भाषा की क्षमता का सिकाि करने हेतु तथा सिसभन्न िासहखिक प्रसक्रयाओं द्वारा िमाज, ि ंस्कृ सत एिं जीिन के मू ल्यं कय िमझने हेतु असभकखित है |

Objectives: पवठ्यक्रम उद्देश्य :

- ि ंदभानुिार उसचत भाषा का प्रययग करने की दक्षता कय छात्यं मेंं उत्पन्न करना |
- िासहि के माध्यम ि े िमाज एिं मानिीय मू ल्यं कय ि मझाकर, उन मू ल्यं की रक्षा हेतु प्रेररत करना |
- छात्यं मेंं पु स्तक पठन एिं ले ि न की अकृ सतम प्रिृसि स्थासपत करना |
- अध्येताओं मेंं िासहि के माध्यम ि े प्रभाि ी एिं कु शल ि ंचार का सिकाि करना |

Learning Outcomes :असि गम पररवम:

अध्ययन की िमाखप्त पर अध्येता –

- िामासजक मूल् एि नैसतक जिाबदेही कय स्वीकार कर िकता है |
- िासहि की प्राि ंसगकता कय जीिन मेंं िमझने की दक्षता रि ता है |
- िमाज मेंं अंतसनसहत पद्दसतया एिं सिचारधाराओं का व्याख्यान करने मेंं िक्षम बन

िकता है |

- िासहि के माध्यम िे प्रभाि ी एिं कु शल िंचार का सिकाि करिकत
है |

c) Pedagogy:सिक्षशवस्त्र :

1. Direct method
2. ICT and Digital support
3. Collaborative and Cooperative learning
4. Flipped Classroom

Prerequisites/Pre reading for the course:पूवपेक्षव:

- अध्येता कय,सहन्दी िंि काव्य का िंसक्षप्त ज्ञान आिश्यक है |
- सहन्दी िासहि के इसतहािि का िंसक्षप्त ज्ञान की आिश्यकता है |
- सहन्दी व्याकरण का अिबयधन आिश्यक है |

Course Content: अध्ययन सवषय िूची / पवठ्यक्रम

इकवई –1: िंि-काव्य – नहुष – मैसथलीशरण गुप्त **7 hours**

कसि पररचय

काव्य पररचय

शची िग

नहुष िग

इकवई –2: िंि-काव्य – नहुष – मैसथलीशरण गुप्त **7 hours**

उिशी

िग

स्वगभयग

िग

इकवई –3: िंि-काव्य – नहुष – मैसथलीशरण गुप्त **6 hours**

िन्दे

श िग

मंतृणा

िगपतन

िग

इकवई –4: **6 hours**

अिंकवर

सिसनमव ररवव्यू :

िूपर 30, समशन मंगल, थप्पड़,आसिकल 15

िूचनव : प्रत्येकइकवई 25 अंकके िएसनिवररतहै |

d) Suggested Text Books and References

Text book/s: पवठ्य पुस्तक:

1. ि ं ि -क ाव्य – नहुष – म ैसथलीशरण ग ुप्त

References: ि न्दर ् ग्रन्थ :

1. रि – छं द – अलं कर - कृ ष्णदे ि शमा & ि ुरे श अग्र ि ाल
2. सहन्दी ि ासहि का इसतह ाि - ि ॉ. नागे द्र
3. आध ुसनक सहन्दी ि ासहि का इसतह ाि - ि ॉ. बच्चन सि ं ह
4. सहन्दी ि ासहि का नि ीन इसतह ाि - ि ॉ. लाल ि ाहब सि ं ह
5. श ुद्ध सहन्दी कै ि े बयले कै ि े ललि े - पृथ्वीनाथ पाण्डे
6. मीसिया सिमश – रामशरण जयशी

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ4013	**Language IV: Additional English**	**CC**	**1**	**1**	**0**	**2**	**3**

Course Description:

This2-credit coursehelps the learner explore various socio-cultural issues through literature. The course provides insight on matters like education and culture that are pertinent in the contemporary society. The course also offers multi-dimensional perspective in the genres of literature and contributes for language enrichment.

Prerequisites: The student must possess fair knowledge of language, literature, culture and society.

Pedagogy: Collaborative Method, Flipped Classroom, Blended Learning

Course Objectives:

- To infer the myths from the contemporary perspective.
- To outline the idea of family represented in literature.
- To interpret horror and suspense as a genre of literature.
- To assess the impact of education in building a society.

Course Outcome:

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

- Examine the relevance of myths and mythology.
- Demonstrate family values and ethics essential to live in the society.
- Analyze horror and suspense as a significant genre of literature.
- Evaluate the applicability of academic contribution in building a society.

Course Contents:

Unit-I:Myths & Mythology **6 hours**

John W. May – Narcissus

W.B. Yeats – The Second Coming

DevduttPattanaik - *Shikhandi and the Other Stories They Don"t Tell you* (Extracts)

Unit-II: Family & Relationships **6 hours**

Nissim Ezekiel – Night of the Scorpion
Langston Hughes – Mother to Son
Kate Chopin – The Story of an Hour
Henrik Ibsen – A Doll"s House (Extract)

Unit-III: Horror & Suspense **7 hours**

Edgar Allan Poe – The Raven
Bram Stoker – A Dream of Red Hands
Satyajit Ray – Adventures of Feluda (Extract)

Unit-IV: Education **7 hours**

The Dalai Lama – The Paradox of Our Times
Kamala Wijeratne – To a Student
Sudha Murthy – In Sahyadri Hills, a Lesson in Humility
FrigyesKarinthy – Refund

Reference Books:

- Finneran, Richard J. *The Collected Works of W.B. Yeats*(Volume I: The Poems: Revised Second Edition). Simon & Schuster, 1996.
- Pattanaik, Devdutt. *Shikhandi: Ánd Other „Queer" Tales They Don"t Tell You*. Penguin Books, 2014.
- Ezekiel, Nissim. *Collected Poems* (With A New Introduction By John Thieme). OUP, 2005.
- Hughes, Langston. *The Collected Poems of Langston Hughes*. Vintage, 1995.
- Chopin, Kate. *The Awakening and Selected Stories of Kate Chopin*. Simon & Schuster, 2004.
- Ibsen, Henrik. *A Doll"s House*. Maple Press, 2011.
- Poe, Edgar Allan. *The Complete Poetry of Edgar Allan Poe*. Penguin USA, 2008.
- Stoker, Bram. *Dracula*. Fingerprint Publishing, 2013.
- Ray, Satyajit. *The Complete Adventures of Feluda* (Vol. 2). Penguin Books Ltd., 2015.
- Lama, Dalai. *Freedom In Exile: The Autobiography of the Dalai Lama of Tibet*. Little, Brown Book Group, 1998.
- Murthy, Sudha. *Wise and Otherwise: A Salute to Life*. Penguin India, 2006.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ4020	**Journalism IV(Fundamentals of Media Research)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:

The course is aimed at acquainting and initiating the student to the nuances – theoretical & practical – involved in research. Each student is assigned a supervisor who will supervise and guide the project/dissertation of not less than 35 - 40 pages which the student is required to submit at the end of semester in the prescribed format. This will aid the students in gaining a proper insight into research in communication studies and devising the project will impart clarity in the nuances of doing research.

Prerequisites: Inquisitive nature to identify the problems.

Pedagogy: Direct instruction and flipped class method

Course Objectives:

1. To expose students to the theory and mechanics of conducting research
2. To provide students with knowledge on the fundamental aspects of research
3. To make the students to apply the research techniques in media studies
4. To empower the students to conduct the research study independently

Course Outcomes:

On completion of the course, the student will be able to

1. Outline the process of research
2. Relate the methods of research with the perspective of industry research in media
3. Discuss the significance of research to build the branch of Media Studies
4. Propose a research topic independently

Course Content:

Unit I: Introduction to Media Research **10 Hours**

Introduction to research concepts- Definition, types & need for research; Basic principles of „Scientific" research: empiricism, verifiability, generalization; Fundamental vs. Applied Research; Quantitative vs. Qualitative data; Role of research in the media; Steps in research.

Unit II: Elements of Research **10 Hours**

Review of Literature-Significance of Review of Literature; Research Approaches or designs: Experiment Designs- Posttest, Pretest & Posttest, Solomon Four Group Design, Factorial Analysis ; Survey, Content Analysis; Case Study; Data collection techniques: Questionnaire, Interview, Schedule; Sampling techniques.

Unit III: Research Presentation **10 Hours**

Data processing, Analysis, presentation and interpretation of data; Use of graphics in data presentation; Research writing - Research proposal; Chapterization of thesis: Components and style- APA, MLA; Preparation of Bibliography, Index"

Unit IV: Research in media audiences and the „effects‟ debate 9 Hours
Magic bullet to limited effects; Two-Step Flow of Communication; Users and Gratifications model; Cultivation analysis; Audience reception.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ4020 (P)	**Journalism Practical IV**	**HC**	**0**	**0**	**2**	**2**	**4**

- Research Proposal/ Synopsis Presentation
- Bibliography Chapter

References Books

1. Berger J. *Media and Communication Research Methods: An Introduction To Qualitative And Quantitative Approaches*, California Sage Publication. 2000
2. Wimmer, Roger D. and Dominick, Joseph R. *Mass Media Research: An Introduction*, Singapore Wadsworth Publishing. 2000.
3. Kothari, C.R , *Research Methodology: Methods and Techniques*, New age International Ltd. Publishers.1990

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ4030	**American Literature**	**HC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:
American literature is closely steeped in history and this course therefore is specifically designed to acquaint the students with literary narratives or texts framed in history for a wider understanding of the domain of American Literature at large.
Prerequisites: The student must possess basic insights of America‟s socio-political, cultural History.
Pedagogy:
Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning
Course Objectives:

- To identify the major American poets and their works.
- To examine the relationship between American history and literature.
- To assess the development of American literature and its rich variations.
- To interpret discourses of literature and to empower communication skills.

Course Outcomes:

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

- Demonstrate the development of the American literature.
- Outline the various issues presented in American prose.
- Demonstrate familiarity with the features of the American novel and drama.
- Analyze American film texts to exhibit good grasp of issues related to America and its relevance.

Course Contents

Unit – I: Poetry **13 hours**

1. Walt Whitman – O Captain! My Captain!
2. Emily Dickinson – The Chariot
3. Robert Frost – Birches
4. Langston Hughes – Let America Be America Again
5. Sylvia Plath – Disquieting Muses
6. Allen Ginsberg – Supermarket in California

Unit – II: Prose **13 hours**

1. Nathaniel Hawthorne – Rappaccini‟s Daughter
2. Philip Roth – Defender of the Faith
3. Frederick Douglass – Extract from *Narrative of the Life of Frederick Douglass, an American Slave* (Douglass struggle for learning & his views on plantation slaves)
4. Chief Seattle – *Speech*

Unit – III: Drama/Fiction: **13 hours**

1. Tennessee Williams – *The Glass Menagerie*
2. Scott Fitzgerald – *The Great Gatsby*

Unit – IV: American Film Texts **13 hours**

1. Margaret Mitchell – *Gone With the Wind*
2. Henry James – *Golden Bowl*

REFERENCE:

- Whitman, Walt. *The Complete Works of Walt Whitman*. Asia Pacific, 2013.
- Collins, Billy. *The Selected Poems of Emily Dickinson*. Modern Library, 2000.

- Frost, Robert. *The Collected Poems*. Vintage Classics, 2013.
- Rampersad, Arnold. *The Collected Poems of Langston Hughes*. Vintage, 1995.
- Plath, Sylvia. *Sylvia Plath Selected Poems*. Faber, 2003.
- Ginsberg, Allen. *Selected Poems 1947-1995*. Penguin, 2001.
- Hawthorne, Nathaniel. *The Complete Works of Nathaniel Hawthorne*. Asia Pacific, 2017 (Kindle edition)
- Jacobs, Harriet. *Incidents in the Life of a Slave Girl*. Digireads, 2001.
- Blaisdell, Bob.*Great Speeches by Native Americans*. Dover, 2000.
- Fitzgerald, F. Scott. *The Great Gatsby*. Collins, 2010.
- Williams, Tennesse. *A Streetcar Named Desire*. Penguin, 2009.
- Mitchell, Margaret. *Gone with the Wind*. Maple, 2015.
- James, Henry. *The Golden Bowl*. Wordsworth Editions, 2000.

Course Description:
This course is a study of Child growth and development. Emphasis is on major theories and perspectives as they relate to the physical, cognitive, and psychosocial aspects of development from conception to Childhood. Upon completion, students should be able to demonstrate knowledge of development till childhood.
Prerequisites: Basic understanding of Human Life cycle and biology
Pedagogy: Direct Teaching, ICT methods, Experimental method, Case Studies.
Course Objectives:

1. To introduce Basic concepts of human development, factors affecting the human development.
2. To introduce the biological correlates and prenatal human development
3. To introduce the various milestones of infancy and early childhood
4. To introduce the changes in milestones of development in later childhood.

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

1. Elaborate the Basic concepts of child development and evaluate core concepts, strengths, and weaknesses of the major theories of Child development.
2. Evaluate and understand the biological factors that contributes to Child development and changes during prenatal development
3. Analyze the impact of biological/genetic influences on physical growth, cognition and behavior during Infancy and early Childhood

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ4040	**Psychology IV (Child Development)**	**HC**	**2**	**1**	**0**	**3**	**4**

4. Analyze the impact of biological/genetic influences on physical growth, cognition and behavior during Later Childhood

Course Contents:

Unit-I: Introduction **10 Hours**

a) Definition of child psychology, difference between developmental and child psychology.
b) Domains of Development, Stages of Child development
c) Issues: Continuous or Discontinuous Development, Nature vs. Nurture, one or many course of Development.
d) Historical Foundations: medieval Times, The Reformation, philosophies of the Enlightenment, scientific beginnings-Darwin, Hall, Gesell, Baldwin.
e) Modern Perspectives: Psychoanalytic-Freud, Erikson; Behaviorism and social learning theory, Cognitive development theory-Piaget.
f) Recent Theoretical Perspectives: Information processing, Developmental Cognitive Neuroscience, Ethology and Evolutionary Developmental Psychology, Vygotsky‟s sociocultural theory, Ecological Systems theory.
g) Child Development and Social Policy: Definition, need for social policy for children, culture and public policies.
h) Research Designs: Correlational, experimental, modified experimental, longitudinal, cross-sectional, sequential, microgentic design.

Unit-II: Foundations of Development **10 Hours**

a) Biological Foundations: Evolutionary perspective, Genetic Foundation-genes, chromosomes, genetic code, dominant and recessive inheritance, genotype, phenotype, sex determination, multiple offspring‟s, Chromosomal Abnormalities: down syndrome, klienfelter‟s syndrome, turner‟s syndrome, Fragile X syndrome; Gene-linked abnormalities- taysachs disease, sickle cell anemia, PKU. Genetic Counselling.
b) Prenatal Development: Prerequisites for conception- maturation, ovulation, fertilization. Conception.
c) Milestones of Prenatal development: Zygote, Embryo, Foetus- changes across the stages.
d) Prenatal Assessment- Amniocentesis, chorionic villus sampling, embryoscopy, pre-implantation diagnosis, maternal blood test, umbilical cord blood sampling, ultrasound
e) Birth: stages of labor, Delivery-types-normal, C-section, breech, forcep and suction.
f) Neonate: appearance, assessment-APGAR scale,

Unit -III: Infancy and Early childhood **10 Hours**

Infancy: Reflexes and states of arousal.

a) Physical Development: Pattern of growth, height and weight, Brain, Sleep and Nutrition.
b) Motor development-sequence and skills.
c) Sensory and Perpetual Development: Vision, touch, hearing, taste and smell.
d) Cognitive Development: cognitive process-sensorimotor stage. Language development
e) Socioemotional Development: temperament and personality, attachment and its development.

f) Early childhood:
g) Physical Development: body growth, motor development, sleep.
h) Cognitive Development: Piaget‟s Preoperational stage, vygotsky‟s theory.
i) Language development: phonology, morphology, syntax, semantics, pragmatics.
j) Socioemotional development: the self, emotional development, moral development, parenting impact, sibling relationships, peer relations, play and media.

Unit- IV: Middle Childhood **9 Hours**

a) **Physical Development:** body growth and change, the brain, Motor Development, exercise, health, illness and disease. Children with disabilities- scope of disabilities, educational issues
b) **Cognitive Development:** Piaget‟s theory, information processing, Intelligence.
c) **Language Development:** vocabulary, grammar and metalinguistic awareness, reading, writing, bilingualism and second language, learning.
d) Socioemotional development: The Self, emotional development, moral development, changes in parent-child relationships, Peers- changes, peer status, social cognition, bullying, and friends**.**

Reference Books:

1. Laura E Berk. Child Development, 9th edition, Prentice Hall of India. 2017.
2. Diane E Papalia. Human Development 7th International Edition, Mc Graw Hill Publications. 1998.
3. Lois Hoffman. Developmental Psychology Today 5th Edition, Mc Graw Hill Inc. 1988.
4. Elizabeth B Hurlock. Developmental Psychology-a life-span approach 5 th Edition, Tata Mc Graw Hill publication. 1987.
5. Hetherngton& Parke. Child Psychology. 5 th International Edition, Mc Graw, Hill. 1999.
6. John W. Santrock. Life Span Development, 9 th Ed. Mc Graw Hill Publication. 2011.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ4040 (P)	**Psychology Practicals IV**	**HC**	**0**	**0**	**2**	**2**	**4**

Statistics: t-test: independent sample and dependent sample.

5. Concept Formation
6. Creativity
7. Size and weight Illusion
8. Two-point threshold
9. VSMS

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ4050	**Minor Research Project**	**HC**	**0**	**0**	**6**	**6**	**12**

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

Prerequisites: Student must have knowledge of Research methodology

Pedagogy: ICT/ Flipped Classrooms/ Collaborative Learning/Guiding and supervising

Course Objective:

1. To carry out the research under the guidance of supervisor and in the process learn the techniques of research.
2. To explore new and fruitful ideas in the chosen field of the programme
3. To develop a perspective and to design and execute a research
4. To experience how the research is performed and to investigate an identified problem

Course Outcomes:

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

1. Infer withthe literature search
2. Demonstrate the experiments related to research and formulate computational techniques
3. Interpret the data and to demonstrate their domain knowledge
4. Apply and write report and defend the research findings.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ4060	**Employability Skills – II (Placement)**	**RULO**	**0**	**0**	**0**	**0**	**2**

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

FIFTH SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ5010	**Journalism-V(Media Laws And Ethics)**	**HC**	**3**	**1**	**0**	**4**	**4**

Course Description:
The purpose of this course is to provide students with a model by which to analyze, understand, and act upon the law and ethical considerations which journalists face. The course will consist of the writings of the Supreme Court, the Ethical rules of the Society of Professional Journalists, and actual events to build an analytical model. There is no profession more important to a democracy than journalism -when vigilant and diligent and resolute. In order to perform that role, the students are required to understand both the law and the ethics that govern it.
Prerequisites: Primary understanding of the requirement of laws in society.
Pedagogy: Direct instruction, Collaborative and ICT method
Course Objectives:

1. To provide students with knowledge on the laws and ethics in journalism
2. To equip the students with legal understanding of legal issues impacting them on the field.
3. To make students aware of the legal limits when reporting on sensitive and controversial issue of the day
4. To familiarize with the different kinds of media laws that a journalist will encounter in the field.

Course Outcomes:
At the conclusion of this course, students will be able to:

1. List best contemporary ethical and professional journalism practices
2. Define basic legal terminology.
3. Explain the workings of the Indian civil and criminal justice system.
4. Define the limits of legal rights.

Course Content:

Unit I: Indian Constitution **8 Hours**
Preamble; Directive principles; Fundamental Rights and duties; Article 19-1(a) and (b) - with reference to Freedom of the Press- reasonable Restrictions

Unit II: Media Laws **12 Hours**
Press and Registration of Books Act; Working Journalist Act; Defamation - Civil and criminal defamation-Libel & Slander; Judicial Reporting & Contempt of Court; Right to Information Act; Legislative privileges and contempt of legislature; Copy right Act; Intellectual Property Rights-

Copyright, Trademarks, Patents & GI; IT Act 2000 & Cyber Laws; cable network Resolution; Film Censorship; Cinematograph Act 1952; Prasar Bharathi Act

Unit III: Issues in Media **11 Hours**

Information Society; ICT revolution-Information & Knowledge society; NWICO; Media and Globalization- Implications; Sensationalism, Paid News; Sting Operations, Obscenity; Pressures on media

UNIT-IV: Ethics in Media **8 Hours**

Control; Press commission‟s (I&II) recommendations; Prasar Bharathi Act; Press council- code of conduct for journalists; Broadcasting Code-Right to privacy-Self Regulatory Bodies – IBF, NBA, Broadcast Content Compliance Council (BCCC), Ombudsman

Projects:

1. Case study Presentation
2. RTI
3. News Analysis of Court and Parliamentary Proceedings
4. Visit to High Court/ Vidhana Soudha

Reference Books:

1. Singh Sanjay Kumar. *Press Laws and ethics of Journalism*. Anmol Publication Pvt Ltd.2013.
2. Malar and M neela. *Media laws and ethics*. New Delhi: PHI learning private limited.2012.
3. Sharma Kumar Ajay. *Journalism laws*. New Delhi: Random Publications.2012.
4. Singh Yatindara Justice. *Cyber Laws*.Delhi Universal Law Publishing.2005.
5. Basu DD. *Law of the Press*. New Delhi: Prentice Hall.2002.
6. Seib Philip & Fitzpatrick Kathy. *Journalism Ethics*. New York : Harcourt Brace College Publishers.2000.
7. T MecluskeyMatha. *Feminism, Media and The Law*. New York:Focus Press.1997.
8. K SVenkateshwaran . *Mass Media Laws and Regulations in India*. Singapore : AMIC.1993.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ5021	**Journalism-VI A (Brand Ecology)**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Description:

The course Brand Ecology is structured to prepare students to have an understanding on how brands communicate with consumers. It gives a deeper insight to students about brand communication methods from traditional forms like guerilla marketing to modern ways that have

opened up in electronic and social media. It familiarizes students in understanding effective brand communication by use of new media technologies towards new types of consumers and media users. Students will also learn to design and implement brand communication strategies, measure brand effectiveness and cater the internal and external stakeholders. The course will be a combination of inform lecture and involve group discussion activities, case analysis and exercises.

Prerequisites: A basic idea about the concept of brands.

Pedagogy: Direct instruction, inquiry based and Collaborative method

Course Objectives:

- To introduce the students to the concepts of Branding, Brand image, Brand value and equity.
- To understand how brands are created, managed and sustained.
- To plan and implement brand marketing programs.
- To familiarize with the concepts of managing brands.

Course Outcomes:

At the conclusion of this course, students will be able to:

- Identify the brand management concepts in the real world.
- Examine how Brands function and sustain.
- Interpret the Planning, designing and implementing brand communication strategies.
- Make use of the new media technologies as a medium to communicate to stakeholders.

Course Content:

Unit-I : Introduction to Brand Management **10 Hours**

The importance of Branding. Brand versus Product; Brand image, Brand Value, Brand Equity, Brand Position, Product Life Cycle, Market Segmenting, Targeting, Identifying and establishing Brand Positioning.

Unit-II : **Brand Management** **10 Hours**

Identifying and establishing brand positioning. Positioning guidelines, Brand Associations, Internal Branding, Branding challenges and opportunities, Choosing Brand Elements to Build Brand Equity, Brand-Product Matrix.

Unit-III: **Strategic Brand Management** **10 Hours**

New product Branding and Introduction process; Brand Extensions, Advantages and disadvantages and Opportunities, How consumers evaluate Brand Extensions, Developing Brand Plans, Designing and implementing Brand Marketing programs, Measuring and Interpreting Brand performance, Sustaining Brand Equity.

Unit-IV: Managing Brands **9 Hours**

Managing Brand Portfolio, Reinforcing Brands, Revitalizing brands, sustaining a Brand long term, Maintaining Brand Consistency, Protecting Sources of Brand Equity, Acquiring New customers, Global Brand Equity, Global Brand Positioning.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5021 (P)	**Journalism Practicals VI (A)**	**SC**	**0**	**0**	**2**	**2**	**4**

Submit a case analysis of any Indian brand of your choice
Prepare abrand plan to brand yourself
Prepare a brand plan for a new productto be introduced.

References Books:

1. Keller, Parameswaran and Jacob (Edt). *Strategic Brand Management*, Bangalore: Pearson India.2015.
2. Philip Kotler (Edt). *Marketing management*, New Delhi: Pearson India.2015.
3. Ramanuj Majumdar. *Product Management in India*, New Delhi: Phi Learning. 2009.
4. Annurag Batra. *Marketing Whitebook*, New Delhi: BW Businessworld Media.2019.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ5022	**Journalism VI (B) (Fundamentals of Photography)**	SC	2	1	0	3	4

Course Description:
This course will introduce students to the basic principles and techniques of b/w and color digital photography. Hands-on class demonstration and training will be ranging from the technical to the artistic, employing both straightforward and creative camera and computer procedures.
The teaching style will incorporate several formats including seminar-type presentations, hands-on practice, group discussions, critiques, and independent research.
Prerequisites: Keen interest in photography
Pedagogy: Direct Method, Kinesthetic, ICT and Collaborative method
Course Objectives:

1. To make the students concentrate on building the fundamental skills needed to produce images for publication in today‟s media.
2. To ensure that students successfully acquire a basic knowledge of how to operate their cameras

3. To equip students with skills that allow the use of technology to the advantage as visual storytellers.
4. To understand thbe issues in Photojournalism.

Course Outcomes:

At the conclusion of this course, students will be able to:

1. Demonstrate a competent mastery of using a digital camera to produce images that are ready for publication in professional media.
2. Create compelling images that communicate the intended message with accurate captions which are publishable in professional publications.
3. Plan to gather and use audio to enhance the communicative value of a visual package.
4. Critically analyse the issues in Photojournalism.

Course Content:

Unit-I: Introduction To Photography **10 Hours**

Photography, its role & importance and history

Types of camera- TLR, SLR, Polaroid, Underwater Camera & Digital Camera, mirrorless camera

Parts & functions of camera- Aperture, Shutter speed, ISO, Focal No. & Focal Length, Depth of Field, Shallow Depth of Field;

Camera accessories: Tripod, Monopod, Filters, Lens hood and Rigs

Unit-II: Aspects of Photography **10 Hours**

Lens- Definition, Concept & Characteristics of lens

Types of lens- wide angle, normal & Tele; Special lens- zoom, fish eye & macro Lens;

Filter- definition & concept; Characteristics and types of filters

Planning a shoot, studio, location, set props and casting

Unit-III: Principles of Photography **9 Hours**

Lighting: Sources of light: Natural & Artificial

Elements of composition- Rule of Third, Rule of Thumb, Diagonal and S-shaped compositions, Repetition and Rhythm, Moving towards the centre Editing

Unit-IV: Issues Related to Photojournalism **10 Hours**

Various types of photography: Portrait, Wildlife, Nature, Human Interest, Sports, Night photography; street photography

Advertising Photography: Studio and Outdoor,

Text vs. Photograph; Essentials of a press photograph

Qualities of a good photojournalist

Visual story telling - Photo-features, Photo – essays

Writing captions
Challenges faced by photojournalists

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5022 (P)	**Journalism Practical VI (B)**	**HC**	**0**	**0**	**2**	**2**	**4**

- Shooting exercise in artificial lights and natural light
- Photo feature on a specific topic by using self-clicked photographs with Digital Camera.
- Photographs should be of postcard size. A photo feature must comprise of 10 – 12 photographs.
- Each student shall be required to take photographs in the following categories:

  1) Night Photography
  2) Architecture
  3) Portrait
  4) Landscape
  5) Fashion

  Create and design a photo album with text, captions; Individual assignment; minimum 12 prints in A4 pages in multi color, spiral binding

Reference Books:

1. London, Barbara and Stone, Jim. *A Short Course in Digital Photography*. Pearson. 2012.
2. Ang, Tom. *Digital Photography Masterclass*, DK Publishing. 2008.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ5030	**Literary Criticism**	**HC**	**4**	**0**	**0**	**4**	**4**

COURSE DESRIPTION:

This course has been designed to offer the students a comprehensive knowledge of western literary criticism with an emphasis on select prominent thinkers and their significant ideas. The course has also been developed in order to groom the students towards a profound critical approach towards literature.

Prerequisites:

- The student must have basic idea of literary sensibility and Criticism.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To appraise the basic ideas of literary criticism.
- To outline the development of literary criticism.
- To analyze the diversity of literary criticism and its application in literary and non-literary endeavours.
- To examine the modern developments in literary criticism.

Course Outcomes:

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

- Develop an initial association with literary criticism of different era.
- Explain the major characteristics of Greek Literary Criticism.
- Demonstrate a good understanding of Elizabethan, Neo-Classical and Romantic Criticism and enhancing their analytical skills.
- Outline the major features of Victorian, Modern and Postmodern Criticism.

Course Contents:

Unit – I: Introduction **13 hours**

1. Introduction to Literary Criticism
2. Function of literature and literary criticism
3. Brief history of literary criticism

Unit – II: Introduction to Greek Literary Criticism **13 hours**

1. Introduction to Greek Literary Criticism
2. Plato: *The Republic* (Extract)
3. Aristotle: *Poetics* (Extract)

Unit – III: Elizabethan, Neo-Classical and Romantic Criticism **13 hours**

1. Introduction to Elizabethan, Neo-Classical and Romantic Criticism
2. Dryden: Extract from *Essay of Dramatic Poesy* (Neander‟s views on English drama)
3. William Wordsworth & Samuel T. Coleridge: Extract from Preface to *Lyrical Ballads*

Unit – IV: Victorian, Modern and Postmodern Criticism **13 hours**

1. Introduction to Victorian, Modern and Postmodern Criticism

2. Matthew Arnold: The *Study of Poetry* (Extract)
3. T.S. Eliot: Tradition and Individual Talent (Extract)
4. Lawrence E. Cahoone: What Postmodernism Means

REFERENCE:

- Habib, M.A.R. *Literary Criticism from Plato to the Present: An Introduction*. Wiley India, 2012.
- Plato, *The Republic*. Maple, 2013.
- Aristotle, *Poetics*. Penguin, 1996.
- Sen, S. *John Dryden: An Essay of Dramatic Poesy*. Unique Publishers, 2009.
- Wordsworth, William & S.T. Coleridge. *Lyrical Ballads*. Penguin, 2006.
- Arnold, Mathew. *Culture and Anarchy and Other Selected Prose*. Penguin, 2015.
- Eliot, T.S. *Sacred Wood:Essays on Poetry and Criticism*. Nabu Press, 2013.
- Cahoone, Lawrence E. *From Modernism to Postmodernism*. Wiley-Blackwell, 1995.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ5041	Literatures of India – I	**SC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:
This course has been designed to introduce the students to the works of Indian Writings in English. In the modern world, it is extremely important to know and appreciate one‟s roots and therefore this course shall help the students to frame their own ideologies and identities and at the same time make them aware of the richness of Indian literature and culture.
Prerequisites: The student must have basic idea of Indian culture, history and society.
Pedagogy:
Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning
Course Objectives:

- To outline the various movements of Literatures from India.
- To develop an understanding of the socio-political and economic issues of the post-independent India.
- To examine Literatures of India, particularly to writings in translations.
- To assess the literary and political issues that Literatures from India has undergone.

Course Outcomes:

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

- Analyze the various issues discussed by classical and modern poets of Literatures from India.
- Distinguish the major features in the fictional narratives of Literatures from India.
- Demonstrate familiarity with concerns specific to India as presented in non-fictional works by Indian writers.
- Develop a better understanding of socio-political dimensions of India.

Course Contents

Unit – I: Poetry **13 hours**

1. Kalidasa – Canto I "Summer" (from *Ritusamhara*)
2. Kabir – If God be within the mosque…
3. Mira Bai – Your Slander is Sweet
4. Ramprasad Sen – O Longing Mind
5. Sumitra Nandan Pant – Fruits of the Earth
6. Fiaz Ahmed Fiaz – The Colour of the Moment
7. Kuvempu – Kalki
8. Sitakant Mahapatra – Father

Unit – II: Short Fiction **13 hours**

1. Munshi Premchand – The Shroud
2. Saadat Hasan Manto – Thanda Gosht
3. LalithambikaAntarjanam – Revenge Herself

Unit – III: Essays **13 hours**

1. Rabindranath Tagore – Religion of the Forest
2. A. K. Ramanujan – Is There an Indian Way of Thinking?

Unit – IV: Drama/Novel **13 hours**

1. Girish Karnad – *Hayavadana*
2. R.K. Narayan – *The Guide*

REFERENCE:

- Kale, MR. *The Ritusamhara*. Bharatiya Kala Prakashan, 2007.
- Dharwadker, Vinay. *Kabir*. Penguin, 2003.
- Bly, Robert. *Mirabai: Ecstatic Poems*. Aleph Book, 2017.
- Sen, Ramprasad. *Grace and Mercy in her Wild Hair: Selected Poems to the Mother Goddess*. Hohm Press, 1999.
- Kiernan, V.G. *Poems by Faiz Ahmed Faiz*. Oxford, 2000.
- George, KM. *Modern Indian Anthology: Surveys and Poems.*SahityaAkademi, 1992.

- Manto, Saadat Hasan &AatishTaseer. *Manto: Selected Short Stories*. RHI, 2012.
- Narasimhachar, Sudha. *Selected Stories of MunshiPremchand*. Unicorn Books, 2016.
- Holmstorm, Lakshmi. *The Inner Courtyard: Stories by Indian Women*. Rupa, 1991.
- Tagore, Rabindranath. *RabindranathTagoreOmnibus*. Rupa, 2003.
- Ramanujan, A.K. *The Collected Essays of A.K. Ramanujan*. Oxford University Press, 1999.
- Narayan, R.K. *The Guide*. Indian Thought Publications, 2007.
- Karnad, Girish. *Hayavadana*. Oxford, 1997.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ5042	**European & Non-European Writings – I**	**SC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

The widening of the domain of English literature all across the globe has made it extremely important to acquaint the students of English literature to the vast oeuvre of non-canonical literature. This course in particular is designed to introduce the students to the large bodies of European and Non-European literature.

Prerequisites: The student must have basic idea of European Literature.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives

- To assess the cross-cultural perspectives of European literature.
- To examine literature from all over the world and initiate them to the basic concepts and ideas of non-canonical literature.
- To analyze multiple socio-political histories and culture through literature.
- To develop an understanding of basic cultural contexts into which the texts are systematically located.

Course Outcomes:

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

- Demonstrate a good understanding of various issues presented in poetry from all over the world.

- Develop an initial association with the fictional works of literary stalwarts from various nations and their contribution to world literature.
- Outline the characteristic features of Greek drama.
- Analyze the history of Hitler‟s regime.

Course Contents:

Unit – I: Poetry **13 hours**

1. Homer – from *The Iliad*
2. Dante – from *The Inferno*
3. Federico Garcia Lorca – Absent Soul (from *Lament for Ignacio Sanchez Mejias*)
4. Bertolt Brecht – To Those Born Later
5. Anna Akhmatova – Extract from *The Requiem*
6. Czeslaw Milosz – In Warsaw

Unit – II: Poetry **13 hours**

1. Leo Tolstoy – God Sees the Truth, But Waits
2. Franz Kafka – A Hunger Artist
3. Jean-Paul Sartre – The Wall

Unit – III: Essays **13 hours**

1. Simon Goldhill – Introduction from *Greek Tragedy*
2. William L Shirer - *The Rise and Fall of the Third Reich: A History of Nazi Germany* (Extract)

Unit – IV: Drama **13 hours**

1. Sophocles – *Oedipus Rex*
2. Anton Chekov – *The Cherry Orchard*

REFERENCES:

- Homer. *The Iliad.* Penguin,2003.
- Alighieri, Dante. *Inferno.* Collins, 2011.
- Lorca, Frederico Garcia. *Collected Poems.* Penguin, 2001.
- Akhmatova, Anna. *Akhmatova: Poems.* Everyman‟s Library, 2006.
- Brecht, Bertolt. *Selected Poems.* Mariner Books, 1947.
- Milosz ,Czeslaw. *New and Collected Poems: 1931-2001*. Penguin, 2006.
- Tolstoy, Leo. *God Sees the Truth, But Waits.* Creative Classics, 1986.
- Kafka, Franz. *A Hunger Artist.* Twisted Spoon Press, 1996.
- Sartre, Jean Paul. *The Wall.* Hal Leonard Corp, 1995.
- Aeschylus, Euripides and Sophocles. *Greek Tragedy*. Penguin, 2004.
- Shirer, William L. *The Rise and Fall of the Third Reich: A History of Nazi Germany*. RHUK, 1991.
- Sophocles. *The Three Theban Plays.* Penguin, 1984.

- Chekhov, Anton. *Plays.* Penguin, 2002.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5050	**Psychology – V (Measurement and Research Methods in Psychology)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This course aims to provide scientific approach to the field by introducing to the psychological measurement and application of it. Offers basic understanding to process of scientific research, ethical concepts involved in it and introduces basic skill for scientific writing, in order to orient students towards responsible research work in the field of Psychology.
Prerequisites: knowledge about the discipline science and its distinction from other disciplines.
Pedagogy: Direct learnings, Discussion, Assignments, Critical Reasoning, Problem solving.
Course Objectives:

1. To introduce the basic concepts of Psychological measurement and testing
2. To orient to the basic concepts of scientific research process and ethics in research.
3. To equip with scientific writing research methodology.
4. To prepare students to make sense of the research papers.

Course Outcomes:
Upon successful completion of this course, students will be able to:

1. Discover and understand of basic concepts of Psychological Measurement and Research process testing
2. Outline and elaborate the process of scientific research and ethics involved in research
3. Identify and execute step by step process of conducting research
4. Adapt and incorporate scientific writing skills in research.

Course Contents:

Unit I: Psychological Measurement **10 hours**

Definition of measurement, Levels of measurement: Nominal, Ordinal, Interval and Ratio scales, Properties of scales of measurement: Magnitude, equal interval and absolute zero, Distinction between psychological measurement and physical measurement, Problems in psychological measurements.

Definition of psychological test, Uses of psychological test, Characteristics of a good test: Objectivity, Reliability, Validity, Norms, and Practicability, ethical issues in psychological testing.

Unit II: Introduction to Scientific Research **10 hours**

Definition: Science, difference between science and common sense
Methods of knowing: method of tenacity, method of authority, priori method, method of science.
Science and its function
The aims of science, scientific explanation and theory.
Scientific research definition.
The scientific approach.
Types of research: quantitative, qualitative, experimental, explorative, pure, action and applied.
Ethical issues in research.

Unit III: Research Process **10 hours**

Steps in Scientific Research: identifying the problem, hypothesis: definition, types.
Variables: Independent and Dependent variable
Sample vs. population, sampling definition: types-random and non-Radom sampling
Data collection: questionnaire, interview, observation.
Data Analysis: descriptive statistics – central tendency, S.D
Inferential Statistics- Correlation and t-test.

Unit IV: Writing Research Report. **9 hours**

Need to write report
Structure of a research report
APA format of report writing
In text citation
Referencing
Need for publishing

Reference Books:

1. Best, J.W. & Kahn, J.V. Research in education. Prentice-Hall of India. (9th ed, EEE). Publication Manual of the American Psycological Association (6th ed). 2013
2. Kothari, C. R. Research Methodology: Methods and Techniques. WishwaPrakashan(2nd ed).2003.
3. Singh, A. K. Tests, Measurements and Research Methods in Behavioral Sciences. New Delhi: Tata McGraw Hill.1986.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5050 (P)	**Psychology Practical V**	**HC**	**0**	**0**	**2**	**2**	**4**

Statistics: Median test

1. David‟s Battery of Differential Aptitudes-I
2. David‟s Battery of Differential Aptitudes-II
3. Comprehensive Interest Schedule
4. Tweezers Dexterity Test.
5. Regan‟s Progressive Matrices.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5061	**Psychology – VI (A) (Abnormal Psychology - I)**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This course provides an examination of the various psychological disorders as well as theoretical and clinical perspectives to the study of psychopathology. Emphasis is on terminology, classification, etiology and diagnosis of the major disorders. Upon completion, students should be able to distinguish between normal and abnormal behaviour patterns as well as demonstrate knowledge of etiology, symptoms, and diagnosis criteria‟s of major mental disorder. This course has been approved to satisfy the Comprehensive Articulation Agreement for the general education core requirement in social/behavioural sciences.
Prerequisites: Basic Concepts of Psychology
Pedagogy: Direct Learning, Case Studies, Critical Analysis, ICT.
Course Objectives:

1. To sensitize on nature, history and diagnosis of mental disorders.
2. To learn the different perspectives in understanding abnormal behaviour.
3. To learn the symptoms and causes of Anxiety Disorders and Obsessive Compulsive Disorders.
4. To learn the symptoms and causes of Trauma and Stress related disorders and Depressive Disorders.

Course Outcomes:
Upon successful completion of this course, students will be able to:

1. Elaborate the nature, history and diagnosis of abnormal behaviors
2. Discover and understand the different perspectives in understanding the abnormal behavior
3. Outline and elaborate the symptoms, causes and diagnosis of Anxiety and Obsessive-compulsive disorder.
4. Analyze and understand the symptoms, causes and diagnosis of Trauma and Stress related disorders and Depressive Disorders.

Course Contents:

Unit-I: Introduction to Psychopathology **10 Hours**

a. Definition: Abnormal Psychology, Mental Disorder. The science of Psychopathology, The stigma of Abnormal Behaviour, Adaptive and Maladaptive behaviour.
b. Historical conceptions: the ancient western world, the Middle ages, renaissance, age of reason and the Enlightenment, The reform movement.
c. Diagnosing Psychological disorders: Classification Systems- ICD and DSM.
d. Seeking help for Abnormal Behaviour: reasons for clinical contacts, sources of help.

Unit-II: Theoretical Perspectives on Maladaptive Behaviour 10 Hours

a. The Biological Perspective: genetic factors, nervous system and the Brain, The Endocrines, The Neuroscience Revolution, Integration of Biological and Psychological Systems.
b. The Psychodynamic Perspective: Freud and Psychoanalysis, More recent approaches to psychoanalysis.
c. The Behavioural Perspective: Classical conditioning, Operant conditioning and Social-cognitive theories.
d. The Cognitive Perspective: Maladaptive behaviour and cognition.
e. The Humanistic perspective
f. The Existential perspective

The Community-cultural perspective.

Unit-III: Anxiety and Obsessive-compulsive disorders (DSM-5) 10 Hours

a. Definition of Anxiety, Fear and Panic.
b. Prevalence of Anxiety disorder, gender difference if any.
c. Clinical Description of Types: Generalized Anxiety Disorder, Panic disorder, agoraphobia, Specific Phobia-animal, natural environment, Blood-injection-injury, situational, Social Anxiety Disorder, Separation Anxiety Disorder, selective Mutism.
d. Obsessive-compulsive disorders: OCD, excoriation (skin-picking) disorder, hoarding disorder, Body Dysmorphic Disorder, clinical Description and causes.

Unit-IV: Trauma- and stressor-related disorders and Depressive disorders 9 Hours

Trauma- and stressor-related disorders:

a. Definition of Trauma and Stress, type. Stressors
b. Clinical Description and causes of Posttraumatic stress disorder (PTSD), acute stress disorder, reactive attachment disorder and disinhibited social engagement disorder, Adjustment disorders.

Depressive disorders: Disruptive Mood Dysregulation Disorder, Major Depressive Disorder-single episode-mild, moderate, severe, recurrent episode-mild, moderate severe, Persistent Depressive Disorder(Dysthymia), Premenstrual Dysphoric Disorder.

Reference Books:

1. Alloy, L.B., Riskind, JH., andManos,M.J. Abnormal Psychology – Current Perspectives. 9th Edition. New Delhi: Tata McGraw- Hill Edition.2006.
2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed., text revision). Washington, DC: Author.2013.
3. Barlow,D.H. and Durand,M.V. Abnormal Psychology. 2nd Edition. New Delhi: Thomson Publication. 2000.
4. Bootzin,R.B.,Acocella,J.R. and Alloy,L.B. Abnormal Psychology–Current perspectives. 6th Edition, International Edition,Tata Graw –Hill Inc., USA.1993.
5. Carson, R.C., Butcher, J.N and Mineka ,S.Abnormal psychology. 13th Edition. New Delhi: Pearson Education.2004.
6. DSM-5 manual, https://cdn.website-editor.net/30f11123991548a0af708722d458e476/files/uploaded/DSM%2520V.pdf
7. Davidson and Neal Abnormal psychology. Revised 6th Edition, John Wiley Sons World Health Organization. (2008). ICD-10: International statistical classification of diseases and related health problems (10th Rev. ed.). New York, NY: Author.1996.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5062	**Psychology –VI (B) (Health Psychology - I)**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Description:

This is an advanced course in psychology designed to give a broad overview of the field of health psychology. Health psychology is a relatively young, diverse, and multidisciplinary field that examines the mind-body connection and many factors that influence the individual‟s well-being. In this course, students will explore how biological, psychological and social factors are connected and how they may influence health consequences. Following this bio-psychosocial approach, potential biological, psycho physiological, and behavioral pathways to health and disease will be explored. By the end of the course, students would gain fundamental knowledge of the field of health psychology, develop skills for critically evaluating health psychology research, and understand how health psychology may be applied to promote their own well-being.

Prerequisites: Basic understanding and experience of healthy and illness.

Pedagogy: Direct Learning, ICT, Discussion

Course Objectives:

Students are expected to develop an understanding of health psychology and gain skills in the following:

1. To understand the nature, history, origin and scope of Health Psychology.
2. To enhance the cognitive aspects of illness and factors influence compliance.
3. To learn about health promoting behaviors
4. To outline the connection between Pain and Psychological factors.

Course Outcomes:

Upon successful completion of this course, students will be able to:

1. Outline and relate Health and Psychology and its relevance.
2. Analyzethe impact of cognition on illness and explore the need for compliance and factors influencing it.
3. Elaborate and apply the various behaviors that promotes health
4. Acquire and evaluate the psychological aspects related to pain perception and evaluate strategies for dealing with pain sensation and perception

Course Contents:

Unit-I: Introduction **10 Hours**

a) Definition of Healthy Psychology
b) History of Health Psychology
c) Aims of health psychology.
d) Future of health psychology
e) Advantages of the Bio psychosocial Model, Clinical Implications of the Bio psychosocial Model.
f) The Bio psychosocial Model: The Case History of Nightmare Deaths.
g) The Need for Health Psychology: Changing Patterns of Illness, Advances in Technology and Research, Expanded Health Care Services, Increased Medical Acceptance.
h) Health Psychology Research: The Role of Theory in Research, Experiments, Correlational Studies, Prospective and Retrospective Designs, the Role of Epidemiology in Health Psychology, Methodological Tools.

Unit-II: Illness Cognition and Compliance **10 Hours**

Definition of Health, illness
Illness cognition: definition, dimensions, evidences for dimensions, Measurement.
Leventhal‟s Self-regulatory model
Symptom Perception
Coping with crisis of illness
Using the self-regulatory model to predict outcomes-adherence, recovery from stroke and MI
Illness cognitions and health outcomes
Compliance: Definition, work of ley-predicting the patient‟s compliant, improving compliance

Unit-III: Health-Promoting Behaviors **10 Hours**

a) **Health Promotion:** health behaviors and health habits, Practicing and changing health behaviors, barriers to Modifying poor Health Behaviors, Intervening with Children and Adolescents, Intervening with At-risk people, Health promotion and Older Adults, Ethnic and Gender Differences in health risks and habits.
b) **Exercise:** Benefits of Exercise
c) **Accident Prevention:** Home and Workplace Accidents
d) **Cancer-Related Health Behavior:** Mammograms, Colorectal Cancer Screening, Sun safety practices

e) **Developing a Healthy Diet:** changing diet, Resistance to Modifying Diet, Intervention to Modify Diet.
f) **Sleep:** Sleep and Health
g) Rest, Renewas, Savoring

Unit-IV: Pain **9 Hours**

a) Pain: nature, definition, cross-cultural perspective on pain, measuring pain, physiology of pain.
b) Pain theories: early theories, gate control theory.
c) Role of Psychosocial factors in pain perception.
d) Clinical Issues in Pain Management: acute and chronic pain, pain and personality.
e) Pain control techniques: Pharmacological Control of Pain Surgical Control of Pain Sensory Control of Pain Biofeedback Relaxation Techniques Distraction Coping Skills Training Cognitive-Behavioural Therapy.

References Books:

1. Jane Ogden. Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi. 2010.
2. Shelley E. Taylor. Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi. 2006.
3. Steve R. Baumgardner & Marie K. Crothers. Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia. 2009.
4. M. Robin Dimatteo& Leslie R. Martin. Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia. 2002.
5. Alan Carr- Positive Psychology, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia**.**

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5061(P)/B20BJ5062(P)	**Psychology Practical -VI(A)/ Psychology Practical VI(B)**	**SC**	**0**	**0**	**2**	**2**	**4**

Statistics: Chi-square test.

1. Eysenk‟s personality questionnaire
2. Bell‟s adjustment inventory
3. Type A and Type B behavioural pattern
4. Assertiveness
5. Big-5 personality factors

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ5070	**Employability Skills – III**	**RULO**	**Non credit compulsory course**				**2**

SIXTH SEMESTER

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ6010	**Journalism VII (Advertising and Corporate Communication)**	**HC**	**3**	**1**	**0**	**4**	**4**

Course Description:
The course Advertising and Corporate Communication will make the students aware of the advertising environment in the 21st Century, agency and client relationships, consumer behavior, ethics, and the role of research, creative appeals, and media selection in advertising effectiveness. Within corporate communications classes, students focus on the management, strategic planning, and implementation of marketing, communication, and public relations techniques all to resolve corporate dilemmas. Corporate communications course focuses on researching problems, setting objectives, identifying audiences, designing messages, choosing communication channels, and evaluating results for all types of organizations. Ethical decision making, on-line communication, and career opportunities are also analyzed via case studies in the field. The course will be a combination of informal lecture and small-group discussion, case analysis, and guest lecture.

Prerequisites: A preliminary exposure to the advertisements.

Pedagogy: Direct method, inquiry based and collaborative method

Course Objectives:

1. To introduce to the Concepts and Principles of Advertising, Ad Agency Management and Brand Management
2. To take the roles and scopes of PR in management, its various tools and the emerging importance of the discipline in varying areas.
3. To look at the evolution of Corporate Communication
4. To expand role in organizational and marketing communication

Course Outcomes:

After the completion of this course, students will be able to:

1. Outline the process of producing advertisements
2. Construct and analyze audience research, media research, and environmental scanning
3. Design public relation strategy for the organization image and well-being
4. Formulate corporate communication strategy for crisis management, brand management, etc.

Course Content:

Unit-I: Introduction to Advertising **13 Hours**

Advertising- Definition, Nature and scope
Origin and development of advertising
Social and Economic Effects of Advertising
Ethical & Regulatory Aspects of Advertising
Ad Agency- structure and Function

Unit-II: Elements in Advertising **13 Hours**

Mediums of advertising: Print, Radio and television
New trends in advertisement; Designing advertisement: Copy writing, elements of ad copy, layout
Ethics in advertising; Types of advertising; Advertising appeals
Campaigns- Media planning strategy, media mix, Media selection, Ad budgeting.

Unit-III: Introduction to Public Relations **13 Hours**

Public Relations- Meaning &Definition, nature, scope; Functions
Origin and development of public relations in India
Differences between Public opinion, Publicity, Propaganda and PR
Role and responsibility of a public relation practitioner

Unit-IV: Aspects of Public Relations **13 Hours**

PR Tools - House Journals, Press Conferences, Press releases, Exhibitions, Advertising, Media Tour. Corporate Communication. Corporate Social Responsibility.
Ethical issues in PR- Employee relations, shareholder relations, distributor-dealer relations, community relations, consumer relations
Lobbying and fundraising
Professional organizations in PR

References Books:

1. J V Vilanilam.*Public Relations in India*, Sage Publications.2011.
2. Choonawala S A and Sethia K C (Edt). *Foundations of Advertising theory & Practice, Bangalore*: Himalaya Publishing.2005.
3. Wells and MorlatyBurfert (Edt). *Advertising: Principle &Practice*.NewDelhi:Prentice Hall.2003.
4. Chandrakandan . *Public Relations,* Authors press.2002.
5. Percy LarR ry. *Strategic Advertisement Management*, Europe Prentice Hall ISBN.2002.
6. R Staffer Marla (Edt). *Advertising Promotion and New Media*, USA :Times Mirror Co.2001.
7. Wells William.*Advertising, Principles and Practice*, London: Prion Books Ltd.2001.
8. Ahuja &chabra. *Public Relations*. New Delhi : Surjit Publications.2001.
9. F Arens Williams. *Contemporary Advertisement*,USA: Times Mirror Education Group.2000.

10. Singh Bir. (Edt). *Advertising Management* .New Delhi: Anmol Publications.2000.
11. Percy Larry (Edt). *Strategic advertisement Management*. New Delhi: Suraj Publications.2000.
12. Pandey,Meena. *Foundation of Advertising Theory and Practice*.Bombay: Himalaya Publishing house.1989.
13. M Scott, Cutlip. *Effective Public relations*. Prentice Hall. 1985.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ6021	**Journalism -VIII (A) (New Media)**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This course provides the students with a critical introduction to the emerging "wired" or "cyber" technologies and the economic and political implications of the same. In this course, the students will learn about the historical development of the Internet and other forms of new media and examine the repercussions of the digital revolution for our communities, identities, politics, and our daily lives. Students will further learn how to create a web page and how to blog.
Prerequisite: Basic knowledge to work with ICT
Pedagogy: Direct Instruction, Inquiry Based Learning, Collaborative learning, Flipped Classroom
Course Objectives:

1. Through a variety of online and offline projects, students will develop the skills needed to be an active participant in the new media culture
2. To be able to relate to technological determinism in society
3. To enable the students to develop a critical, sociologically and historically informed perspective on the digital communication revolution and the Internet
4. To acquire the skills required for technical proficiency required in web platforms

Course Outcomes:
After the completion of this course, the students will be able to-

1. Define and discuss key theoretical concepts related to new media studies
2. Develop technical proficiency to be an active participant in the new media culture.
3. Identify and assess the social, cultural and political implications of new media production and consumption process.
4. Relate to upcoming digital evolution

Course Content:

Unit – I: Introduction to New Media **10 Hours**
Introduction to New Media- Meaning and characteristics
Interactivity and New Media

Economics of New Media
Intranet to Internet; Information & Knowledge Society
Social Media: Uses by different demographics; Ethical issues with Social Networking, Social relationship and Identity-Online and Offline
Transmedia

Unit – II: Impact of New Media on Journalism **10 Hours**

Understanding New Media- Impact of new media on journalism
Difference of elements between web journalism, traditional journalism and other media
Characteristics of the online writer/journalist; Trends in web/online journalism
Journalism ethics and restraint in new media-Accuracy, Privacy, Fairness, Linking, Journalistic integrity, Questions of Plagiarism;

Unit – III: Writing For the Web **10 Hours**

Linear vs. nonlinear form
Writing for the screen vs. writing for print
Web page writing and editing techniques
Website vs. web-portal
Web site planning, design and the writer
Audience analysis; content planning, structure; Copyright issues; Mobile content/connecting to your audience
Visual Design; New Media aesthetics

Unit – IV: New Media and Society **9 Hours**

Networked Societies
E-Governance; Innovations in E-Governance
New Media as Surveillance Technology
Activism in Cyber Space

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6021 (P)	**Journalism Practical I**	**SC**	**0**	**0**	**2**	**2**	**4**

- Introduction to Blogging and Vlogging
- Creating a news portal.
- Learning the basics of the production of a podcast.
- Actively participate in a Cyber Media campaign or do a report on Cyber Activism
- Observational studies on Surveillance technologies, Youth and Social Networking

References Books:

1. Hand Book of New Media by Lievrouw and Livingston, Sage (Student Edition)

2. Stephen McDowell & Kartik Pashupati (nd) „India's Internet policies: ownership, control, and purposes"; Unpublished Paper.
3. Kahn, R and D Kellner. "New Media and Internet Activism: From The Battle of Seattle to Blogging" *New Media & Society*, Vol. 6, No. 1, 87-95. 2004.
4. Castells, Manual. *The Network Society: a cross-cultural perspective*, Edward Elgar, MA (Chapter 1. Informationalism, networks, and the network society: a theoretical blueprint pp.3-45.). 2004
5. Gill, S.S.*India"s Information Revolution: A Critique*; Rupa, Delhi, 2004.
6. Van Dijk, J. A. G. M. " *The Network Society : Social Aspects of New Media",* Sage Publications,2005.
7. Why activists cannot afford to neglect the Internet by Arun Mehta from The Public Domain *Sarai Reader 01 (*P 140-146)
8. Lister, Martin : K. Kelly; J. Dovey S Giddings; & I Grant. New Media: A Critical Introduction , 2nd Routledge, London. 2008.
9. Everett, A. Digitextuality and click theory: Theses on convergence media in the digital age. In A. Everett, ed. & J. Caldwell (Eds.), New media: Theories and practices of digitextuality (pp. 1–28). New York: Routledge.2003.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BJ6022	**Journalism - VIII (B) (Development Communication)**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Description:

This course is designed to provide the students with detailed insight into the significance of communication for development. Students in the process shall gain an understanding of how communication strategies in different medium of traditional and mainstream media can help in developmental purposes.

Prerequisite: Basic level of understanding of the development concept

Pedagogy: Direct Instruction, Inquiry Based Learning, Collaborative learning, Flipped Classroom

Course Objectives

1. To help the students understand the concept of development.
2. To explain students the indicators of development.
3. To interpret development issues, particularly in Indian perspective
4. To apply the skills of development journalism

Course Outcomes:

After the successful completion of the course, students will be able to-

1. List the indicators of development
2. Classify developmental issues plaguing the developing nations
3. Demonstrate communication strategies to tackle developmental issues
4. Analyse the development communication strategies from the Indian perspective

Course Content:

Unit – I: Concept of Development **10 Hours**

Definition, meaning and process of development

Ingredients (5Ms) of development and money generation, MNCs and foreign aid

Characteristics of developing countries i. High dependence on primary sector ii. Unemployment, population iii. Low productivity iv. Low level of living

Unit – II: Indicators Of Development **10 Hours**

Economic and social indicators of development: i. GDP/GNP ii. Human Development Index iii. Physical Quality of Life Index

Other indicators: i. Communication as an indicator ii. Democracy as an indicator iii. Human Rights as an indicator

Unit – III: Development Issues **10 Hours**

Poverty Alleviation

Employment generation

Women and child development

Health and Family Welfare

Tribal rights on forest

Unit – IV: Media & Development **9 Hours**

Use of traditional media for development

Role of print media in development

Contribution of radio & TV to development

ICT for Development

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6022 (P)	**Journalism Practical – VIII (B)**	**SC**	**0**	**0**	**2**	**2**	**4**

- Prepare Case Study of a Welfare Scheme
- Devise and conduct a street play on a social issue outside the campus

- Make a PSA on a social cause of your choice (Print or Electronic)

Reference Books:

1. Melkote, Srinivas R, *Communication for Development in the Third World: Theory and Practice*.Sage Publications. 1991.
2. Arvind and Rogers, Everett M. *India's Information Revolution*, Sage Publications, New Delhi. 1989.
3. Usha Rani, N. *Folk Media for Development*, Karnataka Book Publishers. 1996.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ6030	**Literary Theory and Criticism**	**HC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

This course has been designed to introduce the students to critical theory, a twentieth century literary phenomenon. The course shall expose to them certain significant strategies to engage with literary texts across the globe at the basic level. The course shall also pay special attention to select theoreticians from the body of western critical theory.

Prerequisites:

- The students should possess the qualities of analyzing and critically evaluating the texts.
- The student must have basic idea of Classical criticism.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To develop basic ideas of critical theory.
- To distinguish certain eminent schools of critical theory.
- To build a deep interest for critical theory among the learners.
- To enhanceinterpretation and application of the theory and its relevance.

Course Outcomes:

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

- Interpret the various characteristic features of Feminist Criticism.
- Demonstrate familiarity with Marxist Criticism.

- Examine the major ideas related with Postcolonial theory and criticism.
- Analyze the ways in which literary criticism can be applied in practice.

Course Contents:

Unit – I: Feminist Criticism **13 hours**

1. Peter Barry: Feminist Criticism (from *Beginning Theory*)
2. Elaine Showalter: Towards a Feminist Poetics (Extract)
3. Susie Tharu and K. Lalitha: Introduction from *Women Writing: Volume I 600 B.C. to the Early Twentieth Century*

Unit – II: Marxist Criticism **13 hours**

1. Peter Barry: Marxist Criticism (from *Beginning Theory*)
2. Terry Eagleton: *Marxism and Literary Criticism* (Extract)
3. Howard, Jean E. and Scott Cutler Shershow (Ed): *Marxist Shakespeares* (Extract)

Unit – III: Postcolonialism **13 hours**

1. Hans Bertens: Extract from *Literary Theory: The Basics* (Postcolonial Criticism)
2. Edward Said: *Orientalism* (Introduction)
3. Leela Gandhi: *Postcolonial Theory – A Critical Introduction* (Extract)

Unit – IV: Literary Criticism in Practice **13 hours**

1. Excerpts from *A Handbook of Critical Approaches to Literature* by Wilfred L Guerien et al)
Three readings of "To His Coy Mistress" – Traditional, Formalist, and Feminist
i) The Traditional Approaches in Practice – Traditional Approaches to Marvell"s "To His Coy Mistress"
ii)The Formalist Approach – Word, Image, and Theme: Space-Time Metaphors in "To His Coy Mistress"
iii) Feminist Approaches – The Marble Vault: The Mistress in "To His Coy Mistress"
2. Robert Cross - A Postcolonial Reading of *Lagaan*

REFERENCES:

- Barry, Peter. *Beginning Theory*. Viva Books, 2010.
- Tharu, Susie and K. Lalitha. *Women Writing in India: Volume I 600 B.C. to the Early Twentieth Century*. OUP, 1997.
- Eagleton, Terry. *Marxism and Literary Criticism*. Routledge, 2002.
- Howard, Jean E. and Scott Cutler Shershow (Ed): *Marxist Shakespeares.* Routledge, 2000.
- Bertens, Hans. *Literary Theory: The Basics*. Routledge, 2013.
- Said, Edward W. *Orientalism.* Penguin India, 2001.
- Gandhi, Leela. *Postcolonial Theory – A Critical Introduction.* OUP, 1998.

- Guerien, Wilfred L (et al). *A Handbook of Critical Approaches to Literature*. OUP USA, 2005.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ6041	**Literatures of India – II**	**SC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

This course is the higher level of the former course on Indian Writings in English. In the course design, the texts are carefully selected in order to equip and empower the students to develop an intense understanding of the postcolonial body of Indian English literature that would trigger in them an urge to critically analyze the literary works but also the socio-cultural issues which contributed to the development of the Indian English Literature.

Prerequisites:

- The student must have basic idea of key themes of Literatures from India.
- The student must be familiar with Indian history, society and culture.

Pedagogy:

Flipped Classroom / ICT /Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To develop the idea of „Unity in Diversity"throughLiteratures from India.
- To outline the socio- political and cultural issues of the cotemporary period through Literatures from India.
- To enhance the ability to critically address postcolonial issues.
- To infer genre of gender aspects through literature.

Course Outcomes:

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

- Explain the various issues dealt by contemporary poets of India and their contribution towards „decolonization".
- Analyze the major features and their value in the fictional narratives of India.
- Demonstrate familiarity with concerns specific to India as presented in non-fictional works.
- Illustrate an understanding and participate in the contemporary socio-political happenings of India.

Course Contents:

Unit – I: Poetry **13 hours**

1. Nissim Ezekiel – Goodbye Party for Miss Pushpa T.S.
2. KekiDaruwala – Migrations
3. Kabita Sinha – Eve Speaks to God
4. K. Satchidandan – Gandhi and the Poem
5. ChandrashekaraKambar – Fiend of Folktales
6. Jyoti Lanjewar - Mother

Unit – II: Short Fiction **13 hours**

1. O.V. Vijayan – After the Hanging
2. Githa Hariharan – The Remains of the Feast
3. TemsulaAo – The Jungle Major

Unit – III: Essays **13 hours**

1. Sudhir Kakar – Feminine Identity in India (Extract from *TheInner World)*
2. Rajeshwari Sunder Rajan - Language Debate(Extract from *Lie of the Land)*

Unit – IV: Drama/Novel **13 hours**

1. Mahesh Dattani – *Dance Like a Man*
2. Mahasweta Devi – *Mother of 1084*

REFERENCE:

- Dattani, Mahesh. *Dance Like a Man*. Penguin, 2006.
- Devi, Mahashweta. *Mother of 1084*. Penguin, 2014.
- Kakar, Sudhir. *The Inner World: A Psychoanalytic Study of Childhood and Society in India*. Oxford, 2012.
- Hariharan, Githa. *The Art of Dying*. Penguin, 1993.
- Vijayan, O.V. *After the Hanging and Other Short Stories*. Penguin, 1990.
- Ezekiel, Nissim. *Collected Poems*. Oxford, 2005.
- Daruwala, Keki. *Collected Poems 1970-2005*. Penguin, 2006.
- Satchidanandan, K. *While I Write: New and Selected Poems*. HarperCollins, 2011.
- Merhotra, A.K. *The Oxford Indian Anthology of Twelve Modern Indian Poets*. Oxford, 1997.
- Ao, Temsula. *These Hills Called Home: Stories from a War Zone*. Penguin India, 2005.

Course Code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BJ6042	**European & Non-European Writings – II**	**SC**	**4**	**0**	**0**	**4**	**4**

COURSE DESCRIPTION:

This course is specially designed to engage the students into the wider discourse of European and Non-European literatures, specifically to develop in them a critical awareness of the world literature at large. Another motive behind such an intense framing is that the students would be more sensitive to the issues of the world literature, history and politics after the completion of the course.

Prerequisites:

- The student must have basic idea of geographical and cultural aspects of Europe and European Literature.

Pedagogy:

Flipped Classroom / ICT / Collaborative Learning / Direct Method / Differentiated Learning

Course Objectives:

- To interpret the works of the significant authors of the European and Non-European Literature.
- To infer socio-political and cultural issues as represented in the select European and Non-European literary texts.
- To develop familiarity of global concerns.
- To build an understanding of various dimensions of world literature and its role in refining the theory of human mind.

Course Outcomes:

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

- Demonstrate a good understanding of the issues that contributed to the development of the discourse of world literature.
- Explain the various issues presented in postcolonial and neo-colonial poetry from all over the world.
- Develop an initial association with the fictional works of postcolonial writers from various nations and demonstrate collective global voice.
- Outline the characteristics of postcolonialism and its relevance.

Course Contents:

Unit – I: Poetry **13 hours**

1. Pablo Neruda – I am Explaining a Few Things
2. A.D. Hope – Australia
3. Margaret Atwood – Helen of Troy Does Countertop Dancing

4. Zulfikar Ghose – This Landscape, These People
5. Gabriel Okara – You Laughed and Laughed and Laughed
6. Yasmine Gooneratne – On an Asian Poet Fallen Among Americans

Unit – II: Short Fiction **13 hours**

1. Katherine Mansfield – The Garden Party
2. Gabriel Garcia Marquez – A Very Old Man with Enormous Wings
3. Jorge Luis Borges – The Gospel According to Mark

Unit – III: Essays **13 hours**

1. Ngugi - Abolition of English Department
2. Loomba, Ania. *Colonialism/ Postcolonialism* (Extract)

Unit – IV: Novel **13 hours**

1. Chinua Achebe – *Things Fall Apart*
2. Jean Rhys – *Wide Sargasso Sea*

REFERENCE:

- Neruda, Pablo. *The Essential Neruda: Selected Poems*. City Light Books, 2014.
- Hope, A.D. *A.D. Hope: Selected Prose and Poetry*. Halstead, 2000.
- Atwood Margaret. *Eating Fire: Selected Poetry 1965-1995*. Little Brown Book Group, 2010.
- Ghose, Zulfikar. *50 Poems*. OUP Pakistan, 2010.
- Okara, Gabriel. *Gabriel Okara: Collected Poems*. University of Nebraska Press, 2016.
- Marquez, Gabriel Garcia. *Collected Stories*. Penguin, 2000.
- Mansfield, Katherine. *The Garden Party and Other Stories*. Penguin, 2007.
- Rhys, Jean. *Wide Sargasso Sea*. Penguin, 2000.
- Achebe, Chinua. *Things Fall Apart*. Penguin, 2001.
- Loomba, Ania. *Colonialism/ Postcolonialism*. Routledge, 2016.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6050	**Psychology – VII (Industrial Psychology)**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Description:
Industrial psychology combines the principles of psychology with a methodical investigation of various work settings. Often referred to as industrial-organizational psychology, this discipline analyzes numerous aspects of the working world and the attitudes of individuals toward their

respective careers. Industrial psychology concerns itself with the application of psychological concepts to the work environment. Professionals who hold degrees in the discipline often perform consulting work for companies.

Prerequisites: Understanding of Basic Concepts of Psychology

Pedagogy: Direct Learning, ICT, Case Studies, Discussion

Course Objectives:

1. To understand the basic concepts of industrial-organizational psychology.
2. To learn the role of Leadership in organizations and determinants of employee motivation.
3. To learn the sources of employee stress and coping strategies
4. To learn about factor that influences job satisfaction and morale in organizations.

Course Outcomes:

Upon successful completion of this course, students will be able to:

1. Develop the solid fundamental knowledge of Organizational psychology as a discipline.
2. Elaborate the leadership behavior and its impact on employee‟s performance and compare and contrasts different strategies to motivate and reward the employee‟s in organization.
3. Analyze the difference stressors and its impact on employees‟ and explore difference strategies to manage the stress level in the organization.
4. Outline and analyze the factors that contribute to Job satisfaction and Morale in Organizations.

Course Contents:

Unit-I: Introduction to Organizational Psychology **10 Hours**

a. Definition, Goals, Forces and Fundamental concepts -Nature of people and nature of organization. Areas of Industrial psychology.
b. Two classical studies-A).Time and motion study -Nature and characteristics, Use of Therbligs. Principles, psychological implications and shortcomings
c. Hawthorne studies –Nature, Implications and criticisms. Importance of Time and Motion studies and Hawthorne studies.

Unit-II: Leadership and Motivation **10 Hours**

a. Leadership – definition and nature, styles of leadership-authoritarian & democratic leaders, Transactional & Transformational leaders, Team work, Team cycle and team building.

b. Motivation- Goal setting- elements, Content Theories of Motivation – Herzberg‟s-Motivator-Hygiene (Two factors) Theory, Alderfer‟s- E-R-G Model.
c. Reward system- Financial and Non-financial incentives.
d. Economic Incentive Systems: Purposes & Types- Incentives Linking Pay with Performance, Wage Incentives, Profit Sharing, Gain Sharing, And Skill-Based Pay.

Unit-III: Employee Stress and Management **10 Hours**

a. Employee stress: Definition of Employee Stress, Extreme Products of Stress, Causes of Stress, Stress& Job Performance, Individual differences in Stress Response.
b. Approaches to Stress Management: Organizational strategies to manage stress, individual approaches to manage stress.

Unit-IV: Job Satisfaction and Industrial Morale **9 Hours**

a). Studying Job Satisfaction-Benefits of job satisfaction studies, Use of Existing job satisfaction Information, Factors influencing on job satisfaction.

b) Industrial Morale**:** Nature and characteristics, importance of industrial morale.

References:

1. Ivancevich, John. M. Konopaske, Robert & Matteson, Michael. T, Organizational Behavior and Management. 10th edition, McGraw-Hill Irwin2013.
2. Griffin, Ricky. W and Moorhead, Gregory Organizational Behaviour: managing people and Organizations. 11th edition. South-Western cengage learning.2014.
3. Buchanan, David. A and Huczynski, Andrzej. A Organizational Behaviour. 9th edition. Pearson. 2013.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6050 (P)	**Psychology Practical -VII**	**HC**	**0**	**0**	**2**	**2**	**4**

PRACTICAL -VII: B20BJ6050 (P) - DESSERTATION WORK: Based on Student Interest

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6061	**Psychology-VIII (A) (Abnormal Psychology - II)**	**SC**	**2**	**1**	**0**	**3**	**3**

Course Description:

This course provides an examination of the various psychological disorders as well as theoretical, clinical, perspectives of the study of psychopathology. Emphasis is on terminology, classification, etiology, diagnosis of some of the major disorders such as Somatoform Disorder, Schizophrenia, Mood Disorders and Personality Disorders.

Prerequisites: Basic understanding about normal and abnormal behaviour.

Pedagogy: Direct learning, Case Discussion, ICT, Critical analysis.

Course Objectives:

1. To learn about symptoms, causes, types and diagnosis of Bipolar Disorders.
2. To learn about symptoms, causes, types and diagnosis of Somatic symptom Disorders.
3. To learn about symptoms, causes, types and diagnosis of Schizophrenia Spectrum Disorders.

4. To identifynormal and abnormal behaviour.

Course Outcomes:

Upon successful completion of this course, students will be able to:

1. Outline and understand the clinical features, causes, types and causes of Bipolar Disorders.
2. Outline and elaborate the clinical features, causes, types and causes of Somatic symptom Disorders
3. Elaborate and the clinical features, causes, types and causes of Schizophrenia Spectrum Disorders
4. Distinguish the clinical features, causes, types and causes of Bipolar Disorders.

Course Contents:

Unit-I: Bipolar Disorders **10 Hours**

Bipolar I Disorder: Current or most recent episode manic, Current or most recent episode hypomanic, Current or most recent episode depressed, current or most recent episode unspecified- Symptoms and causes

Bipolar II Disorder-mild, moderate, severe- Symptoms and causes

Cyclothymic Disorder- Symptoms and causes

Unit-II: Somatic Symptom Disorders **10 Hours**

Somatic Symptom Disorder, Illness Anxiety Disorder, Conversion Disorder, Factitious Disorder-symptoms and causes.

Unit-III: Schizophrenia Spectrum Disorder. **10 Hours**

Schizotypal (personality) Disorder, Brief psychotic disorder, Schizophreniform Disoder, Schizophrenia, Schizoaffective Disorder-bipolar type, depressive type, Catatonic Disorder-symptoms and causes.

Unit-IV: Personality Disorders **9 Hours**

Cluster A Personality Disorders: Paranoid Personality Disorder, Schizoid Personality Disorder, and Schizotypal Personality Disorder.

Cluster B Personality Disorders-Antisocial Personality Disorder, Borderline Personality Disorder, Histrionic Personality Disorder, Narcissistic Personality Disorder.

Cluster C Personality disorders-Avoidant Personality Disorder, Dependent Personality Disorder, and Obsessive –Compulsive Personality Disorder. Clinical symptoms and causes.

Reference Books:

1. Alloy, L.B., Risking, JH., and Manos,M.J. Abnormal Psychology – Current Perspectives. 9th Edition. New Delhi: Tata McGraw- Hill Edition.2006.
2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed., text revision). Washington, DC: Author.2013.
3. Barlow,D.H. and Durand,M.V. Abnormal Psychology. 2nd Edition. New Delhi: Thomson Publication. 2000.

4. Carson, R.C., Butcher, J.N and Mineka ,S. Abnormal psychology. 13th Edition. New Delhi: Pearson Education.2004.
5. Davidson and Neal. Abnormal psychology. Revised 6th Edition, John Wiley Sons World Health Organization. ICD-10: International statistical classification of diseases and related health problems (10th Rev. ed.). New York, NY: Author.1996.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6062	**Psychology-VIII (B) (Health Psychology - II)**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Description:
This is an advanced course in psychology designed to give a broad overview of the field of health psychology. Health psychology is a relatively young, diverse, and multidisciplinary field that examines the mind-body connection and many factors that influence the individual‟s well-being. In this course, students will explore the impact of stress on our health and difference strategies to cope with stress. It explore the psychological determinants of Life style disorders, psychoneuroimmunology and immunology disorders.
Prerequisites: Basic understanding of concepts of Health Psychology.
Pedagogy: Direct learning, ICT, Kinesthetic methods, Case studies.
Course Objectives:

1. To learn about causes and consequences of stress.
2. To learn about strategies to cope with various stressors.
3. To understand the psychological contribution in onset, treatment of life style disorders.
4. To understand the psychological correlates of psychoneuroimmunoloigcal and immunology disorders.

Course Outcomes:
Upon successful completion of this course, students will be able to:
1. Identify the sources of stress.
2. Outline the skills of coping with stress.
3. Evaluate the role of Psychological factors in the onset, worsening, treatment of various life-style disorders.
4. Simplify the ways in which quality of life and longevity can be enhances among people suffering from various Life-style disorders.

Course Contents:

Unit-I: Stress **10 Hours**

a. Stress: Definition, Stressor, Appraisal of Stressors.

b. Origins of the Study of Stress: Fight or Flight, Selye‟s General Adaptation Syndrome, Tend-and-Befriend, Stress and Illness
c. The Physiology of Stress: Effects of Long-Term Stress, Individual Differences in Stress Reactivity, Physiological Recovery, Allostatic Load.
d. Stressful Events: Dimensions of Stressful Events, Perception of Stress, adaptation to ongoing stress.
e. Studying Stress: Studying Stress in the Laboratory, Inducing Disease, Stressful Life Events, Daily Stress.
f. Sources of Chronic Stress: Effects of Early Stressful Life Experiences, Chronic Stressful Conditions, Stress in the Workplace, Some Solutions to Workplace Stressors, Combining Work and Family Roles

Unit-II: Coping Strategies **10 Hours**

Coping with Stress and Resilience: Personality and Coping, Psychosocial Resources, Resilience, Coping styles, Problem-Focused and Emotional-Focused Coping.

Coping and External Resources

Coping Outcomes

Coping Interventions: Mindfulness Meditation and Acceptance/Commitment, Therapy, Expressive Writing, Self-Affirmation, Relaxation Training.

Social Support: What is Social Support, Effects of Social Support on Illness, Bio psychosocial pathways, Moderation of Stress by Social Support, Effective kinds of Support, Enhancing Social Support?

Unit-III: Life-style Disorders **10 Hours**

CHD: Nature of CHD, Stress and CHD, Women and CHD, Personality, Cardiovascular Reactivity, and CHD, Depression and CHD, Other Psychosocial Risk Factors and CHD, Management of Heart Disease.

Hypertension: measurement, causes, treatment, stress and personality, The Hidden disease

Stroke: risk factors, consequences, rehabilitative Interventions.

Type II Diabetes: Health Implications of Diabetes, The Management of Diabetes.

Unit-IV: Psychoneuroimmunology and Immune related disorders. **9 Hours**

Psychoneuroimmunology: the immune system, assessing immune functioning, stress and immune functioning, negative affect and immune functioning, stress, immune functioning and interpersonal relationships, coping and immune functioning, intervention to improve immune functioning.

Cancer: difficulty in studying it, predictors, psychosocial factors and cancer, adjusting to cancer, psychosocial issues and cancer, finding meaning in cancer, interventions, therapies with cancer patients.

Type I Diabetes: Problems of Adolescent Diabetics.

Reference Books:

1. Jane Ogden. Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi. 2010.

2. Shelley E. Taylor. Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi.2006.
3. Steve R. Baumgardner & Marie K. Crothers. Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.2009.
4. M. Robin Dimatteo& Leslie R. Martin. Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia. 2002.
5. Alan Carr- Positive Psychology, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BJ6061(P)/B20BJ6062 (P)	**Psychology Practical -VIII(A)/ Psychology Practical - VIII(B)**	**SC**	**0**	**0**	**2**	**2**	**4**

Statistics: Non-parametric tests for significant difference: Mann-Whitney U test and Wilcoxon signed rank test.

1. Beck‟s Depression Inventory.
2. Beck‟s Anxiety Inventory
3. General Health Questionnaire.
4. 16 Personality factors.
5. Multiphasic Personality Questionnaire.

CAREER DEVELOPMENT AND PLACEMENT

Having a degree will open doors to the world of opportunities for you. But Employers are looking for much more than just a degree. They want graduates who stand out from the crowd and exhibit real life skills that can be applied to their organizations. Examples of such popular skills employers look for include:

1. Willingness to learn
2. Self-motivation
3. Team work
4. Communication skills and application of these skills to real scenarios
5. Requirement of gathering, design and analysis, development and testing skills
6. Analytical and Technical skills
7. Computer skills
8. Internet searching skills
9. Information consolidation and presentation skills
10. Role play
11. Group discussion, and so on

REVA University therefore, has given utmost importance to develop these skills through variety of training programs and such other activities that induce the said skills among all students. A full-fledged Career Counseling and Placement division, namely Career Development Center (CDC) headed by well experienced senior Professor and Dean and supported by dynamic trainers, counselors and placement officers and other efficient supportive team does handle all aspects of Internships and placements for the students of REVA University. The prime objective of the CDC is to liaison between REVA graduating students and industries by providing a common platform where the prospective employer companies can identify suitable candidates for placement in their respective organization. The CDC organizes pre-placement training by professionals and also arranges expert talks to our students. It facilitates students to career guidance and improve their employability. In addition, CDC forms teams to perform mock interviews. It makes you to enjoy working with such teams and learn many things apart from working together in a team. It also makes you to participate in various student clubs which helps in developing team culture, variety of job skills and overall personality.

The need of the hour in the field of Journalism, Political Science & Economics 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 Applied sciences also has emphasised subject based skill training through lab practice, internship, project work, industry interaction and many such skilling techniques. Special training is also arranged for those interested in entrepreneurial venture. 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 recognized 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.

Registrar
REVA University
Bengaluru - 560 064

REVA UNIVERSITY
Bengaluru, India

SCHOOL OF PERFORMING ARTS AND INDIC STUDIES

BA – PaEP

(Performing Arts, English & Psychology)

Hand Book

2020-22

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Rukmini Educational
Charitable Trust

www.reva.edu.in

Registrar
REVA University
Bengaluru - 560 064

Chancellor's Message

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

- Nelson Mandela.

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

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

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

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

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

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Vice-Chancellor's Message

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

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

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

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

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become

skilled with relevant to industry requirements. Structured training programs on soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of "Technology Incubation Centers" in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

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

Welcome to the portals of REVA University!

Dr. K. Mallikharjuna Babu
Vice-Chancellor, REVA University

DIRECTORS MESSAGE

The freedom that students are getting to choose their careers now is much broader than ever before. Unconventional career choice is the new way, and the Gen Y is all about wonderful creativity. School of Performing Arts, aims to benchmark itself in the area of Music, Dance and Theatre courses from the Diploma to Research level degrees. Indian tradition in which Music and Dance plays a pivotal role is a major attraction and a focus of study for not only Indians but westerners too, for, one finds it very scientific and vast area for inter-disciplinary research activities. Department is well equipped to meet the traditional and modern needs of both Indian and foreign nationals. The performing wing of the school shall aim to churn out the most sought after performers and especially thinking dancers. The syllabi is world class and prepares students not just as performers but also in the areas like research, Art Management, Personality development, soft skills, Music, Nattuvangam, Theatre studies and other allied art forms, apart from bringing in internationally acclaimed artistes for workshops, guest lectures and interactive sessions. The field work and Dissertation makes the course rigorous and unparalleled.

The curriculum caters to and has relevance to local, regional, national, global development's needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional, ethics, gender, human values, environment &sustainability.

I take this as my privilege to welcome the artistes and connoisseurs to come and explore the finer aspects and unexplored world of Performing Arts at REVA University

Dr Vidya Kumari.S
Director, School of Performing Arts

CONTENTS

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 fulfil 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 Divya Sree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond road park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualified experienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 15,000+ students study various courses across REVA’s three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

ABOUT REVA UNIVERSITY

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka and notified in Karnataka State Gazette 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.
REVA consistently ranked as one of the top universities in various categories because of the diverse community of international students and its teaching excellence in both theoretical and technical education in the fields of Engineering, Management, Law, Science, Commerce, Arts, Performing Arts, and Research Studies. REVA offers 28 Undergraduate Programmes, 22 Full-time and 2 Part-time Postgraduate Programmes, 18 Ph. D Programmes, and other Certificate/ Diploma/Postgraduate Diploma Programmes in various disciplines.

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

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

learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish success in their career. The University has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students' placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headed by a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science & technology and other areas of study. The interdisciplinary-multidisciplinary research is given the top most priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our young faculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless 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, Counsellors and Placement Officers.

The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been 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 RatnaProf. 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 DefenceDr.Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

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

founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga class's everyday to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Vision

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

Mission

- To create excellent infrastructure facilities and state-of-the-art laboratories and incubation centres
- To provide student-centric learning environment through innovative pedagogy and education reforms
- To encourage research and entrepreneurship through collaborations and extension activities
- To promote industry-institute partnerships and share knowledge for innovation and development
- To organize society development programs for knowledge enhancement in thrust areas
- To enhance leadership qualities among the youth and enrich personality traits, promote patriotism and moral values.

Objectives

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

ABOUT THE SCHOOL OF PERFORMING ARTS AND INDIC STUDIES

India proudly treasures the rich heritage and culture which is unparalleled and incomparable to any in the world. Indian arts play a pivotal role and Performing Arts stands as testimony to the richness of this country's cultural legacy. India is an ancient civilization with widespread social, political, linguistic, cultural, philosophical, artistic, religious, spiritual, and natural diversity. It is not only the tradition of ancient sages from the Vedas and Upanishads to Buddhist and Yoga traditions but also modern teachers like Swami Vivekananda. The Performing Arts, comprising of Music, Dance and Theater, are in demand as career choices, like never before. REVA-SPA&IS offers unique, challenging Performing Arts and Indic Studies programmes which prepare artistes for the future. The aim of these courses is to bring in a holistic view to the performing arts' education system in India. The School of Performing Arts and Indic Studeis offers courses like Certificate, Diploma, BAPaEP (Triple degree in Performing Arts, English literature and Psychology), MPA (Masters of Performing Arts) and Ph. D programs. Our Syllabus is world class and bench-marked. The SPA&IS is in the beautiful campus of REVA University - which has received the 'Best Campus' and the 'Best upcoming University' awards. Being the institutional member of International Dance Council (CID), the official member partner of UNESCO, the School of Performing Arts and Indic Studies is now concentrating on collaborating with universities abroad for short term and semester exchange programs and on introducing Indian Performing Arts to the foreign students. Indic Studies or Indology is the academic study of the history and cultures, languages, and literature of the Indian subcontinent.It is an interdisciplinary scholarly study that not only covers philosophy, tradition, values, art, science, culture, and religions of India but most importantly provides a peek into integrative approach to knowledge and life that has withstood the test of time in healthy and harmonious living against many onslaughts and challenging circumstances. While India has been origin of Indic ideas, yet these ideas transcend time and space, and thus Indic philosophy and traditions, such as Yoga and Ayurveda, are relevant to the entire world. The importance of these ideas is so profound that Prof. W. Norman Brown of University of Pennsylvania as early as May 1939 wrote in the 'Bulletin of the American Council of Learned Societies', Washington, D.C., "Every college which aims to prepare its graduates for intelligent work in the world which is to be theirs to live in, must have on its staff a scholar competent in the civilization of India" and further added "no department of study… in any major university can be fully equipped without fully trained specialist in Indic phases of its discipline."

Keeping this in view the School of Performing Arts has come forward to offer Diploma and PG Diploma programs in Indic Studies/ Indology from the academic year 2020-21. The school has also proposed to rename it as School of Performing Arts and Indic Studies to broaden its scope and to offer more and more programs/ courses relating to Indic Studies/Indology in coming years and thereby facilitate students to understand better the rich philosophy, tradition, values, art, science, culture, and religions of India. Internationally acclaimed artistes and Scholars visit the campus often as visiting faculty members and guest lecturers to interact with students. The performing wing at the School of Performing Arts and Indic Studies has performing opportunities all over the country and abroad. Students can expect to become thinking, professional artistes. The seminars, workshops, guest classes are intended make them ready to face the world of Arts that is an amalgamation of a spectrum of experiences and choices.

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BOS MEMBERS

Name and Position	
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B A - PaEP(Performing Arts, English and Psychology)

Programme Overview

Performing Arts, English and Psychology disciplines deal with human life and human experience qualitatively. Humanities investigates how do human beings behave? Why do they behave this way? How do human beings interact with each other? How do human beings interpret the world around them? And what kind of political, social and cultural institutions do they form?

The field of humanities include Modern languages, Classical languages, Linguistics, Literature, History, Jurisprudence, Philosophy, Archaeology, Comparative religion, Ethics, History, criticism and theory of the arts, Journalism, Psychology, Political science and such subject areas.

Bachelor of Arts programme in Performing Arts, English and Psychology offered by **School of Performing Arts at REVA UNIVERSITY** intends to focus on performing Arts, English language skills and impart knowledge on psychology amongst its students.

Theatre, music, dance, and other kinds of performances are present in all human cultures. The history of music and dance date to pre-historic times. In India, religion, philosophy and myth cannot be divorced from their art forms. Dance, Drama and music are tied inextricably to ceremony of any kind. Bharatnatyam, Kathakali, Kathak, Manipuri, Odissi, Kuchipudi, Sattriya, Mohiniyattam are some of the classical Dance forms of India. Similarly, the classical music forms of India are Hindustani Classical Music and Carnatic Classical Music, in addition, there are hundreds of regional music forms and there are many musical instruments to compose and play music. Koodiyattam, Yaksha gana, Swang, Bhand Paather, Ankiya Naat Bhaona, Tamasha, Therukoothu, Jatra are some of theatre forms of India. In addition, there are puppet forms. They all adhere to the canons of classical dance laid down in the Natya Shastra, a second century C.E. text ascribed to the sage Bharata, to whom it was supposedly revealed by the Creator, Brahma.

Performing arts in India and its practitioners are referred to as being part of the "entertainment industry." This indicates a paradigm shift in the manner in which the arts is being viewed by society. The message apparent by the shift is that the audience now expects that the Arts must entertain in the manner defined by the entertainment industry, and they must form part of an organized industry. The performing arts industry in India reached INR236 billion in 2012 and is expected to witness a CAGR of 2.5% over

2012—2018 to reach INR275 billion in 2018. The industry will primarily be driven by new and innovative forms of fund raising by theater and dance groups and a growing demand for Indian culture at an international level.

At present more than 400 million youth are below 18 years of age and they have varied aspirations. ASignificant number of them would like to work in entertainment industry. In this context, a n undergraduate University Programme offered by **REVA University** in Performing Arts, English and Psychology is relevant to meet the future human resources requirement of Entertainment Industry and also safe guard Indian tradition and culture.

Program Educational Objectives (PEOs)

PEO-1	Prospective Employment and Career Prospects- To empower graduates for employment in the performing arts field, content writing, teaching and exploring careers in Psychology and orient them for research and higher studies.
PEO-2	Proficiency- Graduates will demonstrate comprehensive knowledge of literature in their chosen domain or research focus. They will describe a range of techniques related to performing arts and rhetorical strategies used in texts, including their relationship to audience, purpose and cultural contexts.
PEO-3	Entrepreneurship- Establish dance institutes/studios and to work as entrepreneurs with an ability to develop new projects and choreographic works.
PEO-4	Research Methods- Graduates will learn how to design and carry out original and persuasive research in Performing arts, English literature and Psychology with particular attention to literary theory and criticism.
PEO-5	Continuous Learning- The course will enable them to be a continuous learner by expanding the skill-set in response to a changing environment and new developments.

Program Outcomes (POs)

1. **Performing Arts knowledge**: Apply the knowledge of Performing Arts, World Dance History, Art History, English literature, Social Psychology, Developmental Psychology for the solution of complex problems in various domains of life sciences including the cultural, societal, and environmental arenas.
2. **Problem analysis**: Identify, formulate and analyze problems related to the various domains of Performing Arts such as technical aspects of performing arts, ancient Sanskrit treatises, historical timelines, Indian cultural heritage, critical writing and interdisciplinary studies.
3. **Conduct investigations of complex problems**: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

4. **Multi-Disciplinary Approach**- Articulate the relations among culture, history and texts.
5. **Modern tool usage:** To **c**reate, select, and apply appropriate techniques, resources, and modern technology for theatre/dance and music productions which in turn benefit the audience.
6. **Ethics:** Apply ethical principles and commit to professional ethics, responsibilities and norms in Humanities and Social Sciences in general and in performing arts field in particular.
7. **Individual and team work**: Perform/Act effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
8. **Communication**: Communicate effectively with the artiste's fraternity and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.
9. **Art management and finance**: Demonstrate knowledge and understanding of Performing Arts and management principles and apply these to one's own work, as a member and leader in a team. Manage art projects in multidisciplinary environments.
10. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

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

1. Visualise, Create, Design and Analysedance, music and theatre projects
2. Apply appropriate performing arts techniques and produce high quality productions and expressions of art
3. Use higher order critical, analytical skills to solve a new problem in multi-disciplinary fields of Performing Arts, English literature and Psychology

REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Postgraduate Degree programs- 2020

(Framed as per the provisions under Section 35 (ii), Section 7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

1. Title and Commencement:

1.1. These Regulations shall be called the **"REVA University Regulations for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Post Graduate Degree Programs- 2020".**

1.2. These Regulations shall come into force from the date of assent of the Chancellor.

2. The Programs:

The following programs and all Graduate Degree programs to be instituted and introduced in REVA University in coming years shall follow these regulations.

BA PaEP

Performing Arts (Bharatanatyam, Kuchipudi,Mohiniyattam, Odissi, Carnatic Music, Hindustani)
English
Psychology

3. Definitions:

Course: Every course offered will have three components associated with the teaching-learning process of the course, namely:

(i) L= Lecture (ii) T= Tutorial (iii) P=Practice;

Where:

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

T stands for **Tutorial** session consisting participatory discussion / 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.

4. Courses of study and Credits

4.1. The study of various subjects in M. Sc., degree program are grouped under various courses. Each of these course carries credits which are based on the number of hours of teaching and learning.

4.1.1. In terms of credits, every **one hour session of L amounts to 1 credit per Semester** and a minimum of **two hour session of T or P amounts to 1 credit per Semester** over a period of one Semester of 16 weeks for teaching-learning process.

4.1.2. The total duration of a semester is 20 weeks inclusive of semester-end examination.

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

4.1.4. The concerned BoS will assign Credit Pattern for every course based on the requirement. However, generally, courses can be assigned with 1-4 Credits depending on the size of the course.

4.1.5. Different **Courses of Study** are labelled and defined as follows:

Core Course:

A course which should compulsorily be studied by a candidate as a core-requirement is termed as a Core course. The CORE courses of Study are of THREE types, viz – (i) Hard Core Course, and (ii) Soft Core Course.

A. Hard Core Course (HC):

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

B. 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.

C. 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.

D. Open Elective Course (OE):

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.**

E. Project Work / Dissertation:

Project work / Dissertation work is a special course involving application of knowledge in solving / analysing /exploring a real life situation / difficult problem. A project work carrying **FOUR or SIX** credits is called **Minor Project** work / **Dissertation.** A project work of **EIGHT, TEN, TWELVE or SIXTEEN** credits is called **Major Project** work / **Dissertation**. **A Project work may be a hard core or a Soft Core as decided by the BoS / concerned.**

5. Eligibility for Admission:

Bachelors Degree of three years with Chemistry subject/Physical Science as one of the cognate /

major / optional subjects with 45% (40% in case of candidates belonging to SC/ST) of marks in aggregate from any recognized University / Institution or any other qualification recognized as equivalent thereto.

6. Scheme, Duration and Medium of Instructions:

6.1. M.Sc., degree program is of 4 semesters - 2 years duration. A candidate can avail a maximum of 6 semesters (3 years) including blank semesters, if any to successfully complete M. Sc. degree. Whenever a candidate opts for blank semester, he/she has to study the prevailing courses offered by the School when he/she resumes his/her studies.

6.2. The medium of instruction shall be English.

7. Credits and Credit Distribution:

7.1. A candidate has to earn 96 credits for successful completion of Two Year Postgraduate degree with a distribution of credits for different courses as given in Table - 1 given below:

Table-1

Credits and Credit Distribution for Two Year Post Graduate degree programs

Course Type	**Credits for Two Year (6 Semesters) Post Graduate Degree Programs**
Hard Core Course	A minimum of 60 but not exceeding 70
Soft Core Course	A minimum of 14 but not exceeding 30
Open Elective	A minimum of 04
RULO	A minimum of 2 but not exceeding 8
Total	**96**

7.2. The concerned BOS based on the credits distribution pattern given above shall prescribe the credits to various types of courses and shall assign title to every course including project work, practical work, field work, self-study elective, as **Hard Core (HC) or Soft Core (SC) or Open Elective (OE)**. The concerned BOS based on the credits distribution pattern given above shall prescribe the credits to various types of courses and shall assign title to every course including project work, practical work, field work, self-study elective, as **Hard Core (HC) or Soft Core (SC) or Open Elective (OE)**.

7.3 Every course including project work, practical work, field work, self-study elective should be entitled as Hard Core (HC) or Soft Core (SC) or Open Elective (OE) by the BoS concerned. However, following shall be the RULO (REVA Unique Learning Offerings) courses with credits mentioned against them, common to all branches of study. However the BoS of respective program/ discipline shall decide about the total credits for RULO courses.

RULO Courses		
Sl. No.	**Course Title**	**Number of Credits**
1	Sports, Yoga, Music, Dance, Theatre	2
2	MOOC / Swayam/ Coursera/Internship /Soft Skill Training/ Attending conferences/Webinars/Industrial Visits/In-house R&D etc.	6
	Total	**8**

7.4. The concerned BOS shall specify the desired Program Objectives, Program Educational Objectives, Program Specific Outcomes and Course Outcomes while preparing the curriculum of a particular program.

7.5. A candidate can enrol for a maximum of 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.

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

8. Add-on Proficiency Certification / Diploma:

8.1. Add- on Proficiency Certification:

To acquire Add on Proficiency Certification a candidate can opt to complete a minimum of 4 extra credits either in the same discipline /subject or in different discipline / subject in excess to 96 credits for the Two Year Post Graduate degree programs.

8.2. Add on Proficiency Diploma:

To acquire Add on Proficiency Diploma, a candidate can opt to complete a minimum of 18 extra credits either in the same discipline /subject or in different discipline / subject in excess to 96 credits for the Two Year Post Graduate degree programs.

The Add on Proficiency Certification / Diploma so issued to the candidate contains the courses studied and grades earned.

9. Assessment and Evaluation:

A. Each course is assessed for a total weight of 100%. Out of the total 100% weight; 50% weight is for Continuous Internal Assessment (CIA or IA) and the remaining 50% for the Semester End Examination (SEE). This applicable for theory, laboratory, workshop, studio

and any such courses

B. Out of 50% weight earmarked for Internal Assessment (IA)- 15% for test-1, 15% for test-2 and 20% for Assignments/and this is applicable for theory based courses

C. The tests and assignments are conducted as per the semester academic calendar provided by the University.

The details as given in the table:

Component	**Description**	**Conduction**	**Weight Percentage**
C1	Test-1: IA1	6th week from the starting date of semester	15
	Test-2: IA2	12th week from the starting date of semester	15
C2	1 Assignment	7th week	10
	2 Assignment	13th week	10
C3	SEE including practical	between 17th Week-20th Week	50
Results to be Announced			**By the end of 21st Week**

Note: IA or CIA includes C1 and C2

Each test must be conducted for a duration of 60 minutes, setting the test question paper for a maximum of 30 marks. The final examination must be conducted for a duration of 3 hours and the question paper must be set for a maximum of 100 marks.

D. Students are required to complete courses like technical skills, placement related courses, Open electives and any such value addition or specialized courses through online platforms like SWAYAM/NPTEL/Any other reputed online education aggregator. Students are required to choose the courses on the advice of their course coordinator/Director and required to submit the course completion certificate along with percentage of marks/grade scored in the assessment conducted by the online education aggregator. If the online education aggregator has issued a certificate along with the grade or marks scored to students, such courses will be considered for SGPA calculations, in case the aggregator has issued only a certificate and not marks scored, then such courses will be graded through an examination by concerned School, in case, if grading is not possible, students will be given a pass grade and award the credit and the credits will not be considered for SGPA calculations. The Online/MOOCs courses will not have continuous internal assessment

component

Such of those students who would like to discontinue with the open elective course that they have already registered for earning required credits can do so, however, they need to complete the required credits by choosing an alternative open elective course.

Setting question paper and evaluation of answer scripts:

i. For SEE, three sets of question papers shall be set for each theory course out of which two sets will be by the internal examiners and one set will be by an external examiner. In subsequent years by carrying forward the unused question papers, an overall three sets of question papers should be managed and depending on the consumption of question papers either internal or external examiner be called for setting the question paper to maintain an overall tally of 3 papers with the conditioned mentioned earlier. The internal examiner who sets the question paper should have been course tutor.

ii. The Chairman of BoE shall get the question papers set by internal and external examiners.

iii. There shall be single valuation for all theory papers by internal examiners. However, there shall be moderation by the external examiner who has the subject background. In case no external examiner with subject background is available, a senior faculty member within the discipline shall be appointed as moderator.

iv. The SEE examination for Practical work / Field work / Project work/Internship will be conducted jointly by internal and external examiners as detailed below: However, the BoE on its discretion can also permit two internal examiners.

v. If a course is fully of (L=0): T :(P=0) type or a course is partly P type i.e, (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

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

10.1. A practical examination shall be assessed on the basis of:

A. Knowledge of relevant processes;

B. Skills and operations involved;

C. Results / products including calculation and reporting.

10.2. In case a course is fully of P type (L=0:T=0:P=4), the performance of a candidate shall be assessed for a maximum of 100 marks as explained below:

A. Continuous Internal assessment (CIA) = 50 marks.

B. Semester end practical examination (SEE) = 50 marks.

i	Conduction of regular practical throughout the semester	20 marks

ii	Maintenance of lab records /industry reports/SDP reports	15 marks
iii	Laboratory test and viva	15 marks
	Total	**50 marks**

The 25 marks for continuous assessment shall further be allocated as under (IA or CIA):

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

10.3. The SEE for Practical work will be conducted jointly by internal and external examiners. However, if external examiner does not turn up, then both the examiners will be internal examiners.In case a course is partly P type i.e, (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

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

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

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

1	First Dissertation presentation describing the problem definition	Should be done a semester before the project semester	Weightage: 0%
2	Dissertation Progress presentation-1	7th week from the start date of project semester	Weightage: 25%
3	Dissertation progress presentation-2	14th Week from the start date of project semester	Weightage -25%
4	Final project Viva and Dissertation Submission	17th -20th Week of project Semester	Weightage: 30% for Dissertation Weightage : 20% for Final Viva Voce

11. Provision for Appeal:

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

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

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

12. Eligibility to Appear Semester End Examination (SEE)

12.1. Only those students who fulfil a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc, as part of the course(s), as provided in the succeeding sections, shall be eligible to appear for SEE examination.

12.2. Requirements to Pass a Course

Students are required to score a total minimum of 40% (Continuous Internal assessment and SEE) in each course offered by the University/ Department for a pass (other than online courses) with a minimum of 20 (40% of 50) marks in final examination

13. Requirements to Pass the Semester

To pass the semester, a candidate has to secure minimum of 40% marks in each subject / course of the study prescribed in that semester.

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

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

13.2. Provision to Withdraw Course:

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is Soft Core Course or Open Elective Course.

A DROPPED course is automatically considered as a course withdrawn.

13.3. Re-Registration and Re-Admission:

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

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

14. Attendance Requirement:

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

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

A. Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc, during a semester shall not be permitted to appear to the end semester (C4) examination and such student shall seek re-admission as provided in 7.8.4.

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

15. Absence during Mid Semester Examination:

In case a student has been absent from a mid-semester (C1, C2) examination due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Head of the School, for make-up examination. The Head of the School may consider such request

depending on the merit of the case and after consultation with course instructor and class teacher, and arrange to conduct a special test for such candidate(s) well in advance before the C3 examination of that respective semester. Under no circumstances C1, C2 test shall be held after C3 examination.

16. Grade Card and Grade Point

16.1. Provisional Grade Card: The tentative / provisional grade card will be issued by the Registrar (Evaluation) at the end of every semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average** (SGPA).

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

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

Marks 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= [C1+C2+C3]) secured by a candidate in a course which is **rounded to nearest integer**. V is the credit value of course. G is the grade and GP is the grade point.

16.3.1 Computation of SGPA and CGPA

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

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

SGPA (Si) = ∑ (Ci x Gi) / ∑Ci Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

Illustration for Computation of SGPA and CGPA

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	4	A+	9	4X9=36
Course 2	4	A	8	4X8=32
Course 3	3	B+	7	3X7=21
Course 4	3	O	10	3X10=30
Course 5	3	P	5	3X5=15
Course 6	3	B	6	3X6=18
Course 7	2	O	10	2X10=20
Course 8	2	A	8	2X8=16
	24			188

Illustration No. 1

Thus, **SGPA = 188 ÷ 24 = 7.83**

Illustration No. 2

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	P	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			**175**

Thus, **SGPA = 175 ÷ 24 = 7.29**

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	O	10	4 x 10 = 40
Course 2	4	A+	9	4 x 9 = 36
Course 3	3	B+	7	3 x 7 = 21
Course 4	3	B	6	3 x 6 = 18

Course 5	3	A+	9	3 x 9 = 27
Course 6	3	B+	7	3 x 7 = 21
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A+	9	2 x 9 = 18
	24			**199**

Illustration No.3

Thus**, SGPA = 199 ÷ 24 = 8.29**

Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for Two year Post Graduate degree program is calculated taking into account all the courses undergone by a student over all the semesters of a program i. e.,

CGPA = $\sum$(Ci x Si) / $\sum$Ci

Where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration: No.4

Semester (ith)	**No. of Credits (Ci)**	**SGPA (Si)**	**Credits x SGPA (Ci X Si)**
1	24	6.83	24 x 6.83 = 163.92
2	24	7.71	24 x 7.71 = 185.04
3	24	8.68	24 x 8.68 = 208.32
4	24	9.20	24 x 9.20 = 220.80
Cumulative	96		778.08

CGPA after Final Semester

Thus, CGPA = 24×6.83+24×7.13+24×8.68+24×9.20 = 8.11 (96)

16.3.2 Conversion of Grades into Percentage:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored = CGPA Earned x 10

Illustration: CGPA Earned 8.10 x 10=81.0

16.3.3 Classification of Results

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

CGPA	Grade (Numerical Index)	Letter Grade	Performenace	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

Overall percentage=10*CGPA

17. Challenge Valuation

A. A student who desires to apply for challenge valuation shall obtain a photo copy of the answer script by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the grade awarded to him/her by surrendering the grade card and by submitting an application along with the prescribed fee to the Registrar (Evaluation) within 10 days after the announcement of the results. This challenge valuation is only for SEE.The answer scripts for which challenge valuation is sought for shall be evaluated by the external examiner who has not involved in the first evaluation. The higher of two marks from first valuation and challenge valuation shall be the final.

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

Assessment Table

Hardcore	COs	IA1	IA2	Assignment	SEE	Total	Hours
	CO1	7.5		5	12.5	25	15
	CO2	7.5		5	12.5	25	15
	CO3		7.5	5	12.5	25	15
	CO4		7.5	5	12.5	25	15
Softcore	**COs**	**IA1**	**IA2**	**Assignment**	**SEE**	**Total**	**Hours**
	CO1	7.5		5	12.5	25	12
	CO2	7.5		5	12.5	25	12
	CO3		7.5	5	12.5	25	12
	CO4		7.5	5	12.5	25	12

B A (Performing Arts, English and Psychology - PaEP)

Scheme of Instructions (Effective for Academic Year 2020-23)

Sl. No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours	Teaching School/Dept.
				L	T	P	C		
First Semester									
1	B20BA1011	Language – II: Kannada	FC	2	1	0	3	4	**School of Performing Arts &Indic studies**
2	B20BA1012	Language – II: Hindi							
3	B20BA1013	Language – II: Additional English							
4	B20BA1020	Communicative English – I	FC	2	1	0	3	4	
5	B19BA1030	Constitution of India and Professional Ethics	FC	2	1	0	3	4	**School of Legal Studies**
5	B20BA1041	History of Indian Dance	SC	4	0	0	4	4	**School of Performing Arts &Indic studies**
6	B20BA1042	MusicTheory 1							
7	B20BA1043	Fundamentals Of Theatre Art							
8	B20BA1051	Practical-1 (Fundamentals of Bharathanatyam)	SC	1	0	2	3	5	
9	B20BA1052	Practical – 1 Fundamentals of Kuchipudi							
10	B20BA1053	Practical -1-Fundamentals of Dance Mohiniyattam							
11	B20BA1054	Practical-1-Fundamentals of Dance Odissi							
12	B20BA1055	Practical-1-Fundamentals of Dance Kathak							
13	B20BA1056	Practical-1 (Fundamentals of Carnatic Music)							
14	B20BA1057	Fundamentals Of Hindustani Music Practical-1							
15	B20BA1058	Practical-1–Fundamental of Acting in Theatre							
16	B20BA1060	English Literature (Chaucer – Pope) & Language – I	HC	4	0	0	4	4	**School of Performing Arts &Indic studies**
17	B20BA1070	Psychology – I (Basic Psychological Process –I)	HC	2	1	0	3	4	
18	B20BA1070(P)	Psychology Practical 1	HC	0	0	2	2	4	
19	B19BA1080	Yoga	RULO	0	0	2	2	4	**Sports**
Total				**20**	**2**	**7**	**27**	**37**	
Note:*Students shall choose any **ONE Soft Core (SC)** out of Four Soft Core Courses									
Second Semester									
1	B20BA2011	Language–II: Kannada II	FC	2	1	0	3	4	**School of Performing Arts &Indic studies**
2	B20BA2012	Language–II: Hindi II							
3	B20BA2013	Language–II: Additional English II							
4	B20BA2020	Communicative English – II	FC	2	1	0	3	4	

5	B20BA2031	Natya Sastra and Performing Arts	SC	4	0	0	4	4	**School of Performing Arts &Indic studies**
6	B20BA2032	Music theory 2 (Karnatik Music)							
7	B20BA2033	Music theory 2 (Hindustani Music)							
8	B20BA2034	History of World Theater							
9	B20BA2041	Practical 2 –Bharatanatyam	SC	1	0	2	3	5	
10	B20BA2042	Practical 2 –Kuchipudi							
11	B20BA2043	Practical 2- Mohiniyattam							
12	B20BA2044	Practical –2 Odissi							
13	B20BA2045	Practical –2 Kathak							
14	B20BA2046	Practical-2 Carnatic Music							
15	B20BA2047	Practical-2 Hindustani Vocal							
16	B20BA2048	Practical 2– Design in Theater and Acting Advance I							
17	B20BA2050	English Literature (The Romantic Age) & Language – II	HC	4	0	0	4	4	**School of Performing Arts &Indic studies**
18	B20BA2060	Psychology-II (Basic Psychologial Process – II)	HC	2	1	0	3	4	
19	B20BA2060 (P)	Psychology Practical -II	HC	0	0	2	2	4	
20	B19BA2071	Folklore Study – Folk Dance	SC	0	1	1	2	3	**School of Performing Arts &Indic studies**
21	B19BA2072	Folklore Study – Folk Music	SC						
22	B19BA2073	Folklore Study – Folk Theatre	SC						
23	B19BA2080	Skill Development – 1 (Multimedia and Designing)	RULO	0	0	2	2	4	**UIIC**
Total				**15**	**4**	**7**	**26**	**35**	

Note:*Students shall choose any **ONE Soft Core** (SC) out of four Soft Core Courses

Third Semester

1	B20BA3011	Language–II:Kannada III	FC	1	1	0	2	3	**School of Performing Arts &Indic studies**
2	B20BA3012	Language–II: Hindi III							
3	B20BA3013	Language–II: AdditionalEnglish III							
4	B18BA3020	Environmental Studies	FC	3	0	0	3	3	**School of Applied Sciences**
5	B20BA3031	Rasa Theory and its implications in Performing Arts	SC	4	0	0	4	4	**School of Performing Arts &Indic studies**
6	B20BA3032	Music Theory 3 (Karnatik Music)							
	B20BA3033	Music Theory 3 (Hindustani Music)							
7	B20BA3034	Kannada , Children and EasternTheatre History							
8	B20BA3041	Practical -3 – Bharatanatyam							

9	B20BA3042	Practical – 3 Kuchipudi	SC	1	0	2	3	5	**School of Performing Arts &Indic studies**
10	B20BA3043	Practical-3- Mohiniyattam							
11	B20BA3044	Practical –3 Odissi							
12	B20BA3045	Practical –3 Kathak							
13	B20BA3046	Practical – 3 Carnatic Music							
14	B20BA3047	Practical-3 Hindustan Vocal							
15	B20BA3048	Practical 3 –Design in Theater and Major Production							
16	B20BA3050	English Literature (Victorian & Modern) & Language – III	HC	4	0	0	4	4	**School of Performing Arts &Indic studies**
17	B20BA3060	Psychology – III (Social Psychology)	HC	2	1	0	3	4	**School of Performing Arts &Indic studies**
18	B20BA3060(P)	Psychology Practical - III	HC	0	0	2	2	4	
19	B18BA3070	Skill Development – 2 (Indian Classical Dance Make up)	RULO	0	0	2	2	4	**UIIC**
20	B21PAO301	Open Elective	OE	2	2	0	3	4	
21	B20BA3090	Internship in Performing Arts	HC	0	0	3	3	4	
Total				**17**	**4**	**10**	**29**	**41**	

Fourth Semester

1	B20BA4011	Language–II: Kannada IV	FC	1	1	0	2	3	**School of Performing Arts &Indic studies**
2	B20BA4012	Language–II: Hindi IV							
3	B20BA4013	Language–II: Additional English IV							
4	B20BA4021	Textual Traditions in Performing Arts	SC	4	0	0	4	4	**School of Performing Arts &Indic studies**
5	B20BA4022	Music Theory 4 (Karnatik Music)							
6	B20BA4023	Music Theory 4 (Hindustani Music)							
7	B20BA4024	Theatre architecture and developments of theatre							
8	B20BA4031	Practical – 4 Bharatanatyam	SC	1	0	2	3	5	**School of Performing Arts &Indic studies**
9	B20BA4032	Practical – 4 Kuchipudi							
10	B20BA4033	Practical 4- Mohiniyattam							
11	B20BA4034	Practical –4 Odissi							
12	B20BA4035	Practical –4 Kathak							
13	B20BA4036	Practical 4–CarnaticVocal							
14	B20BA4037	Practical-4 Hindustani Vocal							
15	B20BA4038	Practical 4– Political Theatre							
16	B20BA4040	Reading India	HC	4	0	0	4	4	**School of Performing Arts &Indic studies**

17	B20BA4050	Psychology – IV (Developmental Psychology)	HC	2	1	0	3	4	**School of Performing Arts &Indic studies**
18	B20BA4050(P)	Psychology Practical - IV	HC	0	0	2	2	4	
19	B18BA4070	MOOC (SELF STUDY)	RULO	0	0	2	2	4	
Total				13	2	6	20	29	
Fifth Semester									
1	B20BA5011	Traditions and Innovations in Performing Arts	SC	4	0	0	4	4	**School of Performing Arts &Indic studies**
2	B20BA5012	Music Theory 5 (Karnatik Music)							
	B20BA5013	Music Theory 5 (Hindustani Music)							
3	B20BA5014	Theatre aesthetics and play Writing							
4	B20BA5031	Practical 5–Bharathanatyam	SC	1	0	2	3	5	**School of Performing Arts &Indic studies**
5	B20BA5032	Practical – 5 Kuchipudi							
6	B20BA5033	Practical 5- Mohiniyattam							
7	B20BA5034	Practical 5- Odissi							
8	B20BA5035	Practical 5- kathak							
9	B20BA5036	Practical 5–Carnatic Vocal							
10	B20BA5037	Practical-5- Hindustani Vocal							
11	B20BA5038	Practical – 5 Theatre Acting Advance III							
12	B20BA5040	Literary Criticism	HC	4	0	0	4	4	**School of Performing Arts &Indic studies**
13	B20BA5051	Literatures of India – I	SC	4	0	0	4	4	
14	B20BA5052	Reading Myths and Mythologies							
15	B20BA5060	Psychology – V (Abnormal Psychology – I)	HC	2	1	0	3	4	
18	B20BA5071	Psychology – VI (A) (Indigenous Psychology- An Indian Perspective—I)	SC	2	1	0	3	4	
19	B20BA5072	Psychology – VI (B) (Health Psychology – I)							
16	B20BA5060 (P)	Psychology Practical - V	HC	0	0	2	2	4	
17	B20BA5071 (P)/ B20BA5072 (P)	Psychology Practical - VI (A)/ Psychology Practical - VI (B)	HC	0	0	2	2	4	
20	B18BA5080	Skill Development - Employability Skills	RULO	0	0	2	2	4	UIIC
TOTAL				13	4	8	27	36	
Sixth Semester									
1	B20BA6011	Aesthetics	SC	4	0	0	0	4	

2	B20BA6012	Music Theory 6 (Karnatik Music)							**School of Performing Arts &Indic studies**
3	B20BA6013	Music Theory 6 (Hindustani Music)							
4	B20BA6014	Theatre direction							
5	B20BA6031	Practical 6–Bharathanatyam	SC	1	0	2	3	5	**School of Performing Arts &Indic studies**
6	B20BA6032	Practical – 6 Kuchipudi							
7	B20BA6033	Practical-6- Mohiniyattam							
8	B20BA6034	Practical –6 Odissi							
9	B20BA6035	Practical –6 kathak							
10	B20BA6036	Practical 6–CarnaticVocal							
11	B20BA6037	Practical-6-							
12	B20BA6038	Practical- 6 – Theatre							
13	B20BA6030	Literary Theory and Criticism	HC	4	0	0	4	4	**School of Performing Arts &Indic studies**
14	B20BA6041	Literatures from India – II	SC	4	0	0	4	4	**School of Performing Arts &Indic studies**
15	B20BA6042	Revisionist Writings							
16	B20BA6050	Psychology - VII (Abbnormal Psychology – II)	HC	2	1	0	3	3	**School of Performing Arts &Indic studies**
17	B20BA6061	Psychology - VIII (A) (Indigenous Psychology- An Indian Perspective-II)	SC	2	1	0	3	3	**School of Performing Arts &Indic studies**
18	B20BA6062	Psychology - VIII (B) Health Psychology - II							
19	B20BA6050(P)	Psychology - VII (Abnormal Psychology – II) Practical	HC	**0**	0	2	2	4	
20	B20BA6061 (P)/B20BA6062 (P)	Psychology Practicals - VIII (A) /Psychology Practicals - VIII (B)	HC	**0**	0	2	2	4	
21	B18BA6070	Field Trip	HC	0	0	2	2	-	
22	B18BA6080	Dissertation	HC	0	0	3	4	-	
Total				**17**	**2**	**12**	**31**	**47**	

NOTE:

1. *****Students shall choose **ONE** in each SC and Lab Courses.
2. Major project is compulsory and will begin in 4th Semester. Students will either choose internal guide from the school and continue with in-house projects or choose to do project work either in industry or research organization.

HC=Hard Core; SC=Soft Core; OE=Open Elective; RULO = REVA Unique Learning Offerings

Credits Semester-wise (2020-21) **Semester-wise Credit Distribution**

Semester	I	II	III	IV	Total

HC-Theory					
HC-Lab					
SC-Theory					
OE					
Project					
RULO					
Total					

Semesters	**No. of Credits**	**No. of Hours**
I		
II		
III		
IV		
Total		

Semester-wise Course Types & Credit Distribution

Semester	**HC**	**SC**	**OE**	**RULO**	**TOTAL**
I					
II					
III					
IV					
Total					

Credits Based on L: T: P

Semester	**L**	**T**	**P**	**Total**	**Total Hours**
I					
II					
III					
IV					
Total					

B A - PaEP (Performing Arts, English and Psychology)

DETAILED SYLLABUS

SEMESTER 1

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA1011	Language: Kannada - I	SC	2	1	0	3	4

Prerequisite :

- PÀ£ÀßqÀ ¨sÁµÉAiÀÄ §UÉUÉ ¥ÁæxÀ«ÄPÀ w¼ÀÄªÀ½PÉ CUÀvÀå..
- ¨sÁµÉAiÀÄ£ÀÄß NzÀ®Ä ªÀÄvÀÄÛ §gÉAiÀÄ®Ä w½¢gÀ¨ÉÃPÀÄ.
- ¥ÀzÀ« ¥ÀÆªÀð ²PÀëtzÀ°è PÀ£ÀßqÀ ¨sÁµÉAiÀÄ£ÀÄß N¢gÀ¨ÉÃPÀÄ.

Course Objectives:

£Á®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉÆA¢zÉ. CzÀgÀAvÉ ªÉÆzÀ®£ÉAiÀÄ ¸É«Ä¸ÀÖgï£À°è d£À¥ÀzÀ, ¥ÁæaÃ£À, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ºÉÆ¸ÀUÀ£ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÄÌ ªÀiÁrPÉÆAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©ügÀÄaAiÀÄ£ÀÄß ªÀÄÆr¸À¯ÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉÆvÉUÉ ªÀåQÛvÀé «PÀ¸À£ÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀ¯ÁUÀÄvÀÛzÉ.

- ¨sÁµÉ, ¸Á»vÀå, EwºÁ¸À ªÀÄvÀÄÛ ¸ÀA¸ÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ ¸ÀA§A¢ü¹zÀAvÉ ¥ÀjZÀ¬Ä¸À¯ÁUÀÄvÀÛzÉ.
- «zÁåyðUÀ¼À ¸ÀªÀðvÉÆÃªÀÄÄR ¨É¼ÀªÀtÂUÉUÉ C£ÀÄªÁUÀÄªÀAvÉ ºÁUÀÆ CªÀgÀ°è ªÀiÁ£ÀªÀ ¸ÀA§AzsÀUÀ¼À §UÉÎ UËgÀªÀ, ¸ÀªÀiÁ£ÀvÉ ªÀÄÆr¹, ¨É¼É¸ÀÄªÀ ¤nÖ£À°è ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
- CªÀgÀ°è ¸ÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨sÁµÉ, GvÀÛªÀÄ «ªÀÄ±Áð UÀÄt, ¤gÀUÀð¼À ¸ÀA¨sÁµÀuÉ, ¨sÁµÀt PÀ¯É ºÁUÀÆ §gÀºÀ PË±À®åUÀ¼À£ÀÄß ¨É¼É¸ÀÄªÀÅzÀÄ UÀÄjAiÀiÁVzÉ
- ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀÆ®ªÁUÀÄªÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀªÀÄ£ÀzÀ°èèlÄÖPÉÆAqÀÄ ¸ÀÆPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ ªÀiÁrPÉÆ¼Àî¯ÁVzÉ.

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Course Outcomes:

d£À¥ÀzÀ, ¥ÁæaÃ£À, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ºÉÆ¸ÀUÀ£ÀßqÀzÀ ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄÆ®PÀ PÁ®zÀ ¹ÜvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉÆÃlUÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

- ¸ÁªÀiÁfPÀ, gÁdQÃAiÀÄ, zsÁ«ÄðPÀ, ¸ÁA¸ÀÌøwPÀ ºÁUÀÆ °AUÀ¸ÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀªÀÄ£ÀºÀj¸ÀÄªÀÅzÀgÉÆA¢UÉ «zÁåyðUÀ¼À°è ZÀZÁð ªÀÄ£ÉÆÃ¨sÁªÀªÀÅ ¨É¼ÉAiÀÄÄvÀÛzÉ.
- fÃªÀ£ÀzÀ°è §gÀÄªÀ C©ü¥ÁæAiÀÄ ¨ÉÃzsÀUÀ¼ÀÄ, ¸ÀªÀÄ¸ÉåUÀ¼À£ÀÄß DzsÀÄ¤PÀ ¸ÀAzÀ¨sÀðzÀ°è ªÀiÁ£À«ÃAiÀÄvÉAiÉÆA¢UÉ ¤ªÀð»¸ÀÄªÀAvÉ ¥ÉæÃgÉÃ¦¸ÀÄvÀÛzÉ.
- ¸ÁªÀiÁfPÀ CjªÀÅ ªÀÄÆr¸ÀÄvÀÛzÉ

- GvÀÛªÀÄ ¸ÀAªÀºÀ£À PÀ¯ÉAiÀÄ£ÀÄß ¨É¼É¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß FqÉÃj¸ÀÄvÀÛzÉ.

Course Content:

Unit I d£À¥ÀzÀ ªÀÄvÀÄÛ ¥ÁæaÃ£À PÁªÀå

1. ¸ÀvÀåªÀAvÉ ºÀqÉzÀªÀé d£À¥ÀzÀ VÃvÉ
2. £É®¸ÀÄUÉ ¤£Àß ªÀPÀëzÉÆ¼É ¥ÀA¥À
3. £É®QjªÉ£ÉAzÀÄ §UÉ«gÉ bÀ®QjªÉA gÀ£Àß
4. avÀæªÀÄ¥ÁvÉæ gÀªÀÄvÉ £Áj d£Àß

Unit II ªÀÄzsÀåPÁ°Ã£À PÁªÀå

C©ÞAiÀÄÄªÉÆªÉÄð PÁ®ªÀ±À¢A ªÀÄgÁåzÉAiÀÄA zÁAlzÉÃ.... £ÁUÀZÀAzÀæ

1. ªÀZÀ£ÀUÀ¼ÀÄ CPÀÌªÀÄºÁzÉÃ«
2. ªÀZÀ£ÀUÀ¼ÀÄ §¸ÀªÀtÚ
3. wgÀÄ¤Ã®PÀAoÀgÀ gÀUÀ¼É ºÀjºÀgÀ

Unit III ¸ÀtÚ PÀxÉUÀ¼ÀÄ

ªÉÆ®A ¹AºÀªÀÄA PÉÆAzÀ PÀxÉ zÀÄUÀð¹AºÀ

1. PÀ¯ÁärAiÀÄ PÉÆÃt ªÀiÁ¹Û
2. AiÀiÁgÀÆ CjAiÀÄzÀ «ÃgÀ PÀÄªÉA¥ÀÄ
3. ¸ÀªÀÄ¸ÉåAiÀÄ ªÀÄUÀÄ wæªÉÃtÂ

Unit IV £ÁlPÀ

1. mÉÆ¼ÀÄîUÀnÖ n.¦. PÉÊ¯Á¸ÀA

¥ÀgÁªÀÄ±Àð£À UÀæAxÀUÀ¼ÀÄ :

1. ªÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2014
2. ¸ÀAUÀæºÀ. £ÁUÉÃUËqÀ JZï.J¯ï., ZÁjwæPÀ d£À¥ÀzÀ PÀxÀ£À PÁªÀåUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÁðlPÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀÆgÀÄ. 2008
3. ¹ÃªÀiÁwÃvÀ PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ ¸ÀA¥ÀÄl 1,2,3,4,5 ªÀÄvÀÄÛ 6, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2014
4. ¸ÀAUÀæºÀ. £ÁUÉÃUËqÀ JZï.J¯ï., PÀ£ÀßqÀ d£À¥ÀzÀ PÀxÀ£À PÁªÀåUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÁðlPÀ eÁ£À¥ÀzÀ ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀÆgÀÄ. 2007
5. ºÀA¥À £ÁUÀgÁdAiÀÄå, ¸ÁAUÀvÀå PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
6. £ÁgÁAiÀÄt¦.«, ZÀA¥ÀÆ PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
7. PÁ¼ÉÃUËqÀ £ÁUÀªÁgÀ, wæ¥À¢, gÀUÀ¼É ªÀÄvÀÄÛ eÁ£À¥ÀzÀ ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
8. ¸ÀA. ¨É£ÀUÀ¯ï gÁªÀÄ gÁªï ªÀÄvÀÄÛ ¥Á£ÀåA ¸ÀÄAzÀgÀ ±Á¹ÛçÃ, ¥ÀÄgÁt £ÁªÀÄ ZÀÆqÁªÀÄtÂ, ¥ÀæPÁ±ÀPÀgÀÄ ¥Àæ¸ÁgÁAUÀ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ. 2010
9. qÁ. azÁ£ÀAzÀ ªÀÄÆwð, ªÀZÀ£À ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2013
10. ¸ÀA. §¸ÀªÀgÁdÄ J¯ï. ¸ÀªÀðdÕ£À ªÀZÀ£ÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2012
11. ¸ÀA. §¸ÀªÀgÁdÄ J¯ï. CPÀÌ£À ªÀZÀ£ÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 1997
12. ¸ÀA ªÀÄgÀÄ¼À¹zÀÝ¥Àà PÉ, £ÁUÀgÁd Q.gÀA. ªÀZÀ£À PÀªÀÄäl, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2016

13. £ÀgÀ¹AºÁZÁgï. r.J¯ï., ¥ÀA¥À ¨sÁgÀvÀ ¢Ã¦PÉ, ¥ÀæPÁ±ÀPÀgÀÄ r.«.PÉ ªÀÄÆwð ¥ÀæPÁ±À£À, ªÉÄÊ¸ÀÆgÀÄ. 2012
14. /gÀAeÁ£ï zÀUÁð, ±ÀgÀtgÀ ¸ÀªÀÄUÀæ PÁæAw, ¥ÀæPÁ±ÀPÀgÀÄ. ¯ÉÆÃ»AiÀiÁ ¥ÀæPÁ±À£À, §¼Áîj. 2015
15. zÉÃ±À¥ÁAqÉ J¸ï.J¯ï. ¨ÉÃAzÉæ ±ÀjÃ¥sÀgÀ PÁªÁåAiÀiÁ£À, ¥ÀæPÁ±ÀPÀgÀÄ zÉÃ¹ ¥ÀÄ¸ÀÛPÀ, ¨ÉAUÀ¼ÀÆgÀÄ. 2013
16. ¸ÀA. ©.J¸ï. PÉÃ±ÀªÀgÁªï. PÉÊ¯Á¸ÀA PÀ£ÀßqÀ £ÁlPÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ CAQvÀ ¥ÀÄ¸ÀÛPÀ, ¨ÉAUÀ¼ÀÆgÀÄ. 2005
17. ±ÁªÀÄgÁAiÀÄ vÀ.¸ÀÄ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À ªÉAPÀtÚAiÀÄå ¸ÁägÀPÀ UÀæAxÀªÀiÁ¯É, ªÉÄÊ¸ÀÆgÀÄ -2014
18. ²ªÀgÀÄzÀæ¥Àà f.J¸ï. PÀ£ÀßqÀ ¸Á»vÀå ¸À«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2013

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA1012	**Hindi**	**SC**	**2**	**1**	**0**	**3**	**4**

Prerequisites/Pre reading for the course: पपपपपपपपपपपप:

- अध्येता, पी.यु.सी के स्तर पर द्वितीय भाषा के रूप में द्विन्दी का अध्ययन करना चाद्विए|
- द्विन्दी साद्वित्य के इद्वतिास का सांद्विप्त ज्ञान की आवश्यकता िै |
- द्विन्दी व्याकरण का अवबोधन आवश्यक िै |
- अंग्रेज़ी – द्विन्दी अनुवाद से संबंद्वधत जानकारी जरुरी िै |

Course Objectives:

पपपपपपपपप पपपपपपपप :

- संदभानुसार उद्वधत भाषा का प्रयोग करने की दिता को छात्रों में उत्पन्न करना|
- साद्वित्य के माध्यम से समाज एवं मानवीय मूल्यों को समझाकर, उन मूल्यों की रिा िेतु प्रेरित करना|
- छात्रों में पुस्तक पठन एवं लेखन की अकृ द्वतम प्रवृद्वि स्थाद्वपत करना|
- अध्येताओं में साद्वित्य के माध्यम से प्रभावी एवं कु शल संचार का द्वकास करना|

Course Outcomes:

पपपपप पपपपपप :

अध्ययन की समाप्तप्त पर अध्येता –

- सामाद्वजक मूल् एवं नैद्वतक जवाबदे िी को स्वीकार कर सकता िै |
- साद्वित्य की प्रासंद्वगकता को जीवन में समझने की दिता रखता िै |
- समाज में अंतद्वनद्वित पद्दद्वतया एवं द्वचारधाराओं का व्याख्यान करने में सिम बन सकता िै |
- साद्वित्य के माध्यम से प्रभावी एवं कु शल संचार का द्वकास कर सकता िै |

Course content:

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ppppp –1 **:**kkkkkkk **,** kkkkkkkkkk

1.kkkkkkk – kkkk – kkkkkkkkkkk

2.kkkkkkk – kkkkkkk kkkkk – kkkkkkkkkk kkkkkkk kkkkkkkk

3.kkkkkkkkkk – kkkk kk kkkk kkkkkkkk kkkk kkkk – kkkkkkkkkk kkkkk

ppppp –2 **:**kkkkkkk, kkkkkkkkkk

4.kkkkkkk – kkkkk kk kkkkk – kkkkkkk kkkkkkk

5.kkkkkkk – kkkk kkkkkkk – kkkkkkkk

6. kkkkkkkkkkkk – kkkkk – kkkkkkkkk kkkkkkk

ppppp –3 **:**kkkkkkkk, kkkkkkkkk kkkkk

7. kkkkkkkk – kkkkk kk kkkkkkk – kkkkkkkkk kkkkkkk

8.kkkkkkkkk kkkkk – kkkkk kk kkkkkkkkk – kkkkkkkkk kkkkkk

ppppp –4 **:**kkkkkkkk, kkkkkkkkkk

ppppppp : kkkkkkkkkkk – kkkkkkkk (kkkkk kkkk kkkkkkkkkk)

ppppppppp : kkkkkkkkkkk kk kk kkkkkkk kkkk kkk |

ppppppp : **ppppppppppp ppppp** 25 **pppp ppppppp ppppppppppp pp** |

d) Suggested Text Books and References

Text book/s: ppppppp pppppppp :

1. द्विन्दी पाठ्य पुस्तक – रेवा द्वश्वद्यालय |

References: ppppppppp ppppppppp :

1. सुबोध व्यविाररक द्विन्दी – डॉ. कु लदीप गुप्त
2. अद्वभनव व्यविाररक द्विन्दी – डॉ.परमानन्द गुप्त
3. द्विन्दी साद्वित्य का इद्वतिास - डॉ. नागेन्द्र
4. आधुद्वनक द्विन्दी साद्वित्य का इद्वतिास - डॉ. बच्चन द्वसंि
5. द्विन्दी साद्वित्य का नवीन इद्वतिास - डॉ. लाल साि‍ब द्वसंि
6. शुद्ध द्विन्दी कै से बोले कै से द्वलखे- पृथ्वीनाथ पाण्डे
7. कायालय अनुवाद द्वनदेद्वशका
8. संिेपण और पल्लवन - के.सी.भाद्विया&तुमन द्वसंग

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA1013	Additional English I	SC	2	1	0	3	4

Prerequisites: The student must possess fundamentals of language skills and be aware of social issues.

Course Objectives

1. To develop linguistic prowess of the students.
2. To appraise different genres of literature.
3. To illustrate the fundamentals of creative language.
4. To enhanceconsistent reading habits.

Course Outcomes

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

1. Demonstrate a thorough understanding of sensitive and critical social issues.
2. Gage an understanding of literary devices
3. Coherent reading skill
4. Developwide range of vocabulary.
5. Critically analyze a piece of prose or poetry.
6. Explain their opinion in a coherent and communicable manner.

Course Contents

Unit-I: Values & Ethics
Literature: Rabindranath Tagore - Where the Mind is Without Fear
William Wordsworth – Three Years She Grew in Sun and Shower
Saki – The Lumber-room
William Shakespeare – Extract from Julius Caesar (Mark Antony's Speech)
Language:Vocabulary Building

Unit-II: Natural & 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

Unit-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

Unit-IV: Success Stories
Literature: Emily Dickinson – Success is Counted Sweetest

Rupert Brooke – Success
Dr. Martin Luther King - I Have a Dream
Helen Keller – Excerpt from The Story of My Life
Writing Skills: Brochure &Leaflet

Reference Books:

- Tagore, Rabindranath. Gitanjali. Rupa Publications, 2002.
- Wordsworth, William. The Complete Works of William Wordsworth. Andesite Press, 2017.
- Munro, Hector Hugh. The Complete Works of Saki. Rupa Publications, 2000.
- Shakespeare, William. The Complete Works of William Shakespeare. Sagwan Press, 2015.
- Chindhade, Shirish. Five Indian English Poets: Nissim Ezekiel, A.K. Ramanujan, ArunKolatkar, DilipChitre, R. Parthasarathy. Atlantic Publications, 2011.
- Dickens, Charles. The Signalman and Other Horrors: The Best Victorian Ghost Stories of Charles Dickens: Volume 2. Createspace Independent Publications, 2015.
- Anderson, Hans Christian. The Fir Tree. Dreamland Publications, 2011.
- Colvin, Sidney (ed). The Works of R. L. Stevenson. (Edinburgh Edition). British Library, Historical Prints Edition, 2011.
- Bishop, Elizabeth. Poems. Farrar, Straus and Giroux, 2011.
- Swift, Jonathan. Gulliver's Travels. Penguin, 2003.
- Dickinson, Emily. The Complete Poems of Emily Dickinson. Createspace Independent Publications, 2016.
- Brooke, Rupert. The Complete Poems of Rupert Brooke. Andesite Press, 2017.
- King, Martin Luther Jr. &James M. Washington. I Have a Dream: Writings And Speeches That Changed The World. Harper Collins, 1992.
- Keller, Helen. The Story of My Life. Fingerprint Publishing, 2016.
- Green, David. Contemporary English Grammar Structures and Composition. New Delhi: MacMillan Publishers, 2010.
- Thorpe, Edgar and Showick Thorpe. Basic Vocabulary. Pearson Education India, 2012.
- Leech, Geoffrey and Jan Svartvik. A Communicative Grammar of English. Longman, 2003.
- Murphy, Raymond. Murphy's English Grammar with CD. Cambridge University Press, 2004.

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA1020	**Communicative English – I**	**HC**	**4**	**0**	**0**	**4**	**4**

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Prerequisites: The student must have knowledge of intermediate English Grammar and LSRW skills.

Course Objectives

1. To enhance functional communication skills.
2. To develop functional use of language in professional contexts.
3. To utilize oral presentations in multiple contexts.
4. To apply effective written skills in formal communication.

Course Outcomes

After the completion of the course, students will be able to:

1. Identify pressing issues relating to society, environment and media.
2. Develop a process-oriented approach to writing.
3. Differentiate between formal and in-formal styles of writing
4. Apply the grammatical skills developed during the course aptly.
5. Demonstrate a good command over language
6. Exhibit refined interpersonal skills in their communication.

History of Indian Dance

Course Contents

Unit-I: Functional English
Remedial Grammar: Past Simple; Past Continuous; Irregular Verb
Writing Skills: Paragraph Writing
Activities: Conversations; Leaving Phone Messages
Literature: Chief Seattle – The End of Leaving and Beginning of Survival

Unit-II: Interpersonal Skills
Remedial Grammar: Present Simple & Present Continuous; Activity & State Verb
Writing Skills: Official Letters
Activities: Making Apologies; Invitations & Making Arrangements
Literature: Ruskin Bond – Tiger in the Tunnel

Unit-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

Unit-IV: Communication Skills
Remedial Grammar: Collocations; Prepositions
Writing Skills: Precise Writing
Activities: Offers, Suggestions & Requests
Literature: Avijit Pathak – Onscreen Magic

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.

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Week

B19BA1030	**Constitution and Human Rights**	**FC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

1. To impart knowledge on Constitution ofIndia.
2. To facilitate the understanding of Fundamental Rights, Duties and other Rights which is been given by ourlaw.
3. To facilitate the understanding of Constitution perspective and make them face the world as a bonafidecitizen.
4. To attain knowledge about ethics and also know about professionalethics.
5. Explore ethical standards followed by differentcompanies.

Course Outcomes:

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

1. Explain the Indian constitutional provisions and fololow them.
2. Demonstrate the fundamental rights and humanrights.
3. Explain the duties and more importantly practice them in a rightway.
4. Adopt the habit of raising their voice against a unconstitutionality of any laws and upon any legal discrimination as we have session of debates on Constitutionalvalidity.
5. Demonstrate professional ethics and know about etiquettes aboutit.

Course Content:

Unit- I: Indian Constitutional Philosophy& Legislature

1. Features of the Constitution andPreamble
2. Fundamental Rights and FundamentalDuties,
3. Directive Principles of StatePolicy
4. Union Parliament and State Legislature : Powers andFunctions

Unit- II: Executive and Judiciary

1. President, Prime Minister and Councils ofMinister
2. State Governor, Chief Minister and Council ofMinisters
3. The Supreme Court and High Court: Powers andFunction.

4. ElectionCommission

Unit III: Concept and Development of Human Rights

1. Meaning , Scope and Development of HumanRights
2. United Nations and Human Rights –UNHCR
3. UDHR 1948, ICCPR1966 and ICESCR1966

Unit IV: Human Rights in India

1. Protection of Human Rights Act, 1993 (NHRC and SHRC)
2. First, Second and Third Generation HumanRights
3. Judicial Activism and HumanRights

Prescribed Books:

- Introduction to Indian Constitution - D.D. Basu, Prentice Hall of India Pvt. Ltd..New Delhi
- SubashKashyap, Indian Constitution, National BookTrust
- H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
- V.N.Shukla, Constitution of India (Eastern BookCo)
- S.K. Kapoor - HumanRights
- Durga Das Basu, Human Rights in Constitutional Law, Prentice Hall of India Pvt. Ltd.. New Delhi

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B20BA1041	**History of Indian Dance**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. Understanding the broad area of PerformingArts.
2. E xplain the aims and objectives of performing arts and their development through various stages;
3. Describe the utility of performing arts during the ancient and the medieval period;
4. E xamine the importance of the three art forms in the development of human personality; and

Course Outcomes

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

1. The students will be able to communicate clearly and effectively about the history of the Performing Arts and Dance in India.
2. The students will be able to understand the history of the different art forms of dance from a bird's eye point of view and place a specific dance form in the appropriate social, political, or historical context.

3. The students would be able to apply critical thinking skills to the understanding of a particular form of dance.
4. The students will be able to understand the different academic approaches to Dance study and Dance reading.

Course Content:

Unit	Topics	Description
1	Introduction	1. Introduction to Art History and Performing Arts 2. Vedic, Ancient, Medieval and Modern periods in India 3. Origin and development of Dance in India
2	Sources to study Dance History	1. Tangible and Intangible sources 2. Tangible sources – sculptures, inscriptions, manuscripts, paintings, books. 3. Intangible sources – oral traditions, performance, traditional theatres, social practices & rituals, temple festivals. 4. Different treatises on Dance – an introduction 5. Alaya, Asthana and Sabha – a journey
3	Classical and Folk dance forms	1. Introduction to Natya Sastra 2. Concept of Marga and Desi 3. Folk dance traditions of India 4. Natya mela and Nattuva mela 5. Classical dance forms of India
4	Biographies of Dance historians	1. Dr. Ananda K Coomaraswamy 2. Dr. V. Raghavan 3. Dr. Kapila Vatsysyan

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
B20BA1042	**Music Theory 1**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. To impart the knowledge of Indian music.
2. To understand the development of Indian Music in various stage.
3. To enable the studnts to understand the music and its glorious past, through the biographies of musicalTrinity.
4. To make the students understand the nuances of the Indian Classical Music.
5. To enable them to understand the technical terms in music.

Course Outcomes:

At the end of the course the students would be in a position to understand the nuances of the Carnatic Music

1. The Students would not only understand the fundamentals of Carnatic music but would also understand the importance of tala or time cycle or rhythm.
2. The students would get used to the voice culture exercise
3. Students would understand the history and lakshanas of ragas
4. at the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music

Course Contents

UNIT	Topics	Description
UNIT 1	Hisotry of Indian Music	• History and development of Indian Music • Music during Vedic period • Sound and emergence of sounds (places)
UNIT 2	Paribhashika shabda (Technical terms)	• Technical terms:-Nada, Sruti, Svara, Vadi, Samvadi, Vivadi and Anuvadi, Saptakas, Sthayi,Anthara, Tala-Sapta talas, Shadangas, Chapu tala, Janaka(Thaats/Melakartha) and Janya Ragas.
UNIT 3	Distinctive features of Indian music	• Cultural, Intellectual, Emotional, Spiritual values of music
		•

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA1043	**History of Theatre Art**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. Effectively trace the theatrical evolution with a historical perspective.
2. Analyze the qualities of a performance as a whole
3. Have a critical understanding regarding a theatre performance
4. Have a basic exposure to various performing art forms in India and their technicalities.
5. Have a historical vision of theatre as an art form from ancient times.

Course Outcomes:

Upon completion of this course, the student should be able:

1. To have an appreciation of the collaborative nature of the theatre arts.
2. To be able to critically evaluate the success of theatrical productions.
3. To be familiar with a broad range of theatrical terminology
4. To analyze the historical diversity of theatre across the geographic area of India.
5. To realize the ancient prominence of theatre art in Indian context.

Course Contents

Unit	Topics	Description
UNIT 1	Introduction to Theatre Art	1. Introduction to Performing Arts 2. Introduction to Theatre Art History in India.
UNIT 2	Distinctive features of Indian theatre	• Cultural elements and values of Indian theatre • Intellectual elements and values • Emotional elements and values • Spiritual elements and values of Indian theatre

UNIT 3	Folk theatre forms of India	1. Origin and development of folk theatre 2. Relation between rituals and folk theatre 3. Folk theatre forms of India Bhavai, Nautanki, Kutiyattam. 4. Contemporary scenario of folk forms
UNIT 4	Ancient Indian theatre	1. Origin and development of ancient Indian theatre – Indus valley civilization art, Buddhist period art. 2. Social concepts of India – structures of family, employments and caste. 3. Dravidian culture and theatre

Course Code	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.
B20BA1051	**Practical-1 (Fundamentals of Bharathanatyam)**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objective

1. To enable the dancer to have a strong foundation in Bharathanatyam dance style
2. Fostering the development of young artistes' performance skills, knowledge and understanding.
3. To enable the dancers/artiste of School of Performing Arts to have a strong foundation in both the practical and the theory of musical concepts.
4. To make the students learn the different adavu patterns in Bharathanatyam

Course Outcomes:

1. Demonstrate the different adavu patterns in Bharathanatyam.
2. Understand the nuances of Bharathanatyam
3. Explain the basic aspects of bharathanatyam
4. Analyzing the pattern of invocatory items in bharathanatyam

Course Content:

Unit	Description	Topics
1	Fundamentals	• Basic exercises for stretching, strengthening and core building • Dasa Vida adavus
2	Dance 1	Alarippu – 1

3	Dance 2	Pushpanjali – 1
4	Singing and Recitation	Learning singing the lyrics of items and the recitation of jathis and solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs/ Wk
B20BA1052	**Practical – 1 Fundamentals of Kuchipudi**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

- To help the dancer to become more flexible and strengthens the body muscles before dance
- To enable the dancer to have a strong foundation in kuchipudi dance style.
- To enable the dancer to have a strong understanding in the jathi patterns of Kuchipudi.
- To teach the students the items in dance and also the technical aspects of the item which include taalam, music etc.

Course outcome

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

- Will be able to attain good flexibility, improved muscle tone and strength
- Learn the fundamental adavus in Kuchipudi dance style.
- Demonstrate the changes in pancha Jathi Adavus in Kuchipudi
- Understand the pattern of Jathiswaram and also the intricacies in choreographing such items.

Course content

Unit	Description	Topics
1	Fundamentals	Exercises and Adugulu

2	Fundamentals	Jathulu
3	Dance 1	Jathiswaram -1
4	Singing and Recitation	Learning singing the lyrics of the items and also the recitation of the jathis and the solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA1053	**Practical-1-Fundamentals of Dance Mohiniyattam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

1. To enable the dancer to have a strong foundation in Mohiniyattam style.
2. To enable the dancer to have a strong foundation in the dance style by learning the basics in Mohiniyattam
3. To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.
4. To understand the moolahasthas used in Mohiniyattam

Course Outcomes:

1. Perform the fundamentals
2. Perform the Adavus that they have learned
3. Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
4. A good understanding about sollus and the kala patterns of the Adavus.

Course Content

UNIT	Description	Topics
1	Exercises	Basic Exercises

2	Hasta Bhedas	Asamyuktha Hastha Bhedas from Hasta Lakshana Deepika
3	Fundamentals	Basic Adavus
4	Fundamentals	Thermanam Adavus

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA1054	**Practical-1-Fundamentals of Dance Odissi**	**sc**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To help the dancer to become more flexible and strengthens the body muscles before dance
2. To enable the students to understand the pattern of movements in odissi
3. To teach the basics adavus in Odissi.
4. To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.

Course Outcomes:

1. Learn the uniqueness of odissi movements
2. Understand about the structural aspects of Odissi
3. Demonstrate the varieties of Bedas
4. Analyze the Tribhanga posture.

Course Content

UNIT	Description	Topics
1	Fundamentals	1.Chauk, 2. Tribhangi
2	Fundamentals	1.Padabheda 2.Shirobheda
3	Fundamentals	1.Grivabheda
4	Fundamentals	1.Drishtibheda

CourseCode	CourseTitle	Course Type	L	T	P	C	Hrs./ Wk.

B20BA1055	**Practical-1 (Fundamentals of Kathak)**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To help the dancer to become more flexible and strengthens the body muscles before dance
2. To enable the students to understand the pattern of movements in Kathak
3. To teach the basics movements of the kathak.
4. To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

1. Learn and demonstrate the uniqueness of Kathak movements
2. Understand about the structural aspects of Kathak
3. Demonstrate the varieties of movements
4. Analyze the patters of tala.

Course Content

UNIT	Description	Topics
1	Basics 1	Basic Hand exercise with foot work.
2	Basics 2	Basic foot movements.
3	Basics 3	Laykari of taal with basic foot work.
4	Basics 4	Padhant

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.

B20BA1056	**Practical-1 (Fundamentals of Carnatic Music)**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To impart primary knowledge of role and importance of music indance.
2. Fostering the development of young artistes' musical skills, knowledge andunderstanding.
3. To enable the dancers/artiste of School of Performing Arts to have a strong foundation in both the practical and the theory of musicalconcepts.
4. To make the students learn the basics of Carnatic music and to enable them to learn it in the practicalway.

Course Outcomes:

1. At the end of the course the students would be in a position to understand the nuances of the CarnaticMusic
2. The Students would not only understand the fundamentals of Carnatic music but would also understand the importance of tala or time cycle orrhythm.
3. The students would get used to the voice cultureexercise
4. Students would understand the importance of music with respect todance

Course Content:

Unit	Description	Topics
1	Music Basics And voice culture	• Sarale varase • Madhyastayi varase
2	Music Basics And voice culture	• Jantivarase
3	Music Basics	• Mandrastayi varase
4	Music Basics	• Tarastayi varase

Course Code	Course Title	Course Type	L	T	P	C	Hrs/ Wk
B20BA1057	**Fundamentals Of Hindustani Music**	**sc**	**1**	**0**	**2**	**3**	**5**

	Practical-1						

Course Objectives

1. To impart the strong fundamental knowledge of Hindustani classical Music.
2. To make the students learn the compositions in Hindustani classical music
3. To enable them to learn it in the practical way.
4. To enable them to understand the technical terms in music.

Course Outcomes

1. At the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music
2. The Students would not only understand the fundamentals and basics of the music but would also become a performer.
3. Understand the technical aspects of Hindustani Music
4. Dmonstrate the Basics of Hindustani Music.

Course content

UNIT	Description	Topics
1	Music Basics And voice culture -1	• Pranayam • Swaralankar practice • Talagnyana
2	Music Basics And voice culture-2	• Jantiswara practice • Tri sapthakswara abhyaas
3	Voice culture -3	• Meend,Andolan,Kan swar practice • Merukhand Abhyaas
4	Voice culture -4	Nada, Shruthi, Laya, Aroha, Avaroha, Thaat ,Vadi - Samvadi,Ras,Varjyaswaras ,Anga,Prahar, Komal - Theevra – Shuddha Sapthak ,Khayal,Dhrupad, Dhamar,Thumri,Bhajan,Ghazal, Bhavageethe, Haveli sangeeth

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda

2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA1058	**Practical-1–Fundamentals of Theatre**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

1. Develop an appreciation and unerring zeal towards dramatic literature.
2. Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
3. Demonstrate the historical evolution of drama and its variants.

Course Outcomes

1. The completion of the course enables pupils to realize the vitality and the prominence of the Indian Theatre.
2. Be able to subdue the fear of expression.
3. Be able to emote and demonstrate the terminologies of theatre both theoretically and practically.

Course Content:

Unit	Topics	Description
1	**Body Movement**	1. Physical culture 2. Animal behaviors and Body languages 3. Kalari Payattu – Stage 1 (Basics)
2	**Theatre Games and Activities**	1. 200+ Theatre games as described by Augusto Boal 2. Team work based Theatre Activities 3. Activities enabling the exploration of Body 4. Practicing any one folk art form.

3	**Voice**	1. Natural sounds Voice projection Voice modulation 2. Elements of voice Pitch Volume Tempo
4	**Acting 1 - Exploring the dynamics of Theatre**	1. Bharat Muni's four acting stages – Angika,Satvika, Vachika and Aaharya. 2. Discovering and exploring the essential tools for Acting 3. Exploring theatrical exercises enabling to access acting elements.

Reference Books:

1. Dr. Manomohan Ghosh, *Natya Sastra*
2. Joan Borysenko, *Minding the body and mending the mind*
3. K. V. Akshara, *Rangaprapancha*
4. Kapila Vatsyayan, *"Traditional Indian Theatre Multiple streams"*
5. Jean Benedetti, *The Art of the Actor –The essential history of Acting from Classical times to the present day*Oscar G Brockett & Franklin J Hildy, *History of The Theatre*

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BA1060	**English Literature (Chaucer – Pope) & Language – I**	**HC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1. To outline the framework of different literary genres.
2. To relate to the idea of literary ages and its significance.
3. To analyze the works of important authors from the medieval age to the neo-classical age.
4. To enhance the language skills of the students.

Course Outcomes

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

Course Contents

1. Apply the learnt poetic sensibilities in the creation of poetry.
2. Formulate the process of reading prose and enriching literary & non-literary writing.
3. Gain an understanding of the literary ages
4. Develop dramatic sensibilities.

5. Critically appraise literary works
6. Illustrate a good understanding of speech sounds in English and the structure of words.

Unit – I: Poetry

The Medieval Age:

1. Chaucer - "The Squire" (from *General Prologue to the Canterbury Tales*)

The Elizabethan Age:

2. Edmund Spencer – Sonnet 75 (from the *Amoretti*)
3. William Shakespeare – Sonnet 118

The Puritan Age:

14. John Milton – On His Blindness

Metaphysical Poetry:

5. John Donne – A Valediction: Forbidding Mourning
6. George Herbert – The Collar
7. Andrew Marvell – To His Coy Mistress

The Neoclassical Age:

8. Alexander Pope – Extract from *The Rape of the Lock* (Belinda's Toilette)

Unit – II: Prose

1. Francis Bacon – Of Travel; Of Studies
2. Joseph Addison – Silence
3. Dr. Samuel Johnson – Extract from *Preface to Shakespeare* (Three Unities)
4. Oliver Goldsmith – Extract from *The Citizen of the World* ("Letter XXVI. The Character of the Man in Black; With Some Instances of His Inconsistent Conduct")

Unit – III: Drama

1. William Shakespeare – *Othello*
2. Christopher Marlowe – *Dr. Faustus* (film text)

Unit – IV: Language

1. Language
2. Speech Sounds in English
3. The Structure of Words

REFERENCES:

- Chaucer, Geoffrey. *The Canterbury Tales*. Harper Press, 2012.
- Warren, Robert Penn. *Six Centuries of Great Poetry*. Dell, 1992.
- Shakespeare, William. *The Sonnets*. Macmillan, 2016.
- Quiller-Couch, Sir Arthur. "On His Blindness" *The Oxford Book of English Verse 1250 - 1900 - Volume I,* ed.1919.
- Ricks, Christopher. *Metaphysical Poetry*. Penguin, 2006.
- Kaul, RK. *The Rape of the Lock*. Oxford, 1997.
- Bacon, Francis. *The Essays*. Penguin, 1985.
- Addison, Joseph. *Addison and Steele*. Forgotten Books, 2018.

- Sen, S. *Dr. Johnson: Preface to Shakespeare*. Unique Publishers, 1989.
- Goldsmith, Oliver. *The Citizen of the World*. University Press of the Pacific, 2002.
- Shakespeare, William. *Othello*. Maple Classics, 2013.
- Marlowe, Christopher, *Dr. Faustus*. Oxford University Press, 2010.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA1070	**Foundations Of Psychology-I**	**HC**	**3**	**0**	**1**	**4**	**5**

Course Objectives

In accordance with the American Psychological Association (APA) recommendations for undergraduate psychology learning objectives and outcomes, students will (1) learn the basic principles of traditional psychological content areas and (2) use the scientific method as an approach to critical thinking and sceptical inquiry. Accomplishing this objective involves:

1. Demonstrating knowledge and understanding of theory and research in the general domains of psychology
2. Explore the biological basis of behavior
3. Understanding the process receiving the sensory information and making meaning out of it.
4. Understand the basic concepts of motivation, Emotions and Sleep and its application for self-growth

Course Outcomes

After the successful completion of the course, students will be able to-

1. Explores the nature, scope, theoretical perspective and research methods in Psychology
2. Discovers the biological basis of human behavior
3. Explores the mechanism of processing of sensory information and perception.
4. Explores the function of Sleep, motivation and emotions of human beings

Course Contents

Unit-I: The Science of Psychology

a) Meaning, Definition and goals of Psychology.
b) Psychology is a Science or an Art, Debate.
c) Psychology Vs Psychiatry: Difference in nature, education, treatment and scope.
d) Branches of Psychology: General psychology, Educational Psychology, Industrial psychology, clinical psychology, counseling psychology, social psychology, developmental psychology, Para psychology, Positive psychology.
e) History of Psychology: Wundt, Titchener and James
f) Modern Perspectives: Psychodynamic perspectives, Behavioral perspectives, Cognitive perspectives, Humanistic perspectives, Gestalt theory, Positive Psychology.
g) Psychology in Modern India: Status, Education, Licensing and Scope.
h) Scientific Research: Steps in scientific approach, Descriptive methods: Observation, Case Study, Survey methods. Correlational studies. Experimental method: Variables, Experimental and control group, single and double blinded studies, placebo effect, single and double blinded studies.

Unit-II: The Biological Perspective

a. Neurons: Structure and functions of neuron and glial cells, types of neuron and glial cells.
b. The neural impulse: Action potential and Resting potential, synaptic transmission.
c. Neurotransmitter: types, functions.
d. Nervous system: CNS: Brain-forebrain, midbrain, hindbrain; hemispheres, four lobes, and Spinal cord-structure and functions,
e. PNS-Somatic and autonomic nervous system- divisions and functions.
f. Methods for studying Brain: Lesioning, stimulation: invasive and non-invasive, neuroimaging: CT, MRI, EEG, PET, FMRI, MEG.
g. Glands: Endocrine and Exocrine glands; Endocrine Glands: types and functions.

Unit-III: Basic Cognitive Process.

Attention: Definition, types.

a. **Sensation**: Definition, types of sensation, sensory receptors, transduction, Absolute threshold, Differential threshold, habituation, sensory adaptation, sensory integration.
b. Vision: structure of eye, light and eye, visual accommodation. Retina-rods and cones. Visual pathway. Perception of color-trichromatic theory, opponent-process theory, color blindness.
c. Hearing: Structure of ear, Sound and ear, sound localization, vestibular organ.
d. **Perception**: Definition, Gestalt laws of organization, Figure-ground relationship, top-down and bottom-up process.
e. Constancies: size, shape, Brightness
f. Depth Perception: Monocular and Binocular cues. Perceptual illusions.

Unit-IV: Sleep, Motivation and Emotions.

a. Consciousness, Altered states of consciousness, Sleep
b. **Sleep**: biology of sleep-circadian rhythm, function of sleep, stages of sleep.
c. Sleep disorders: nightmares and REM sleep behavior disorder, Night terrors, sleep walking, insomnia, sleep apnea, Narcolepsy.
d. Motivation: definition, types-intrinsic, extrinsic motivation; Physiological Motives-Hunger, thirst, sex; Social motives-Achievement, Power Affiliation.
e. Theories: Drive –reduction theory, Mcclelland's theory, Maslow's theory.
f. Emotion: Definition, three elements of emotion.
g. Types of Emotions
h. Theories: James-Lange theory, Cannon-Bard Theory, Facial feedback hypothesis, Schachter-singer cognitive arousal theory, Lazarus and Cognitive-mediational Theory.
i. Emotional Intelligence: definition, nature, importance.

References Books:

1. Robert S. *Feldman* (2004) *understanding Psychology* 6th *Edition* Tata MrGram – Hill.
2. Saundra K Ciccarelli and Glenn E Meyer (2008), Psychology, South Asia Edition,
3. Robert A Baron (2001), Psychology, III Edition, Prentice Hall Publications
4. John. W. Santrock (2006), Psychology Essentials, 2nd Edition Tata Mc Graw Hill
5. Hillgord & Atkinson (2009), Introduction to Psychology Oxford IBH publishing Co. Pvt. Ltd.
6. Morgan, King (2004), Introduction to Psychology, VII Edition, 1989, Mc Graw Hill IBH Publication

PSYCHOLOGY PRACTICALS– 1:

Descriptive Statistics: Measures of Central Tendency: Grouped Data and Ungrouped Data.

1. Directed observation and accuracy of report.
2. Stroop Effect
3. Emotional Intelligence
4. Muller lyer Illusion
5. Signal Detection

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Week
B19BA1080	**Yoga**	RULO	**0**	**0**	**2**	**2**	**4**

Course Objectives:

1. To prepare the students for the integration of thei rphysical,mental and spiritual faculties
2. To enable the students to maintain goodhealth
3. To practice mental hygiene and to attain higher level ofconsciousness;
4. To possess emotional stability, self-control and concentration;and
5. To inculcate among students self-discipline, moral and ethicalvalues.

Course Outcomes:

On completion of the course learners will be able to:

1. Practice yoga for strength, flexibility, and relaxation.
2. Learn techniques for increasing concentration and decreasing anxiety.
3. Become self disciplined andself-controlled
4. Improve physical fitness and perform better in studies
5. Gain self confidence to face the challenges in the society with commitment to serve the society

Course Content:

Unit-I:

Yoga: Introduction, Surya Namaskara- 12 counts.

Unit-II:

Asanas: Sitting- Vajrasana, Dandasana, Padmasana, Matsyasana, Paschimottasana, Shirasasana.
Asanas: Standing- Tadasana, Trikonasana, Parshwa konasana, Veerabadrasana.

Unit-III:

Asanas: Prone Position- Bhujangasana, Dhanurasana.
Asanas: Supine Position- Sarvangasana, Halasana.Mudras- Dhyana mudra, , Namaste mudra, Nasika mudra

Unit-IV:

Pranayams:- Anuloma – Viloma, Basthrika, Bhramari.
Dhyana & its types: Competition format, Rules and their interpretations

SEMESTER 2

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Week
B19BA2011	Language: Kannada-II	SC	2	1	0	3	4

Course Objectives:

£Á®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉÆA¢zÉ. CzÀgÀAvÉ JgÀqÀ£ÉAiÀÄ ¸É«Ä¸ÀÖgï£À°è ¥ÁæaÃ£À, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ¯ÉÃR£ÀUÀ¼ÀÄ ºÁUÀÄ ¥ÀæªÁ¸À PÀxÀ£À ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÄÌ ªÀiÁrPÉÆAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©ügÀÄaAiÀÄ£ÀÄß ªÀÄÆr¸À¯ÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉÆvÉUÉ ªÀåQÛvÀé «PÀ¸À£ÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀ¯ÁUÀÄvÀÛzÉ.

- ¨sÁµÉ, ¸Á»vÀå, EwºÁ¸À ªÀÄvÀÄÛ ¸ÀA¸ÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ ¸ÀA§A¢ü¹zÀAvÉ ¥ÀjZÀ¬Ä¸À¯ÁUÀÄvÀÛzÉ.
- «zÁåyðUÀ¼À ¸ÀªÀðvÉÆÃªÀÄÄR ¨É¼ÀªÀtÂUÉUÉ C£ÀÄªÁUÀÄªÀAvÉ ºÁUÀÆ CªÀgÀ°è ªÀiÁ£ÀªÀ ¸ÀA§AzsÀUÀ¼À §UÉÎ UËgÀªÀ, ¸ÀªÀiÁ£ÀvÉ ªÀÄÆr¹, ¨É¼É¸ÀÄªÀ ¤nÖ£À°è ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
- CªÀgÀ°è ¸ÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨sÁµÉ, GvÀÛªÀÄ «ªÀÄ±Áð UÀÄt, ¤gÀUÀð¼À ¸ÀA¨sÁµÀuÉ, ¨sÁµÀt PÀ¯É ºÁUÀÆ §gÀºÀ PË±À®åUÀ¼À£ÀÄß ¨É¼É¸ÀÄªÀÅzÀÄ UÀÄjAiÀiÁVzÉ
- ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀÆ®ªÁUÀÄªÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀªÀÄ£ÀzÀ°èèlÄÖPÉÆAqÀÄ ¸ÀÆPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ ªÀiÁrPÉÆ¼Àî¯ÁVzÉ.

Course Outcomes:

¥ÁæaÃ£À, ªÀÄzsÀåPÁ°Ã£À PÁªÀåUÀ¼ÀÄ, ºÉÆ¸ÀUÀ£ÀßqÀzÀ ¯ÉÃR£ÀUÀ¼ÀÄ ºÁUÀÄ ¥ÀæªÁ¸À PÀxÀ£À ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄÆ®PÀ PÁ®zÀ ¹ÜvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉÆÃlUÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

- ¸ÁªÀiÁfPÀ, gÁdQÃAiÀÄ, zsÁ«ÄðPÀ, ¸ÁA¸ÀÌøwPÀ ºÁUÀÆ °AUÀ¸ÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀªÀÄ£ÀºÀj¸ÀÄªÀÅzÀgÉÆA¢UÉ «zÁåyðUÀ¼À°è ZÀZÁð ªÀÄ£ÉÆÃ¨sÁªÀªÀÅ ¨É¼ÉAiÀÄÄvÀÛzÉ.
- fÃªÀ£ÀzÀ°è §gÀÄªÀ C©ü¥ÁæAiÀÄ ¨ÉÃzsÀUÀ¼ÀÄ, ¸ÀªÀÄ¸ÉåUÀ¼À£ÀÄß DzsÀÄ¤PÀ ¸ÀAzÀ¨sÀðzÀ°è ªÀiÁ£À«ÃAiÀÄvÉAiÉÆA¢UÉ ¤ªÀð»¸ÀÄªÀAvÉ ¥ÉæÃgÉÃ¦¸ÄvÀÛzÉ.
- ¸ÁªÀiÁfPÀ CjªÀÅ ªÀÄÆr¸ÀÄvÀÛzÉ
- GvÀÛªÀÄ ¸ÀAªÀºÀ£À PÀ¯ÉAiÀÄ£ÀÄß ¨É¼É¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß FqÉÃj¸ÀÄvÀÛzÉ.

Course Content:

Unit-I ªÀÄzsÀåPÁ°Ã£À PÁªÀå

1. ZÀAzÀæªÀÄw «¯Á¥À gÁWÀªÁAPÀ
2. ºÀUÉUÀ¼À£ÀÄ »ArzÀ£ÀÄ ªÀÄ£ÀzÉÆ¼ÀUÉ PÀÄªÀiÁgÀªÁå¸À
3. ©gÀÄUÁ½ ¥ÉÆqÉAiÀÄ¯É ®QëöäÃ±À
4. UÉÆÃgÀPÀë ¥Àæ¸ÀAUÀ ZÁªÀÄgÀ¸À

Unit II ªÀÄzsÀåPÁ°Ã£À PÁªÀå

1. wæ¥À¢UÀ¼ÀÄ ¸ÀªÀðdÕ
2. ªÀÄÄAzÀPÉÌ ¯ÉÃ¸ÀÄAlÄ £ÀªÀÄUÉ ºÉ¼ÀªÀ£À PÀmÉÖ VjAiÀÄªÀÄä

3. V½AiÀÄÄ ¥ÀAdgÀzÉÆ½®è ¥ÀÄgÀAzÀgÀ zÁ¸ÀgÀÄ
4. PÀgÉzÀÄ PÉÆlÖ£ÀÄ ±Á¥À°À£ÀÄ PÀ£ÀPÀzÁ¸ÀgÀÄ

Unit III ¯ÉÃR£ÀUÀ¼ÀÄ

1. ªÉÆÃPÀë ºÀÄqÀÄPÀÄvÀÛ ¦æÃwAiÀÄ §AzsÀ£ÀzÀ°è ¦. ®APÉÃ±À
2. ¤gÀAPÀÄ±À°ÀÄw¬ÄAzÀ DvÀä²æÃ PÀÄªÉA¥ÀÄ
3. ªÀiÁ£À«ÃAiÀÄvÉ CAvÁgÀ¯Áè zÉÃªÀ£ÀÆgÀÄ ªÀÄºÁzÉÃªÀ
4. ¨sÀÆvÁ¬Ä ªÀÄÄ¤zÁ¼ÀÄ ªÀÄÄgÁj §¯Áè¼À

Unit IV ¥ÀæªÁ¸À PÀxÀ£À

1. £À£ÉÆß¼ÀV£À ºÁqÀÄ PÀÆå¨Á f.J£ï. ªÉÆÃºÀ£ï

¥ÀgÁªÀÄ±Àð£À UÀæAxÀUÀ¼ÀÄ :

1. ªÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2014
2. ¹ÃªÀiÁwÃvÀ PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ ¸ÀA¥ÀÄl 1,2,3,4,5 ªÀÄvÀÄÛ 6, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2014
3. ºÀA¥À £ÁUÀgÁdAiÀÄå, ¸ÁAUÀvÀå PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
4. PÁ¼ÉÃUËqÀ £ÁUÀªÁgÀ, wæ¥À¢, gÀUÀ¼É ªÀÄvÀÄÛ eÁ£À¥ÀzÀ ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
5. ¸ÀA. ¨É£ÀUÀ¯ï gÁªÀÄ gÁªï ªÀÄvÀÄÛ ¥Á£ÀåA ¸ÀÄAzÀgÀ ±Á¹ÛçÃ, ¥ÀÄgÁt £ÁªÀÄ ZÀÆqÁªÀÄtÂ, ¥ÀæPÁ±ÀPÀgÀÄ ¥Àæ¸ÁgÁAUÀ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ. 2010
6. ¸ÀA. §¸ÀªÀgÁdÄ J¯ï. ¸ÀªÀðdÕ£À ªÀZÀ£ÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2012
7. ªÀÄgÀÄ¼À¹zÀÝ¥Àà PÉ, µÀlà¢ ¸Á»vÀå, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
8. ¸ÀA. ¸ÉÃvÀÄgÁªÀÄ gÁªï C.gÁ., ²æÃ ®Qëöä±À£À eÉÊ«Ä¤ ¨sÁgÀvÀ(ªÀÄÆ®-vÁvÀàAiÀÄð-¸ÀavÀæ), ¥ÀæPÁ±ÀPÀgÀÄ PÁªÀÄzsÉÃ£ÀÄ ¥ÀÄ¸ÀÛPÀ ¨sÀªÀ£À, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
9. ¸ÀA. f.J¸ï.¨sÀmï., PÀÄªÀiÁgÀªÁå¸À£À PÀuÁðl ¨sÁgÀvÀ PÀxÁªÀÄAdj ¥ÀæªÉÃ±À, ¥ÀæPÁ±ÀPÀgÀÄ CPÀëgÀ ¥ÀæPÁ±À£À, ºÉUÉÆÎÃqÀÄ, ¸ÁUÀgÀ. 2006
10. QÃvÀð£ÁxÀ PÀÄvÀðPÉÆÃn, PÀ£ÀßqÀ ¸Á»vÀå ¸ÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉÆÃn ªÉÄªÉÆÃjAiÀÄ¯ï læ¸ïÖ, zsÁgÀªÁqÀ. 2009
11. ±ÁªÀÄgÁAiÀÄ vÀ.¸ÀÄ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À ªÉAPÀtÚAiÀÄå ¸ÁägÀPÀ UÀæAxÀªÀiÁ¯É, ªÉÄÊ¸ÀÆgÀÄ -2014
12. ²ªÀgÀÄzÀæ¥Àà f.J¸ï. PÀ£ÀßqÀ ¸Á»vÀå ¸À«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 201

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA2012	Hindi	SC	2	1	0	3	4

Course Objectives

ppppppppppp ppppppppppp :

- सं◌दभ◌ानु◌सार उद्धवत भ◌ाष◌ा क◌ा प्रय◌ोग करन◌े क◌ी द◌ित◌ा क◌ो छ◌ात◌्ो◌ं म◌ेंं उत्पन्न करन◌ा |
- साद्वि◌त्य क◌े म◌ाध्यम स◌े समाज एवं मानव◌ीय म◌ूल◌्ो◌ं क◌ो समझ◌ाकर, उन म◌ूल◌्ो◌ं क◌ी र◌ि◌ा ि◌े◌त◌ु प्र◌ेरत करन◌ा |
- छ◌ात◌्ो◌ं म◌ेंं प◌ु◌स्तक पठन एवं ल◌ेखन क◌ी अक◌ृ द्धतम प्रव◌ृद्धि स◌्थ◌ाप◌पत करन◌ा |
- अध्य◌े त◌ाओं म◌ेंं साद्वि◌त्य क◌े माध्यम स◌े प्रभावी एवं क◌ु शल स◌ंचार क◌ा द्धवक◌ास करन◌ा |

Course Outcomes:

ppppppp ppppppppp :

अध्ययन की समाप्तप्त पर अध्येता –

- सामाद्धजक म◌ूल् एवं न◌ैद्धतक जव◌ाबद◌े ि◌ी क◌ो स्व◌ीक◌ार कर सकत◌ा ि◌ै |
- साद्वि◌त्य क◌ी प्र◌ास◌ंद्धगकत◌ा क◌ो ज◌ीवन म◌ेंं समझन◌े क◌ी द◌ित◌ा रखत◌ा ि◌ै |
- समाज म◌ेंं अ◌ंत◌ःनद्धि◌त पद्दद्धतय◌ा एवं द्धवच◌ारध◌ार◌ाओं क◌ा व्य◌ाख्य◌ान करन◌े म◌ेंं सिम बन सकत◌ा ि◌ै |
- साद्वित्य के माध्यम से प्रभावी एवं कु शल संचार का द्धवकास कर सकता ि◌ै |

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ppppp – **1** ककककक: कककककककक ककक कककककक

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2 ककककक: कककककककक ककक कककककक 4.कककककककक

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ppppp – **3** ककककक: कककककककक ककक कककककक

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9.कककककक – ककक क ककककक ककककक ककक – ककककक

ppppp – **4**

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ppppp : **pppppppppp ppppp** 25 **ppp pppppp pppppppppppp pp** |

d) Suggested Text Books and References

Text book/s: ppppp pppppppp :

1. ह्रिन्दी पाठ्य पुस्तक – रेवा ह्रवश्वह्रवद्यालय |

References: pppppppp pppppppp :

1. सुबोध व्यवहारिक ह्रिन्दी – डॉ कु लदीप गुप्त .
2. अद्रभनव व्यविाररक द्विन्दी – डॉपरमानन्द गुप्त.
3. ह्रिन्दी साह्रहत्य का इह्रतहास नागेन्द्र .डॉ -
4. आधुह्रनक ह्रिन्दी साह्रहत्य का इह्रतहास बच्चन ह्रसंह .डॉ -
5. ह्रिन्दी साह्रहत्य का नवीन इह्रतहास लाल साहिब ह्रसंह .डॉ -
6. शुद्ध द्विन्दी कै से बोले कै से ह्रलखेपृथ्वीनाथ पाण्डे -
7. संक्षेपण एवं पल्लवन

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA2013	**Additional English II**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

1. To ensure the development of the linguistic prowess of the students
2. To motivate the students to appreciate literature
3. To help students build strong language fundamentals
4. To promote an appreciable reading habit among the students

Course Outcomes

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

1. Demonstrate a thorough understanding of sensitive and critical social issues.
2. Develop reading skills and vocabulary range
3. Critically analyse a piece of prose or poetry
4. Express their opinion in a coherent and communicable manner
5. Conceptualise original pieces
6. Appraise pieces based on notions of high and low art

Course Contents

Unit-I: Ecology & Environment

Literature:Toru Dutt - Casuarina Tree
Robert Frost – Stopping by Woods on a Snowy Evening
Tomas Rivera–The Harvest
CV. Raman – Water – The Elixir of Life
Language:Degrees of Comparison

Unit-II: Voices from the Margin
Literature:Tadeusz Rozewicz – Pigtail
Jyoti Lanjewar – Mother
Sowvendra Shekhar Hansda – The Adivasi Will Not Dance
Harriet Jacobs – Excerpt from Incidents in the Life of a Slave Girl
Language:Prefix and Suffix

Unit-III: Women & Society
Literature:Kamala Das – An Introduction
UshaNavrathnaram – To Mother
Rabindranath Tagore – The Exercise Book
Jamaica Kincaid – Girl
Writing Skills:Dialogue Writing

Unit-IV:Popular Culture
Literature:Rudyard Kipling – The Absent-minded Beggar
Sir Arthur Conan Doyle – The Hound of the Baskervilles
Aldous Huxley – The Beauty Industry
Writing Skills:Story Writing

Reference Books:

- Agrawal, K.A. *Toru Dutt the Pioneer Spirit of Indian English Poetry - A Critical Study*. Atlantic Publications, 2009.
- Latham, Edward Connery (ed). *The Poetry of Robert Frost*. Holt Paperbacks, 2002.
- Gale, Cengage Learning. *A Study Guide for Tomas Rivera's The Harvest*. Gale, Study Guides, 2017.
- Basu, Tejan Kumar. *The Life and Times of C.V. Ram*an. PrabhatPrakashan, 2016.
- Rozewicz, Tadeusz. *New Poems*. Archipelago, 2007.
- Manohar, Murli. *Critical Essays on Dalit Literature*. Atlantic Publishers, 2013.
- Hansda, SowvendraShekhar. *The Adivasi Will Not Dance: Stories*. Speaking Tiger Publishing Private Limited, 2017.
- Jacobs, Harriet. *Incidents in the Life of a Slave Girl*. Createspace Independent Publication, 2014.
- Das, Kamala. *Selected Poems*. Penguin Books India, 2014.
- Tagore, Rabindranath. *Selected Short Stories of Rabindranath Tagore*. Maple Press, 2012.
- Gale, Cengage Learning.*A Study Guide for Jamaica Kincaid's Girl*. Gale, Study Guides, 2017.
- Kipling, Rudyard. *The Absent-Minded Beggar*. Hardpress Publishing, 2013.
- Doyle, Arthur Conan. *The Hound of the Baskervilles*. General Press, 2017.
- Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
- Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
- Samson, T. (ed.) *Innovate with English.* Cambridge University Press, 2010.
- Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.

B19BA2020	**Communicative English – II**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

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

Course Outcomes

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

1. Demonstrate ethical and political responsibilities in taking cognizance of issues relating to society, environment and media
2. Develop a process oriented approach to writing
3. Apply grammatical skills developed during the course
4. Utilize language effectively to focus on interpersonal skills
5. Develop a good command over the language
6. Identify the nuances of the different types of formal writing and incorporate the same in their writing

Course Contents

Unit-I: Language Acquisition
Remedial Grammar:Questions & Negatives; Questions Tags
Writing Skills:Email Writing
Activities:Group Discussions
Literature:Alphonse Daudet - The Last Lesson

Unit-II: Persuasive Skills
Remedial Grammar: Past Simple & Past Perfect
Writing Skills: Report Writing
Activities: Book & Movie Reviews
Literature: Lord Alfred Tennyson – Ulysses

Unit-III: Cognitive Skills
Remedial Grammar: Present & Past Passive; Conditionals
Writing Skills: Creative Writing
Activities: Role Plays
Literature: O. Henry – The Gift of the Magi

Unit-IV: Employability Skills
Remedial Grammar: Reported Speech; Idioms
Writing Skills: Cover Letter & CV
Activities: Exchanging Information
Literature: Saki – The Open Window

Reference Books:

1. Bansal, R.K. and J.B. Harrison. *Spoken English*. Orient Blackswan, 2013.
2. Raman, Meenakshi and Sangeeta Sharma. *Technical Communication*. Oxford University Press, 2015.
3. Thorpe, Edgar and Showick Thorpe. *Objective English*. Pearson Education, 2013.
4. Dixson, Robert J. *Everyday Dialogues in English*. Prentice Hall India Pvt Ltd., 1988.
5. Turton, Nigel D. *ABC of Common Errors*. Mac Millan Publishers, 1995.
6. Samson, T. (ed.) *Innovate with English.* Cambridge University Press, 2010.
7. Kumar, E Suresh, J. Savitri and P Sreehari (ed). *Effective English*. Pearson Education, 2009.
8. Goodale, Malcolm. *Professional Presentation*. Cambridge University Press, 2013.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2031	**Natya Sastra and Performing Arts**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1. To make the students understand the importance of the text Natya sastra in the arena of PerformingArts
2. To make the students learn the basics of the Natya Sastra and the fundamentals of the different Units init.

Course Outcomes

1. At the end of the course the students would be in a position to understand the importance and the greatness of the text NatyaSastra
2. The Students would not only understand the fundamentals of the different chapters in Natya Sastra but would also try to implement them in their practical and theorylearning.

Course Content:

UNIT	Description	Topics
1	Introduction to Natya Sastra	• Introduction to Natya Sastra – the encylopedia on Dramaturgy and its history • Natyotpathi – the evolution of Natya

2	11 aspects of Natya Sastra – a detailed study	• Rasa • Bhava • Abhinaya • Dharmi • Vritthi • Pravritthi • Sidhi • Swara • Atodyam • Ganam • Rangam
3	Traditional Theatres of South India and Dasaroopakas	• Kudiyattam, Krishnattam, Terukuthu, Nautanki, Tamasha, Jatra, Burrakatha, Chhau, Yakshagana and Bayalata, Bhagavatha Mela • Ten forms of Drama by Dhananjaya
4	Natya Sastra in the Modern World	• Marga and Desi • Indian Classical Dance Forms • Discovery of Natya Sastra in 19thcentury • Different works on Natya Sastra from 19th century

Reference Books:

- Natya Sastra – Dr. ManomohanGhosh
- Bharata – The Natya Sastra – Dr. KapilaVatsyayan
- Natya Sastra in the Modern World – Dr. Radhavallabh Tripathi
- Bharatamuni Praneetha Natyasastra – Acharya P.Ramachandra
- Abhinava Bharati on Bharata's Natya Sastra – ManjulGupta
- Natya Sastra and the Indian Dramatic Tradition – Dr. Radhavallabh Tripathi

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2032	**Music Theory 2- Karnatik Music**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1. To enable the artistes of School of Performing Arts to have a strong foundation in both practical and theory ofmusic.
2. Enable students to understand the importance of music and its glorious past, through the biographies of lengendry maestros.
3. To enable students to understand the melekartha/Thaat raga system
4. To enable them to understand the classification of geeta prakaras in Indian classical

Course Outcomes

1. At the end of the course the students would be in a position to understand the nuances of Indian classical Music.
2. The Students would not only understand the fundamentals and basics of the music but would also understand the tala system in Indian classicalmusic Philosophical ideas.
3. The students would get used to the melakartha/Thaat scheme
4. Students would understand the importance of raga classification and alap.

Course content

UNIT	Description	Topics
1	Katapayadi Sutra	• 72 melakartha scheme- katapayadi formulae, Bhoota sankhya
2	Raga classification	• Raga classification- Varja, Vakra, Upanga-Bhashanga,Nishadantya Panchamantya ragas, Dhaivatanthya ragas
3	Music Basics Theory Music	• Classification of Musical Forms in General, Geetam – Lakshya Geetam & Lakshana Geetam, Swarajathi &Jathiswaram
4	Music Basics Theory Music	• Tala dasapranas • Ghana, Thata, sushira and Avanaddha

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2033	Music Theory 2- Hindustani Music	SC	4	0	0	4	4

Course Objectives

1. To enable the artistes of School of Performing Arts to have a strong foundation in both practical and theory ofmusic.
2. Enable students to understand theimportanceofmusicanditsgloriouspast, through the biographies of lengendry maestros.
3. To enable students to understand the melekartha/Thaat raga system

Course Outcomes

1. At the end of the course the students would be in a position to understand the nuances of Indian classical MusicThe Students would not only understand the fundamentals and basics of the music but would also understand the tala system in Indian classicalmusic Philosophical ideas.
2. The students would get used to the melakartha/Thaat scheme
3. Students would understand the importance of raga classification and alap.

Course content

UNIT	Description	Topics
1	Classification of Parental Scales	Hindustani music part) 10 Thaats scheme
2	Raga classification	• (Hindustani music part) Raga ragini Vargeekarana
3	Types of Compositions	• (Hindustani music part) Geetha prakaras - Swaramalika,Lakshan geeth,Tarana,Chathurang,Dhamar,Dhrupad,Thumri & Khayal Bandish
4	Elements of Hindustani Music	• Hindustani music part) **Short notes** - Alap system Important Philosophical ideas Gayaki - Nayaki Nibaddha - Anibadda Prakara

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy

4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande

Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2033	**World Theater**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. To look at the historical background of Sanskrit theatre
2. To be known about the regional theatrical developments.
3. To have a broader knowledge of Western Theatre evolution
4. To be familiar to various stages of theatre in Western countries
5. To enter the regime of major plays of Ancient India and Western theatre

Course Outcomes:

Upon completion of this course, the student should be able to:

1. Have an appreciation of the details of theatre arts documented in the history of India.
2. Evaluate the success of theatrical practices in Karnataka.
3. Get familiar with a broad range of theatrical terminology and personalities in Sanskrit, Kannada and Western theatre.
4. Appreciate the evolution of theatre in Western countries in detail.
5. Identify the social themes & structures historically responsible for the development of dramatic types.

Course Content:

Unit	Topics	Description
1	Sanskrit theatre	1. Introduction to Natya Sastra 2. Origin and development of Sanskrit theatre. 3. Introduction to Dhananjaya's dasharoopakas 4. Sanskrit playwrights –Bhasa, Kalidasa, Shudraka
2	Karnataka theatre	1. Origin and development of folk theatre in Karnataka – Yakshagana, Doddata, Sannata, Talamaddale. 2. Professional theatre history of Karnataka. 3. Major theatre companies of Karnataka – Gubbi company, 4. Origin and development of amateur theatre in Karnataka.
3	Western theatre 1	1. Origin and development of Greek Theatre. 2. Greek playwrights – Aeschylus, Sophocles, Euripides, Aristophanes. 3. Origin and development of Roman theatre. 4. Roman playwrights – Plautus, Terrence, Seneca.
4	Western theatre 2	1. Origin and development of medieval theatre 2. Origin and development of Elizabethan theatre. 3. Modern European theatre Commedia Del Arte Realism Naturalism Expressionism Absurd theatre 4. Germinal playwrights – Henrik Ibsen, Antonin Chekov, August Strindberg, Maxim Gorky, Bertolt Brecht, Eugene Ionesco, Samuel Beckett.

Reference Books

1. Dr. ManomohanGhosh, *Natya Sastra*
2. Dhananjaya – trans – George C O Haas, *Dasharoopaka*
3. B. R. Venkataramana Aithala & Deepa Ganesh, *Kannada Theatre History 1850 - 1950*
4. ChrisHogget, *All About Theatre – off stage*
5. Bradley A Gerard, *Behind the Scenes*
6. K. V. Akshara, *Rangaprapancha*

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2041	**Practical 2 – Fundamentals of Bharatanatyam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To help the Student to have more knowledge and base in the form.
2. To enable the dancer to have a strong foundation in Bharatanatyam
3. To enable the dancer to have a strong foundation in the dance style by learning the different items and abhinaya
4. To teach the students the items in dance and also the technical aspects of the item which

Course Outcomes:

1. Demonstrate the structural aspects of Nrita items in Bharathanatyam
2. Compare the Nritta and Nritya items in Bharathanatyam with examples
3. Analyzing the Historical aspects of the items
4. Understand the nuances of abhinaya

Course Content

Unit	Topics	Description
1	Dance 1	Jathiswaram – 1
2	Dance 2	Shabdam poorvardha
3	Dance 2	Shabdam uttarardha
4	Singing and Recitation	Learning singing the lyrics of items and the recitation of jathis and solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2042	Practical 2 – Fundamentals of Kuchipudi	SC	1	0	2	3	5

Course Objectives:

1. To enable the dancer to learn the invocatory items in Kuchipudi dancestyle.
2. To enable the dancer to have a strong foundation in the dance style by learning the different items andabhinaya
3. To enable the students to become more aware of the different items in therepertoire
4. To teach the students the items in dance and also the technical aspects of the item which include rhythm, music, and literature

Course Outcomes

1. Explain the importance of invocatory items in the repertoire.
2. Understand the structure of different invocatory items in Kuchipudi
3. Differentiate the patterns of Poorvaranga and Vinayaka Kavithwam.
4. Will be able to further teach the items and also understand the intricacies in choreographing such items

Course content

Unit	Topics	Description
1	Dance 1	Brahmanjali
2	Dance 2	Vinayaka Kowthvam 1st part
3	Dance 2	Vinayaka Kowthvam 2nd part
4	Singing and Recitation	Learning singing the lyrics of the items and also the recitation of the jathis and the solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA2043	**Practical 2-Fundamentals of Dance Mohiniyattam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course objectives:

1. To make the students understand the nuances of the Mohiniyattam.
2. To enable them to understand the technical terms in Cholkkettu and jathiswaram.
3. To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
4. To teach the students the dances and also the technical aspects of the item which include taalam, music and literature.

Course outcomes:

1. At the end of the course the students would be in a position to understand the nuances of the Mohiniyattam art form.
2. The students would not only understand the fundamentals and basics of the dance, but would also become a performer.
3. Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
4. A good understanding about the items music and lyrics meaning.

Course Content

UNIT	Description	Topics
1	Fundamentals	• Basic Adavus
2	Hasta Bhedas	• Samyutha Hastas bhedas from Hastha Lakshana Deepika, Bandhuhasthas,devahasthas,dasavatara • Hasthas,eight mudras viniyogams
3	Dance 1	• Cholkattu -1
4	Dance 1	• Jathiswaram – 1

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2044	**Practical –2 Fundamentals of Odissi Dance**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To teach the important items in Odissi
2. To enable the students to understand the patterns of item in Odissi
3. To enable the students to understand about the repertoire of Odissi
4. To teach the students the items in dance and also the technical aspects of the item which include rhythm, music and literature.

Course Outcomes:

1. learn the history behind each item in Odissi
2. Explain the the tala system in Odissi
3. Understand the nuances of Abhinaya in odissi
4. Demonstrate the patterns Nritta and Nrithya in Odissi.

Course Content

UNIT	Description	Topics
1	Dance 1	1.Mangalacharan 2. stuti
2	Dance 2	1.Vandana
3	Dance 3	1.BatuNritya
4	Dance 4	1.Sthayi

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2045	Practical-2 (Fundamentals of Kathak)	SC	1	0	2	3	5

Course Objectives:

1. To make the students understand the nuances of the kathak.
2. To enable them to understand the technical terms in katak
3. To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
4. To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.

Course Outcomes:

1. learn the history behind each item in Kathak
2. Explain the the tala system in Kathak
3. Understand the nuances of Abhinaya in Kathak
4. Demonstrate the patterns Nritta and Nrithya in Kathak.

Course Content

UNIT	Description	Topics
1	Dance 1	Basic toda/tukdas in teentaal.
2	Dance 2	Basic Tihaii in teentaal.
3	Dance 3	Chakkar dar Toda in teentaal.
4	Singing and recitation	Padhant

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2046	Practical-2 (Fundamentals of Carnatic Music)	SC	1	0	2	3	5

Course Objectives

1. To enable the dancers/artistes of School of Performing Arts to have a strong foundation in both practical and theory ofmusic.
2. To teach students the fundamental technicalities in music through varied music scriptures and make them adept in the recitation of the songs in the Carnaticmusic.
3. Voice culture and to make the students understand the nuances of CarnaticMusic.
4. To enable them to understand the technical terms in music

Course Outcomes:

1. At the end of the course the students would be in a position to understand the nuances of Carnatic Music
2. The Students would not only understand the fundamentals and basics of the music but would also become aperformer.
3. The students would get used to the voice cultureexercise
4. Students would understand the importance of music with respect todance

Course content

Unit	Topics	Description
1	Music Basics And voice culture	• SaptatalaAlankaras
2	Music Basics And voice culture	• DatuVarasegalu • Geethe-1
3	Music Basics Theory Music	• Alankaras • Geethe –2
4	Music Basics Theory Music	• Geethe –3 • Geethe –4

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA2047	**Fundamentals Of Hindustani Practical-2**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

1. To make the students understand the nuances of the Hindustani Music.
2. To make the students learn the compositions in Hindustani classical music and to enable them to learn it in the practical way.
3. To enable them to understand the technical terms in music.

Course Outcomes

1. At the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music
2. The Students would not only understand the fundamentals and basics of the music but would also become a performer.
3. The students will be able to sing in concerts and will also have a strong music theory

Course content

UNIT	Description	Topics
1	Music – Raga abhyas & Prasthuthi	• Raag Bibhas • Raag GurjariTodi Practice of Sargamgeeth, Lakshanageeth, Chotakhayal-Alap & Taan for above ragas
2	Music – Raga abhyas & Prasthuthi	• Raag Durga • Raag Alhaiyya Bilawal Practice of Sargamgeeth, Lakshanageeth, Chotakhayal-Alap & Taan for above ragas
3	Music – Raga abhyas & Prasthuthi	• Raag Purvi • Raag Asawari Practice of Sargamgeeth, Lakshanageeth, Chotakhayal-Alap & Taan for above ragas

4	Music Practical theory	• Taal – Dadra, Keherwa (Only Tekha) • Usage of Tanpura & Harmonium • Bhathkande Swaralipi abhyaas/ Notation practice

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA2048	**Practical 2– Design in Theater and Acting Advance I**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

1. Develop an appreciation and unerring zeal towards dramatic literature.
2. Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
3. Demonstrate the historical evolution of drama and its variants across the world.
4. Explore the episteme of Theatrical Terminologies and Theories.

Course Outcomes

1. The completion of the course enables pupils to realize the vitality and the prominence of Theatre across the world.
2. Be able to enhance the reading skills.
3. Be able to analyse and demonstrate the characters in a script theoretically and practically.
4. Be able execute acting skills in a scene.

Course Content:

Unit	Topics	Description
1	**Theatre Make – up**	1. History of Make-up 2. Types of theatre make-up Straight Character Mosaic Sculpture 3. Color symbolism and character analysis 4. Executing make-up for various characters.
2	**Stage Craft**	1. The Significance of Sets, Prop and Make-up 2. Functions of set, Technical terms pertaining to stage. Types of props used in a play Dynamic Static.
3	**Stage Props and setting**	1. Executing Stage Properties for a given play using raw materials. Preparing hand and set properties for a periodical and a social play. 2. Drawing Ground plan-cross section plan and Elevation plans of stage
4	**Acting 2 –** **Practice and Development of Theatre**	1. Continuing the previous exercises and activities Rhythm Pitch and Volume Meaning of Speech Symbol Signal 2. Introduction to "Trance Energy" of Antonin Arthaud 3. Introduction to Grotowski's "Poor Theatre"

Reference Books:

1. Dr. ManomohanGhosh, *Natya Sastra*
2. Dhananjaya – trans – George C O Haas, *Dasharoopaka*
3. B. R. Venkataramana Aithala & Deepa Ganesh, *Kannada Theatre History 1850 - 1950*
4. ChrisHogget, *All About Theatre – off stage*
5. Bradley A Gerard, *Behind the Scenes*
6. K. V. Akshara, *Rangaprapancha*

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B19BA2050	**English Literature (The Romantic Age) & Language – II**	**HC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1. To relate to the context of the literary ages.
2. To develop aesthetic understanding of the text.
3. To identify the new genres in British literature.
4. To interpret the discourses of literature and to comprehend the idea of liberty, equality and fraternity.

Course Outcomes

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

1. Develop creative skills and human values through aesthetics of literature.
2. Demonstrate the knowledge and incorporate the proficiency of language skills through prose.
3. Deduct historical aspects from literature to develop mastery over social skills.
4. Construct coherent sentences in English.
5. Critically analyse the literary concepts used in the select literary pieces.
6. Appreciate poetic language

Course Contents

Unit – I: Poetry

***The Age of Transition*:**

1. William Blake – The Chimney Sweeper

***The Romantic Age*:**

2. William Wordsworth – The Solitary Reaper
3. Samuel Taylor Coleridge – *Extract from* The Rime of the Ancient Mariner (Part I – lines 1-82)
4. Lord Byron – On This Day I Complete My Thirty-Sixth Year
5. Percy Bysshe Shelley – Stanzas Written in Dejection, near Naples
6. John Keats – Ode to a Nightingale

Unit – II: Prose

1. Charles Lamb – Dream-Children: A Reverie
2. William Hazlitt – On the Feeling of Immortality in Youth
3. Percy Bysshe Shelley – Extract from *A Defence of Poetry* (Shelly views on Nature of Poetry)
4. Mary Wollstonecraft – Extract from *A Vindication of the Rights of Women* (Chapter 5)

Unit – III: Fiction

1. Ann Radcliffe – *The Mysteries of Udolpho*
2. Jane Austen – *Pride and Prejudice* (film text)

Unit – IV: Language

1. The Structure of Sentences

2. Discourse

REFERENCES:

- Wordsworth, Jonathan. *The Penguin Book of Romantic Poetry*. Penguin, 2006.
- Coleridge, Samuel Taylor, *The Rime of the Ancient Mariner.* Macmillan Collector's Library, 2017
- Applebaum, Stanley. *English Romantic Poetry: An Anthology*. Dover, 1996.
- Driver, Paul. *Poetry of the Romantics*. Penguin, 2000.
- Blaisdell, Bob. *Great English Essays: From Bacon to Chesterton*. Dover, 2005.
- Wollstonecraft, Mary, *Vindication of the Rights of Women*. Penguin, 2010.
- Sinha, Susanta K. *English Essayists*. Oxford University Press, 1997.
- Austen, Jane. *Pride and Prejudice*. Penguin, 2009.
- Radcliffe, Ann. *The Mysteries of Udolpho*. Penguin, 2001.
- Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
- Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B19BA2060	**Foundations Of Psychology-Ii**	**HC**	**2**	**1**	**0**	**3**	**3**

Course Objectives

1. To introduce the student to the different approaches to Learning
2. To introduce the mechanism of formation of memory and factors influencing our memory
3. To help the student to understanding cognitive process and Intelligence
4. To orient the students about Personality Development.

Course Outcomes

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

1. Discovers the ways different behaviors are learnt and its application to change the behavior.
2. Gain an understanding of mechanism of Human memory process and apply the knowledge in improving one's memory.
3. Explores the mechanism behind human thought process, intelligence and related concepts
4. Explores the concept personality, factors influencing, and different components of personality.

Course Contents

Unit-I: Learning

a) Definition.
b) Theories of Learning: Classical Conditioning- Experiment, Basic Concepts-Neutral stimulus, Conditional Stimulus, Unconditional Stimulus, Conditional response, Unconditional Response, Stimulus Generalization,

Discrimination, Extinction, Spontaneous Recovery, Higher Order Conditioning, Application to Human Behavior-systematic desensitization, aversion therapy.

c) Operant Conditioning: Basic Concepts-Reinforcement, Punishment-positive and negative, Experiments, Schedules of Reinforcement. Stimulus control, extinction, generalization and spontaneous recovery. Application: Shaping, Token Economy.
d) Cognitive Learning theory: Latent Learning-Tolman, Insight learning-Kohler, Learned Helplessness-Seligman.
e) Observational Learning: Bobo doll experiment, Basic concepts.
f) Learning in Classroom and Study skills.

Unit-II: Memory

a) Definition, Three processes of Memory-Encoding, Storage, Retrieval
b) Three memory System- Sensory memory-iconic, echoic, Short-term memory-working memory, long-term memory- Declarative-episodic, semantic, nondeclarative memory.
c) Retrieval cues: encoding specificity. Recall and Recognition.
d) Forgetting: reasons, theories-memory trace decay theory, interference theory.
e) Biological Bases of Memory.
f) Relationship between learning and memory
g) Memory strategies: mnemonic, peg-word, method of loci, music and rhythm.
h) Memory disorders: Amnesia, Alzhemer's.

Unit-III: Higher Cognitive process

a) Thinking**:** Defintion, types: convergent, divergent; concept formation.
b) Problem solving- definition, types: analogy, heuristics, trial and error, algorithms.
c) Reasoning- definition, types: inductive and deductive.
d) Decision making,
e) Intelligence: Definition, IQ, IQ distribution and interpretation
f) Broader conceptions of Intelligence: Spearman's two factor theory, Sternberg's triarchic theory, Multiple Intelligences, Guilford's theory.
g) Types of intelligence tests- individual, group, verbal, non-verbal and performance tests with examples.
h) Role of Heredity and Environment in intelligence
i) Extremes of Intelligence.
j) Creativity: Definition, stages, characteristics

Unit-IV: Personality

a) Nature and definition of personality (Allport's definition).
b) Factors influencing on development of personality.
c) Approaches to personality theories.
d) Psychodynamic Perspectives: Freud and Jung's theory
e) Trait approaches: NEO-5 theory.
f) Social Learning theory: Bandura's theory of Personality.
g) Humanistic Approach: Roger's Theory.
h) Measurement of personality: Objective Measurement: Questionnaires, rating scales. Projective Techniques.

References Books:

1. Robert S. *Feldman* (2004) *understanding Psychology* 6th *Edition* Tata MrGram – Hill.
2. Saundra K Ciccarelli and Glenn E Meyer (2008), Psychology, South Asia Edition,
3. Robert A Baron (2001), Psychology, III Edition, Prentice Hall Publications
4. John. W. Santrock (2006), Psychology Essentials, 2nd Edition Tata Mc Graw Hill

5. Hillgord & Atkinson (2009), Introduction to Psychology Oxford IBH publishing Co. Pvt. Ltd.
6. Morgan, King (2004), Introduction to Psychology, VII Edition, 1989, Mc Graw Hill IBH Publication

Psychology Practical-II:

Statistics: Measures of Variance: Range, S. D, Quartile deviation.

1. Cueing
2. Chunking
3. Maze-learning
4. Bilateral Transfer
5. Concept Formation

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B19BA2071	**Folklore Study – Folk Dance**	**SC**	**0**	**1**	**1**	**2**	**3**

Course Objectives

1. To teach the students the history and development of Folk lore in India
2. To teach the students the theoretical aspects of the folk lore.
3. To teach the students the practical aspects of the folk lore.

Course Outcomes

1. The students would be able to communicate and explain about the history of the folk lore.
2. The students will have an understanding of the theoretical aspects of the folklore
3. The students would be able to perform an item in folk style.

Course Content:

UNIT	Description	Topic
1	Introduction to Folk Arts	1. Introduction and importants of folk arts 2. Characteristics of folk arts 3. Folk art forms of India 4. Folk art forms that have survived generations
2	Folk dances of India	1. Folk dances from different states of India 2. Puppetry 3. History and development of folk dances of India
3	Dakshinatya Pravritti	1. Detailed study of Folk dances of Andhra 2. Detailed study of Folk dances of Tamil Nadu 3. Detailed study of Folk dances of Kerala 4. Detailed study of Folk dances of Karnataka 5. Detailed study of Folk dances of Maharashtra
4	Practical session	1. Learning and practicing any 2 folk dance

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B19BA2072	**Folklore Study – Folk Music**	SC	0	1	1	2	3
		Form					

Course Objectives

1. To teach the students the history and development of Folk lore in India
2. To teach the students the theoretical aspects of the folk lore.
3. To teach the students the practical aspects of the folk lore.

Course Outcomes

1. The students would be able to communicate and explain about the history of the folk lore.
2. The students will have an understanding of the theoretical aspects of the folklore
3. The students would be able to perform an item in folk style.

Course Content:

UNIT	Description	Topics
1	Introduction to Folk arts	• Introduction and importants of folkarts • Characteristics of folkarts • Folk art forms ofIndia • Folk art forms that have survived generations
2	Development of Folk Music	• Earliest records of Indian folkmusic • History andregionality
3	Instruments used for folk dance	• Sushira, Avanadha, Thanthri, Ghana Vadys used in folk music • Instruments used in north and south folk music.
4	Practical session	• Learning and practicing any 2 folk music form

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B19BA2073	**Folklore Study – Folk Theatre**	**SC**	**0**	**1**	**1**	**2**	**3**

Course Objectives

1. To teach the students the history and development of Folk lore in India
2. To teach the students the theoretical aspects of the folk lore.
3. To teach the students the practical aspects of the folk lore.

Course Outcomes

1. The students would be able to communicate and explain about the history of the folk lore.
2. The students will have an understanding of the theoretical aspects of the folklore
3. The students would be able to perform an item in folk style.

Course Content:

Unit	Topics	Description
1	Introduction to Folk Arts	1. Introduction and importants of folk arts 2. Characteristics of folk arts 3. Folk art forms of India 4. Folk art forms that have survived generations
2	Folk Theatre of India	1. Introduction 2. Different Theatre forms of Ancient India 3. Medieval India 4. Modern India
3	Dakshintya Pravritti	1. Koodiyattam 2. Yakshagana 3. Veddhi Natakam 4. Therukoothu 5. Tamasha
4	Practical session	5. Learning and practicing any 2 folk theatre form

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA2080	**Skill Development -1 (Multimedia and Designing)**	RULO	0	0	2	2	4

Note: Skill Development (Multimedia and Designing) courses are organised by the **Placement and Training Centre.** The students have to undergo Soft Skill Courses conducted by the said Centre.

SEMESTER 3

Course Code	Course Title	Course Type	L	T	P		Hrs./ Wk.
B18BA3011	Language: Kannada-III	SC	2	1	0	3	4

Course Objectives:

£Á®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÀªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉÆA¢zÉ. CzÀgÀAvÉ ªÀÄÆgÀ£ÉAiÀÄ ¸É«Ä¸ÀÖgï£À°è ºÉÆ¸ÀUÀ£ÀßqÀ ¸Á»vÀå ¥ÀæPÁgÀUÀ¼ÁzÀ £ÀªÉÇÃzÀAiÀÄ, £ÀªÀå PÁªÀå, ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÄÌ ªÀiÁrPÉÆAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©ügÀÄaAiÀÄ£ÀÄß ªÀÄÆr¸À¯ÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉÆvÉUÉ ªÀåQÛvÀé «PÀ¸À£ÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀ¯ÁUÀÄvÀÛzÉ.

- ¨sÁµÉ, ¸Á»vÀå, EwºÁ¸À ªÀÄvÀÄÛ ¸ÀA¸ÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ ¸ÀA§A¢ü¹zÀAvÉ ¥ÀjZÀ¬Ä¸À¯ÁUÀÄvÀÛzÉ.
- «zÁåyðUÀ¼À ¸ÀªÀðvÉÆÃªÀÄÄR ¨É¼ÀªÀtÂUÉUÉ C£ÀÄªÁUÀÄªÀAvÉ ºÁUÀÆ CªÀgÀ°è ªÀiÁ£ÀªÀ ¸ÀA§AzsÀUÀ¼À §UÉÎ UËgÀªÀ, ¸ÀªÀiÁ£ÀvÉ ªÀÄÆr¹, ¨É¼É¸ÀÄªÀ ¤nÖ£À°è ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
- CªÀgÀ°è ¸ÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨sÁµÉ, GvÀÛªÀÄ «ªÀÄ±Áð UÀÄt, ¤gÀUÀð¼À ¸ÀA¨sÁµÀuÉ, ¨sÁµÀt PÀ¯É ºÁUÀÆ §gÀºÀ PË±À®åUÀ¼À£ÀÄß ¨É¼É¸ÀÄªÀÅzÀÄ UÀÄjAiÀiÁVzÉ
- ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀÆ®ªÁUÀÄªÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀªÀÄ£ÀzÀ°èèlÄÖPÉÆAqÀÄ ¸ÀÆPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ ªÀiÁrPÉÆ¼Àî¯ÁVzÉ.

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Course Outcomes:

ºÉÆ¸ÀUÀ£ÀßqÀ ¸Á»vÀå ¥ÀæPÁgÀUÀ¼ÁzÀ £ÀªÉÇÃzÀAiÀÄ, £ÀªÀå PÁªÀå, ¸ÀtÚPÀxÉUÀ¼ÀÄ ºÁUÀÄ £ÁlPÀ ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄÆ®PÀ PÁ®zÀ ¹ÜvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉÆÃl UÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

- ¸ÁªÀiÁfPÀ, gÁdQÃAiÀÄ, zsÁ«ÄðPÀ, ¸ÁA¸ÀÌøwPÀ ºÁUÀÆ °AUÀ¸ÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀªÀÄ£ÀºÀj¸ÀÄªÀÅzÀgÉÆA¢UÉ «zÁåyðUÀ¼À°è ZÀZÁð ªÀÄ£ÉÆÃ¨sÁªÀªÀÅ ¨É¼ÉAiÀÄÄvÀÛzÉ.
- fÃªÀ£ÀzÀ°è §gÀÄªÀ C©ü¥ÁæAiÀÄ ¨ÉÃzsÀUÀ¼ÀÄ, ¸ÀªÀÄ¸ÉåUÀ¼À£ÀÄß DzsÀÄ¤PÀ ¸ÀAzÀ¨sÀðzÀ°è ªÀiÁ£À«ÃAiÀÄvÉAiÉÆA¢UÉ ¤ªÀð»¸ÀÄªÀAvÉ ¥ÉæÃgÉÃ¦¸ÀÄvÀÛzÉ.
- ¸ÁªÀiÁfPÀ CjªÀÅ ªÀÄÆr¸ÀÄvÀÛzÉ
- GvÀÛªÀÄ ¸ÀAªÀºÀ£À PÀ¯ÉAiÀÄ£ÀÄß ¨É¼É¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß FqÉÃj¸ÀÄvÀÛzÉ.

Course Content:

Unit I £ÀªÉÇÃzÀAiÀÄ PÀ«vÉUÀ¼ÀÄ

1. ¨É¼ÀUÀÄ zÀ.gÁ. ¨ÉÃAzÉæ
2. PÀ°Ì PÀÄªÉA¥ÀÄ
3. PÀ£Àßqï ¥ÀzÀUÉÆ¼ï f. ¦. gÁdgÀvÀßA

Unit II **£ÀªÉÇÃzÀAiÀÄ °ÁUÀÄ £Àª Àå PÀ«vÉUÀ¼ÀÄ**

1. CªÀzsÀÆvÀ ¸ÀÄ.gÀA.JPÀÄÌAr
2. ªÀÄ£É¬ÄAzÀ ªÀÄ£ÉUÉ PÉ.J¸ï.£À
3. £À£Àß °ÀtvÉ f.J¸ï.J¸ï.

Unit III ¸ÀtÚ PÀxÉUÀ¼ÀÄ

1. zÁ½ £ÀqÉzÁªÀ CuÁÚ CªÀÄgÉÃ±À £ÀÄUÀqÉÆÃtÂ
2. PÉÆ£ÉAiÀÄ VgÁQ ¤gÀAd£À
3. ªÀiÁ¤Ãlgï vÉÃd¹é

Unit IV **£ÁlPÀ**

«ÄÃrAiÀiÁ C£ÀÄªÁzÀ.: PÉ. ªÀÄgÀÄ¼À ¹zÀÞ¥Àà

¥ÀgÁªÀÄ±Ðð£À UÀæAxÀUÀ¼ÀÄ :

1. ªÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï °Ë¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2014
2. ¹ÃªÀiÁwÃvÀ PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ ¸ÀA¥ÀÄl 1,2,3,4,5 ªÀÄvÀÄÛ 6, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2014
3. qÁ. CgÀ«AzÀ ªÀiÁ®UÀwÛ, ¸Á»vÀå ¸ÀA¸ÀÌøw ªÀÄvÀÄÛ zÀ°vÀ ¥ÀæeÉÕ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÀßqÀ ¸Á»vÀå ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀÆgÀÄ. 2014
4. qÁ. F.J¸ï. DªÀÄÆgÀ, PÀ£ÀßqÀ PÀxÀ£À ¸Á»vÀå : PÁzÀA§j, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï °Ë¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2016
5. QÃvÀð£ÁxÀ PÀÄvÀðPÉÆÃn, PÀ£ÀßqÀ ¸Á»vÀå ¸ÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉÆÃn ªÉÄªÉÆÃjAiÀÄ¯ï læ¸ïÖ, zsÁgÀªÁqÀ. 2009
6. ¸ÀA. ©.J¸ï. PÉÃ±ÀªÀgÁªï. PÉÊ¯Á¸ÀA PÀ£ÀßqÀ £ÁlPÀUÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ CAQvÀ ¥ÀÄ¸ÀÛPÀ, ¨ÉAUÀ¼ÀÆgÀÄ. 2005
7. ±ÁªÀÄgÁAiÀÄ vÀ.¸ÀÄ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À ªÉAPÀtÚAiÀÄå ¸ÁägÀPÀ UÀæAxÀªÀiÁ¯É, ªÉÄÊ¸ÀÆgÀÄ -2014
8. DzsÀÄ¤PÀ PÀ£ÀßqÀ PÁªÀå ¨sÁUÀ-2, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2004
9. ²ªÀgÀÄzÀæ¥Àà f.J¸ï. PÀ£ÀßqÀ ¸Á»vÀå ¸À«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï °Ë¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2013

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA3012	Hindi	SC	2	1	0	3	4

Course Objectives:

पपपपपपपपप पपपपपपपप :

- सदभानुसार उद्धत भाषा का प्रयोग करने की दिता को छात्रों में उत्पन्न करना |
- साद्वित्य के माध्यम से समाज एवं मानवीय मूल्यों को समझाकर, उन मूल्यों की रिा ितु प्ररत करना |
- छात्रों में पुस्तक पठन एवं लेखन की अकृ द्धतम प्रवृद्धि स्थाद्धपत करना |
- अध्येताओं में साद्वित्य के माध्यम से प्रभावी एवं कु शल संचार का द्धकास करना |

Course Outcomes:

पपपपप पपपपपप :

अध्ययन की समाप्तप्त पर अध्येता –

- सामाद्विजक मूल्य एवं नैद्विक जवाबदेिी को स्वीकार कर सकता िै |
- साद्वित्य की प्रासंद्विकता को जीवन में समझने की दिता रखता िै |
- समाज में अंतद्विनद्वित पद्दद्वतया एवं द्विचारधाराओं का व्याख्यान करने में सिम बन सकता िै |
- साद्वित्य के माध्यम से प्रभावी एवं कुशल संचार का द्विकास कर सकता िै |

पपपप –1 **:**कककक : कक कक ककककककककककक – कक. कककक ककक कककक

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पपपप –2 **:**कककक : कक कक ककककककककककककककक कककककक

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पपप प –3 **:**कककक : कक कक ककककककककककककक ककककक

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पपपप –4**:**

पपपपपप : ककककककककक - कककककक - कककककक कककक ककककक कककककक - ककककककककक - कककककक ककककक ककककक कककककककककककक

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d) Suggested Text Books and References

Text book/s: पपपपप पपपपपप :

1. **पप पप पपपपपपपपपपप** – **पप. पपपप पपप**

References: पपपपपपप पपपपपप :

1. मीद्विडया लेखन एवं जनसंचार – डॉ संजीव कुमार.
2. .द्विन्दी साद्वित्य का इद्वतिास नागन्द्रे .डॉ -
3. आधुद्विनक द्विन्दी साद्वित्य का इद्वतिास बच्चन द्विसंि .डॉ -
4. द्विन्दी साद्वित्य का नवीन इद्वतिास लाल सािब द्विसंि .डॉ -
5. शुद्ध द्विन्दी कैसे बोले कैसे द्विलखेपृथ्वीनाथ पाण्डे -

6. कायालय अनुवाद ब्यूरो द्वारा
7. मीडिया ब्रीफिंग – रामशरण जोशी

8. सं◌स्कृ◌त– जनसं◌चार और ब◌ाज◌ार , नन्द भर◌ि◌◌ाज

Course code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA3013	Additional English III	SC	2	1	0	3	3

Course Objectives

- To ensure the development of the linguistic prowess of the students
- To motivate the students to appreciate literature
- To help students build strong language fundamentals
- To promote an appreciable reading habit among the students

Course Outcomes

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

1. Demonstrate a thorough understanding of sensitive and critical social issues.
2. Develop reading skills and vocabulary range
3. Critically analyse a piece of prose or poetry
4. Express their opinion in a coherent manner
5. Appraise children's literature as a genre for children as well as adults
6. Identify figures of speech and literary tones

Course Contents

Unit-I:Gender & Identity
Anne Sexton – Consorting with Angels
Eugene Field – The Doll's Wooing
Suniti Namjoshi – Extracts from Feminist Fables
Ruth Vanita & SaleemKidwai (ed) – Same Sex Love in India (Extract)
Charlotte Perkins Gilman – The Yellow Wallpaper 12 Hours

Unit-II: Love & Romance
Alfred Noyes – The Highway Man
William Shakespeare – Sonnet 116
Frank Richard Stockton – The Lady or the Tiger?
Oscar Wilde – The Nightingale and the Rose
William Shakespeare – Excerpt from Romeo and Juliet (Balcony Scene)

Unit-III: War & Trauma
Lord Alfred Tennyson – The Charge of the Light Brigade
TaufiqRafat – The Medal
Guy de Maupassant – Two Friends
Sadaat Hasan Manto – Toba Tek Singh
Bertolt Brecht – Excerpt from Fear and Misery of the Third Reich

Unit-IV: Children's Literature
William Blake – The Chimney Sweeper

D.H. Lawrence – Discord in Childhood
Hans Christian Anderson – The Snow Queen
Anna Sewell – The Black Beauty (Extract)
Rudyard Kipling – The Jungle Book (Extract)

Reference Books:

- Sexton, Anne. *The Complete Poems*. Houghton Mifflin, 1999.
- Namjoshi, Suniti. *Feminist Fables*. Spinifex Press, 1998.
- Vanita, Ruth &SaleemKidwai (ed.) *Same Sex Love in India*. Penguin India, 2008.
- Gilman, Charlotte Perkins. *The Yellow Wallpaper*. Rockland Press, 2017.
- Gale, Cengage Learning. *A Study Guide for Alfred Noyes's "The Highwayman"*. Gale, Study Guides, 2017. (Kindle Edition Available)
- Shakespeare, William. *Poems and Sonnets of William Shakespeare*. Cosimo Classics, 2007.
- Stockton, Frank Richard. *The Lady, or the Tiger?*Createspace Independent Publications, 2017.
- Wilde, Oscar. *The Collected Works of Oscar Wilde*. Wordsworth Editions Ltd., 1997.
- Shakespeare, William. *Romeo and Juliet*. Rupa, 2001.
- Tennyson, Lord Alfred. *The Complete Works of Alfred Tennyson*. Forgotten Books, 2017.
- Blake, William Erdman, David V. (ed.). *The Complete Poetry and Prose* (Newly revised ed.). Anchor Books, (1988).
- Maupassant, Guy de. *Guy de Maupassant-The Complete Short Stories*. Projapati, 2015.
- Manto, SadaatHasan. *Manto: Selected Short Stories*. RHI, 2012.
- Brecht, Bertolt. *Fear and Misery in the Third Reich*. Methuen Drama, 2012.
- Ricks, Christopher. *Metaphysical Poetry*. Penguin, 2006.
- Anderson, Hans Christian. *Fairy Tales by Hans Christian Anderson*. Read Books, 2010.
- Sewell, Anna. *The Black Beauty*. Maple Press, 2014.
- Kipling, Rudyard. *The Jungle Book*. Amazing Reads, 2018.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3020	**Environmental Studies**	**FC**	**3**	**0**	**0**	**3**	**4**

Course Objectives:

1. The course is to understand the fundamental concepts of Environment and its Components like air, water, soil andminerals.
2. To understand the working of various bio diversities, Ecosystems, and naturalresources.
3. To acquire the knowledge of transformation of Energy in the nature in differentforms.

4. To get familiarized with the problems of the earth like pollution, degradation, overpopulation etc

Course Outcomes:

By the end of the course student shall be able to:

1. Analyze the environmental conditions and protect it. Identify and recognize the role of individual, government and NGO in environmentalprotection.
2. List and illustrate the causes of environmental pollution & find ways to overcomethem.
3. Express motivation to find new renewable energy resources with high efficiency through active research & design pollution controlledproducts
4. Relate t**o** the ecological imbalances and protectit.

Course Contents

UNIT -1Multidisciplinary Nature of Environmental Studies

Environment, objectives and guiding principles of environmental education, Components of environment, Structure of atmosphere, Sustainable environment/Development, Impact of technology on the environment in terms of modern agricultural practices and industrialization, Environmental Impact Assessment. Environmental protection – Role of Government-Assignments of MOEF,

Functions of central and state boards, Initiative and Role of Non-government organizations in India and world.

Self-study**:** Need for public awareness on the environment, Gaia Hypothesis.

UNIT-2Environmental Pollution, Degradation and Waste Management

Environmental Pollution – Definition, sources and types, Pollutant-Definition & classification, Concepts of air pollution, water pollution, Soil pollution, Automobile pollution-Causes, Effects & control measures.

Self-study**:** Case studies of London smog, Bhopal gas tragedy, marine pollutions and study of different waste water treatmentprocesses.

Environmental Degradation – Introduction, Global warming and greenhouse effect, acid rain- formation & effects, Ozone depletion in stratosphere and its effect.Solid Waste management – Municipal solid waste, Biomedical waste, Industrial solid waste and Electronic waste (E-Waste).

Self-study**:** Disaster management, early warning systems-bio indicators for Tsunami and other natural disasters.

UNIT-3 Energy and Natural Resources

Energy – Definition, classification of energy resources, electromagnetic radiation-features and applications, Conventional/Non-renewable sources – Fossil fuels based(Coal, petroleum & natural gas), nuclear energy, Non-conventional/renewable sources – Solar, wind, hydro, biogas, biomass, geothermal, ocean thermal energy, Hydrogen as an alternative as a future source of energy.

Self-study: Remote sensing and its applications, Chernobyl (USSR) nuclear disaster and Fukushima (Japan) nuclear disaster.

Natural resources –water resource(Global water resource distribution, Water conservation methods, Water quality parameters, Uses of water and its importance), Mineral resources (Types of minerals, Methods of mining & impacts of mining activities),Forest wealth (Importance, Deforestation-Causes, effects and controlling measures)

Self-study: Hydrology & modern methods adopted for mining activities.

UNIT-4 Ecology and Ecosystem

Ecology-Definition, branches, objectives and classification, Concept of an ecosystem – Structure and functions, Characteristics of an Ecosystem-Ecosystem Resilience, Ecological succession and productivity, Balanced ecosystem, Components of ecosystem-abiotic and biotic, biological diversity.

Biogeochemical cycles and its environmental significance – Carbon

and nitrogen cycle, Energy flow in ecosystem, food chains –types, food web & Ecological Pyramids. Self-study: Need for balanced ecosystem and restoration of degraded ecosystems.

Text Books:

1. R.J. Ranjit Daniels and Jagadish Krishnaswamy**"Environmental Studies**", , (2017), Wiley India Private Ltd., New Delhi, Co-authored &Customised by Dr.MS Reddy &Chandrashekar, REVAUniversity.
2. Benny Joseph, **"Environmental Studies**" Tata McGraw – Hill Publishing CompanyLimited.
3. Dr.S.M.Prakash, **Environmental Studies** by Elite Publishers Mangalore,2007

Reference Books:

1.RajagopalanR.,"**Environmental Studies – from Crisis to cure**", Oxford University Press2005 2.Arvindwalia, Kalyani**Environmental Science**Publications, 2009.

3. AnilkumarDey and ArnabkumarDey **EnvironmentalStudies**.

Course Objectives:

1. To make the students understand the concept of Rasa.
2. To make the students learn to imbibe Rasa in practice
3. To make the students be able to relate Rasa to allied arts
4. To improve the performative skills of the performer.

Course Outcomes:

1. The response group would have learnt to understand and appreciate the concept ofRasa.
2. Students shall be able to connect the Rasa and apply its relevance to today's artscenario.
3. Students shall be able to dwell deeper in concepts given and approach in a scholasticmanner.
4. Can apply the various Rasa concepts in theirperformances.

Course Content:

UNIT	Topics	Description
Unit I	Overview and Analysis of Rasa	• The concept ofRasa. • What is Rasa? Ras-sutra of Bharata and its various constituents.(NS) • Literature and Commentators on Rasa andtexts
Unit II	Nava Rasa	• Study of Nava-Rasa and their application in practice. • Rasa Prakarna according to Bhatta lollata, Shree Shankuka.
Unit III	Application of Rasa	• Rasa principles according to scholars Bhatta Nayaka, AbhinavaGupta • Episodes to depict rasa from the Epics, plays and contemporarysituations.

Unit IV	Rasa in Contemporary Times	• Rasa theory in contemporary Indianliterature. • Paribhashika (foreign) words like Dhwani, Alankara, Bhava, Auchitya etc

Reference Books:

1. Natya Sastra – Dr. ManomohanGhosh
2. Susan L Schwartz – Rasa; Performing the Divine inIndia
3. David Buchta – RasaTheory
4. Srinivas Reddy - Theory ofRasa

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3032	**Music Theory 3 (Carnatic Music)**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1. To make the students learn the concept of Lakshana geetha in Indian classical music .
2. To enable them to understand the definition of compositional forms
3. To make the student understand the different aspects of raga system
4. To increasethe musical interest of students through the knowledge of varied musical instruments.

Course Outcomes

1. The students will be able to analyse the notation in south indian music
2. Students will be able to understand the raga lakshanas of different ragas
3. At the end of the course the students would be in a position to understand the nuances of Indian classical Music and the bhava of Raga
4. The Students would not only understand the fundamentals and basics of the music but would also understand the biographies of composers.

Course content

Unit	Topics	Description

1	\Raga Lakshana	• Raga lakshanas of the following ragas- Abhogi, Mohanam, Hamsadhwani, Sankarabharanam, Mayamalavagaula, kalyani
2	Notation system	Detailed knowledge of the notation used in South Indian Music. Write in notation Geetams learnt in practical
3	Classification of Instruments	Classification of Musical instruments in Karnatic & Hindustani music
4	Life Histories	Biographies of the following composers – Ramaswami dikshither,Pattanam Subramania Iyer, Maha Vaidyanatha Iyer, Ramanad Sreenivasa Iyengar,VeenaKuppaiyer

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3033	**Music Theory 3 (Hindustani Music)**	**SC**	**4**	**0**	**0**	**4**	**4**

Program Objectives

1. To make the students learn the concept of Lakshana geetha in Indian classical music .
2. To enable them to understand the definition of compositional forms
3. To make the student understand the different aspects of raga system
4. Toincreasethemusicalinterestofstudentsthroughtheknowledgeofvariedmusical instruments.

Course Outcomes

1. The students will be able to analyse the notation in south indian music
2. Students will be able to understand the raga lakshanas of different ragas
3. At the end of the course the students would be in a position to understand the nuances of Indian classical Music and the bhava of Raga
4. The Students would not only understand the fundamentals and basics of the music but would also understand the biographies of composers.

Course Content

Unit	Topics	Description
1	Raga Lakshana	Raga lakshanas of the following ragas- 1.Raag Bibhas 2.Raag GurjariTodi 3.Raag Durga 4.Raag Alhaiyya Bilawal 5.Raag Purvi 6.Raag Asawari 7.Raag Yaman Kalyan 8.Raag Nand 9.Raag Bhimpalasi 10.Raag Bhageshree 11.Raag Puriya Kalyan 12.Raag Malkauns
2	Notation system	Vishnu Digambar Paluskar & Vishnu Narayana Bhatkhande's Notation system.
3	Classification of Instruments	Classification of Musical instruments in Karnatic & Hindustani music
4	Life Histories	Life history of Ustad Karim Khan, Pandit Panchakshari Gawaii,Kanaka dasa, Basavanna,

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3034	**Kannada, Children and EasternTheatre History**	SC	4	0	0	4	4

Course Objectives:

1. To develop a comprehension of the principles and terminology of the theatre.
2. To comprehend the development of children's theatre in India
3. To analyze the process of producing a play for a young audience.
4. To explore major plays in regional language – Kannada
5. To access the historical knowledge of Eastern theatre history

Course Outcomes:

Upon completion of this course, the student should be able to:

1. Develop an understanding of the importance and uses of theatre in educational curriculum.
2. Gain the knowledge to implement theatre games in the classroom.
3. Examine the influence of theatre on children and their development.
4. Understand the cultural relevance of Kannada plays in a historical timeline
5. Analyze the technicalities and variants of theatre forms in Eastern countries

Course content:

Unit	Topics	Description
1	Major playwrights of Karnataka	1. T. P. Kailasam, Girish Karnad, P. Lankesh 2. Contemporary playwright's interpretation on Ethic, Religion and Culture. 3. Appropriation of contemporary playwrights to present cultural values in their plays. 4. Interpretations of directors with examples.
2	Children's theatre	1. Origin and development of children's theatre. 2. Major characters of children's play. 3. Scope of children's play and major personalities. 4. Children's play and education.

3	Asian theatre 1	1. Origin and development of Peaking Opera. 2. Specialties of peaking opera characters. 3. Technicalities of peaking opera – costume, make up and stage.
4	Asian theatre 2	1. Origin and development of Japanese theatre 2. Origin and development of Noh theatre 3. Origin and development of Kabuki theatre 4. Origin and development of Bunraku theatre

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3041	**Practical 3 – Bharatanatyam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

1. Elevating their artistic talent to a higher level
2. To provide exposure to the gestural language of Bharatanatyam.
3. Enable the students to understand the possibilities of mimetic language of dance.
4. Finding the possibilities to channelize their skills and improve them

Course Outcomes

1. Explain the nuances of abhinaya in Keerthanam and Kowthavam.
2. Develop the understanding of musical and rhythmic correlation of the students.
3. Differentiate the pattern of the jathis in Keertana and Kowtam.
4. Understand the detailed explanation about angikabhinaya according to Abhinayadarpanam.

Rasa Theory and its implications in Performing Arts

Course content

Unit	Topics	Description
1	Shlokas from Abhinaya Darpana	• Asamyuta Hastas • Samyuta Hastas • Pada Bhedas • Greeva Bhedas • Drishti bhedas • Siro Bhedas
2	Dance 1	• Kowthavam - 1

3	Dance 1	• Keerthana – 1
4	Singing and Recitation	• Learning singing the lyrics of items and the recitation of jathis and solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs /Wk
B20BA3042	**Practical – 3 Kuchipudi**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To enable the students to have the understanding about the items in Kuchipudi
2. To help the students to understand the nuances of Abhinaya
3. To help the students to develop their improvisation skills.
4. To teach the students the items in dance and also the technical aspects of the item which include rhythm, music and literature.

Course outcome

1. Understand the historical aspects of the items in Kuchipudi
2. Develop acting skills of the dancer.
3. Demonstrate the tala aspects of the shabdam and Keertanam
4. Differentiate the abhinaya aspects in Kuchipudi from other dance forms.

Course content

Unit	Topics	Description
1	Dance 1	• Shabdam – 1
2	Dance 2	• Shloka abhinayam -1
3		
4		

Course Code	Course Title	Course Type	L	T	P	C	Hrs/Wk
B20BA3043	**Practical-3- Mohiniyattam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To enable the dancer to understand the choreography patterns of padam and keerthanam.
2. To ensure that students learn the various Dances in the Mohiniyattam repertoire.
3. To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
4. To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.

Course outcomes:

1. Understand the aproach in the choreography of padam and keerthanam
2. The students would not only understand the fundamentals and basics of the dance,but would also become a performer.
3. Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
4. A good understanding about the items music and lyrics meaning

Course Content

UNIT	TOPICS	DESCRIPTION
1	Dance 1	• Padam – 1
2	Dance 1	• Keerthanam – 1
3	Hastha Lakshana Deepika	• Shlokas from Hastha Lakshana Deepika
4	Singing and Recitation	• Learning singing for the lyrics of the item and recitation of the jathis and solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3044	**Practical –3 Odissi**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To teach the students about the Padabhedas used in Odissi
2. To enable the students to understand the structure of odissi items
3. To help the students to understand the musical element in Odissi
4. To teach the students the items in dance and also the technical aspects of the item which include rhythm, music and literature.

Course Outcomes:

1. Learn the padabheda used in Odissi
2. Apply the chari, Bhramari and Uthplavana Bhedas in cHoreohraphies in future.

3. Understand the basic terminology used in the odissi dance style.
4. Demonstrate the items learned in the syllabus.

Course Content

Unit	Topics	Description
1	Dance 1	• Uthplavanas • Chari,Bhramari (used in Odissi dance),
2	Dance 2	• Pallavi (based on any raga), • Odiyaabhinaya
3	Dance 3	• Banamali Das
4	Dance 4	• Upendra Bhanja

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3045	**Practical –3 Kathak**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To enable the dancer to understand the choreography patterns items in the syllabus.
2. To ensure that students learn the various Dances in the Kathak repertoire.
3. To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
4. To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.

Course Outcomes:

1. Understand the aproach in the choreography of Kathak pieces
2. The students would not only understand the fundamentals and basics of the dance,but would also become a performer.
3. Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future
4. A good understanding about the items music and lyrics meaning

Course Content

Unit	Description	Topics
1	Shlokas	Basic shlokas
2	Dance 1	Paran and chakkar dar paran
3	Dance 2	Ladi
4	Singing and recitation	Padhant

Course Code	CourseTitle	ourse Type	L	T	P	C	Hrs./ Wk.
B20BA3046	**Practical – 3 Carnatic Music**	SC	1	0	2	3	5

Course Objectives

1. To make the students learn the concept of Lakshana geetha in carnatic music and to enable them to learn it in the practical way.
2. To enable them to understand the definition of compositional forms
3. To make the student understand the different aspects of raga system
4. To make the student understand the fundamentals of Carnatic music

Course Outcomes

1. The students will be able to analyze the melakartta division of venkatamaki
2. Students will be able to understand and sing the nottu swara pattern
3. At the end of the course the students would be in a position to understand the nuances of Carnatic Music and the bhava of Raga
4. The Students would not only understand the fundamentals and basics of the music but would also become a performer.

Course Content

Unit	Topics	Description
1	Music Basics	• LakshanaGeetha • What is ragam • Evalution, development of Raga • Bhava of Raga

2	Learning Raga	• Jathiswaram –kalyani • NottuSwaras
3	Jathi & Composition	• SwaraJathi- 1 Definition of compositional forms
4	Sloka/Devotional Song and Raga	• Swara jathi – 2 • Devotional song/Sloka

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA3047	**Practical-3 Hindustani Vocal**	SC	1	0	2	3	5

Course Objectives

1. To make the students understand the nuances of the Carnatic Music.
2. To make the students learn the compositions in Hindustani classical music and to enable them to learn it in the practical way.
3. To enable them to understand the notation system of Hindustani music.

Course Outcomes

1. At the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music
2. The Students would not only understand the fundamentals and basics of the music but would also become a performer.
3. The students will be able to sing in concerts and will also have a strong music theory Knowledge

Course Content

Unit	Topics	Description
1	Music – Raga abhyas & Prasthuthi	• Raag Todi • Raag Ahir Bhairav Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.

2	Music – Raga abhyas & Prasthuthi	• Raag Bhoop • Raag Puriya Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.
3	Music – Raga abhyas & Prasthuthi	• Raag Marwa • Raag Jaounpuri Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.
4	Music Practical theory	• Taal – Teentaal (Only Tekha) • Usage of Tanpura & Harmonium • Bhathkande Swaralipi abhyaas/ Notation practice

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B20BA3048	**Practical 3 –Design in Theater and Major Production**	SC	1	0	2	3	5

Course Objectives

1. Develop an appreciation and unerring zeal towards dramatic literature.
2. Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
3. Analyse the all sort of technicalities of a theatre performance
4. Mastering technical terminologies and executive measures.

Course Outcomes

1. The completion of the course enables pupils to realize the relevance and limitations of technicalities of a Theatre performance.
2. Be able to subdue the fear of expression.
3. Be able to analyse the technicalities of a play script.
4. Be able to extrapolate and execute the technicalities of theatre both theoretically and practically

CourseContent:

Unit	Topics	Description
1	**Stage Costumes**	1. Significance of Costumes in Theatre 2. Broad classification of stage costumes Mythological Historical Social Symbolic Ritualistic 3. Costume designing for a play. 4. Preparing Costume Plates for the designed play.
2	**Stage Lighting**	1. Origin and development of Stage Lighting 2. Types of stage lights and their technicalities Parts of lights Primary colors and combination of secondary colors 3. Relation of Make-up and Costume to Stage Lighting 4. Lighting design for a scene
3	**Stage Masks**	1. Origin and development of Masks

		2. Usage of mask in ritualistic theatre and contemporary theatre (Indian context) 3. Characterizing, preparation and execution of a mask.
4	**Acting 4 – Major Production**	1. Body toning, balance and imbalance 2. Introduction to Mayerhold's "Bio Mechanism" 3. Major Production directed by faculty.

Reference Books:

1. Chris Hogget, *All About Theatre*
2. K. V. Akshara, *Ranga Prapancha*
3. B. R. Venkataramana Aithala & Deepa Ganesh, *Kannada Theatre History 1850 – 1950*
4. ChrisHogget, *All About Theatre – off stage*
5. Bradley A Gerard, *Behind the Scenes*
6. K V Akshara, *Ranga Prayoga*
7. Swortzell L, *International Guide to Children's Theatre and Educational Theatre*
8. Jeffrey S B, *The History of Eastern Theatre*

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B18BA3050	**English Literature (Victorian & Modern) & Language – III**	**HC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1. To examine the literary works from Victorian and Modern period.
2. To analyze the key concepts of Victorianism and Modernism.
3. To assess the basic social and cultural theories of modern age.
4. To develop professional skills in speech and writing.

Course Outcomes

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

1. Identify the major poets of the Victorian and Modern periods and their works in English Literature.
2. Outline the various issues presented in the prose of the Victorian and Modern periods.
3. Demonstrate complete familiarity with the features of novels of the Victorian period.
4. Understand the generic changes in literature of the modern period
5. Identify and differentiate between writing styles
6. llustrate a good understanding of the various components of Speech and Writing.

Course Contents

Unit – I: Poetry

The Victorian Age:

1. Alfred Tennyson – Ulysses
2. Robert Browning – My Last Duchess
3. Christina Rossetti – Goblin Market
4. Mathew Arnold – Dover Beach

Modern Poetry:

5. W.B. Yeats – An Acre of Grass
6. W.H. Auden – The Shield of Achilles
7. T.S. Eliot – Prelude

Unit – II: Prose
1. D.H. Lawrence – The Rocking-Horse Winner
2. R.L. Stevenson – An Apology for Idlers
3. Virginia Woolf – Extract from *A Room of One's Own*
4. Lewis Carroll – Excerpt from *Alice's Adventures in Wonderland*

Unit – III: Fiction
1. Charles Dickens – *The Adventures of Oliver Twist*
2. Charlotte Bronte – *Jane Eyre*

Unit – IV: Language
1. Speech and Writing
2. Tenor and Domain
3. Introduction to Style
4. Stylistic Analysis: A Framework

REFERENCES:

- Cunningham, Valentine. *Victorian Poetry*. Blackwell, 2003.
- Negri, Paul. *English Victorian Poetry: An Anthology*. Dover, 1998.
- Yeats, W.B. *WB Yeats: Collected Poems*. Vintage, 1990.
- Eliot, T.S. *The Complete Poems and Plays of T.S. Eliot*. Faber, 2004.
- Sen, S. *W.H. Auden: Selected Poems*. Unique Publishers, 2015.
- Lawrence, D.H. *The Rocking Horse Winner*.Perfection Learning, 1982.
- Woolf, Virginia. *A Room of One's Own*. Penguin, 2002.
- Dickens, Charles. *Oliver Twist*. Norton, 2009.
- Bronte, Charlotte. *Jane Eyre*. Penguin, 2002.
- Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
- Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA3060	Social Psychology	HC	3	1	0	4	5

Course Objectives

1. To introduce the historical and scientific origin, theories and development of the Social Psychology in the western and Indian context
2. To introduce the basic concepts in Social Perception
3. To help the students in understanding one's Self and self-development

4. To introduce the dynamics of interpersonal relationships.

Course Outcomes

After the completion of this course, a student will be able to:

1. Demonstrate the ability to articulate factors contributing to human Social Behavior and the cultural influences.
2. Describes the factors that contributes to Social Perceptions of individuals.
3. Explore One's Self
4. Explores the dynamics of Interpersonal relationship.

Course Contents

Unit-I: Introduction

a) Definition; History- Origin and Development.
b) Social psychology in India
c) Theories - Cognitive, Decision making, Interdependence, Socio-cultural, Evolutionary, and Mid-range theories.
d) Research in Social Psychology: goals of research, selecting participants, Research design-correlations, Experimental-field, laboratory, data collection: self-report, observation, internet research.
e) Bias in research- experimenter bias, subject bias, replication.
f) Ethics in Research-informed consent, debriefing, minimal risk.

Unit-II: Social Perception

a) Social Perception: definition
b) Non-verbal Communication: the visible channel- distance, gestures, eye contact, facial expression, paralanguage; multiple channels.
c) Impression formation- information used: roles, physical cues, salience, from beahviors to traits, central traits, categorization, context effects; continuum model of Impression formation.
d) Integrating Impressions: Evaluation, negativity effect, positive bias, emotional information, the averaging principle, imputing meaning, resolving inconsistencies.
e) Impression management.
f) Attribution: definition, types, theory- Jones and Davis's Correspondent Inference Theory, Kelley's Covariation theory. Biases in the Attribution Process-Fundamental attribution error, actor-observer effect, false consensus. Self-saving attributional bias.

Unit –III: The Self

a) Self-presentation: accuracy in predicting our behavior, self-presentationtactics, ineffective self-presentation, self-handicapping.
b) Self-knowledge: Sources-socialization, reflected appraisal, feedback from others, self-perception, labeling arousal states, introspection, Self identity, Culture, cognition and emotions; Aspects of Self-knowledge: self-schemas, self-discrepancies.
c) Self-regulation: Working Self-concept, Self-complexity, self-efficacy, personal control, bahvaiors, self-awareness.
d) Social Comparison: goals, theory, process.
e) Self-esteem: definition, measurement, gender difference, factors influencing self esteem

f) Culture and Self: in Indian and western context.

Unit-IV: Interpersonal Relationships

a) Need to belong: loneliness, social rejection.
b) Liking: definition, Social exchange theory, Sources-internal, external, social interaction.
c) Internal sources of Liking others: need to belong, role of affect.
d) External Sources: proximity, familiarity, physical beauty.
e) Social Interaction sources of Liking: similarity, reciprocal liking or disliking, social skills, personality, desires, gender differences.
f) Mate Selection: Gender differences
g) Love: Definition, types, triangular theory of love.
h) Romantic Love: cultural variations in marriage.
i) Interdependency theory: rewards and costs, evaluating outcomes, coordinating outcomes, Fair exchange, beyond exchange.
j) Self- disclosure: definitions, reasons, hazards, cultural differences, gender diffrences.
k) Intimacy: definition, model, gender difference.

Reference Books:

1. Taylor, S E, Peplau, L A and Sears, D O. (2017) *Social Psychology*, 12th edition.New Delhi: Pearson Prentice-Hall of India Pvt Ltd.
2. Branscombe, N R and Baron, R A.(2018) Social Psychology, 14th edition, Pearson India Education Services Pvt. Ltd.
3. Crisp, R.J. and Turner, R.N. (2007), *Essential Social Psychology. N*ew Delhi: Sage Publications India Pvt Ltd.
4. Misra,G. and Dalal,A.K. (2001).*Social Psychology in India: Evolution and Emerging trends.* Edited by Ajit.K.Dalal and GirishwarMisra.New Directions in IndianPsychology,Volume I:Social Psychology.New Delhi: Sage Publications India Pvt.Ltd.
5. Myers, D.G (2002) *Social Psychology,* 7th international edition.New York: McGraw Hill Companies.

Practicals-III:

Statistics: Correlation-Paramentric and non parametric data.

a. Self-concept
b. Self-esteem
c. Free Association
d. Assessment of Love

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA3070	**Skill Development–II (Indian Classical Dance Make-up)**	**RULO**	**0**	**0**	**2**	**2**	**4**

Students will have to compulsorily undergo ONE Skill Development training in Indian Classical Makeup of Four credits conducted either by the School of Performing Arts or by REVA University or the Skill Development Centre during this Semester.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3080	Open Elective	OE	0	0	2	4	4

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA3090	Intenship	OE	0	0	2	2	4

SEMESTER 4

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk
B18BA4011	Language: Kannada-Vl	SC	2	1	0	3	4

Course Objectives:

£Á®ÄÌ ¸É«Ä¸ÀÖgïUÀ¼À°è ¸ÀªÀÄUÀæ PÀ£ÀßqÀ ¸Á»vÀåªÀ£ÀÄß ¥ÀjZÀ¬Ä¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß ºÉÆA¢zÉ. CzÀgÀAvÉ £Á®Ì£ÉAiÀÄ ¸É«Ä¸ÀÖgï£À°è ºÉÆ¸ÀUÀ£ÀßqÀ ¸Á»vÀå ¥ÀæPÁgÀUÀ¼ÁzÀ £ÀªÀå, ¹ÛçÃªÁ¢ ºÁUÀÄ £ÀªÉÇåÃvÀÛgÀ PÁªÀå, ««zsÀ¯ÉÃR£ÀUÀ¼ÀÄ ºÁUÀÄ PÁzÀA§j ¸Á»vÀåªÀ£ÀÄß ¥ÀoÀåªÀ£ÁßV DAiÉÄÌ ªÀiÁrPÉÆAqÀÄ, «zÁåyðUÀ¼À°è ¸Á»vÀåzÀ §UÉÎ ¸ÀzÀ©ügÀÄaAiÀÄ£ÀÄß ªÀÄÆr¸À¯ÁUÀÄvÀÛzÉ. ¸ÁA¸ÀÌøwPÀ w¼ÀÄªÀ½PÉAiÀÄ eÉÆvÉUÉ ªÀåQÛvÀé «PÀ¸À£ÀzÀ PÀqÉUÉ UÀªÀÄ£À ¤ÃqÀ¯ÁUÀÄvÀÛzÉ.

- ¨sÁµÉ, ¸Á»vÀå, EwºÁ¸À ªÀÄvÀÄÛ ¸ÀA¸ÀÌøwUÀ¼À£ÀÄß PÀ£ÀßqÀ, PÀ£ÁðlPÀPÉÌ ¸ÀA§A¢ü¹zÀAvÉ ¥ÀjZÀ¬Ä¸À¯ÁUÀÄvÀÛzÉ.
- «zÁåyðUÀ¼À ¸ÀªÀðvÉÆÃªÀÄÄR ¨É¼ÀªÀtÂUÉUÉ C£ÀÄªÁUÀÄªÀAvÉ ºÁUÀÆ CªÀgÀ°è ªÀiÁ£ÀªÀ ¸ÀA§AzsÀUÀ¼À §UÉÎ UËgÀªÀ, ¸ÀªÀiÁ£ÀvÉ ªÀÄÆr¹, ¨É¼É¸ÀÄªÀ ¤nÖ£À°è ¥ÀoÀåUÀ¼À DAiÉÄÌAiÀiÁVzÉ.
- CªÀgÀ°è ¸ÀÈd£À²Ã®vÉ, ±ÀÄzÀÞ ¨sÁµÉ, GvÀÛªÀÄ «ªÀÄ±Áð UÀÄt, ¤gÀUÀð¼À ¸ÀA¨sÁµÀuÉ, ¨sÁµÀt PÀ¯É ºÁUÀÆ §gÀºÀ PË±À®åUÀ¼À£ÀÄß ¨É¼É¸ÀÄªÀÅzÀÄ UÀÄjAiÀiÁVzÉ
- ¸ÀàzsÁðvÀäPÀ ¥ÀjÃPÉëUÀ½UÉ C£ÀÄPÀÆ®ªÁUÀÄªÀAvÀºÀ «µÀAiÀÄUÀ¼À£ÀÄß UÀªÀÄ£ÀzÀ°èèlÄÖPÉÆAqÀÄ ¸ÀÆPÀÛ ¥ÀoÀåUÀ¼À£ÀÄß DAiÉÄÌ ªÀiÁrPÉÆ¼Àî¯ÁVzÉ.

Course Outcomes:

ºÉÆ¸ÀUÀ£ÀßqÀ ¸Á»vÀå ¥ÀæPÁgÀUÀ¼ÁzÀ £ÀªÀå-£ÀªÉÇåÃvÀÛgÀ PÁªÀå, ««zsÀ¯ÉÃR£ÀUÀ¼ÀÄ ºÁUÀÄ PÁzÀA§j ¸Á»vÀå PÀ°PÉAiÀÄ ªÀÄÆ®PÀ PÁ®zÀ ¹ÜvÀåAvÀgÀUÀ¼À£ÀÄß CzÀgÀ M¼À£ÉÆÃl UÀ¼À£ÀÄß ¨É¼É¸ÀÄvÀÛzÉ.

- ¸ÁªÀiÁfPÀ, gÁdQÃAiÀÄ, zsÁ«ÄðPÀ, ¸ÁA¸ÀÌøwPÀ ºÁUÀÆ °AUÀ¸ÀA§A¢ü «ZÁgÀUÀ¼ÉqÉ UÀªÀÄ£ÀºÀj¸ÀÄªÀÅzÀgÉÆA¢UÉ «zÁåyðUÀ¼À°è ZÀZÁð ªÀÄ£ÉÆÃ¨sÁªÀªÀÅ ¨É¼ÉAiÀÄÄvÀÛzÉ.

- fÃªÀ£ÀzÀ°è §gÀÄªÀ C©ü¥ÁæAiÀÄ ¨ÉÃzsÀUÀ¼ÀÄ, ¸ÀªÀÄ¸ÉåUÀ¼À£ÀÄß DzsÀÄ¤PÀ ¸ÀAzÀ¨sÀðzÀ°è ªÀiÁ£À«ÃAiÀÄvÉAiÉÆA¢UÉ ¤ªÀð»¸ÀÄªÀAvÉ ¥ÉæÃgÉÃ¦¸ÀÄvÀÛzÉ.
- ¸ÁªÀiÁfPÀ CjªÀÅ ªÀÄÄr¸ÀÄvÀÛzÉ.
- GvÀÛªÀÄ ¸ÀAªÀºÀ£À PÀ¯ÉAiÀÄ£ÀÄß ¨É¼É¸ÀÄªÀ GzÉÝÃ±ÀªÀ£ÀÄß FqÉÃj¸ÀÄvÀÛzÉ.

COURSE CONTENT:

Unit I £ÀªÀå-¹ÛçÃªÁ¢ PÀ«vÉUÀ¼ÀÄ

1. §Ä¢ÞªÀAvÀjUÉ PÀ£À¸ÀÄ ©zÀÝgÉ J.PÉ.gÁªÀÄ£ÀÄd£ï
2. PÀÄjUÀ¼ÀÄ ¸Ágï PÀÄjUÀ¼ÀÄ ¤¸Ágï CºÀªÀÄzï
3. CPÀÌ ºÉÃ½zÀÄ ¸À. GµÁ

Unit II zÀ°vÀ-§AqÁAiÀÄ

1. £À£Àß PÀªÀ£ÀUÀ¼À°è ºÀÄqÀÄPÀ¢gÀÄ £À£Àß ZÀA¥Á
2. zÀ°vÀgÀÄ §gÀÄªÀgÀÄ zÁj©r ¹zÀÞ°AUÀAiÀÄ
3. PÀlÖqÀzÀ PÉ®¸ÀUÁgÀgÀÄ JZï J¸ï ²ªÀ¥ÀæPÁ±À

Unit III ¯ÉÃR£ÀUÀ¼ÀÄ

1. ºÀ¹gÀÄ ºÉÆ¸ÀPÀÄªÀ UÀtÂUÀ¼ÀÄ AiÀÄ®è¥Àà gÉrØ
2. eÁUÀwÃPÀgÀtzÀ »£Éß¯ÉAiÀÄ°è UÁA¢üÃfAiÀÄ ¥Àæ¸ÀÄÛvÀvÉ ¹. £ÁUÀtÚ
3. ZÁªÁðPÀgÀÄ : MAzÀÄ n¥ÀàtÂ ¦J£ï gÀAUÀ£ï

Unit IV PÁzÀA§j

1. ¸ÀA¸ÁÌgÀ AiÀÄÄ.Dgï. C£ÀAvÀªÀÄÆwð

¥ÀgÁªÀÄ±Àð£À UÀæAxÀUÀ¼ÀÄ :

1. ªÀÄÄUÀ½ gÀA.²æÃ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ VÃvÁ §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 2014
2. ¹ÃªÀiÁwÃvÀ PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ ¸ÀA¥ÀÄl 1,2,3,4,5 ªÀÄvÀÄÛ 6, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2014
3. ºÀA¥À £ÁUÀgÁdAiÀÄå, ¸ÁAUÀvÀå PÀ«UÀ¼ÀÄ, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2010
4. gÀAeÁ£ï zÀUÁð, ±ÀgÀtgÀ ¸ÀªÀÄUÀæ PÁæAw, ¥ÀæPÁ±ÀPÀgÀÄ. ¯ÉÆÃ»AiÀiÁ ¥ÀæPÁ±À£À, §¼ÁÎj. 2015
5. ªÀ¹µÀ×., gÀvÁßPÀgÀªÀtÂðAiÀÄ ¨sÀgÀvÉÃ±À ªÉÊ¨sÀªÀ, ¥ÀæPÁ±ÀPÀgÀÄ ZÉÃvÀ£À §ÄPï ºË¸ï, ªÉÄÊ¸ÀÆgÀÄ. 1999
6. qÁ. CgÀ«AzÀ ªÀiÁ®UÀwÛ, ¸Á»vÀå ¸ÀA¸ÀÌøw ªÀÄvÀÄÛ zÀ°vÀ ¥ÀæeÉÕ, ¥ÀæPÁ±ÀPÀgÀÄ PÀ£ÀßqÀ ¸Á»vÀå ¥ÀjµÀvÀÄÛ, ¨ÉAUÀ¼ÀÆgÀÄ. 2014
7. qÁ. F.J¸ï. DªÀÄÆgÀ, PÀ£ÀßqÀ PÀxÀ£À ¸Á»vÀå : PÁzÀA§j, ¥ÀæPÁ±ÀPÀgÀÄ ¸Àé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2016
8. QÃvÀð£ÁxÀ PÀÄvÀðPÉÆÃn, PÀ£ÀßqÀ ¸Á»vÀå ¸ÀAUÁw, ¥ÀæPÁ±ÀPÀgÀÄ PÀÄvÀðPÉÆÃn ªÉÄªÉÆÃjAiÀÄ¯ï læ¸ïÖ, zsÁgÀªÁqÀ. 2009
9. ±ÁªÀÄgÁAiÀÄ vÀ.¸ÀÄ., PÀ£ÀßqÀ ¸Á»vÀå ZÀjvÉæ, ¥ÀæPÁ±ÀPÀgÀÄ vÀ¼ÀÄQ£À ªÉAPÀtÚAiÀÄå ¸ÁägÀPÀ UÀæAxÀªÀiÁ¯É, ªÉÄÊ¸ÀÆgÀÄ -2014

10. ¸ÀA. qÁ! ¹. Dgï. ZÀAzÀæ±ÉÃRgï, ªÀÄÄAzÁ¼ÀÄvÀ£ÀzÀ ®PÀëtUÀ¼À£ÀÄß ¨Á¼É¹PÉÆ¼ÀÄîªÀÅzÀÄ ºÉÃUÉ?, ¥ÀæPÁ±ÀPÀgÀÄ £ÀªÀPÀ£ÁðlPÀ ¥À©èPÉÃµÀ£îì ¥ÉæöÊªÉmï °«ÄmÉqï. 2010
11. DzsÀÄ¤PÀ PÀ£ÀßqÀ PÁªÀå ¨sÁUÀ-2, PÀÄªÉA¥ÀÄ PÀ£ÀßqÀ CzsÀåAiÀÄ£À ¸ÀA¸ÉÜ, ªÉÄÊ¸ÀÆgÀÄ «±Àé«zÁå¤®AiÀÄ, ªÉÄÊ¸ÀÆgÀÄ. 2004
12. ²ªÀgÀÄzÀæ¥Àà f.J¸ï. PÀ£ÀßqÀ ¸Á»vÀå ¸À«ÄÃPÉë, ¥ÀæPÁ±ÀPÀgÀÄ ¸Áé¥Àß §ÄPï ºË¸ï, ¨ÉAUÀ¼ÀÆgÀÄ. 2013

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA4012	Hindi	SC	2	1	0	3	4

Course Objectives

ppppppppppp ppppppppppp :

- सं◌दभ◌ानु◌सार उद्धृत भाष◌ा क◌ा प्रय◌ोग करन◌े क◌ी द◌ृि◌त◌ा क◌ो छ◌ात◌्रो◌ं म◌ें◌ं उत्पन्न करन◌ा |
- साद्वित्य क◌े म◌ाध्यम स◌े सम◌ाज एव◌ं म◌ानव◌ीय म◌ूल◌्यो◌ं क◌ो समझ◌ाकर, उन म◌ूल◌्यो◌ं क◌ी र◌ि◌ा ि◌े◌तु प्र◌ेररत करना |
- छ◌ात◌्रो◌ं म◌ें◌ं प◌ुस्तक पठन एव◌ं ल◌ेखन क◌ी अकृ द्धतम प्रवृद्धि स◌्थ◌ाद्धपत करन◌ा |
- अध्य◌ेत◌ाओ◌ं म◌ें◌ं साद्वित्य क◌े म◌ाध्यम स◌े प्रभाव◌ी एव◌ं क◌ु शल स◌ंचार क◌ा द्धवक◌ास करन◌ा |

Course Outcomes:

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अध्ययन की समाप्तप्त पर अध्येता –

- साम◌ाद्धजक म◌ूल् एव◌ं न◌ैद्धतक जव◌ाबद◌े ि◌ी क◌ो स्व◌ीक◌ार कर सकत◌ा ि◌ै◌ |
- साद्वित्य क◌ी प्रास◌ंद्धगकत◌ा क◌ो ज◌ीवन म◌ें◌ं समझन◌े क◌ी द◌ृि◌त◌ा रखत◌ा ि◌ै◌ |
- सम◌ाज म◌ें◌ं अ◌ंतद्धनद्धित पद्दद्धतय◌ा एव◌ं द्धवचारध◌ार◌ाओ◌ं क◌ा व्य◌ाख्यान करन◌े म◌ें◌ं सिम बन सक◌ा ि◌ै◌ |
- साद्वित्य क◌े म◌ाध्यम स◌े प्रभाव◌ी एव◌ं क◌ु शल स◌ंचार क◌ा द्धवक◌ास कर सकत◌ा ि◌ै◌ |

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d) Suggested Text Books and References

Text book/s: पपपपप पपपपपप:

1. कक्क-कक्कक्कक्क – कक्कक्क – कक्कक्कक्कक्कक्क कक्कक्कक्क

References: पपपपपपपप पपपपपप :

1. लेखक का द्वसनेमा - कुं वर नारायण
2. द्विन्दी साद्वित्य क ा इद्वत ास न ागद्रे .ड ॉ -
3. आध ुद्वनक द्विन्दी साद्वित्य क ा इद्वत ास बच्चन द्वस .ड ॉ -
4. द्विन्दी साद्वित्य क ा नव ीन इद्वत ास ल ाल स ाि ब द्वस ं ि .ड ॉ -
5. शुद्ध द्विन्दी कै से बोले कै से द्वलखेपृथ्वीनाथ पाण्डे -
6. म ैद्वडय ा द्वमश – र ामशरण ज ोशी
7. द्वसनेमा-द्वसनेमा - दयानंद पाण्डेय

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BA4013	**Additional English IV**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

1. To infer the myths from the contemporary perspective.
2. To outline the idea of family represented in literature.
3. To interpret horror and suspense as a genre of literature.
4. To assess the impact of education in building a society.

Course Outcomes

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

1. Examine the relevance of myths and mythology.
2. Demonstrate family values and ethics essential to live in the society.
3. Analyze horror and suspense as a significant genre of literature.
4. Identify the generic difference between supernatural, horror and gothic literature

5. Evaluate the applicability of academic contribution in building a society

6.Appraise literature as tool for improving society

Course Contents

Unit-I:Myths & Mythology
John W. May – Narcissus
W.B. Yeats – The Second Coming

Unit-II: Family & Relationships
Nissim Ezekiel – Night of the Scorpion
Kate Chopin – The Story of an Hour
Henrik Ibsen – A Doll's House (Extract)

Unit-III: Horror & Suspense
Edgar Allan Poe – The Raven
Bram Stoker – A Dream of Red Hands

Unit-IV: Education
Kamala Wijeratne – To a Student
Sudha Murthy – In Sahyadri Hills, a Lesson in Humility
FrigyesKarinthy – Refund

Reference Books:

- Finneran, Richard J. *The Collected Works of W.B. Yeats*(Volume I: The Poems: Revised Second Edition). Simon & Schuster, 1996.
- Pattanaik, Devdutt. *Shikhandi: Ánd Other 'Queer' Tales They Don't Tell You*. Penguin Books, 2014.
- Ezekiel, Nissim. *Collected Poems* (With A New Introduction By John Thieme). OUP, 2005.
- Hughes, Langston. *The Collected Poems of Langston Hughes*. Vintage, 1995.
- Chopin, Kate. *The Awakening and Selected Stories of Kate Chopin*. Simon & Schuster, 2004.
- Ibsen, Henrik. *A Doll's House*. Maple Press, 2011.
- Poe, Edgar Allan. *The Complete Poetry of Edgar Allan Poe*. Penguin USA, 2008.
- Stoker, Bram. *Dracula*. Fingerprint Publishing, 2013.
- Ray, Satyajit. *The Complete Adventures of Feluda* (Vol. 2). Penguin Books Ltd., 2015.
- Lama, Dalai. *Freedom In Exile: The Autobiography of the Dalai Lama of Tibet*. Little, Brown Book Group, 1998.
- Murthy, Sudha. *Wise and Otherwise: A Salute to Life*. Penguin India, 2006.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4021	**Textual Traditions in Performing Arts**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. To enable the students to understand the tangible heritage of India and the different arenas where the traditions and cultures could be found related to PerformingArts
2. To make the students learn the different texts from ancient, medieval and modern periods related to PerfomringArts.

Course Outcomes

1. At the end of the course the students would be able to understand the importance and the greatness of the Cultural heritage of India and their Tangiblesources.
2. The Students would not only understand the Tangible sources of Performing Arts but also would be able to read, understand and apply them to the performances ofthem.

Course content

Unit	Topics	Description
1	History of Indian Performing Arts and its Sources	History and developmentof PerformingArts • Tangible source • Intangible Sources • List of World Heritage Sites in India
2	Tangible Sources for Performing Arts	• Manuscripts • Sculptures • Templearchitectures • Hindu Mythology and • Iconography of Gods and Goddesses • Books on Dance, Music and Theatre • FilmArchives
3	Texts on Performing Arts	• Abhinaya Darpanam of Nandikeshwara– 2nd century AD • Abhinava Bharati of Abhinava Gupta – 10th centuryAD • Nritta Ratnavali of Jayapasena– 13th centuryAD • Brihaddeshi of Matanga Muni – 6th to 8th centuryAD • AbhilashitarthaChintamani • of Someshwara – 12th century AD
4	Texts on Performing Arts	• Sangeeta Ratnakara – 13th century AD. • Kalidasa'sAbhignanashakuntalam – 1st century BC to 4th centuryAD • Silappadikaram ofIlango Adigal

		– 2nd centuryAD • Ratnavali of Harsha – 7thcenturyAD

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4022	**Music Theory 4 (Carnatic Music)**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. To make the students learn the Kacheri compositions in Indian classical music
2. To enable them to understand the theoretical aspects ofcompositions.
3. To provide them with higher knowledge of ragalakshanas
4. To empower them with concert related technicalities andtraining

Course Outcomes:

On completion of the course learners will be able to:

1. The Students would be able to understand the concept of the gamaka system
2. The Students would be able to write notation.
3. The students would be able to understand the Hindustani and Indian classical raga classification.
4. Students would acquire stronger capacity to effectively render more challengingcompositions through understanding about the different Ragalakshanas.

Course content

Unit	Topics	Description

1	Basics of music concert	Gamakas, Panchadasa gamakas, Dasavidha gamakas
2	Basics of concert music	Write the notation of varnams learnt and krithis
3	Fundamentals of concert	Ragas in Karnataka music- Melakartha and Corresponding Indian classical ragas
4	Raga lakshanas	Ragalakshanas of the ragas: Shanmukhapriya, Anandabhairavi, Sahana, Nattakkurunji, Darbar, Kanada,Todi, Begada, Reetigaula, Kamboji, Saveri, Kedaragaula, Bhairavi, Purvikalyani, Harikambhoji, Madhyamavathi, Surutti, Kharaharapriya, Bilahari.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4023	**Music Theory 4 Hindustani Music**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. To make the students learn the Kacheri compositions in Indian classical music
2. To enable them to understand the theoretical aspects ofcompositions.
3. To provide them with higher knowledge of ragalakshanas
4. To empower them with concert related technicalities andtraining

Course Outcomes:

On completion of the course learners will be able to:

1. The Students would be able to understand the concept of the gamaka system
2. The Students would be able to write notation.
3. The students would be able to understand the Hindustani and Indian classical raga classification.
4. Students would acquire stronger capacity to effectively render more challengingcompositions through understanding about the different Ragalakshanas.

Course content

Unit	Topics	Description
1	Rasa Theory	Rasa Shastra
2	Notation for the composition	Write the notation of Bandishes for the mentioned ragas in the practical.
3	Fundamentals of concert	Ragas in Hindustani music- Thaats and Corresponding Indian classical ragas
4	Raga lakshanas	Raga lakshanas of the following ragas- 1. Raag Todi 2. Raag Ahir Bhairav 3. Raag Bhoop 4. Raag Puriya 5. Raag Marwa 6. Raag Jaounpuri 7. Raag Khamaj 8. Raag Shuddha Sarang 9. Raag Shuddha Kalyan 10. Raag Brindavani sarang 11. Raag Kafi 12. Raag Bhairavi

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4024	Theatre architecture and developments of theatre	SC	4	0	0	4	4

Course Objectives:

1. To analyze the technicalities and variants of theatre architecture around the world.
2. To realize the evolution of stage and construction types of theater buildings on a historical timeline.
3. To gain a knowledge of important theatre persons and playwrights in modern India
4. To realize the social relevance of theatre performances.
5. To examine the history of political theatre in India.

Course Outcomes:

Upon completion of this course, the student should be able to:

1. Clearly demonstrate the historical development of theatre architecture in India
2. Keenly examine different variants of theatre architectural developments with reference to the time line across the world.
3. Analyze the theatre developments during independence movement and post-independence period in India
4. Examine the historical prominence of political theatre.
5. Understand the emergence of street theatre in Indian socio-political scenario.

Course Content:

Unit	Topics	Description
1	Theatre architecture 1	1. Greek theatre architecture - Amphitheater 2. Roman theatre architecture – Circus Maximus, Colosseum 3. Sanskrit theatre architecture – Bharata's Natya gruha
2	Theatre architecture 2	1. Development of stages in theatre architecture – Arena to Proscenium. 2. Elizabethan theatre architecture – Globe theatre 3. Division of proscenium stage. 4. Black box theatre.
3	Modern Indian theatre	1. Theatre during Independence movement. 2. Theatre in post-independence period. 3. Major playwrights of modern Indian theatre Vijay Tendulkar Mahesh Dattani.

4	Street theatre	1. Introduction to Street theatre in India. 2. Concept of Political theatre. 3. Theatre as an instrument of social change. 4. Prominent personalities in Indian street theatre Habib Tanvir Badal Sircar Gaddar Safdar Hashmi.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4031	**Practical – 4 Bharatanatyam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

1. To enable the students to understand the structure of Varnam.
2. To teach students the items in dance and also the technical aspects of the items which include taalam, music, literature and the spiritual and philosophical depths in it.
3. To impart knowledge of Varnam to the students.
4. To enable the students to have an understanding about the jathis structure of Varnam.

Course Outcomes

1. Explain the Historical aspects of Varnam.
2. Understanding the patterns of jathis in Varnam.
3. Demonstrate the structural aspects of Nritya items in Bharathanatyam
4. Understanding about the possibility of abhinaya in Varmnam.

Course Content:

Unit	Topics	Description
1	Dance 1	Varnam poorvardha
2	Dance 1	Varnam uttarardha
3	Singing and Recitation	Learning singing the lyrics of items and the recitation of jathis and solkattus
4	Singing and Recitation	Learning singing the lyrics of items and the recitation of jathis and solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4032	Practical – 4 Kuchipudi	SC	1	0	2	3	5

Course Objectives

1. To enable the dancer to learn and perform tharangam.
2. To help the students to understand about the important items in Kuchipudi.
3. To attain the detailed knowledge of Kuchipudi.
4. To teach the students the technique of dancing on the brass plate.

Course Outcomes:

1. Demonstrate the technique of dancing on the plate
2. Explain the historical aspects of Tharangam.
3. Understand the contemporary composers and their works.
4. Describe the importance of Tharangam in a Kuchipudi recital

Course Content:

Unit	Topics	Description
1	Dance 1	Tharangam 1st part
2	Dance 2	Tharangam 2nd part
3	Dance 3	Contemporary composer work
4	Singing and Recitation	Learning singing the lyrics of the items and also the recitation of the jathis and the solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA4033	Practical 4- Mohiniyattam	SC	1	0	2	3	5

Course Objectives:

- To make the students understand the nuances of the Dance form of Mohiniyattam..
- To enable the dancers of School of Performing Arts have a strong performing skill in the practical they are going to learn the item from repertoire is Padam the abhinaya piece.

- To enable the dancer to have a strong understanding about the characteristics of varna.
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature**.**

Course Outcomes:

- Will be able to further teach the items and also understand the intricacies in choreographing such items in future.
- Students will be able to perform Abhinaya Dance piece Padam.

- Perform the Dances that they have learned
- Have a few solid traditional Dances in their repertoire

Course Content

Unit	Topics	Description
1	Padam	Part I
2	Padam	Part II
3	HasthaBhedas	1. Deva Hasthas 2. Shlokas from HasthaLakshanaDeepika
4	Taala	Learn Taala and Raaga

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4034	**Practical –4 Odissi**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- To enable to teach the students swarapallavi of Odissi
- To teach the students the nuances of abhinaya
- To attain the detailed knowledge of Odissi.
- To teach the students the items in dance and also the technical aspects of the item which

Course Outcomes

- Analyzing the Historical aspects of the items
- Understand the nuances of Abhinaya in Odissi
- Demonstrate the structural aspects of each items.
- Recognize the difference in the choreography pattern of eac item.

Course Content

UNIT	DESCRIPTION	TOPICS
1	Dance 1	1.Swabhinayapallavi
2	Dance 2	1.Sanskritstuti (God/Goddess)
3	Dance 1	1..Swabhinayapallavi Part -2
4	Dance 2	1.Sanskritstuti (God/Goddess)-Part-2

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4035	**Practical –4 Kathak**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

- To enable to teach the students Parmelu of Kathk
- To teach the students the nuances of abhinaya
- To attain the detailed knowledge of Kathak.
- To teach the students the items in dance and also the technical aspects of the item which

Course Outcomes:

- Will be able to further teach the items and also understand the intricacies in choreographing such items in future.
- Students will be able to perform Abhinaya Dance piece.
- Perform the Dances that they have learned
- Have a few solid traditional Dances in their repertoire

Course Content

Unit	Description	Topics
1	Dance 1	Parmelu and kavith in teentaal.

2	Dance 2	Bhajan
3	Dance 3	Amad and paran amad.
4	Singing and recitation	Padhant

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4036	**Practical 4–CarnaticVocal**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

- To make the students learn the Kacheri compositions in Carnatic music and to enable them to learn it in the practicalway.
- To enable them to understand the theoretical aspects ofcompositions.
- To provide them higher levels of vocaltraining
- To empower them with concert related technicalities andtraining

Course Outcomes:

- The Students would be able to understand the concept of the Tana varnam andPada varnam
- The Students would be able to sing in madhyamakalas
- The students would be able to sing different compositional forms inconcert.
- Students would acquire stronger capacity to effectively render more challengingcompositions

Unit	Topics	Description
1	Basics of concert music	▪ TanaVarnam -1 ▪ TananVarnam - 2
2	Basics of concert music	• PadaVarnam - 1 • PadaVarnam- 2
3	Basics of concert music	• VilambakalaKriti – 1 • VilambakalaKriti - 2
4	Basics of concert music	• Madhyamakalakriti – 1 • Madhyamakalakriti - 2

Course Code	Course Title	Course Type	L	T	P	C	Hrs/wk
B20BA4037	**Practical-4 Hindustani vocal**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- To make the students understand the nuances of the Carnatic Music.
- To make the students learn the compositions in Hindustani classical music and to enable them to learn it in the practical way.
- To enable them to understand the technical terms in music.

Course Outcomes

- At the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music
- The Students would not only understand the fundamentals and basics of the music but would also become a performer.
- The students will be able to sing in concerts and will also have a strong music theory Knowledge

Course content

Unit	Topics	Description
1	Music – Raga abhyas & Prasthuthi	• Raag Khamaj • Raag Shuddha Sarang Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.
2	Music – Raga abhyas & Prasthuthi	• Raag Shuddha Kalyan • Raag Brindavani sarang Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas
3	Music – Raga abhyas & Prasthuthi	• Raag Kafi • Raag Bhairavi Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.

4	Music Practical theory	1. Taal – Ektaal (Only Tekha) 2. Usage of Tanpura & Harmonium 3. Bhathkande Swaralipi abhyaas/ Notation practice

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivr

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA4038	**Practical 4– Political Theatre**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- Develop an appreciation and unerring zeal towards dramatic literature.
- Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
- Analyse the all sort of technicalities of a theatre performance
- Mastering technical terminologies and executive measures.
- Cognoscente the technical essentials of a script.

Course Outcomes

- The completion of the course enables pupils to realize the relevance and limitations of technicalities of a Theatre performance.
- Be able to subdue the fear of expression.
- Be able to analyse the technicalities of a play script.
- Be able to extrapolate and execute the technicalities of theatre both theoretically and practically.
- Improvise scenes spontaneously.

Course Content:

Unit	Topics	Description
1	**Street Theatre**	1. History of Indian street theatre. 2. Major movements of street theatre in India
2	**Group activities**	1. Group activities are executed regarding Observational aspects Stage presence Concentration Conviction Confidence Energy Directionality
3	**Improvisation**	1. Introduction to Improvisation 2. Spontaneous Scene improvisation by students based on action and reaction.
4	**Acting 5 – Street play**	1. Training on construction of a street play 2. Major elements of a street play 3. Presentation of a street play

Reference Books:

1. Katie Mitchell, *The Director's Craft*
2. Dr. Manomohan Ghosh, *Natya Sastra*
3. Juliet Rufford, *Theatre and Architecture*
4. Nandi Bhatia, *Acts of Authority, Acts of Resistance*
5. Jacob Srampickal, *Voice to The Voiceless – The Power of People's Theatre in India*
6. Badal Sarcar, *The Third Theatre*
7. K. V. Akshara, *Rangaprayoga*

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B20BA4040	**Reading India**	**HC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

- To relate to the culture and aesthetics of India.
- To analyze the various issues related to the formation of India as a nation.
- To outline the issues of caste, class and gender related problems in India.

- To interpret the contemporary political happenings in India.

Course Outcomes

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

1. Develop an insight into the richness of India's culture and aesthetics.
2. Demonstrate familiarity with the various issues related to the formation of India as a nation.
3. Explain the issues of caste, class and gender related problems in India.
4. To analyze contemporary politics in India.
5. Critique dominant discourses on the history of India
6. Appreciate the importance of Indian writing in English

Course Contents

Unit – I: Culture and Aesthetics

1. Anand Coomaraswamy: The Dance of Shiva (from *The Dance of Shiva: Fourteen Essays*)
2. David Frawley: India and the Coming Century(from *Hinduism and the Clash of Civilizations*)

Unit – II: Nation

1. Vikram Chandra: *Red Earth and Pouring Rain*

2. Ritu Menon and Kamla Bhasin: *Borders and Boundaries - Women in India's Partition* (Extract)

Suggested Reading:

Salman Rushdie: Dynasty (from *Imaginary Homelands*)

Unit – III: Caste, Class & Gender:

1. Meena Kandaswamy: Becoming a Brahmin
2. Devanur Mahadeva: One Who Sold Themselves
3. Rajia Sajjad Zaheer: Neech
4. A. Revathi: *The Truth about Me – A Hijra Life Story* (Extract)

Unit – IV: Contemporary Politics

1. Basharath Peer: *Curfewed Nights* (Extract)
2. ShashiTharoor: *India – From Midnight to the Millennium and Beyond* (Introduction)

REFERENCE BOOKS:

- Coomaraswamy, Ananda. *The Dance of Shiva: Fourteen Essays.* Rupa Publications India, 2013.
- Devy, G.N. *Indian Literary Criticism: Theory and Interpretation*. Orient Blackswan, 2010.
- Frawley, David. *Hinduism and the Clash of Civilizations*. Voice of India, 2001.
- Chandra, Vikram. *Red Earth and Pouring Rain.* Penguin India, 2000.
- Guha, Ramchandra. *Patriots and Partisans*. Penguin India, 2013.
- Menon, Ritu and KamlaBhasin. *Borders and Boundaries - Women in India's Partition.* Kali for Women, 1998.
- Rushdie, Salman. *Imaginary Homelands*. Random House India, 2010.
- Revathi, A. *The Truth About Me – A Hijra Life Story*. Penguin India, 2010.

- Peer, Basharath. *Curfewed Nights*. RHI, 2009.
- Tharoor, Shashi. *India – From Midnight to the Millennium and Beyond.* Penguin India, 2012.
- Roy, Arundhati. My Seditious Heart – An Unfinished Diary of Nowadays. *The Caravan: A Journal of Politics and Culture.* May 1, 2016.
  URL: http://www.caravanmagazine.in/essay/seditious-heart-arundhati-roy

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B20BA4050	**Psychology -IV(Developmental Psychology)**	**HC**	**2**	**1**	**0**	**4**	**4**

Course Objectives

1. Explaintheimportanceofstudyinglife-spandevelopment.
2. Describethehistoryofinterestinthelife-spanperspectiveandindicatehowcontemporaryconcernshavearisenfrompreviousviews.
3. Discussthenatureof developmentasapatternofmovementorchangeoccurring throughoutthelifespan.
4. Define and distinguishbetweenbiologicalprocesses,cognitiveprocesses,and socio-emotionalprocesses.
5. Understandthemajordevelopmentalperiodsfromconceptiontodeath.
6. Understand,compare,andcontrastthekeydevelopmenttheories
7. Defineanddistinguishbetweentheory,hypotheses,andthescientificmethod,andunderstandthedifferentresearchmeasuresusedbydevelopmentalpsychologists.
8. Understandthestandardethicsofdevelopmentalresearch.

Course Outcomes

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

1. Identifythemajorissues,tasksandmilestonesofhumandevelopment,suchasphysical,cognitive,socialandemotionaldevelopmentthroughoutthelifespan.
2. Evaluatecoreconcepts,strengths,andweaknessesofthemajortheoriesoflifespandevelopment.
3. Evaluatehowethnicity,culture,class,andgenderinfluencelifespandevelopment.

4. Explaintheimpactofbiological/geneticinfluencesonphysicalgrowth,cogniti onandbehavior.
5. Assesshowcurrentresearchsupportsandcritiquesthemajortheoriesofdevelopment.
6. Demonstratethedevelopmentalaspectssuchasphysicaldevelopment,cogniti vedevelopment, psychosocial development and emotional development in each stage of humanlifespan.

Course Contents

Unit-I:IntroductionandPrenatalDevelopment 12Hours

- Conceptofhumandevelopment-Introduction,stagesoflifespandevelopment.
- Aspectsofhumandevelopment-Physical,social,cognitive,moral.
- Factorsinfluencinghumandevelopment-Ecologicalfactors,hereditaryfactors.
- Overviewoftheoriesofhumandevelopment-Erickson,Piaget,Kohlberg.
- Conceivinganewlife-Fertilization;MultipleBirths
- MechanismsofHeredity-GeneticCode,SexDetermination,PatternsofGeneticTransmission-DominantandRecessiveInheritance.
- ChromosomalandGenelinkedabnormalities.–ChromosomalAbnormality-Downsyndrome;Sex-linked chromosomal abnormalities - Kleinfelters, fragile X, Turner's, XYY; Genelinkedabnormalities-PKU,SickleCellAnaemia.
- Stagesofprenataldevelopment.
- PrenatalAssessment-Amniocentesis,chorionicvillussampling,embryoscopy,pre-implantationdiagnosis,maternalbloodtest,umbilicalcordbloodsampling,ultrasound.
- BirthProcess-StagesofChildBirth.

Unit II: Infancy to Childhood 12 Hours

- Newborn appearance, reflexes, assessments and states
- Physicalandmotordevelopment,cognitiveandlanguagedevelopment,psychosocialdevelopment:Emotions.

Unit-III:PubertyandAdolescence 12Hours

- Puberty:Meaning,biologicalchanges:Sexualmaturation,growthspurt,primaryandsecondarysexualcharacteristics;responsestophysicalchange;Development ofidentity;

- Adolescentrelationships:Family,Peers.

Unit-IV:Adulthood 12Hours

- Physicaldevelopment
- Foundationsofintimaterelationships:friendship,love,andsexuality;Marriage :Maritaladjustmentandconditionsinfluencingit.Parenthood:adjustmenttopa renthood.
- Occupationaladjustment:Stableandunstablepatterns,preparationforretireme nt,workretirementandleisure inlateadulthood.
- Psychosocialchanges:CopingwithMid-lifecrisis,Primaryandsecondaryageing.
- Psychosocialaspects:lifestyleandsocialissues:Personalrelationships:Relati onshipwithadultchildren,great-grandparenthood.
- Stagesandpatternsofgrieving.

Reference Books:

1. Laura E Berk (2017), Child Development, 9th edition, Prentice Hall of India
2. Diane E Papalia (1998), Human Development 7th International Edition, Mc Graw Hill Publications
3. Lois Hoffman (1988), Developmental Psychology Today 5th Edition, Mc Graw Hill Inc.
4. Elizabeth B Hurlock(1987), Developmental Psychology-a life-span approach 5 th Edition, Tata Mc Graw Hill publication
5. Hetherngton& Parke (1999), Child Psychology. 5 th International Edition, Mc Graw, Hill
6. John W. Santrock (2011) Life Span Development, 9 th Ed. Mc Graw Hill Publication

Psychology Practicals-IV:

Statistics: t-test: independent sample and dependent sample.

1. Concept Formation
2. Creativity
3. Size and weight Illusion
4. Two-point threshold
5. VSMS

MOOC/ SWAYAM:

Globally,MOOC(MassiveOpenOnlineCourse)platformsaregainingmuchpopularity.Consideri ng the popularity and relevance of MOOCs, Government of India has also launched an indigenous platform, SWAYAM. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) is basically an integrated MOOCs platform for distance education that is aimed at offering all the courses from school level (Class IX) to post-graduation level. The

platform has been developed collaboratively by MHRD (Ministry of Human Resource Development) and AICTE (All India Council for Technical Education) with the help of Microsoft and is capable of hosting 2,000 courses. There are many other international agencies, foreign universities offering MOOC courses.

Astudent shall register and successfully complete any of the courses available on SWAYAM.Student shall inform the MOOC/SWAYAM coordinator of the school about the course to which he/she has enrolled. The minimum duration of the course shall be not less than 40 hours and of 4 credits. The student should submit the certificate issued by the SWAYAM to the MOOC/SWAYAM coordinator of the school, the grades obtained in the course shall be forwarded to concerned authority of the University

SEMESTER 5

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA5011	**Traditions and innovations in performing arts**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

1.To provide an understanding of traditions in dance drama music
2.To provide an understanding of innovations in performing arts
3. To provide an understanding of transitions in performing arts from ancient to post modern period.
4. To provide an understanding of terminologies with reference to the topic.

Course Outcomes

1. The response group would have understood the importance of traditions in performing arts.
2.The response group would have understood that innovations are inseperable part of traditions .
3. The response group would have understood the paradigms of the topic.
4. The response group would have understood the application of innovations and creativity based on traditions.

Course Contents

Unit	Topics	Description
1	Definitions of Traditions, Transitions and innovations in Performing Arts	1. Understanding of the timeline with reference to performing arts 2. Defining tradition 3. Defining innovation 4. Defining dance drama and music 5. Defining transition in traditions
2	Marga in Performing Arts	1. Defining paradigm 'Marga ' in dance, drama and music 2. Sculptures art architecture and performing arts 3 literatutre and performing arts. Nrityalakshana and nritya lakshya. 4. Natyasastra study and performing arts.
3	Desi in Performing Arts	1.Defining the paradigm 'Desi'in dance drama and music 2. Sculptures art architecture and performing arts 3. literatutre and performing arts Nritya lakshana and nritya lakshya

		4. Sangeeta ratnakara and performing arts
4	Traditions and Transitions in Performing Arts	1. Venkatamakhi to the music trinity 2. Haridasas, Vaishnavism Bhakthi movement 3. Royal composers, court poets and their contribution to innovation in performing arts. 4. Tradition and transition in the modern and post modern period. 5. Application of the above study practically by the response group.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA5012	**Music Theory 5 (Karnatik music)**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

- To make the students learn distinctive features of Indian music
- To enable them to understand the great composers of Indian classical music
- To make the student understand the similarities of kathakali - yekshagana sangeetham, Kathak-Odissi Music.
- To empower them with concert related technicalities andtraining

Course Outcomes:

On completion of the course learners will be able to:

- The Students would be able to understand the features of Indian music theory
- The Students would be able to understand the great composers of Indian classical music the students would be able to sing different compositional forms inconcert
- Students would acquire render more challengingcompositions and to have a stronger knowledge on the music in Vedic times.

Course content

Unit	Topics	Description
1	Basic for concert music	Distinctive features of Indian Music
2	Life history	Prominent stalwarts of yester years in vocal:Semmangudi Srinivasa Iyer.,Palghat K V Narayanaswami,M D Ramanathan ,Madurai Mani Iyer.,D K Pattambal,M S Subbalakshmi,M LVasanthakumari.
3	Music for dance	A study on Kathakali music & Yekshagana music ragas and talas figuring in it.
4	Basic for concert music	Music in the Vedic time

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA5013	**Music Theory 5 (Hindustani music)**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

- To make the students learn distinctive features of Indian music
- To enable them to understand the great composers of Indian classical music
- To make the student understand the similarities of kathakali - yekshagana sangeetham, Kathak-Odissi Music.
- To empower them with concert related technicalities andtraining

Course Outcomes:

On completion of the course learners will be able to:

- The Students would be able to understand the features of Indian music theory
- The Students would be able to understand the great composers of Indian classical music the students would be able to sing different compositional forms inconcert
- Students would acquire render more challengingcompositions and to have a stronger knowledge on the music in Vedic times.

Course content

Unit	Topics	Description
1	Basic for concert music	Distinctive features of Indian Music
2	Life History	Life history of Sadarang,Pandit Kumar Gandharwa,Pandit Bhimsen Joshi,Ustad Innayath Hussain Khan, Vidushi Kishori Amonkar, Ustad Amir Khan
3	Music for Dance	A study on Kathak Music & Odissi music ragas and talas figuring in it.
4	History	Music in the Vedic time

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA5014	**Theatre aesthetics and play writing**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

1. To analyze and demonstrate the description of aesthetics in theatre art context.
2. To identify and describe the 6 component parts of the dramatic form: plot, character, theme, diction, rhythm, and spectacle.
3. To identify and describe the major forms of drama: tragedy, comedy, melodrama, farce, tragicomedy.
4. Demonstrate their ability to write and speak clearly about dramatic literature, the requirements of production and the experience of performance.

Course Outcomes:

Upon completion of this course, the student should be able to:

1. Critically explain the meaning and adaptation of aesthetics in theatre art in a cultural scenario.
2. Identify and discuss the achievements of a number of prominent multicultural playwrights.
3. Demonstrate an analytical grasp of the central concerns of the selected plays.
4. Understand the emergence of street theatre in Indian socio-political scenario.

Course Content:

Unit	Topics	Description
1	Aesthetics	1. Definition of Aesthetics 2. Aesthetics and Art 3. Semiotics of Theatre 4. Theatre art and cognition.
2	Aesthetics of theatre	1. Aesthetics of Indian theatre Folk Classical 2. Aesthetics of Western Theatre 3. Redefinition of aesthetics in modern theatre
3	Play writing	1. Basic concept of play writing 2. Elements of play writing – Theme, Plot, Characters, Dialogue. 3. Introduction to the theories of play writing - Aristotle 4. Influence of tradition on a contemporary society on play writing.
4	Play Analysis	1. Scenes structure and acts in play 2. Structure of a one-act play. 3. Dramatic action and conflict in play. 4. Analysis of one play of any playwright below *Western Playwrights Sophocles Euripides Christopher Marlowe Shakespeare Moliere Jean Paul Sartre George Buchner Eugene O'Neil Gabriel Garcia Lorca Henrik Ibsen August Strindberg Antonin Chekov Arthur Millar Eugene Ionesco

		Samuel Beckett *African Playwright Wole Soynka *Indian Playwright Kalidasa Bhasa Shudraka Vijay Tendulkar Mahesh Dattani Habib Tanvir Badal Sarcar Girish Karnad Lakshmipathi Kolar

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA5031	**Practical 5–Bharathanatyam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

- To ensure that students learn the various items in the Bharatanatyam repertoire.
- To enable the dancer to understand the choreography patterns of Devarnama and Kriti.
- To enable the dancer to have a strong foundation in the knowledge of Different treatises
- To teach the students the items in dance and also the technical aspects Of the item which include taalam, music, literature

Course Outcomes:

- Understand the approach in the choreography of Devarnama and Kriti
- Explain the Historical aspects of Padam and Kriti.
- Analyze the pattern of abhinaya in Padam and Devanama.
- Demonstrate the structural aspects of Devarnama,Kriti and Padam.

Course content

Unit	Topics	Description
1	Dance 1	Devaranama – 1
2	Dance 2	Kriti – 1
3	Dance 2	Padam -1
4	Singing and Recitation	Learning of singing the lyrics of the item and the recitation of the jathis and solkattus

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B19BA5032	**Practical – 5 (Kuchipudi)**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- To help the students to understand the nuances of Abhinaya in Kuchipudi
- To help the students in understanding the difference between krithi and javali.
- To teach the students more dances and develop their understanding about the dance form.
- To teach the students the items in dance and also the technical aspects of the dances which include taalam, music, and literature

Course outcome

- Understand the structure of Tyagaraja Kritis
- Learn about the significance and uniqueness of Thyagaraa kritis
- Demonstrate the improvisation in Abhinaya
- Analyze the structure of javali and krithi.

Course content

Unit	Topics	Description
1	Dance 1	Tyagraja Kriti 1st part
2	Dance 1	Tyagraja Kriti 2nd part
3	Dance 2	Javali
4	Singing and Recitation	Learning singing the lyrics of the items and also the recitation of the jathis and the solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs per week
B20BA5033	**Practical 5- Mohiniyattam**	**Sc**	**1**	**0**	**2**	**3**	**5**

Course objectives:

- To make the students understand the nuances of the Thillana, bhajan and ashtapadi of Mohiniyattam repertoire.
- To teach the students the Dances in dance and also the technical aspects of the Thillana which include taalam,music and literature.

- To enable the dancer to understand the choreography patterns of Bhajans,ashtapadi and thillana.
- To teach the students the Dances in dance and also the technical aspects of the item

Course outcomes

- At the end of the course the students would be in a position to understand the nuances of the Dance form of Mohiniyattaam.
- Studnets will understanded the nuances to better understanding of the dance pieces.
- Perform the Dances they learned in the syllabus
- Will be able to further teach the Dances and also understand the intricacies in choreographing such Dances in future.

Course Content

Unit	Description	Topics
1	Dance 1	Bhajan
2	Dance 2	Thillana
3	Dance 3	Ashtapadi
4	Singing and Recitation	Learning singing for the lyrics of the item and recitation of the jathis and solkattus

Course Code	Course Title	Course Type	L	T	P	C	Hrs per week
B20BA5034	**Practical 5- Odissi**	**Sc**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

- To enable the students understand the 10 incarnation of Vishnu.
- To teach the students to understand the format of Pallavi
- To help the students in understanding the history behind each avathara
- To teach the students the items in dance and also the technical aspects of the item which include rhythm, music and literature.

Course Outcomes:

- Learn about the mythological stories behind eac avatara
- Demonstrate the hastha used to show each avathara
- Explain the structure of Pallavi.
- Understand the structure of Tala in the items.

Course Content

Unit	Description	Topics
1	Dance 1	1. Dasavatar
2	Dance 2	1. Pallavi

3	Dance 1	1.Dasavatar Part -2
4	Dance 2	1. Pallavi Part-2

Course Code	Course Title	Course Type	L	T	P	C	Hrs per week
B20BA5035	**Practical 5- Kathak**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- To enable the students understand the 10 incarnation of Vishnu.
- To teach the students to understand the format of Pallavi
- To help the students in understanding the history behind each avathara
- To teach the students the items in dance and also the technical aspects of the item which include rhythm, music and literature.

Course Outcomes

- Learn about the mythological stories behind eac avatara
- Demonstrate the hastha used to show each avathara
- Explain the structure of Pallavi.
- Understand the structure of Tala in the items.

Course Content

Unit	Description	Topics
1	Dance 1	Introduction of jhaptaal.
2	Dance 2	Gat nikas.
3	Dance 3	Toda/tukda in jhaptaal.
4	Singing and recitation	Padhant

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA5036	**Practical 5–CarnaticVocal**	**SC**	**0**	**0**	**3**	**3**	**6**

Course objectives:

- To make the students learn the Kacheri compositions in Carnatic music and to enable them to learn it in the practicalway.
- To enable them to understand the theoretical aspects ofcompositions.
- To provide them higher levels of vocaltraining
- To empower them with concert related technicalities andtraining

Course outcome

- The Students would be able to understand the concept of the alapana andswarakalpana
- The Students would be able to sing themanodharmasangeeta
- The students would be able to sing different compositional forms inconcert.
- Students would acquire stronger capacity to effectively render more challengingcompositions

Course content

Unit	Topics	Description
1	Basic for concert music	**Javali –1** **Pancharatna Kriti-1**
2	Basic for concert music	**Javali – 2**
3	Basic for concert music	Pancharatna Kriti-2
4	Basic for concert music	Kriti with alapana and swara kalpana

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA5037	**Practical-5 Hindustani Music**	**sc**	**1**	**0**	**2**	**3**	**5**

Course Objectives

1. To make the students understand the nuances of the Carnatic Music.
2. To make the students learn the compositions in Hindustani classical music and to enable them to learn it in the practical way.
3. To make the students learn some instruments of Hindustani classical music and to enable them to learn it in the practical way.
4. To enable them to understand the technical terms in music.

Course Outcomes

1. At the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music
2. The Students would not only understand the fundamentals and basics of the music but would also become a performer.
3. The students will be able to sing in concerts and will also have a strong music theory
4. Knowledge of taal concept.

Course Content

Unit	Topics	Description
1	Music – Raga abhyas & Prasthuthi	• Raag Yaman Kalyan • Raag Nand • Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.
2	Music – Raga abhyas & Prasthuthi	• Raag Bhimpalasi • Raag Bhageshree Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.
3	Music – Raga abhyas & Prasthuthi	• Raag Puriya Kalyan • Raag Malkauns Practice of Sargamgeeth, Lakshanageeth, Chotakhayal- Alap & Taan for above ragas.
4	Music Practical theory	• Taal – Ektaal (Only Tekha) • Usage of Tanpura & Harmonium • Bhathkande Swaralipi abhyaas/ • Notation practice

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B19BA5038	**Practical – 5 Theatre Acting Andvance III**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- Develop an appreciation and unerring zeal towards dramatic literature.
- Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
- Elevate the pupils to perceive the Social contexts of theatrical performances.
- Analyse the social perception and executive measures of theatre historically.
- Cultivate an analytical mind on the social credentials of a script.

Course Outcomes

- The completion of the course enables pupils to realize the historical implementations of social perception in Theatre performances.
- Be able to subdue the fear of expression in a social scenario.
- Be able to dissect a play script through the lenses of social discourse.
- Be able to effectively perform in a social structure.

Course Content:

Unit	Topics	Description
1	**Speech work**	1. Tongue twisting Exercises Different types of Reading Narrations Diction Intonation Emphasis Pauses Tempo 2. Dialogues delivery Practicing speech with a literary piece.
2	**Contemporary playwrights In Kannada**	1. T P Kailasam 2. Girish Karnad 3. Samsa 4. P. Lankesh

3	**Play-reading**	1. Play-reading exercises and practicing with a script 2. Contextual reading, synopsis and character reading of scenes. 3. Script Analysis of scripts Oedipus Macbeth Tuglaq Charandas Chor 4. Script Editing ofplays as per the performative convenience. Suggested scripts : Any Sanskrit script.
4	**Acting 3 - Scene work**	1. Working on a scene for performance. 2. Experimenting on the variants of characters in selected scripts 3. Training on Completeness (gesture, posture, movement) 4. Interaction: Eye contact and actor, reaction with co-artists, relating to other elements of performance.

Reference Books:

1. Nandi Bhatia, *Acts of Authority, Acts of Resistance*
2. Erwin Piscator, *The Political Theatre*
3. Badal Sircar, *The Third Theatre*
4. Augusto Boal, *Theatre of Oppressed*
5. Chris Hogget, *All About Theatre*
6. Katie Mitchell, *The Director's Craft*
7. Janelle Reinelt & Gerald Hewitt, *The Political Theatre of David Edgar*
8. Cliford &Christoper J Herr, *American Political Theatre*c

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B18BA5051	**Literatures of India – I**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

- To outline the various movements of Literatures from India.
- To develop an understanding of the socio-political and economic issues of the post-independent India.
- To examine Literatures of India, particularly to writings in translations.
- To assess the literary and political issues that Literatures from India has undergone.

Course Outcomes

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

- Analyze the various issues discussed by classical and modern poets of Literatures from India.
- Distinguish the major features in the fictional narratives of Literatures from India.
- Demonstrate familiarity with concerns specific to India as presented in non-fictional works by Indian writers.
- Develop a better understanding of socio-political dimensions of India.

Course Contents

Unit – I: Poetry

1. Kalidasa – Canto I "Summer" (from *Ritusamhara*)
2. Kabir – If God be within the mosque…
3. Mira Bai – Your Slander is Sweet
4. Ramprasad Sen – O Longing Mind
5. Sumitra Nandan Pant – Fruits of the Earth
6. Fiaz Ahmed Fiaz – The Colour of the Moment
7. Kuvempu – Kalki
8. Sitakant Mahapatra – Father

Unit – II: Short Fiction

1. Munshi Premchand – The Shroud
2. Saadat Hasan Manto – Thanda Gosht
3. LalithambikaAntarjanam – Revenge Herself

Unit – III: Essays

1. Rabindranath Tagore – Religion of the Forest
2. A. K. Ramanujan – Is There an Indian Way of Thinking?

Unit – IV: Drama/Novel

1. Girish Karnad – *Hayavadana*
2. R.K. Narayan – *The Guide*

REFERENCE:

- Kale, MR. *TheRitusamhara*. Bharatiya Kala Prakashan, 2007.
- Dharwadker, Vinay. *Kabir*. Penguin, 2003.
- Bly, Robert. *Mirabai: Ecstatic Poems*. Aleph Book, 2017.
- Sen, Ramprasad. *Grace and Mercy in her Wild Hair: Selected Poems to the Mother Goddess*. Hohm Press, 1999.
- Kiernan, V.G. *Poems by Faiz Ahmed Faiz*. Oxford, 2000.
- George, KM. *Modern Indian Anthology: Surveys and Poems.*SahityaAkademi, 1992.
- Manto, SaadatHasan&AatishTaseer. *Manto: Selected Short Stories*. RHI, 2012.
- Narasimhachar, Sudha. *Selected Stories of MunshiPremchand*. Unicorn Books, 2016.
- Holmstorm, Lakshmi. *The Inner Courtyard: Stories by Indian Women*. Rupa, 1991.
- Tagore, Rabindranath. *Rabindranath Tagore Omnibus*. Rupa, 2003.
- Ramanujan, A.K. *The Collected Essays of A.K. Ramanujan*. Oxford University Press, 1999.
- Narayan, R.K. *The Guide*. Indian Thought Publications, 2007.
- Karnad, Girish. *Hayavadana*. Oxford, 1997.

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B18BA5052	**Reading Myths and Mythologies**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

- To acquaint the students with readings of myths and mythologiesacross the globe.
- To expose the students to the reading of the Indian epics, the *Ramayana* and the *Mahabharata* and the co-related and prevalent myths.
- To introduce the students to the classical Greco-Roman mythology.
- To familiarize the students with inter-relation of myths and mythologies of South, East and Southeast Asian regions.

Course Outcomes

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

1. Develop an insight into the huge arena of myths and mythologies across the globe.
2. Demonstrate familiarity with the readings of the two great Indian epics, the *Ramayana* and the *Mahabharata*.
3. Explain the basics of the classical Greco-Roman mythology.
4. Apply Greek Literary Criticism to evaluate themes and characterization in classical Greco-Roman epics
5. Critically compare Indian epics with Greco-Roman epics
6. Outline their familiarity with myths and mythologies of South, East and Southeast Asian regions.

Course Contents

Unit – I: Background to Reading Myths & Mythologies

1. JawaharLal Nehru: The Epics, History, Tradition and Myth (from *Discovery of India*)
2. Kumkum Roy: *The Power of Gender and the Gender of Power: Explorations in Early Indian History*(Extract)
3. DevduttPattanaik: Myths and Mythology (from *Indian Mythology*)

Unit – II: Reading Indian Epics

1. Arshia Sattar (Trans): *The Ramayana* as Epic – Introduction till two realms of the Ramayana (from Valmiki's*The Ramayana*)
2. C. Rajagopalachari: Preface to the 2nd Edition (from *Mahabharata*)

Unit – III: Reading Classical Greco- Roman Mythology

1. Sophocles: *Oedipus Rex*
2.Homer: *The Iliad* (Extracts)
3. Virgil: *Aenid* (Extracts)

Unit – IV: Myths and Mythology in South, East and Southeast Asia

Introduction to:
1. Buddhist Mythology (Buddhas, Bodhisattvas, Yidam, Devas, Yakshas)
2. Chinese Mythology (The Chinese Dragon, Important Deities, Mythical Creatures)
3. Burmese Mythology (History and origin, *Nat-kadaw*, Folk beliefs and practices)
4. Vietnamese Mythology (The 'linh', Important Deities, Forms of worships and practices)

REFERENCES:

- Nehru, Jawaharlal. *The Discovery of India*. Penguin India, 2008.
- Roy, Kumkum. *The Power of Gender and the Gender of Power: Explorations in Early Indian History.*OUP, 2010.
- Pattanaik, Devdutt. *Indian Mythology*. Simon and Schuster, 2001.
- Sattar, Arshia (Trans). *The Ramayana*. Penguin Random House India, 2016.
- Rajagopalachari, C. *Mahabharata*. BharatiyaVidyaBhavan, 2010.
- Sophocles. *The Three Theban Plays*. Penguin, 1984.
- Homer. *The Iliad*. Penguin, 2003.
- Virgil. *The Aenid of Virgil*. University of California Press, 1992.
- Clayton, Matt. *Chinese Mythology: A Captivating Guide to Chinese Folklore including Fairytales, Myths, and Legends from Ancient China*. Createspace Independent Publishing Platform, 2018.
- Campbell, Joseph. *Oriental Mythology: The Masks of God.* Penguin USA, 1991.
- Barthes, Roland. Mythologies. RHUK, 2009.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA5060	**Indigenous Psychology-An Indian Perspective--I**	**SC**	**2**	**1**	**0**	**3**	**4**

Course Objectives:

- To acquire knowledge required for the practice of Psychology in Indian context.
- To develop skills required to Cognition, Self and Consciousness in an Indian context.
- To acquire methodological and analytic knowledge and skills of emotions, desires and detachment; types of emotions and their manifestations, theories of rasa and bhāva; positive states of mind; controlling anger and violence in society.
- To develop skills required to maintain Health, Happiness and well-being in an Indian Perspectives on Psychology.

Course Outcomes:

Upon successful completion of this course, students will be able to:

- ❖ Demonstrate a solid fundamental knowledge of Indian psychology as a discipline. This will include both knowledge of the history of the field, but also of the current facets, theoretical perspectives, and the divisions within the broad field of Indian Psychology.
- ❖ Comprehend the concept of Cognition, Self and Consciousness in an Indian context.
- ❖ Understand the bases of emotions, desires and detachment; types of emotions and their manifestations, theories of rasa and bhāva; positive states of mind; controlling anger and violence in society.
- ❖ Understand the concept of Health, Happiness and well-being in an Indian Perspectives on Psychology

Course Content

Unit-I: An Introduction to Indian Psychology

What is Indian psychology; relevance and scope; historical developments; distinction from western psychology.

Unit-II: Indian Perspectives on Cognition, Self and Consciousness

Nature of reality; manas and higher mental states; types of knowing; methods of knowing; yoga as research method.

What is self? Self as consciousness; states of consciousness; self as knower, as enjoyer, as doer; ego-identity and soul identity; self and society.

Unit-III: Human Emotions

Bases of emotions, desires and detachment; types of emotions and their manifestations, theories of rasa and bhāva; positive states of mind; controlling anger and violence in society.

Unit-IV: Health, Happiness and Well-being.

Concepts; mental health — concept, symptoms and treatment; suffering and healing; theories of happiness and well-being; self-growth and liberation.

REFERENCES:

Adair, John. G.(2002).How International is International Psychology? International Journal of Psychology,37, 160-170.

Auluck, S. (2002).Self and identity.In

G. Misra, and A. K. Mohanty (eds.), Perspectives on indigenous psychology, p. 374-398. New Delhi: Concept Publishing Company.

Chiu, C., & Hong, Y. (2006).Social Psychology of Culture. New York: Psychology Press.

Kim,U.,Shu,K.,Yang,K.S.,&Hwang, K.K.(2006).Indigenous and Cultural Psychology: Understanding People in Context.

Springer. Jain, U. (2002). An Indian perspective on emotions.In G. Misra, and A. K. Mohanty (eds.), Perspectives on indigenous psychology, p. 281-291. New Delhi: Concept Publishing Company. 25

Mathijs, Cornelissen, R,M., Misra,G.&Verma, Suneet.(2011). Foundation of Indian Psychology, Vol 1,Theories and Concepts. New Delhi: Pearson

Misra, G., &Gergen, K. J. (2002).On the place of culture in psychological science. . In G. Misra, and A. K.Mohanty (eds.), Perspectives onindigenous psychology, p. 421-439. New Delhi: Concept Publishing Company.

Rao, K. R. (2011). Indian psychology: Implications and applications. In Cornelissen,

R.M. M., Misra, G., Varma, S. (Eds.), Foundation of Indian Psychology: Theories and concepts, Vol, 1. New Delhi: Pearson.

Sinha, J. B. P. (2002). Towards indigenization of Psychology in India. . In G. Misra, and A. K. Mohanty (eds.), Perspectives on indigenous psychology, p. 440-457. New Delhi: Concept Publishing Company.

Smith, P.B., Bond, M. H., &Kagitcibasi, C. (2006). Understanding Social Psychology across cultures: Living and working in a changing world. London: Sage.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA5071	**Abnormal Psychology-1**	**HC**	**2**	**1**	**0**	**3**	**4**

Course Objectives

1. To sensitize on nature, history and diagnosis of mental disorders.
2. To learn the different perspectives in understanding abnormal behaviour.
3. To learn the symptoms and causes of Anxiety Disorders and Obsessive Compulsive Disorders.
4. To learn the symptoms and causes of Trauma and Stress related disorders and Depressive Disorders.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Explores the nature, history and diagnosis of abnormal behaviors
2. Discovers the different perspectives in understanding the abnormal behavior
3. Discovers the symptoms, causes and diagnosis of Anxiety and Obsessive-compulsive disorder.
4. Discover the symptoms, causes and diagnosis of Trauma and Stress related disorders and Depressive Disorders.

Course Contents

Unit-I: Introduction to Psychopathology

a. Definition: Abnormal Psychology, Mental Disorder. The science of Psychopathology, The stigma of Abnormal Behavior, Adaptive and Maladaptive behaviour.
b. Historical conceptions: the ancient western world, the Middle ages, renaissance, age of reason and the Enlightenment, The reform movement.
c. Diagnosing Psychological disorders: Classification Systems- ICD and DSM.
d. Seeking help for Abnormal Behavior: reasons for clinical contacts, sources of help.

Unit-II: Theoretical Perspectives on Maladaptive Behavior

a. The Biological Perspective: genetic factors, nervous system and the Brain, The Endocrines, The Neuroscience Revolution, Integration of Biological and Psychological Systems.
b. The Psychodynamic Perspective: Freud and Psychoanalysis, More recent approaches to psychoanalysis.
c. The Behavioral Perspective: Classical conditioning, Operant conditioning and Social-cognitive theories.
d. The Cognitive Perspective: Maladaptive behaviour and cognition.
e. The Humanistic perspective
f. The Existential perspective

The Community-cultural perspective.

Unit-III: Anxiety and Obsessive-compulsive disorders (DSM-5)

a. Definition of Anxiety, Fear and Panic.
b. Prevalence of Anxiety disorder, gender difference if any.
c. Clinical Description of Types: Generalized Anxiety Disorder, Panic disorder, agoraphobia, Specific Phobia-animal, natural environment, Blood-injection-injury, situational, Social Anxiety Disorder, Separation Anxiety Disorder, selective Mutism.
d. Obsessive-compulsive disorders: OCD, excoriation (skin-picking) disorder, hoarding disorder, Body Dysmorphic Disorder, clinical Description and causes.

Unit-IV: Trauma- and stressor-related disorders and Depressive disorders

Trauma- and stressor-related disorders:

a. Definition of Trauma and Stress, type. Stressors
b. Clinical Description and causes of Posttraumatic stress disorder (PTSD), acute stress disorder, reactive attachment disorder and disinhibited social engagement disorder, Adjustment disorders.

Depressive disorders: Disruptive Mood Dysregulation Disorder, Major Depressive Disorder-single episode-mild, moderate, severe, recurrent episode-mild, moderate severe, Persistent Depressive Disorder(Dysthymia), Premenstrual Dysphoric Disorder.

Reference Books:

1. Alloy, L.B., Riskind, JH., and Manos,M.J. (2006). Abnormal Psychology – Current Perspectives. 9th Edition. New Delhi: Tata McGraw- Hill Edition.
2. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed., text revision). Washington, DC: Author.
3. Barlow,D.H. and Durand,M.V. (2000). Abnormal Psychology. 2nd Edition. New Delhi: Thomson Publication.
4. Bootzin,R.B.,Acocella,J.R. and Alloy,L.B. (1993). Abnormal Psychology–Current perspectives. 6th Edition, International Edition,Tata Graw –Hill Inc., USA.
5. Carson, R.C., Butcher, J.N and Mineka ,S.(2004). Abnormal psychology. 13th Edition. New Delhi: Pearson Education.
6. DSM-5 manual, https://cdn.website-editor.net/30f11123991548a0af708722d458e476/files/uploaded/DSM%2520V.pdf
7. Davidson and Neal (1996). Abnormal psychology. Revised 6th Edition, John Wiley Sons World Health Organization. (2008). ICD-10: International statistical classification of diseases and related health problems (10th Rev. ed.). New York, NY: Author.

Practicals-V :

Statistics: Chi-square test.

1. Eysenk's personality questionnaire
2. Bell's adjustment inventory
3. Type A and Type B behavioural pattern
4. Assertiveness
5. Big-5 personality factors

Paper-VI (B)

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA5072	**Health Psychology-I**	**SC**	**2**	**1**	**0**	**3**	**3**

Course Objectives

Students are expected to develop an understanding of health psychology and gain skills in the following:

1. To understand the nature, history, origin and scope of Health Psychology.

2. To learn the cognitive aspects of illness and factors influence compliance.
3. To learn about health promoting behaviors
4. To learn the connection between Pain and Psychological factors.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Explores the connection between Health and Pscyhology and its relevance.
2. Analyzes the impact of cognition on illness and explore the need for compliance and factors influencing it.
3. Explores the various behviors that promotes health
4. Explore the psychological aspects related to pain perception and evaluate strategies for dealing with pain sensation and perception

Course Contents

Unit-I: Introduction

a) Definition of Healthy Psychology,
b) History of Health Psychology
c) Aims of health psychology.
d) Future of health psychology
e) Advantages of the Biopsychosocial Model, Clinical Implications of the Biopsychosocial Model.
f) The Biopsychosocial Model: The Case History of Nightmare Deaths.
g) The Need for Health Psychology: Changing Patterns of Illness, Advances in Technology and Research, Expanded Health Care Services, Increased Medical Acceptance.
h) Health Psychology Research: The Role of Theory in Research, Experiments, Correlational Studies, Prospective and Retrospective Designs, The Role of Epidemiology in Health Psychology, Methodological Tools.

Unit-II: Illness Cognition and Compliance

Definition of Health, illness
Illness cognition: definition, dimensions, evidences for dimensions, Measurement.
Leventhal's Self-regulatory model
Symptom Perception
Coping with crisis of illness
Using the self-regulatory model to predict outcomes-adherence, recovery from stroke and MI
Illness cognitions and health outcomes
Compliance: Definition, work of ley-predicting the patient's compliant, improving compliance

Unit-III: Health-Promoting Behaviors

a) **Health Promotion:** health behaviors and health habits, Practicing and changing health behaviors, barriers to Modifying poor Health Behaviors, Intervening with Children and Adolescents, Intervening with At-risk people, Health promotion and Older Adults, Ethnic and Gender Differences in health risks and habits.
b) **Exercises:** Benefits of Exercises
c) **Accident Prevention:** Home and Workplace Accidents
d) **Cancer-Related Health Behavior:** Mammograms, Colorectal Cancer Screening, Sun safety practices

e) **Developing a Healthy Diet:** changing diet, Resistance to Modifying Diet, Intervention to Modify Diet.
f) **Sleep:** Sleep and Health
g) Rest, Renewas, Savoring

Unit-IV: Pain

a) Pain: nature, definition, cross-cultural perspective on pain, measuring pain, physiology of pain.
b) Pain theories: early theories, gate control theory.
c) Role of Psychosocial factors in pain perception.
d) Clinical Issues in Pain Management: acute and chronic pain, pain and personality.
e) Pain control techniques: Pharmacological Control of Pain Surgical Control of Pain Sensory Control of Pain Biofeedback Relaxation Techniques Distraction Coping Skills Training Cognitive-Behavioral Therapy.

References Books:

1. Jane Ogden (2010) Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi.
2. Shelley E. Taylor (2006) Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi.
3. Steve R. Baumgardner & Marie K. Crothers (2009) Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
4. M. Robin Dimatteo& Leslie R. Martin (2002) Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.
5. Alan Carr- Positive Psychology, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.

Psychology Practicals VI (A)/VI (B)
Spiritual Well-being

1. **Triguna Questionnaire**
2. **Personal Values questionnaire**
3. **Guidance Need Inventory**
4. **Subjective well-being**

SEMESTER 6

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6011	**Aesthetics**	SC	4	0	0	4	4

Course Objectives :

1. To provide an understanding of the term 'Aesthetics' in general.
2. To provide an understanding of the Philosophy of Aesthetics and Art Appreciation
3. To provide an understanding of Indian Aesthetics and contributions of Indian Aestheticians
4. To provide an understanding of Western Aesthetics and contributions of western Aestheticians
5. To provide an insight into both occidental and oriental aesthetic theories.

Course Outcomes :

1. The response group would have learnt to appreciate art and apply aesthetic approach.
2. The response group would be aware of Indian and western aesthetic theories
3. The response group would be encouraged to apply the learnt subject practically in their performances.
4. The response group would become artistes with increased awareness of aesthetic paradigms.

Course content

Unit	Description	Topic
1	Fundamentals of Aesthetics	1. Classifications of arts 2. Defining the term 'Aesthetics' 3. Art Appreciation and defining ART 4. Philosophy of Aesthetics 5. Understanding 'isms' in relation to aesthetics
2	Principles of Aesthetics	1. Amalgamtion of Visual and performing arts 2. Chaturvidha Abhinaya and Aesthetics 3. Principles of Aesthetics 4. Understanding Beauty and Philosophy 5. Why the study of Aesthetics is Important to a student of performing art
3	Indian Aesthetics	1. Indian Aesthetics 2. Ancient to the 4medieval Theories 3. Aesthetic process and 'Rasa' theory 4. Contributions and works of prominent Aestheticians – till post modern period 5. Application of Aesthetics and performance – a discussion

	Western Aesthetics	1. Western Aesthetics 2. Ancient to Modern period- theories 3. Aesthetic Process and various aspects – a discussion 4. Contributions and works of prominent Aestheticians 5. Application of Aesthetics and performance – a discussion

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6012	**Music Theory 6 (Carnatic Music)**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

- To enable them to understand the theoretical aspects ofcompositions.
- To make them understand the grama system of music
- To empower them with concert related technicalities andtraining
- To enable them to get used to rasa theory of Music

Course Outcomes:

- The Students would be able to understand raga used in film music and Indian classical music in general
- The Students would be able to understand the ancient raga classification
- The students would be able to understand the concept of Rasa
- Students would acquire stronger capacity to effectively render more challengingcompositions

Course content

Unit	Topics	Description
1	Basic for concert music	Ragas used in Carnatic Music
2	Ancient Raga Classification	Ancient Raga Classification – Grama murchana Jathi System, Shadjagrama, Madhyamagrama, Gandharagrama and raga ragini parivarasystem.
3	Karnatik Music Traditional Styles	Introduction to different Karnatik styles – 4Mysore & Tanjore system.

4	Rasa Theory	Evolution of the concept of Rasa through ages & Nava Rasas.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6013	Music Theory 6 (Hindustani Music)	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives:

- To enable them to understand the theoretical aspects ofcompositions.
- To make them understand the grama system of music
- To empower them with concert related technicalities andtraining
- To enable them to get used to rasa theory of Music

Course Outcomes:

- The Students would be able to understand raga used in film music and Indian classical music in general
- The Students would be able to understand the ancient raga classification
- The students would be able to understand the concept of Rasa
- Students would acquire stronger capacity to effectively render more challengingcompositions

Course content

Unit	Topics	Description
1	Basic for concert music	Ragas used in Hindustani Music and Film Music – A general view.
2	Ancient Musicology	Grama murchana Jathi System, Shadjagrama, Madhyamagrama, Gandharagrama
3	Gharanas-Schools of Hindustani Music	Introduction to different Gharanas -Agra, Kirana, Gwaliar, Jaipur, Patiyala.
4	Film Music	Hindustani Music in Film Industry

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6014	**Theatre direction**	SC	4	0	0	4	4

Course Objectives:

- To access a detailed understanding regarding play direction.
- To gain knowledge on well-known play directors across the world.
- To perform detailed script analysis, focusing on a deep understanding of character's objectives, obstacles and tactics, and effectively communicate that understanding in performance.
- To implement fundamental acting terminology and technique to solve theatrical challenges.
- To demonstrate the ability to accurately interpret and utilize written and verbal directions provided for performances.

Course Outcomes:

Upon completion of this course, the student should be able to:

- Realize the importance of theatre music in construction of a play performance.
- Apply the understanding of technicalities of theatrical performances toward improving and refining skills and techniques in subsequent performances as a director.
- Provide constructive feedback to performances by actors.
- Compose and analyze written criticism of live theatrical productions.
- Create and maintain a detailed director's script of the theatrical process.

Course Content:

Unit	Topics	Description
1	Theatre music	6. Introduction to theatre music. 7. Evolution of theatre music in India. 8. Contemporary theatre music.
2	Social significance of Theatre	6. Relevance of social significance of theatre. 7. Effects of theatre on society. 8. Experimental theatre and its effects on society.
3	Play direction	6. Introduction to play direction. 7. Role of a director 8. Significance of playwright, actor and audience in play direction. 9. Supporting elements in play direction – sets, lighting, make up
4	Major play directors in theatre	6. Constantine Stanislavski 7. Vsevolod Mayerhold 8. Erwin Piscator 9. Jercy Grotowski 10. B V Karanth 11. Augusto Boal.

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6031	**Practical 6–Bharathanatyam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives

- To enable the students to understand the structure of Thillana and Javali.
- To enable the students to have an understanding about the korvai structure of Thillana.
- To make the students confident in performing a solo Bharathanatyam performance.
- To teach the students the items in dance and also the technical aspects of the item which include taalam, music, and literature

Course Outcomes:

- Understanding the structural patterns of Thillana.
- Demonstrate the structure in the jathi and korvai in Thillana.
- Analyze the pattern of abhinaya in Javali.
- Build confidence in giving a solo Bharathanatyam performance

Course content

Unit	Topics	Description
1	Dance 1	Javali -1
2	Dance 2	Thillana – 1
3	Singing and Recitation	Learning of singing the lyrics of the item and the recitation of the jathis and solkattus
4	Concert paper	Individual performance of some of the items learnt in the entire syllabus of BA

Course Code	Course Title	ourse Type	L	T	P	C	Hrs./ Wk.
B20BA6032	**Practical – 6 Kuchipudi**	SC	1	0	2	3	5

Course Objectives

- To help the students to understand the nuances of Abhinaya in Padam.
- To help the students in understanding structure of Kuchipudi.
- To make the students confident in performing a solo Kuchipudi Performance.
- To teach the students the items in dance and also the technical aspects of the dances which include taalam, music, and literature

Course outcome

- Demonstrate the structure in the jathi and Korve in Thillana.
- Build confidence in giving a solo performance in Kuhcipudi.
- Develop the ability to explain and coordinate with the accompanying artists independently.
- Understand the concept of sringara in Padam.

Course content

Unit	Topics	Description
1	Dance 1	Padam -1
2	Dance 2	Thillana – 1
3	Singing and Recitation	Learning singing the lyrics of the items and also the recitation of the jathis and the solkattus
4	Performance	Individual performance of some of the items learnt in the entire syllabus of BA

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6033	**Practical-6- Mohiniyattam**	**SC**	**1**	**0**	**2**	**3**	**5**

Course objectives:

- To make the students understand the nuances of the Shloka of Mohiniyattam repertoire..
- To enable them to understand the technical ways of choreography.
- To enable the dancer to have a strong foundation in the dance style by learning the different Dances and abhinaya
- To teach the students the Dances in dance and also the technical aspects Of the item which include taalam, music, literature.

Course outcomes:

- At the end of the course the students would be in a position to understand the nuances of the choreography techniques of Mohiniyattaam.
- Studnets will understanded the nuances to better understanding of the dance pieces.
- Will be able to further teach the items and also understand the intricacies in choreographing such items in future
- A good understanding about the hasthas according to Hasthalakshanadheepika

Course content

Unit	Topics	Description
1	Dance 1	Shloka Abhinayam
2	Hastha Bhedas	Shlokas from Hastha Lakshana Deepika
3	Singing and Recitation	Learning singing for the lyrics of the item and recitation of the jathis and solkattus
4	Concert paper	Individual performance of some of the items that are learned in BA

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6034	**Practical –6** Odissi	SC	1	0	2	3	5

Course Objectives:

- To help the students in understanding the approach of abhinaya in Odissi
- To teach the students the essence of Gita govindam
- To teach the students the structure of Moksya.
- To teach the students the items in dance and also the technical aspects of the dances which include taalam, music, and literature

Course Outcomes:

- Analyse the technicalities of an odissi performance
- Describe about the importance of Ashtapadis in Odissi performance.
- Learn about the structure of Moksya.
- Demonstrate Mokshya with its literature.

Course Content

Unit	Topics	Description
1	Dance 1	Ashtapadi
2	Dance 2	Mokshya.
3	Dance 1	Ashtapadi Part -2
4	Dance 2	Mokshya Part -2

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6035	**Practical –6** Kathak	SC	1	0	2	3	5

Course Objectives:

- To help the students in understanding the approach of abhinaya in Kathak
- To teach the students the essence of Katak
- To teach the students the structure of Ghat Bhaav.
- To teach the students the items in dance and also the technical aspects of the dances which include taalam, music, and literature

Course Outcomes:

- Analyse the technicalities of an Kathak performance
- Describe about the importance Padhant performance.
- Learn about the structure of Tarana.
- Demonstrate dance pieces with its literature.

Course Content

Unit	Topics	Description
1	Dance 1	Tihaii in Jhaptaal
2	Dance 2	Gat bhaav
3	Dance 3	Tarana
4	Singing and recitation	Padhant

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6036	**Practical 6–Carnatic Vocal**	**SC**	**1**	**0**	**2**	**3**	**5**

Course Objectives:

- To enable them to understand the theoretical aspects ofcompositions.
- To provide them higher levels of vocaltraining
- To empower them with concert related technicalities andtraining
- To enable them to get used to kalpanaswara

Course Outcomes:

On completion of the course learners will be able to:

- The Students would be able to understand the concept of the alapana andswarakalpana
- The Students would be able to sing theManodharma sangeetha
- The students would be able to sing different compositional forms inconcert.
- Students would acquire stronger capacity to effectively render more challengingcompositions

Course content

Unit	Topics	Description
1	Basic for concert music	• Padam – 1 • Padam - 2
2	Basic for concert music	• Kavadichinthi • Kavadichithi
3	Basic for concert music	• Thillana – 1 • Tillana - 2
4	Basic for concert music	Kriti with alapana and swara kalpana

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6037	**Practical-6 Hindustani Vocal**	SC	0	0	3	3	**6**

Course Objectives

- To make the students understand the nuances of the Carnatic Music.
- To make the students learn the compositions in Hindustani classical music and to enable them to learn it in the practical way.
- To enable them to understand the technical terms in music.

Course Outcomes

- At the end of the course the students would be in a position to understand the nuances of the Hindustani classical Music
- The Students would not only understand the fundamentals and basics of the music but would also become a performer.

10. The students will be able to sing in concerts and will also have a strong music theory Knowledge

Course content

Unit	Topics	Description
1	Field work	Field Work / Field trip - Report
2	Concert Critics	Concert report – Critics inclusive.
3	Music &Practical	Raag Bhairav- Practice of Bada Khayal with alap and Thaan Raag Mishra Khafi – Thumri
4	Concert paper	Concert paper (Jalsa)

Reference Books:

1) A Historical study of Indian music, Swami Prajnananda
2) Text book of Rasa Sastra, Chandra Reddy
3) Rasa in Aesthetics, Priyadarshi Patnayak and Prof. K.Krishnamurthy
4) Tabla visharada , Dr. Shivendra Prathap Thripathi
5) Development of Hindustani classical music, Rama Saraf
6) Research methodology in Indian music, Amit Kumar Verma
7) Thumri Tarangini, Rajabhayya Punchhawale
8) The Dictionary of Hindustani classical music, Bimalkantha Roy Chaudhuri
9) Hindustani sangeet paddhati Kramika pustaka Maalikaa (1 to 7 volumes), Pt.Vishnu Narayan bhatkhande
10) Shree Sangit Kaladhar, Compositions of dhrupad, Dahyalal Shivram

Course Code	Course Title	Course Type	L	T	P	C	Hrs./ Wk.
B20BA6038	**Practical 6 – Theatre**	SC	1	0	2	3	5

Course Objectives

- Develop an appreciation and thorough commiseration of dramatic performance.
- Eliminate the fear of speaking in public and performance anxiety by enhancing self-confidence.
- Analyse and demonstrate the historical evolution of drama and its variants across the world.
- Mastering technical terminologies and executive measures.
- Dramatize a full-fledged play script.

Course Outcomes

- The completion of the course enables pupils to realize the historical implementations of social perception in Theatre performances.
- Be able to subdue the fear of expression in a social scenario.
- Be able to completely design, analyse and execute the performance of a play both theoretically and practically.

Course Content

Unit	Topics	Description
1	Play direction	1. The creative process of direction Selection of play 2. Basics of Play Direction
2	Movement and Blocking	1. Plotting of movement and blocking for the selected script 2. Activities to discover movements while directing a play
3	Stage Craft	1. Execution of Set designing Costume designing Lighting designing 2. Preparing the director's script
4	Student production	The execution of full-fledged Play

Reference Books:

1. Chris Hogget, *All About Theatre*
2. Katie Mitchell, *The Director's Craft*
3. Stanislavsky, *An Actor Prepares*
4. Erwin Piscator, *The Political Theatre*
5. Jercy Grotowski, *The Poor Theatre*
6. Augusto Boal, *Theatre of the Oppressed*
7. Walter Kerr, *Tragedy and Comedy*
8. Louis Catron, *The elements of playwriting*
9. Vincent Murphy, *Page to Stage – The Craft of Adaptation*
10. Mr. Bradley A Gerard, *Behind The Scenes*

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B19BA6030	**Literary Theory and Criticism**	**HC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

- To develop basic ideas of critical theory.
- To distinguish certain eminent schools of critical theory.
- To build a deep interest for critical theory among the learners.
- To enhanceinterpretation and application of the theory and its relevance.

Course Outcomes

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

. Interpret the various characteristic features of Feminist Criticism.

2. Demonstrate familiarity with Marxist Criticism.

3. Examine the major ideas related with Postcolonial theory and criticism.

4. Analyze the ways in which literary criticism can be applied in practice.

5. Apply learnt literary theories to analyse unseen texts.

6. Differentiate between critical opinions and theoretically charged arguments.

Course Contents

Unit – I: Feminist Criticism

1. Peter Barry: Feminist Criticism (from *Beginning Theory*)
2. Elaine Showalter: Towards a Feminist Poetics (Extract)
3. Susie Tharu and K. Lalitha: Introduction from *Women Writing: Volume I 600 B.C. to the Early Twentieth Century*

Unit – II: Marxist Criticism

1. Peter Barry: Marxist Criticism (from *Beginning Theory*)
2. Terry Eagleton: *Marxism and Literary Criticism* (Extract)
3. Howard, Jean E. and Scott Cutler Shershow (Ed): *Marxist Shakespeares* (Extract)

Unit – III: Postcolonialism

1. Hans Bertens: Extract from *Literary Theory: The Basics* (Postcolonial Criticism)
2. Edward Said: *Orientalism* (Introduction)
3. Leela Gandhi: *Postcolonial Theory – A Critical Introduction* (Extract)

Unit – I: Literary Criticism in Practice

1. Excerpts from *A Handbook of Critical Approaches to Literature* by Wilfred L Guerien et al)

Three readings of "To His Coy Mistress" – Traditional, Formalist, and Feminist

i) The Traditional Approaches in Practice – Traditional Approaches to Marvell's "To His Coy Mistress"
ii)The Formalist Approach – Word, Image, and Theme: Space-Time Metaphors in "To His Coy Mistress"
iii) Feminist Approaches – The Marble Vault: The Mistress in "To His Coy Mistress"
2. Robert Cross - A Postcolonial Reading of *Lagaan*

REFERENCES:

- Barry, Peter. *Beginning Theory*. Viva Books, 2010.
- Tharu, Susie and K. Lalitha. *Women Writing in India: Volume I 600 B.C. to the Early Twentieth Century*. OUP, 1997.
- Eagleton, Terry. *Marxism and Literary Criticism*. Routledge, 2002.
- Howard, Jean E. and Scott Cutler Shershow (Ed): *Marxist Shakespeares.* Routledge, 2000.
- Bertens, Hans. *Literary Theory: The Basics*. Routledge, 2013.
- Said, Edward W. *Orientalism.* Penguin India, 2001.
- Gandhi, Leela. *Postcolonial Theory – A Critical Introduction.* OUP, 1998.
- Guerien, Wilfred L (et al). *A Handbook of Critical Approaches to Literature*. OUP USA, 2005.

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B18BA6041	**Literatures from India – II**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

- To develop the idea of 'Unity in Diversity'through Literatures from India.
- To outline the socio- political and cultural issues of the cotemporary period through Literatures from India.
- To enhance the ability to critically address postcolonial issues.
- To infer genre of gender aspects through literature.

Course Outcomes

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

- Explain the various issues dealt by contemporary poets of India and their contribution towards 'decolonization'.
- Analyze the major features and their value in the fictional narratives of India.
- Demonstrate familiarity with concerns specific to India as presented in non-fictional works.
- Illustrate an understanding and participate in the contemporary socio-political happenings of India.

Course Contents

Unit – I: Poetry

1. Nissim Ezekiel – Goodbye Party for Miss Pushpa T.S.
2. KekiDaruwala – Migrations
3. Kabita Sinha – Eve Speaks to God
4. K. Satchidandan – Gandhi and the Poem
5. ChandrashekaraKambar – Fiend of Folktales
6. Jyoti Lanjewar - Mother

Unit – II: Short Fiction

1. O.V. Vijayan – After the Hanging
2. Githa Hariharan – The Remains of the Feast
3. TemsulaAo – The Jungle Major

Unit – III: Essays

1. Sudhir Kakar – Feminine Identity in India (Extract from *TheInner World)*
2. Rajeshwari Sunder Rajan - Language Debate(Extract from *Lie of the Land)*

Unit – IV: Drama/Novel

1. Mahesh Dattani – *Dance Like a Man*
2. Mahasweta Devi – *Mother of 1084*

REFERENCE:

- Dattani, Mahesh. *Dance Like a Man*. Penguin, 2006.
- Devi, Mahashweta. *Mother of 1084*. Penguin, 2014.
- Kakar, Sudhir. *The Inner World: A Psychoanalytic Study of Childhood and Society in India*. Oxford, 2012.
- Hariharan, Githa. *The Art of Dying*. Penguin, 1993.
- Vijayan, O.V. *After the Hanging and Other Short Stories*. Penguin, 1990.
- Ezekiel, Nissim. *Collected Poems*. Oxford, 2005.
- Daruwala, Keki. *Collected Poems 1970-2005*. Penguin, 2006.
- Satchidanandan, K. *While I Write: New and Selected Poems*. HarperCollins, 2011.
- Merhotra, A.K. *The Oxford Indian Anthology of Twelve Modern Indian Poets*. Oxford, 1997.
- Ao, Temsula. *These Hills Called Home: Stories from a War Zone*. Penguin India, 2005.

Course code	Course Title	Course Type	L	T	P	C	Hrs. / Wk.
B19BA6042	**Revisionist Writings**	**SC**	**4**	**0**	**0**	**4**	**4**

Course Objectives

- To acquaint the students with the genre of revisionist writings.

- To expose the students to the reinterpretation of Indian epics.
- To introduce the students to the contemporary retellings and associative myths of the *Ramayana*and *the Mahabharata*.
- To familiarize the students to the contemporary revision of myths and its connotation.

Course Outcomes

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

1. Develop an insight into the growing body of revisionist literature.
2. Demonstrate familiarity with the various retellings of the two great Indian epics, the*Ramayana* and the *Mahabharata*.
3. Outline the major concerns of the contemporary revision of the *Ramayana*the*Mahabharata*.
4. Demonstrate restructuring of Indian myths and mythologies and their relevance.
5. Prepare re-visionist texts of their own
6. Apply literary theories to analyse select revisionist texts

Course Contents

Unit – I: Introduction

1. A.K. Ramanujan: Three Hundred *Ramayanas*: Five Examples and Three Thoughts on Translation

2. Paula Richman: Hundred *Ramayanas*

Unit – II: Retellings of *The Ramayana*&*The Mahabharata*

1. Sreekantan Nair & Sarah Joseph: *Retelling the Ramayana - Voices from Kerala* (Introduction by Satchidanandan)

2. John Brockington: Introduction to *Yuganta: The End of an Epoch*

3. Shashi Deshpande: *The Stone Women* (Extracts)

Unit – III: Contemporary Retellings of *The Ramayana*

1. DevduttPattanaik: *Sita– An Illustrated Reading of the Ramayana* (Extracts)
2. Kavita Kane: *Lanka's Princess* (Extracts)
3. Volga: The Reunion (from *Liberation of Sita*)

Unit – IV: Contemporary Retellings of*The Mahabharata*

1. Mahasweta Devi: *After Kurukshetra* (Kunti and the Nishadin)
2. V. Raghunathan: *Duryodhana* (Extracts)
3. SharathKomarraju: *The Rise of Hastinapur* (Extracts)

REFERENCE:

- Dharwadker, Vinay (ed). *Collected Essays of A.K. Ramanujan*. OUP, 2004.
- Richman, Paula. *Many Ramayanas: The Diversity of a Narrative Tradition in South Asia*. OUP India, 1997.
- Richman, Paula. *Questioning Ramayanas: A South Asian Tradition*. OUP, 2003.
- Nair, Sreekantan& Sarah Joseph. *Retelling the Ramayana - Voices from Kerala.* OUP, 2005.

- Karve, Irawati. *Yuganta: The End of an Epoch*. Orient Blackswan, 2007.
- Deshpande, Shashi. *The Stone Women*. Writers Workshop, 2000.
- Pattanaik, Devdutt. *Sita: An Illustrated Retelling of Ramayana*. Penguin, 2013.
- Kane, Kavita. *Lanka's Princess*. Rupa Publications, 2016.
- Volga. *The Liberation of Sita*. HarperPerennial, 2016.
- Devi, Mahasweta. *After Kurukshetra*. Seagull Books, 2010.
- Raghunathan, V. *Duryodhana*. HarperCollins, 2014.
- Komarraju, Sharath. *The Rise of Hastinapur*. HarperCollins India, 2015.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA6050	**Indigenous Psychology- An Indian Perspective--II**	**SC**	**2**	**1**	**0**	**3**	**3**

Course Objectives:

1. To understand the basic aspects of an Indian Psychology and how its differ from western perspectives.
2. To outline the overview of general steps involved in test construction, theoretical basis of test construction.
3. To understand item analysis, item discrimination in constructing the test.
4. To outline the application of tests in different fields such as clinical, organizational, educational, counselling, military etc.

Course Outcomes:

With the successful completion of the course the students will be able to

1. Understand an Indian Psychologicalconcepts and compares and contrasts with Western Psychology
2. Orient to the basic concepts of Psychology in Indian Psychology perspective
3. Explains the nature of Self and Consciousness in Indian Perspective.
4. Elaborate on the concept of personality, Emotion and Cognition in Indian Perspective.

Course Content

Unit-I: Roots and General Concepts of Indian Psychology

a) Psychological concepts of Vedas, Vedantas, Upanishads, Bhagavadgita, Samskaras.
b) The Beginning, Ṛtam: Truth and Order, Pluralism and the Notion of Multiple Perspectives, States of Consciousness and Types of Knowledge, Relationship Between Humans and Nature,
c) The Concept and the Doctrine of Karma,

d) The Concept of Dharma and Its Role,

e) Implications of Dharma and Karma for Psychology.

Unit-II: Indian Perspective ofMind-Body Complex

a) Mind in Indian Psychology, Common Thread, Indriyas and the Sensory-Motor Apparatus, A Model of the Mind–Body Complex.

b) **Meditation and Applied Yoga:** What Is Meditation? Effects of Meditation, Therapeutic Applications, Karma Yoga as Means to Liberation, Karma Yoga and Contemporary Psychology, The Various Pathways to Mokṣa

Unit-III: Indian Perspective of Self and Personality

a) Self, Person, and Personality: Theories of the "SELF" in Indian Thought,

b) The Concept of Anattā and the Denial of the Self in Buddhism,

c) Assertion of Ātman in Nyāya–Vaiśeṣika,

d) The Affirmation of the Self in Vedānta, Viśiṣṭādvaita of Rāmānuja,

e) Sāṁkhya-Yoga Conception of the Self,

f) Jaina Conception of the Self, Some Western Parallels of the Concept of Jīva,

g) Svabhāva, Prakṛti, and Personality: Three Types of Personality in the Bhagavad Gītā,

h) Constitution (Prakṛti) and Personality According to Āyurveda,

i) Overview of Personality Typologies from the Indian Tradition.

Unit-IV: Spirituality in India: The Ever Growing Banyan Tree

a. Historical Analysis

b. Case Analysis

c. Ramakrishna: One God, Different Paths

d. Maharishi Mahesh Yogi: Bridging Science and Spirituality with TM

e. Osho Rajneesh: Bridging Sex and *samAdhi*

f. Implications for Global Psychology

References:

Adair, John. G.(2002).How International is International Psychology? International Journal of Psychology,37, 160-170.

Auluck, S. (2002).Self and identity.In

G. Misra, and A. K. Mohanty (eds.), Perspectives on indigenous psychology, p. 374-398. New Delhi: Concept Publishing Company.

Chiu, C., & Hong, Y. (2006).Social Psychology of Culture. New York: Psychology Press.

Kim,U.,Shu,K.,Yang,K.S.,&Hwang, K.K.(2006).Indigenous and Cultural Psychology: Understanding People in Context.

Springer. Jain, U. (2002). An Indian perspective on emotions.In G. Misra, and A. K. Mohanty (eds.), Perspectives on indigenous psychology, p. 281-291. New Delhi: Concept Publishing Company. 25

Mathijs, Cornelissen, R,M., Misra,G.&Verma, Suneet.(2011). Foundation of Indian Psychology, Vol 1,Theories and Concepts. New Delhi: Pearson

Misra, G., &Gergen, K. J. (2002).On the place of culture in psychological science. . In G. Misra, and A. K.Mohanty (eds.), Perspectives onindigenous psychology, p. 421-439. New Delhi: Concept Publishing Company.

Rao, K. R. (2011). Indian psychology: Implications and applications. In Cornelissen,

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Sinha, J. B. P. (2002). Towards indigenization of Psychology in India. . In G. Misra, and A. K. Mohanty (eds.), Perspectives on indigenous psychology, p. 440-457. New Delhi: Concept Publishing Company.

Smith, P.B., Bond, M. H., &Kagitcibasi, C. (2006). Understanding Social Psychology across cultures: Living and working in a changing world. London: Sage.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA6061	**Abnormal Psychology-II**	**HC**	**2**	**1**	**0**	**3**	**3**

Course Objectives

1. To learn about symptoms, causes, types and diagnosis of Bipolar Disorders.
2. To learn about symptoms, causes, types and diagnosis of Somatic symptom Disorders.

3. To learn about symptoms, causes, types and diagnosis of Schizophrenia Spectrum Disorders.
4. To learn about symptoms, causes, types and diagnosis of Bipolar Disorders.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Discovers the clinical features, causes, types and causes of Bipolar Disorders.
2. Discovers the clinical features, causes, types and causes of Somatic symptom Disorders
3. Discovers the clinical features, causes, types and causes of Schizophrenia Spectrum Disorders
4. Discovers the clinical features, causes, types and causes of Bipolar Disorders.

Course Contents

Unit-I:Bipolar Disorders
Bipolar I Disorder: Current or most recent episode manic, Current or most recent episode hypomanic, Current or most recent episode depressed, current or most recent episode unspecified- Symptoms and causes
Bipolar II Disorder-mild, moderate, severe- Symptoms and causes
Cyclothymic Disorder- Symptoms and causes

Unit-II: Somatic Symptom Disorders
Somatic Symptom Disorder, Illness Anxiety Disorder, Conversion Disorder, Factitious Disorder-symptoms and causes.

Unit-III: Schizophrenia Spectrum Disorder.
Schizotypal (personality) Disorder, Brief psychotic disorder, Schizophreniform Disorder, Schizophrenia, Schizoaffective Disorder-bipolar type, depressive type, Catatonic Disorder-symptoms and causes.

Unit-IV: Personality Disorders
Cluster A Personality Disorders: Paranoid Personality Disorder, Schizoid Personality Disorder, and Schizotypal Personality Disorder.
Cluster B Personality Disorders-Antisocial Personality Disorder, Borderline Personality Disorder, Histrionic Personality Disorder, Narcissistic Personality Disorder.
Cluster C Personality disorders-Avoidant Personality Disorder, Dependent Personality Disorder, and Obsessive –Compulsive Personality Disorder. Clinical symptoms and causes.

Reference Books:

1. Alloy, L.B., Riskind, JH., and Manos,M.J. (2006). Abnormal Psychology – Current Perspectives. 9th Edition. New Delhi: Tata McGraw- Hill Edition.

2. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed., text revision). Washington, DC: Author.
3. Barlow,D.H. and Durand,M.V. (2000). Abnormal Psychology. 2nd Edition. New Delhi: Thomson Publication.
4. Carson, R.C., Butcher, J.N and Mineka ,S.(2004). Abnormal psychology. 13th Edition. New Delhi: Pearson Education.
5. Davidson and Neal (1996). Abnormal psychology. Revised 6th Edition, John Wiley Sons World Health Organization. (2008). ICD-10: International statistical classification of diseases and related health problems (10th Rev. ed.). New York, NY: Author.

Practicals -VII:

Statistics: Non-parametric tests for significant difference: Mann-Whitney U test and Wilcoxon signed rank test.

1. Beck's Depression Inventory.
2. Beck's Anxiety Inventory
3. General Health Questionnaire.
4. 16 Personality factors.
5. Multiphasic Personality Questionnaire.

Course Code	Course Tittle	Course Type	L	T	P	C	Hrs./Wk.
B18BA6062	**Health Psychology-II**	**SC**	**2**	**1**	**0**	**3**	**3**

Course Objectives

1. To learn about causes and consequences of stress.
2. To learn about strategies to cope with various stressors.
3. To understand the psychological contribution in onset, treatment of life style disorders.
4. To undersand the psychological correlates of psychoneuroimmunoloigcal and immunology disorders.

Course Outcomes

Upon successful completion of this course, students will be able to:

1. Demonstrate understanding the sources of stress.
2. Demonstrates skills of coping with stress.
3. Evaluate the role of Psychological factors in the onset, worsening, treatment of various life-style disorders.
4. Explores the ways in which quality of life and logivity can be enhances among people suffering from various Life-style disordersEvaluate the role of Psychological factors in the onset, worsening, treatment of various Psychoneuroimmunological and immune related disorders.

Course Contents

Unit-I: Stress

a. Stress: Definition, Stressor, Appraisal of Stressors.
b. Origins of the Study of Stress: Fight or Flight, Selye's General Adaptation Syndrome, Tend-and-Befriend, Stress and Illness
c. The Physiology of Stress: Effects of Long-Term Stress, Individual Differences in Stress Reactivity, Physiological Recovery, Allostatic Load.
d. Stressful Events: Dimensions of Stressful Events, Perception of Stress, adaptation to ongoing stress.
e. Studying Stress: Studying Stress in the Laboratory, Inducing Disease, Stressful Life Events, Daily Stress.
f. Sources of Chronic Stress: Effects of Early Stressful Life Experiences, Chronic Stressful Conditions, Stress in the Workplace, Some Solutions to Workplace Stressors, Combining Work and Family Roles

Unit-II: Coping Strategies

Coping with Stress and Resilience: Personality and Coping, Psychosocial Resources, Resilience, Coping styles, Problem-Focused and Emotional-Focused Coping.

Coping and External Resources

Coping Outcomes

Coping Interventions: Mindfulness Meditation and Acceptance/Commitment, Therapy, Expressive Writing, Self-Affirmation, Relaxation Training.

Social Support: What is Social Support, Effects of Social Support on Illness, Biopsychosocial pathways, Moderation of Stress by Social Support, Effective kinds of Support, Enhancing Social Support.

Unit-III: Life-style Disorders

CHD: Nature of CHD, Stress and CHD, Women and CHD, Personality, Cardiovascular Reactivity, and CHD, Depression and CHD, Other Psychosocial Risk Factors and CHD, Management of Heart Disease.

Hypertension: measurement, causes, treatment, stress and personality, The Hidden disease

Stroke: risk factors, consequences, rehabilitative Interventions.

Type II Diabetes: Health Implications of Diabetes, The Management of Diabetes.

Unit-IV: Psychoneuroimmunology and Immune related disorders.

Psychoneuroimmunology: the immune system, assessing immune functioning, stress and immune functioning, negative affect and immune functioning, stress, immune functioning and interpersonal relationships, coping and immune functioning, intervention to improve immune functioning.

Cancer: difficulty in studying it, predictors, psychosocial factors and cancer, adjusting to cancer, psychosocial issues and cancer, finding meaning in cancer, interventions, therapies with cancer patients.

Type I Diabetes: Problems of Adolescent Diabetics.

Reference Books:

1. Jane Ogden (2010) Health Psychology – a text book, 4th edition, Tata McGraw Hill Education Private Limited, New Delhi.
2. Shelley E. Taylor (2006) Health Psychology – 6th Edition, Tata McGraw Hill Education Private Limited, New Delhi.
3. Steve R. Baumgardner & Marie K. Crothers (2009) Positive Psychology, Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
4. M. Robin Dimatteo& Leslie R. Martin (2002) Health Psychology –, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.
5. Alan Carr- Positive Psychology, Dorling Kindersley (India) Pvt. Ltd, licensees of Pearson Education in South Asia.

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