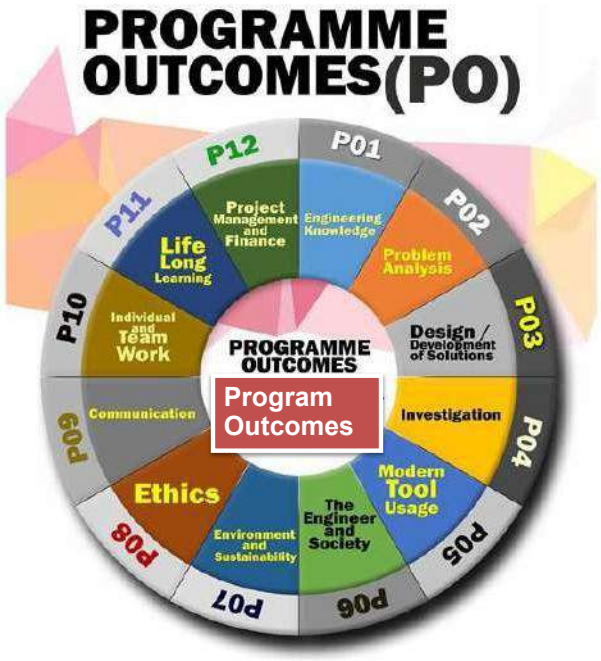
PROGRAMME OUTCOME, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES OF ALL DEPARTMENTS– 2020-21(CRITERIA - 2)

Department of Civil Engineering

2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:



Program Outcomes (POs)
At the end of the B.E program, students are expected to have developed the following outcomes.
PO1-Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems related to CE
PO-2Problem Analysis: Identify, formulate, review literature, and analyze complex engineering problems related to CE and reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
PO3-Design/Development of Solutions: Design solutions for complex engineering problems related to CE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4-Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions
PO5-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 and understanding of the limitations
PO6-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 CE professional engineering practice
PO7-Environment and Sustainability: Understand the impact of the CE professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development
PO8-Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO9-Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings
PO10-Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11-Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environment
PO12-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 (PSOs):

Engineering Graduates will be able to:

PSO-1:	**Competence in Civil Engineering:** Educating students with fundamental mathematical, scientific, and Engineering knowledge to have a significant and positive long-term impact on the field of civil engineering.
PSO-2:	**Usage of Cutting Edge Technology:** Inspiring students and preparing them for successful professional careers using appropriate techniques, resources and modern attitudes and modeling to complex engineering activities with practical knowledge and research exposure.
PSO-3:	**Continuous improvement:** Motivate students in learning to learn and the ability to keep learning for a lifetime to increase their professionalism, update and deepen their knowledge through the development of the profession.

Course outcomes (COs)

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: STRENGTH OF MATERIALS – 18CV32	
CO1	To evaluate the basic concepts of the stresses and strains for different materials and strength of structural elements
CO2	To evaluate the development of internal forces and resistance mechanism for one dimensional and two-dimensional structural elements
CO3	To analyse different internal forces and stresses induced due to representative loads on structural elements
CO4	To evaluate slope and deflections of beams
CO5	To evaluate the behaviour of torsion members, columns and struts

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: – FLUIDS MECHANICS - 18CV33	
CO1	Possess a sound knowledge of fundamental properties of fluids and fluid Continuum
CO2	Compute and solve problems on hydrostatics, including practical applications
CO3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
CO4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
CO5	Compute the discharge through pipes and over notches and weirs

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: – BUILDING MATERIALS AND CONSTRUCTION – 18CV34	
CO1	Select suitable materials for buildings and adopt suitable construction techniques
CO2	Decide suitable type of foundation based on soil parameters
CO3	Supervise the construction of different building elements based on suitability
CO4	Exhibit the knowledge of building finishes and form work requirements

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: BASIC SURVEYING – 18CV35	
CO1	Posses a sound knowledge of fundamental principles Geodetics
CO2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems
CO3	Capture geodetic data to process and perform analysis for survey problems
CO4	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ENGINEERING GEOLOGY – 18CV36	
CO1	Apply geological knowledge in different civil engineering practice
CO2	Students will acquire knowledge on durability and competence of foundation rocks, and confidence enough to use the best building materials
CO3	Civil Engineers are competent enough for the safety, stability, economy and life of the structures that they construct
CO4	Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems
CO5	Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering construction

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: COMPUTER AIDED BUILDING PLANNING AND DRAWING LABORATORY – 18CVL37	
CO1	Prepare, read and interpret the drawings in a professional set up
CO2	Know the procedures of submission of drawings and Develop working and submission drawings for building
CO3	Plan and design a residential or public building as per the given requirements

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: BUILDING MATERIALS TESTING LABORATORY– 18CVL38	
CO1	Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion
CO2	Identify, formulate and solve engineering problems of structural elements subjected to flexure
CO3	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: Analysis of Determinate Structures – 18CV42	
CO1	Identify different forms of structural systems
CO2	Construct ILD and analyse the beams and trusses subjected to moving load
CO3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and beams
CO4	Determine the stress resultants in arches and cables

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: Applied Hydraulics - 18CV43	
CO1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
CO2	Design the open channels of various cross sections including economical channel sections
CO3	Apply Energy concepts to flow in open channel sections, Calculate Energy Dissipation
CO4	Compute water surface profiles at different conditions
CO5	Design turbines for the given data, and to know their operation characteristics under different operating conditions

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: Concrete Technology - 18CV44	
CO1	Relate material characteristics and their influence on microstructure of concrete.
CO2	Distinguish concrete behavior based on its fresh and hardened properties.

CO3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
CO4	Adopt suitable concreting methods to place the concrete based on requirement
CO5	Select a suitable type of concrete based on specific application

Year / SEM: 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: ADVANCED SURVEYING - 18CV45	
CO1	Apply the knowledge of geometric principles to arrive at surveying problems
CO2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems
CO3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instrument
CO4	Design and implement the different types of curves for deviating type of alignments

Year / SEM: 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: WATER SUPPLY AND TREATMENT ENGINEERING - 18CV46	
CO1	Estimate average and peak water demand for a community
CO2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community
CO3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system
CO4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards

Year / SEM: 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: ENGINEERING GEOLOGY LABORATORY - 18CVL47	
CO1	The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices
CO2	The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects
CO3	The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods
CO4	The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the lineaments and other structural features for the given area

CO5	The students will be able to identify the different structures in the field

Year / SEM: 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY - 18CVL48	
CO1	Properties of fluids and the use of various instruments for fluid flow measurement
CO2	Working of hydraulic machines under various conditions of working and their characteristics

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Design of RC Structural Elements – 17CV51	
CO1	understand the design philosophy and principles
CO2	solve engineering problems of RC elements subjected to flexure, shear and torsion
CO3	demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings
CO4	owns professional and ethical responsibility

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Analysis of Indeterminate Structures – 17CV52	
CO1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
CO2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
CO3	Construct the bending moment diagram for beams and frames by Kani's method.
CO4	Construct the bending moment diagram for beams and frames using flexibility method
CO5	Analyze the beams and indeterminate frames by system stiffness method.
Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Applied Geotechnical Engineering – 17CV53	
CO1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects

CO2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
CO3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
CO4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
CO5	Capable of estimating load carrying capacity of single and group of piles

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Computer Aided Building Planning and Drawing – 17CV54	
CO1	Gain a broad understanding of planning and designing of buildings
CO2	Prepare, read and interpret the drawings in a professional set up.
CO3	Know the procedures of submission of drawings and Develop working and submission drawings for building
CO4	Plan and design a residential or public building as per the given requirements

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Air Pollution and Control – 17CV551	
CO1	Identify the major sources of air pollution and understand their effects on health and environment.
CO2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
CO3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
CO4	Choose and design control techniques for particulate and gaseous emissions.

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: OCCUPATIONAL HEALTH AND SAFETY – 17CV564	
CO1	Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others
CO2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard
CO3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation

CO4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors
CO5	Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Geotechnical Engineering Lab – 17CVL57	
CO1	Physical and index properties of the soil
CO2	Classify based on index properties and field identification
CO3	To determine OMC and MDD, plan and assess field compaction program
CO4	Shear strength and consolidation parameters to assess strength and deformation characteristics
CO5	In-situ shear strength characteristics (SPT- Demonstration)

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Course Name: Concrete and Highway Materials Laboratory – 17CVL58	
CO1	Conduct appropriate laboratory experiments and interpret the results
CO2	Determine the quality and suitability of cement
CO3	Design appropriate concrete mix
CO4	Determine strength and quality of concrete
CO5	Test the road aggregates and bitumen for their suitability as road material.
CO6	Test the soil for its suitability as sub grade soil for pavements.

Year / SEM: 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: Construction Management and Entrepreneurship – 17CV61	
CO1	Understand the construction management process.
CO2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
CO3	Fulfill the professional obligations effectively with global outlook

Year / SEM: 3rd year / 6th sem	**Year of Study : 2020-21**

Course Name: Design of Steel Structural Elements – 17CV62	
CO1	Possess a knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behavior of structural steel
CO2	Understand the Concept of Bolted and Welded connections.
CO3	Understand the Concept of Design of compression members, built-up columns and columns splices.
CO4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
CO5	Understand the Concept of Design of laterally supported and un-supported steel beams.

Year / SEM: 3rd year / 6th sem	Year of Study : 2020-21
Course Name: Highway Engineering - 17CV63	
CO1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
CO2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
CO3	Design road geometrics, structural components of pavement and drainage.
CO4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

Year / SEM: 3rd year / 6th sem	Year of Study : 2020-21
Course Name: Water Supply and Treatment Engineering - 17CV64	
CO1	Estimate average and peak water demand for a community.
CO2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
CO3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
CO4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.

Year / SEM: 3rd year / 6th sem	Year of Study : 2020-21
Course Name: Solid Waste Management - 17CV651	
CO1	Analyze existing solid waste management system and to identify their drawbacks

CO2	Evaluate different elements of solid waste management system
CO3	Suggest suitable scientific methods for solid waste management elements
CO4	Design suitable processing system and evaluate disposal sites.

Year / SEM: 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: Water Resources Management - 17CV661	
CO1	Assess the potential of groundwater and surface water resources
CO2	Address the issues related to planning and management of water resources
CO3	Know how to implement IWRM in different regions
CO4	Understand the legal issues of water policy.
CO5	Select the method for water harvesting based on the area

Year / SEM: 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: Software Application Lab - 17CVL67	
CO1	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work

Year / SEM: 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: Extensive Survey Project /Camp – 17CVP68	
CO1	Apply Surveying knowledge and tools effectively for the projects
CO2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
CO3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.
CO4	Professional etiquettes at workplace, meeting and general
CO5	Establishing trust-based relationships in teams & organizational environment

CO6	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques

Year / SEM: 3rd year / 7th sem	**Year of Study : 2020-21**
Course Name: Municipal and Industrial Waste Water Engineering – 15CV71	
CO1	Acquires capability to design sewer and Sewerage treatment plant.
CO2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
CO3	Identify waste streams and design the industrial waste water treatment plant.
CO4	Manage sewage and industrial effluent issues.

Year / SEM: 3rd year / 7th sem	**Year of Study : 2020-21**
Course Name: Design of RCC and Steel Structures – 15CV72	
CO1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
CO2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.

Year / SEM: 3rd year / 7th sem	**Year of Study : 2020-21**
Course Name: Hydrology and Irrigation Engineering – 15CV73	
CO1	Understand the importance of hydrology and its components.
CO2	Measure precipitation and analyze the data and analyze the losses in precipitation.
CO3	Estimate runoff and develop unit hydrographs.
CO4	Find the benefits and ill-effects of irrigation.
CO5	Find the quantity of irrigation water and frequency of irrigation for various crops.
CO6	Find the canal capacity, design the canal and compute the reservoir capacity.

Year / SEM : 3rd year / 7th sem	**Year of Study : 2018-19**
Course Name: Ground Water & Hydraulics – 15CV742	
CO1	Find the characteristics of aquifers.
CO2	Estimate the quantity of ground water by various methods.
CO3	Locate the zones of ground water resources.
CO4	Select particular type of well and augment the ground water storage.

Year / SEM: 3rd year / 7th sem	Year of Study : 2020-21
Course Name: Rehabilitation and Retrofitting of Structures – 15CV753	
CO1	Understand the cause of deterioration of concrete structures.
CO2	Able to assess the damage for different type of structures
CO3	Summarize the principles of repair and rehabilitation of structures
CO4	Recognize ideal material for different repair and retrofitting technique

Year / SEM: 3rd year / 7th sem	Year of Study : 2020-21
Course Name: Environmental Engineering Laboratory – 15CVL76	
CO1	Acquire capability to conduct experiments and estimate the concentration of different parameters.
CO2	Compare the result with standards and discuss based on the purpose of analysis.
CO3	Determine type of treatment, degree of treatment for water and waste water.
CO4	Identify the parameter to be analyzed for the student project work in environmental stream

Year / SEM: 3rd year / 7th sem	Year of Study : 2020-21
Course Name: Computer Aided Detailing of Structures – 15CVL77	
CO1	Prepare detailed working drawings

Year / SEM: 4th year / 8th sem	Year of Study : 2020-21
Course Name: Quantity Surveying and Contracts Management – 17CV81	
CO1	Prepare detailed and abstract estimates for roads and building
CO2	Prepare valuation reports of buildings
CO3	Interpret Contract document's of domestic and international construction works

Year / SEM: 4th year / 8th sem	Year of Study : 2020-21
Course Name: Design of Pre Stressed Concrete Elements – 15CV82	
CO1	Understand the requirement of PSC members for present scenario
CO2	Analyze the stresses encountered in PSC element during transfer and at working
CO3	Understand the effectiveness of the design of PSC after studying losses
CO4	Capable of analyzing the PSC element and finding its efficiency
CO5	Design PSC beam for different requirements

Year / SEM: 4th year / 8th sem	Year of Study : 2020-21
Course Name: Hydraulic Structures – 15CV832	
CO1	Check the stability of gravity dams and design the dam.
CO2	Estimate the quantity of seepage through earth dams
CO3	Design spillways and aprons for various diversion works
CO4	Select particular type of canal regulation work for canal network

Department of Computer Science and Engineering

2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:

PO1-Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2-Apply mathematical foundations, algorithmic principles, and computer Science theory in the modelling and design of computer based systems in a way that demonstrates comprehension of tradeoffs involved in design choices.

PO3-Analyze a problem, and identify and define the computing requirements appropriate to its solution

PO4-Design and development principles in the construction of software systems of varying complexity.

PO5-Design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;

PO6-Use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;

PO7-Work effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary environment.

PO8-Demonstrate knowledge of contemporary issues and understand professional, ethical, legal, security

and social issues and responsibilities;

PO9-Analyze the local and global impact of computing on individuals, organizations, and society;

PO10-Demonstrate knowledge and understanding of the engineering and management principles including financial implications and apply these to his/her work, as a member and leader in a team, and to manage project work as part of a multidisciplinary team.

PO11-Communicate effectively in both verbal and written forms

PO12-Recognize the need for, and be motivated to engage in life-long learning and continuing professional development.

PROGRAM SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

PSO-1:	Understand, apply and demonstrate advanced technical skills in problem solving and leadership, as well as an understanding of system integration and the practical technological problems of end users.
PSO-2:	An ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as other socio-economic constraints.

Course Outcomes:

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: --DATA STRUCTURES AND APPLICATIONS-18CS32	
CO1	Use different types of data structures, operations and algorithms
CO2	Apply searching and sorting operations on files
CO3	Use stack, Queue, Lists, Trees and Graphs in problem solving
CO4	Implement all data structures in a high-level language for problem solving.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ANALOG AND DIGITAL ELECTRONICS – 18CS33	
CO1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
CO2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
CO3	Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods
CO4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
CO5	Develop simple HDL programs

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: COMPUTER ORGANIZATION – 18CS34	
CO1	Explain the basic organization of a computer system.
CO2	Demonstrate functioning of different sub systems, such as processor, Input/output,andmemory.
CO3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
CO4	Design and analyse simple arithmetic and logical units.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: SOFTWARE ENGINEERING– **18CS35**	
CO1	Design a software system, component, or process to meet desired needs within realistic constraints.
CO2	Assess professional and ethical responsibility
CO3	Function on multi-disciplinary teams
CO4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CO5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: DISCRETE MATHEMATICAL STRUCTURES – 18CS36	
CO1	Use propositional and predicate logic in knowledge representation and truth verification..
CO2	Demonstrate the application of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Application of different mathematical proofs techniques in proving theorems in the courses..
CO5	Compare graphs, trees and their applications.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ANALOG AND DIGITAL ELECTRONICS LABORATORY – 18CSL37	
CO1	Use appropriate design equations / methods to design the given circuit..
CO2	Examine and verify the design of both analog and digital circuits using simulators.
CO3	Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.
CO4	Compile a laboratory journal which includes; aim, tool/instruments/software/components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: DATA STRUCTURES LABORATORY – 18CSL38	
CO1	Analyze and Compare various linear and non-linear data structures
CO2	Code, debug and demonstrate the working nature of different types of data structures and their applications
CO3	Implement, analyze and evaluate the searching and sorting algorithms
CO4	Choose the appropriate data structure for solving real world problems
Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: DESIGN AND ANALYSIS OF ALGORITHMS – 18CS42	
CO1	Describe computational solution to well known problems like searching, sorting etc.
CO2	Estimate the computational complexity of different algorithms.
CO3	Devise an algorithm using appropriate design strategies for problem solving.

Year / SEM : 2nd year / 4th sem	Year of Study : 2020-21
Course Name: OPERATING SYSTEMS – 18CS43	
CO1	Demonstrate need for OS and different types of OS
CO2	Apply suitable techniques for management of different resources
CO3	Use processor, memory, storage and file system commands.
CO4	Realize the different concepts of OS in platform of usage through case studies

Year / SEM : 2nd year / 4th sem	Year of Study : 2020-21
Course Name: MICROCONTROLLER AND EMBEDDED SYSTEMS – 18CS44	
CO1	Describe the architectural features and instructions of ARM microcontroller
CO2	Apply the knowledge gained for Programming ARM for different applications.
CO3	Interface external devices and I/O with ARM microcontroller.
CO4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO5	Develop the hardware /software co-design and firmware design approaches.

CO6	Demonstrate the need of real time operating system for embedded system applications

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: OBJECT ORIENTED CONCEPTS – 18CS45	
CO1	Explain the object-oriented concepts and JAVA.
CO2	Develop computer programs to solve real world problems in Java.
CO3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: DATA COMMUNICATION – 18CS46	
CO1	Explain the various components of data communication.
CO2	Explain the fundamentals of digital communication and switching.
CO3	Compare and contrast data link layer protocols.
CO4	Summarize IEEE 802.xx standards

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: DESIGN AND ANALYSIS OF ALGORITHM LABORATORY– 18CSL47	
CO1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
CO2	Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
CO3	Analyze and compare the performance of algorithms using language features..
CO4	Apply and implement learned algorithm design techniques and data structuresto solve real-world problems.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: MICROCONTROLLER AND EMBEDDED SYSTEMS LABORATORY – 18CSL48	
CO1	Develop and test program using ARM7TDMI/LPC2148.
CO2	Conduct the following experiments on an ARM7TDMI/LPC2148evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4tool/compiler.

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY – 17CS51	
CO1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
CO2	Utilize the resources available effectively through ERP
CO3	Make use of IPRs and institutional support in entrepreneurship

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: COMPUTER NETWORKS – 17CS52	
CO1	Explain principles of application layer protocols
CO2	Outline transport layer services and infer UDP and TCP protocols
CO3	Classify routers, IP and Routing Algorithms in network layer
CO4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
CO5	Describe Multimedia Networking and Network Management

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: DATABASE MANAGEMENT SYSTEM – 17CS53	
CO1	Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.
CO2	Use Structured Query Language (SQL) for database manipulation.
CO3	Design and build simple database systems
CO4	Develop application to interact with databases.

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: AUTOMATA THEORY AND COMPUTABILITY – 17CS54	
CO1	Tell the core concepts in automata theory and Theory of Computation
CO2	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
CO3	Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
CO4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness
CO5	Classify a problem with respect to different models of Computation.

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: ADVANCED JAVA AND J2EE– 17CS553	
CO1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
CO2	Build client-server applications and TCP/IP socket programs
CO3	Illustrate database access and details for managing information using the JDBC API
CO4	Describe how servlets fit into Java-based web application architecture
CO5	Develop reusable software components using Java Beans

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: ARTIFICIAL INTELLIGENCE– 17CS562	
CO1	Identify the AI based problems.
CO2	Apply techniques to solve the AI problems
CO3	Define learning and explain various learning techniques
CO4	Discuss expert systems

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: COMPUTER NETWORK LABORATORY– 17CSL57	
CO1	Analyze and Compare various networking protocols.
CO2	Demonstrate the working of different concepts of networking.
CO3	Implement, analyze and evaluate networking protocols in NS2 / NS3

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: DBMS LABORATORY WITH MINI PROJECT – 17CSL58	
CO1	Use Structured Query Language (SQL) for database Creation and manipulation
CO2	Demonstrate the working of different concepts of DBMS
CO3	Implement and test the project developed for an application.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW – 17CS61	
CO1	Discuss cryptography and its need to various applications
CO2	Design and develop simple cryptography algorithms
CO3	Understand cyber security and need cyber Law

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: COMPUTER GRAPHICS AND VISUALIZATION – 17CS62	
CO1	Design and implement algorithms for 2D graphics primitives and attributes.
CO2	Illustrate Geometric transformations on both 2D and 3D objects.
CO3	Understand the concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
CO4	Discussabout suitable hardware and software for developing graphics packages using OpenGL.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: SYSTEM SOFTWARE AND COMPILER DESIGN-17CS63	
CO1	Illustrate system software such as assemblers, loaders, linkers and macroprocessors
CO2	Design and develop lexical analyzers, parsers and code generators
CO3	Discuss about lex and yacc tools for implementing different concepts of system software

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: OPERATING SYSTEMS – 17CS64	
CO1	Demonstrate need for OS and different types of OS
CO2	Discuss suitable techniques for management of different resources
CO3	Illustrate processor, memory, storage and file system commands
CO4	Explain the different concepts of OS in platform of usage through case studies

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: OPERATION RESEARCH– 17CS653	
CO1	Explain optimization techniques for various problems.
CO2	Understand the given problem as transportation and assignment problem and solve.
CO3	Illustrate game theory for decision support system.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: PYTHON APPLICATION PROGRAMMING– 17CS664	
CO1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO2	Demonstrate proficiency in handling Strings and File Systems.
CO3	Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.

CO5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python

Year / SEM : 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY – 17CSL67	
CO1	Implement and demonstrate Lexer's and Parser's
CO2	Implement different algorithms required for management, scheduling, allocation and communication used in operating system..

Year / SEM : 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT – 17CSL68	
CO1	Apply the concepts of computer graphics
CO2	Implement computer graphics applications using OpenGL
CO3	Implement real world problems using OpenGL

Year / SEM : 4th year / 7th sem	**Year of Study : 2020-21**
Course Name: WEB TECHNOLOGY AND ITS APPLICATIONS – 15CS71	
CO1	Adapt HTML and CSS syntax and semantics to build web pages.
CO2	Construct and visually format tables and forms using HTML and CSS
CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO4	Appraise the principles of object oriented development using PHP
CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: ADVANCED COMPUTER ARCHITECTURES– 15CS72	
CO1	Explain the concepts of parallel computing and hardware technologies
CO2	Compare and contrast the parallel architectures
CO3	Illustrate parallel programming concepts

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: MACHINE LEARNING– 15CS73	
CO1	Identify the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
CO2	Explain theory of probability and statistics related to machine learning
CO3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: UNIX SYSTEM PROGRAMMING– 15CS744	
CO1	Ability to understand and reason out the working of Unix Systems
CO2	Build an application/service over a Unix system.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: STORAGE AREA NETWORKS– 15CS754	
CO1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
CO2	Explain components and the implementation of NAS
CO3	Describe CAS architecture and types of archives and forms of virtualization
CO4	Ilustrate the storage infrastructure and management activities

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: MACHINE LEARNING LABORATORY– 15CSL76	
CO1	Understand the implementation procedures for the machine learning algorithms.
CO2	Design Java/Python programs for various Learning algorithms.
CO3	Apply appropriate data sets to the Machine Learning algorithms.
CO4	Identify and apply Machine Learning algorithms to solve real world problems.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: WEB TECHNOLOGY LABORATORY WITH MINI PROJECT– 15CSL77	
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
CO2	Have a good understanding of Web Application Terminologies, Internet Tools other web services.
CO3	Learn how to link and publish web sites

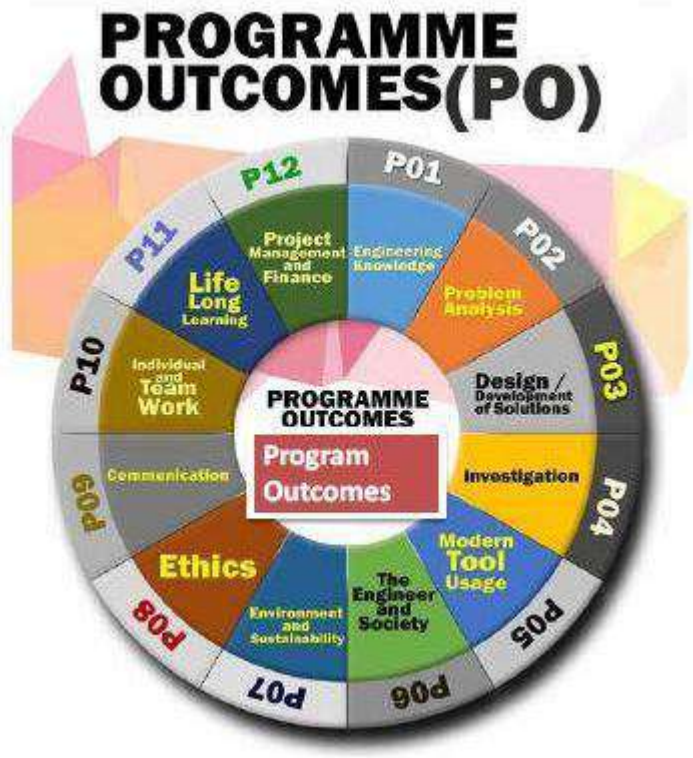
Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: IOT TECHNOLOGY– 15CS81	
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models
CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CO3	Appraise the role of IoT protocols for efficient network communication
CO4	Elaborate the need for Data Analytics and Security in IoT.
CO5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT inIndustry.

Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: BIG DATA ANALYTICS– 15CS82	
CO1	Master the concepts of HDFS and MapReduce framework
CO2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
CO3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
CO4	Infer the importance of core data mining techniques for data analytics
CO5	Compare and contrast different Text Mining Techniques

Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: MODERN INTERFACE DESIGN – 15CS832	
CO1	Design the user interface, design, menu creation and windows creation and connection between menu and windows

Department of Electronics & Communication Engineering

2.6.1 Program outcomes, program specific outcomes and course outcomes



PO1 - Engineering Knowledge: Acquire knowledge on fundamentals of Electronics & Communication Engineering, Sciences, Mathematics and Computational aspects.

PO2 - Problem Analysis: Identify formulate and solve complex Electronics & Communication Engineering problems by choosing and applying appropriate analysis and modeling methods.

PO3 - Design/Development of solutions: Design and conduct hardware, software, simulation component or process to meet desired needs with realistic constraints including health, safety, cultural, societal and environmental considerations.

PO4 - Conduct Investigations of Complex problems: Carry out research, experiments, team projects and publish the outcomes in various symposia, conferences and journals.

PO5 - Modern Tool Usage: Use advanced tools like Matlab, Cadence, Xilinx, Masm, C & Embedded C, Kiel, CCS V3, V4 to solve complex electronics and interdisciplinary problems.

PO6 - The Engineer and Society: Demonstrate the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.

PO7 - Environment and Sustainability: Evaluate the impact of engineering solutions in

diverse engineering fields such as health, environment and safety in global and societal contexts.

PO8 - Ethics: Demonstrate knowledge of professional and ethical responsibilities while presenting sustainable solutions.

PO9 - Individual and Team Work: Work effectively as an individual and as a leader in interdisciplinary environments.

PO10 -Communication: Communicate effectively in both verbal and written form.

PO11 -Project Management and Finance: Apply managerial principles to his/her own work including financial implications and to manage project in multidisciplinary environments.

PO12 -Life-Long Learning: Participate and succeed in competitive examinations, develop confidence for self education and ability for life-long learning.

PO13 - Environmental scan through documents of planning commission and the Professional's society like IEEE, IETE, IAMR, AICTE, FICCI.

PROGRAM SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

PSO-1:	The ability to understand and apply principles of Electronics and Communication Engineering in the analysis, design and development of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.
PSO-2:	To solve real time problems with creative ideas, enabling the students to have successful career in industry and also motivate for higher education to promote research and development activities.

Course Outcomes:

Year / SEM : 2nd year / 3rd sem	**Year of Study : 2020-21**

Course Name: Electronic Instrumentation– 17EC32	
CO1	Describe instrument measurement errors and calculate them & Describe the operation of Ammeters, Voltmeters, Multimeters and develop circuits for multirange Ammeters and Voltmeters.
CO2	Describe functional concepts and operation of Digital voltmeters and instruments to measure voltage, frequency, time period, phase difference of signals, rotation speed, capacitance and pH of solutions & Describe functional concepts and operation of various Analog measuring instruments to measure field Strength, impedance, stroboscopic speed, in/out of phase, Q of coils, insulation resistance.
CO3	Describe and discuss functioning and types of Oscilloscopes, Signal generators and Transducers. Utilize AC and DC bridges for passive component and frequency measurements.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Analog Electronics– 17EC33	
CO1	Describe the working principle and characteristics of BJT, FET, Single stage, cascaded and feedback amplifiers & Phase shift, Wien bridge, tuned and crystal oscillators using BJT/FET/UJT.
CO2	Calculating the AC gain and impedance for BJT using re and h parameters models for CE and CC configuration & Determining the performance characteristics and parameters of BJT and FET amplifier using small signal model.
CO3	Determine the parameters which affect the low frequency and high frequency responses of BJT and FET amplifiers and draw the characteristics & Evaluate the efficiency of Class A and Class B power amplifiers and voltage regulators.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Digital Electronics– 17EC34	
CO1	Develop simplified switching equation using Karnaugh Maps and Quine-McClusky techniques & Explain the operation of decoders, encoders, multiplexers, demultiplexers, adders, subtractors and comparators.
CO2	Explain the working of Latches and Flip Flops (SR, D, T and JK) & Design Synchronous/Asynchronous Counters and Shift registers using Flip Flops.
CO3	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits. Apply the knowledge gained in the design of Counters and Registers.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Network Analysis– 17EC35	
CO1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/ source transformation/ source shifting. Solve network problems by applying Superposition/ Reciprocity/ Thevenin‘s/ Norton‘s/ Maximum Power Transfer/ Millman‘s Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.
CO2	Calculate current and voltages for the given circuit under transient conditions. Apply Laplace transform to solve the given network.
CO3	Evaluate for RLC elements/ frequency response related parameters like resonant frequency, quality factor, half power frequencies, voltage across inductor and capacitor, current through the RLC elements, in resonant circuits Solve the given network using specified two port network parameter like Z or Y or T or h.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Engineering Electromagnetics– 17EC36	
CO1	Evaluate problems on electric field due to point, linear, volume charges by applying conventional methods or by Gauss law.
CO2	Determine potential and energy with respect to point charge and capacitance using Laplace equation. Calculate magnetic field, force, and potential energy with respect to magnetic materials.
CO3	Apply Maxwell‘s equation for time varying fields, EM waves in free space and conductors. Evaluate power associated with EM waves using Poynting theorem.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Analog Electronics Laboratory– 17ECL37	
CO1	Test circuits of rectifiers, clipping circuits, clamping circuits and voltage regulators.
CO2	Determine the characteristics of BJT and FET amplifiers and plot its frequency response.
CO3	Compute the performance parameters of amplifiers and voltage regulators Design and test the basic BJT/FET amplifiers, BJT Power amplifier and oscillators.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Digital Electronics Laboratory– 17ECL38	
CO1	Demonstrate the truth table of various expressions and combinational circuits using logic gates. Design and test various combinational circuits such as adders, subtractors, comparators, multiplexers.
CO2	Realize Boolean expression using decoders. Construct and test flips-flops, counters and shift registers

CO3	Simulate full adder and up/down counters.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Signals And Systems– 17EC42	
CO1	Classify the signals as continuous/discrete, periodic/aperiodic, even/odd, energy/power and deterministic/random signals. Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
CO2	Compute the response of a Continuous and Discrete LTI system using convolution integral and convolution sum. Determine the spectral characteristics of continuous and discrete time signal using Fourier analysis.
CO3	Compute Z-transforms, inverse Z- transforms and transfer functions of complex LTI systems.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Control Systems– 17EC43	
CO1	Develop the mathematical model of mechanical and electrical systems & Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method
CO2	Determine the time domain specifications for first and second order systems Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.
CO3	Determine the stability of a system in the frequency domain using Nyquist and bode plots Develop a control system model in continuous and discrete time using state variable techniques

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Principles Of Communication Systems– 17EC44	
CO1	Determine the performance of analog modulation schemes in time and frequency domains & Determine the performance of systems for generation and detection of modulated analog signals.
CO2	Characterize analog signals in time domain as random processes and in frequency domain using Fourier transforms. Characterize the influence of channel on analog modulated signals.
CO3	Determine the performance of analog communication systems. Understand the characteristics of pulse amplitude modulation, pulse position modulation and pulse code modulation systems.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Linear Integrated Circuits– 17EC45	
CO1	Explain Op-Amp circuit and parameters including CMRR, PSRR, Input & Output Impedances and Slew Rate. Design Op-Amp based Inverting, Non-inverting, Summing & Difference Amplifier, and AC Amplifiers including Voltage Follower.

CO2	Test circuits of Op-Amp based Voltage/ Current Sources & Sinks, Current, Instrumentation and Precision Amplifiers. Test circuits of Op-Amp based linear and non-linear circuits comprising of limiting, clamping, Sample & Hold, Differentiator/ Integrator Circuits, Peak Detectors, Oscillators and Multiplier & Divider.
CO3	Design first & second order Low Pass, High Pass, Band Pass, Band Stop Filters and Voltage Regulators using Op-Amps. Explain applications of linear ICs in phase detector, VCO, DAC, ADC and Timer.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Microprocessors– 17EC46	
CO1	Explain the History of evaluation of Microprocessors, Architecture and instruction set of 8086, CISC & RISC, Von-Neumann & Harvard CPU Architecture, Configuration & Timing diagrams of 8086 and Instruction set of 8086. Write 8086 Assembly level programs using the 8086 instruction set
CO2	Write modular programs using procedures. Write 8086 Stack and Interrupts programming.
CO3	Interface 8086 to Static memory chips and 8255, 8254, 0808 ADC, 0800 DAC, Keyboard, Display and Stepper motors. Use INT 21 DOS interrupt function calls to handle Keyboard and Display.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Microprocessor Lab– 17ECL47	
CO1	Write and execute 8086 assembly level programs to perform data transfer, arithmetic and logical operations. Understand assembler directives, branch, loop operations and DOS 21H Interrupts
CO2	Write and execute 8086 assembly level programs to sort and search elements in a given array. Perform string transfer, string reversing, searching a character in a string with string manipulation instructions of 8086.
CO3	Utilize procedures and macros in programming 8086. Demonstrate the interfacing of 8086 with 7 segment display, matrix keyboard, logical controller, stepper motor, ADC, DAC, and LDR for simple applications.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Linear ICs And Communication Lab– 17ECL48	
CO1	Illustrate the pulse and flat top sampling techniques using basic circuits. Demonstrate addition and integration using linear ICs, and 555 timer operations to generate signals/pulses.
CO2	Demonstrate AM and FM operations and frequency synthesis.
CO3	Design and illustrate the operation of instrumentation amplifier, LPF, HPF, DAC and oscillators using linear IC.

Year / SEM : 3rd year / 5th sem	**Year of Study : 2020-21**

Course Name: Management And Entrepreneurship Development– 17ES51	
CO1	Understand the fundamental concepts of Management and Entrepreneurship. Select a best Entrepreneurship model for the required domain of establishment.
CO2	Describe the functions of Managers, Entrepreneurs and their social responsibilities Compare various types of Entrepreneurs
CO3	Analyze the Institutional support by various state and central government agencies

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21
Course Name: Digital Signal Processing – 17EC52	
CO1	Determine response of LTI systems using time domain and DFT techniques. Compute DFT of real and complex discrete time signals.
CO2	Computation of DFT using FFT algorithms and linear filtering approach.
CO3	Solve problems on digital filter design and realize using digital computations.

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21
Course Name: Verilog HDL– 17EC53	
CO1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction. Write simple programs in VHDL in different styles.
CO2	Design and verify the functionality of digital circuit/system using test benches. Identify the suitable Abstraction level for a particular digital design.
CO3	Write the programs more effectively using Verilog tasks and directives. Perform timing and delay Simulation.

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21
Course Name: Information Theory And Coding– 17EC54	
CO1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
CO2	Model the continuous and discrete communication channels using input, output and joint probabilities Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
CO3	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21

Course Name: Operating System– 17EC553	
CO1	Explain the goals, structure, operation and types of operating systems. Apply scheduling techniques to find performance factors.
CO2	Explain organization of file systems and IOCS. Apply suitable techniques for contiguous and non-contiguous memory allocation.
CO3	Describe message passing, deadlock detection and prevention methods.

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21
Course Name: Automotive Electronics – 17EC561	
CO1	Acquire an overview of automotive components, subsystems, and basics of Electronic Engine Control in today‘s automotive industry.
CO2	Use available automotive sensors and actuators while interfacing with microcontrollers / microprocessors during automotive system design. Understand the networking of various modules in automotive systems, communication protocols and diagnostics of the sub systems.
CO3	Design and implement the electronics that attribute the reliability, safety, and smartness to the automobiles, providing add-on comforts and get fair idea on future Automotive Electronic Systems.

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21
Course Name: 8051 Microcontroller – 17EC563	
CO1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051. Write 8051 Assembly level programs using 8051 instruction set.
CO2	Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051. Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch.
CO3	Write 8051 C programs to generate square wave on 8051 I/O port pin using interrupt and to send & receive serial data using 8051 serial port. Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.

Year / SEM : 3rdyear / 5thsem	Year of Study : 2020-21
Course Name: DSP Lab – 17ECL57	
CO1	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals. Modelling of discrete time signals and systems and verification of its properties and results.

CO2	Implementation of discrete computations using DSP processor and verify the results.
CO3	Realize the digital filters using a simulation tool and a DSP processor and verify the frequency and phase response.

Year / SEM : 3rdyear / 5thsem	**Year of Study : 2020-21**
Course Name: HDL Lab – 17ECL58	
CO1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions. Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.
CO2	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
CO3	Interface the hardware to the programmable chips and obtain the required output.

Year / SEM : 3rdyear / 6thsem	**Year of Study : 2020-21**
Course Name: Digital Communication– 17EC61	
CO1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels. Analyze and compute performance parameters and transfer rates for low pas and bandpass symbol under ideal and corrupted non band limited channels.
CO2	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.
CO3	Demonstrate by simulation and emulation that bandpass signals subjected to corrupted and distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria.

Year / SEM : 3rdyear / 6thsem	**Year of Study : 2020-21**
Course Name: ARM Microcontroller & Embedded Systems– 17EC62	
CO1	Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3. Apply the knowledge gained for Programming ARM Cortex M3 for different applications.
CO2	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO3	Develop the hardware /software co-design and firmware design approaches. Explain the need of real time operating system for embedded system applications.

Year / SEM : 3rdyear / 6thsem	**Year of Study : 2020-21**
Course Name: VLSI Design– 17EC63	

CO1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling. Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.
CO2	Interpret Memory elements along with timing considerations. Demonstrate knowledge of FPGA based system design
CO3	Interpret testing and testability issues in VLSI Design Analyze CMOS subsystems and architectural issues with the design constraints.

Year / SEM : 3rdyear / 6thsem	**Year of Study : 2020-21**
Course Name: Computer Communication Networks – 17EC64	
CO1	Identify the protocols and services of Data link layer. Identify the protocols and functions associated with the transport layer services.
CO2	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite. Distinguish the basic network configurations and standards associated with each network.
CO3	Construct a network model and determine the routing of packets using different routing algorithms.

Year / SEM : 3rdyear / 6thsem	**Year of Study : 2020-21**
Course Name: Cellular Mobile Communications– 17EC651	
CO1	Apply the understanding of statistical characterization of urban mobile channels to compute the performance for simple modulation schemes. Demonstrate the limitations of GSM, GPRS and CDMA to meet high data rate requirements and limited improvements that are needed.
CO2	Analyze the call process procedure between a calling number and called number for all scenarios in GSM or CDMA based systems
CO3	Test and validate voice and data call handling for various scenarios in GSM and CDMA systems for national and international interworking situations.

Year / SEM : 3rdyear / 6thsem	**Year of Study : 2020-21**
Course Name: Digital Switching Systems– 17EC654	
CO1	Describe the electromechanical switching systems and its comparison with the digital switching.
CO2	Determine the telecommunication traffic and its measurements. Define the technologies associated with the data switching operations.
CO3	Describe the software aspects of switching systems and its maintenance.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: Digital System Design Using Verilog– 17EC663	
CO1	Construct the combinational circuits, using discrete gates and programmable logic devices. Describe Verilog model for sequential circuits and test pattern generation
CO2	Design a semiconductor memory for specific chip design. Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
CO3	Synthesize different types of processor and I/O controllers that are used in embedded system.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: Embedded Controller Lab – 17ECL67	
CO1	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.
CO2	Develop assembly language programs using ARM Cortex M3 for different applications. Interface external devices and I/O with ARM Cortex M3.
CO3	Develop C language programs and library functions for embedded system applications.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: Computer Networks Lab – 17ECL68	
CO1	Use the network simulator for learning and practice of networking algorithms. Illustrate the operations of network protocols and algorithms using C programming.
CO2	Simulate the network with different configurations to measure the performance parameters.
CO3	Implement the data link and routing protocols using C programming.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: MICROWAVES AND ANTENNAS – 15EC71	
CO1	Describe the use and advantages of microwave transmission Analyze various parameters related to microwave transmission lines and waveguides.
CO2	Identify microwave devices for several applications. Analyze various antenna parameters necessary for building an RF system
CO3	Recommend various antenna configurations according to the applications

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: DIGITAL IMAGE PROCESSING– 15EC72	
CO1	Understand image formation and the role human visual system plays in perception of gray and color image data. Apply image processing techniques in both the spatial and frequency (Fourier) domains.
CO2	Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.
CO3	Conduct independent study and analysis of Image Enhancement techniques.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: POWER ELECTRONICS– 15EC73	
CO1	Describe the characteristics of different power devices and identify the various applications associated with it.
CO2	Illustrate the working of power circuit as DC-DC converter. Illustrate the operation of inverter circuit and static switches.
CO3	Determine the output response of a thyristor circuit with various triggering options. Determine the response of controlled rectifier with resistive and inductive loads.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: MULTIMEDIA COMMUNICATION– 15EC741	
CO1	Understand basics of different multimedia networks and applications. Understand different compression techniques to compress audio and video.
CO2	Describe multimedia Communication across Networks. Analyse different media types to represent them in digital form.
CO3	Compress different types of text and images using different compression techniques and analyse DMS.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: CRYPTOGRAPHY– 15EC744	
CO1	Use basic cryptographic algorithms to encrypt the data. ·
CO2	Generate some pseudorandom numbers required for cryptographic applications. ·
CO3	Provide authentication and protection for encrypted data.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: IoT & WIRELESS SENSOR NETWORKS– 15EC752	
CO1	Describe the OSI Model for the IoT/M2M Systems. · Understand the architecture and design principles for IoT.
CO2	Learn the programming for IoT Applications.
CO3	Identify the communication protocols which best suits the WSNs.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: SATELLITE COMMUNICATION– 15EC755	
CO1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it. Describe the electronic hardware systems associated with the satellite subsystem and earth station.
CO2	Describe the various applications of satellite with the focus on national satellite system.
CO3	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.

Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: Wireless Cellular and LTE 4G Broadband– 15EC81	
CO1	Understand the system architecture and the functional standard specified in LTE 4G. · Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users. ·
CO2	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.

CO3	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.

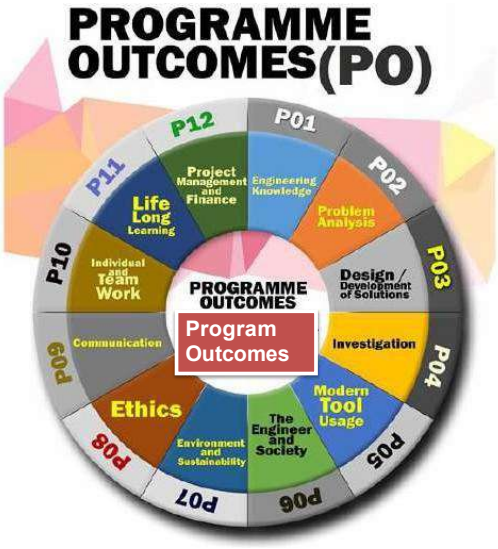
Year / SEM : 4th year / 8th sem	**Year of Study : 2020-21**
Course Name: FIBER OPTICS and NETWORKS – 15EC82	
CO1	Classification and working of optical fiber with different modes of signal propagation. Describe the transmission characteristics and losses in optical fiber communication.
CO2	Describe the construction and working principle of optical connectors, multiplexers and amplifiers. 4. Describe the constructional features and the characteristics of optical sources and detectors.
CO3	Illustrate the networking aspects of optical fiber and describe various standards associated with it.

Year / SEM : 4th year / 8th sem	**Year of Study : 2020-21**
Course Name: Radar Engineering– 15EC833	
CO1	Understand the radar fundamentals and radar signals. · Explain the working principle of pulse Doppler radars, their applications and limitations ·
CO2	Describe the working of various radar transmitters and receivers. ·
CO3	Analyze the range parameters of pulse radar system which affect the system performance

Department of Mechanical Engineering

2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:



PO 1- Demonstrate knowledge of mathematics such as multi-variable calculus, Differential equations, science and engineering.

PO-2 Demonstrate an ability to identify, formulate and solve mechanical engineering problems.

PO-3 Model, analyze, design and realize physical systems, components or processes.

PO-4 Plan and conduct an experimental program and evaluate the results.

PO-5 Use modern engineering tools, software and equipment to analyze problems.

PO-6 Understand the global, societal context of engineering.

PO-7 Provide mechanical engineering solutions to green and sustainable development.

PO-8 Demonstrate knowledge of professional and ethical responsibilities.

PO-9 Work with others to accomplish common goals.

PO-10 Communicate effectively in both verbal and written form

PO-11 Develop confidence for self education and ability for life-long learning.

PO-12 Complete a project with financial management skill.

PROGRAM SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

PSO-1:	Students acquire knowledge in basic science, technical and managerial skills that develop self-confidence for lifelong learning.
PSO-2:	Students acquire theoretical knowledge of advance engineering tools in Design, Thermal and Manufacturing Science that they are capable of applying it for solving real time problems.

Course Outcomes:

Mechanics of Materials	Sub Code:18ME32
CO1	Understand simple, compound, thermal stresses and strains their relations and strain energy.
CO2	Analyse structural members for stresses, strains and deformations.
CO3	Analyse the structural members subjected to bending and shear loads.
CO4	Analyse shafts subjected to twisting loads.
CO5	Analyse the short columns for stability.

Basic Thermodynamics	Sub Code: 18ME33
CO1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems.
CO2	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd lawof thermodynamics.
CO3	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems and apply 1st law of thermodynamics to closed and open systems and determine quantity of energy transfers and change in properties.
CO4	Interpret the behavior of pure substances and its application in practical problems
CO5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations.

Material Science	Sub Code:18ME34
CO1	Understand the mechanical properties of metals and their alloys.
CO2	Analyze the various modes of failure and understand the microstructures offerrous and nonferrous
CO3	Describe the processes of heat treatment of various alloys.
CO4	Acquire the Knowledge of composite materials and their production process as well as applications.
CO5	Understand the properties and potentialities of various materials available and material selection procedures

Metal CuttingandForming	Sub Code:18ME35A
CO1	Describe the casting process and prepare different types of cast products.
CO2	Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, Sand Slinger moulding machines.
CO3	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces.
CO4	CO4: Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mould castings.
CO5	Understand the Solidification process and Casting of Non-Ferrous Metals.
CO6	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes etc. used in manufacturing.
CO7	Describe methods for the quality assurance of components made of casting and joining process Explain the construction & specification of various machine tools. Discuss different cutting tool materials, tool nomenclature & surface finish

Computer AidedMachineDrawing	Sub Code:18ME36A
CO1	Identify the national and international standards pertaining to machine drawing.
CO2	Understand the importance of the linking functional and visualization aspects in the preparation of the part drawings
CO3	Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.
CO4	Interpret the Machining and surface finish symbols on the component drawings.
CO5	Preparation of the part or assembly drawings as per the conventions.

MaterialsTestingLab	Sub Code: 18MEL37A
CO1	Acquire experimentation skills in the field of material testing.
CO2	Develop theoretical understanding of the mechanical properties of materials by performing Experiments.
CO3	Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.
CO4	Apply the knowledge of testing methods in related areas.
CO5	Understand how to improve structure/behavior of materials for various industrial applications.

Foundry andForgingLab A	Sub Code: 18MEL38
CO1	Demonstrate various skills in preparation of molding sand for conducting tensile, shear and Compression tests using Universal sand testing machine.
CO2	Demonstrate skills in determining permeability, clay content and Grain Fineness Number of base sands.
CO3	Demonstrate skills in preparation of forging models involving upsetting, drawing and bending Operations.

AppliedThermodynamics	Sub Code:18ME42
CO1	Apply thermodynamic concepts to analyze the performance of gas power cycles.
CO2	Apply thermodynamic concepts to analyze the performance of vapour power cycles.
CO3	Understand combustion of fuels and performance of I C engines.
CO4	Understand the principles and applications of refrigeration systems.
CO5	Apply Thermodynamic concepts to determine performance parameters of refrigeration and air-conditioning systems.
CO6	Understand the working principle of Air compressors and Steam nozzles, applications, relevance of air and identify methods for performance improvement

FluidMechanics	Sub Code:18ME43
CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.
CO2	Explain the principles of pressure, buoyancy and floatation
CO3	Apply the knowledge of fluid statics, kinematics and dynamics while addressingproblems of mechanical and chemical engineering.
CO4	Describe the principles of fluid kinematics and dynamics.
CO5	Explain the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.
CO6	Illustrate and explain the basic concept of compressible flow and CFD

Kinematicsof Machines	Sub Code:18ME44
CO1	Knowledge of mechanisms and their motion.
CO2	Understand the inversions of four bar mechanisms.
CO3	Analyse the velocity, acceleration of links and joints of mechanisms.

CO4	Analysis of cam follower motion for the motion specifications.
CO5	Understand the working of the spur gears.
CO6	Analyse the gear trains speed ratio and torque

Metal CuttingandForming	**Sub Code:18ME45A**
CO1	Explain the construction & specification of various machine tools.
CO2	Discuss different cutting tool materials, tool nomenclature & surface finish.
CO3	Apply mechanics of machining process to evaluate machining time.
CO4	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.
CO5	Understand the concepts of different metal forming processes.
CO6	Apply the concepts of design of sheet metal dies to design different dies for simple sheet metal

Mechanical MeasurementsandMetrology	**Sub Code:18ME46B**
CO1	Understand the objectives of metrology, methods of measurement, standards of measurement & various measurement parameters.
CO2	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design
CO3	Understand the working principle of different types of comparators.
CO4	Describe measurement of major & minor diameter, pitch, angle and effective diameter of screw threads.
CO5	Explain measurement systems, transducers, intermediate modifying devices and terminating devices.
CO6	Describe functioning of force, torque, pressure, strain and temperature measuring device

Mechanical Measurements andMetrologyLab	**Sub Code:18ME47B**
CO1	Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometer.
CO2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.
CO3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.
CO4	Analyse tool forces using Lathe/Drill tool dynamometer.

CO5	Analyse Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profileusing gear tooth Vernier/Gear tooth micrometer
CO6	Understand the concepts of measurement of surface roughness

MachineShop	**Sub Code:18ME48B**
CO1	To read working drawings, understand operational symbols and execute machining operations.
CO2	Prepare fitting models according to drawings using hand tools- V-block, marking gauge, files, hack saw, drills etc.
CO3	Understand integral parts of lathe, shaping and milling machines and various accessories and attachments used.
CO4	Select cutting parameters like cutting speed, feed, depth of cut, and tooling for various machining operations.
CO5	Perform cylindrical turning operations such as plain turning, taper turning, step turning, thread Cutting, facing, knurling, internal thread cutting, eccentric turning and estimate cutting time.
CO6	Perform machining operations such as plain shaping, inclined shaping, keyway cutting, Indexing and Gear cutting and estimate cutting time

Management AndEngineeringEconomics	**Sub Code:17ME51**
CO1	Explain the development of management and the role it plays at different levels in an organization.
CO2	Comprehend the process and role of effective planning, organizing and staffing for the development of an organization.
CO3	Understand the necessity of good leadership, communication and coordination for establishing effective control in an Organization.
CO4	Understand engineering economics demand supply and its importance in economics decision making and problem solving.

CO5	Calculate present worth, annual worth and IRR for different alternatives in economic decision making.
CO6	Understand the procedure involved in estimation of cost for a simple component, product costing and depreciation, its methods

DynamicsofMachinery	**Sub Code:17ME52**
CO1	Determine the forces and couples for static and dynamic conditions of four bar and slider crank mechanisms to keep the system in equilibrium
CO2	Determine magnitude and angular position of balancing masses under static and dynamic condition of rotating masses in same and different planes
CO3	Determine unbalanced primary, secondary forces and couples in single and multi-cylinder engine
CO4	Determine sensitiveness, isochronisms, effort and power of porter and hartnell governors
CO5	Determine gyroscopic couple and effects related to 2, 4 wheeler, plane disc, ship and aero planes
CO6	Understand types of vibration, SHM and methods of finding natural frequencies of simple mechanical systems
CO7	Determine equation of motion, natural frequency, damping factor, logarithmic decrement of damped free vibration (SDOF) systems
CO8	Determine the natural frequency, force and motion transmissibility of single degree freedom systems
CO9	Determine equation of motion of rotating and reciprocating unbalance systems, magnification factor, and transmissibility of forced vibration (SDOF) systems

TurboMachines	**Sub Code:17ME53**
CO1	Able to give precise definition of turbo machinery
CO2	Identify various types of turbo machinery
CO3	Apply the Euler's equation for turbo machinery to analyses energy transfer in turbo machines
CO4	Understand the principle of operation of pumps, fans, compressors and turbines
CO5	Perform the preliminary design of turbo machines (pumps, rotary compressors and turbines)
CO6	Analyze the performance of turbo machinery

Design ofMachineElements-I	Sub Code:17ME54
CO1	Describe the design process, choose materials
CO2	Apply the codes and standards in design process
CO3	Analyze the behavior of machine components under static, impact, fatigue loading using failure theories
CO4	Design shafts, joints, couplings
CO5	Design of riveted and welded joints
CO6	Design of threaded fasteners and power screws

NonTraditionalMachining	Sub Code:17ME554
CO1	Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.
CO2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.
CO3	Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations
CO4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM &PAM
CO5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM

EnergyAndEnvironment	Sub Code:17ME562
CO1	Summarize the basic concepts of energy, its distribution and general Scenario
CO2	Explain different energy storage systems, energy management, audit and economic analysis
CO3	Summarize the environment eco system and its need for awareness
CO4	Identify the various types of environment pollution and their effects
CO5	Discuss the social issues of the environment with associated acts

Fluid Mechanics &MachineryLab	Sub Code:17MEL57
CO1	Perform experiments to determine the coefficient of discharge of flow measuring devices

CO2	Conduct experiments on hydraulic turbines and pumps to draw characteristics
CO3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations
CO4	Determine the energy flow pattern through the hydraulic turbines and pumps
CO5	Exhibit his competency towards preventive maintenance of hydraulic machines

EnergyConversionLab	**Sub Code:17MEL58**
CO1	Perform experiments to determine the properties of fuels and oils
CO2	Conduct experiments on engines and draw characteristics
CO3	Test basic performance parameters of I.C. Engine and implement the knowledge in industry
CO4	Identify exhaust emission, factors affecting them and report the remedies
CO5	Determine the energy flow pattern through the I C Engine
CO6	Exhibit his competency towards preventive maintenance of IC engines

FiniteElementAnalysis	**Sub Code:17ME61**
CO1	Understand the concepts behind formulation methods in FEM
CO2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements
CO3	Develop element characteristic equation and generation of global equation
CO4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strains induced

ComputerIntegratedManufacturing	**Sub Code:17ME62**
CO1	Able to define Automation, CIM, CAD, CAM and explain the differences between these concepts. Solve simple problems of transformations of entities on computer screen
CO2	Explain the basics of automated manufacturing industries through mathematical models and analyze different types of automated flow lines
CO3	Analyze the automated flow linesto reduce down time and enhance productivity
CO4	Explain the use of different computer applications in manufacturing, and able to prepare part programs for simple jobs on CNC machine tools and robot programming

CO5	Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing

HeatTransfer	**Sub Code:17ME63**
CO1	Understand the basic modes of heat transfer
CO2	Compute temperature distribution in steady-state and unsteady-state heat conduction
CO3	Understand and interpret heat transfer through extended surfaces
CO4	Interpret and compute forced and free convective heat transfer
CO5	Explain the principles of radiation heat transfer and understand the numerical formula for heat conduction problems
CO6	Design heat exchangers using LMTD and NTU methods

Design of MachineElementsII	**Sub Code:17ME64**
CO1	Apply engineering design tools to product design
CO2	Design mechanical systems involving springs,belts and pulleys
CO3	Design different types of gears and simple gear boxes for different applications
CO4	Design brakes and clutches
CO5	Design hydrodynamic bearings for different applications.
CO6	Select Anti friction bearings for different applications using the manufacturers, catalogue.
CO7	Develop proficiency to generate production drawings using CAD software
CO8	Become good design engineers through learning the art of working in a team with morality and ethics

Metal Forming	**Sub Code:17ME653**
CO1	Able to understand the concept of different metal forming process
CO2	Able to approach metal forming processes both analytically and numerically
CO3	Able to design metal forming processes
CO4	Able to develop approaches and solutions to analyze metal forming processes and the associated problems and flaws

AutomobileEngineering	**Sub Code:17ME655**
CO1	To identify the different parts of an automobile and it’s working

CO2	To understand the working of transmission and braking systems
CO3	To comprehend the working of steering and suspension systems
CO4	To learn various types of fuels and injection systems
CO5	To know the cause of automobile emissions ,its effects on environment and methods to reduce the emissions

INDUSTRIALSAFETY	**Sub Code:17ME662**
CO1	Understand the basic safety terms
CO2	Identify the hazards around the work environment and industries
CO3	Use the safe measures while performing work in and around the work area of the available laboratories
CO4	Able to recognize the sign boards and its application
CO5	Able to demonstrate the portable extinguishers used for different class of fires
CO6	Able to write the case studies by sharing experience of the employees working in housekeeping, laboratories like workshops, electrical labs, machine shops, electronics and computer laboratories
CO7	Able to understand and report the case studies from various references (text books, news report, journals, visiting industries like power stations, manufacturing and maintenance)

TotalQualityManagement	**Sub Code:17ME664**
CO1	Explain the various approaches of TQM
CO2	Infer the customer perception of quality
CO3	Analyze customer needs and perceptions to design feedback systems
CO4	Apply statistical tools for continuous improvement of systems
CO5	Apply the tools and technique for effective implementation of TQM

HeatTransferLab	**Sub Code:17MEL67**
CO1	Perform experiments to determine the thermal conductivity of a metal rod
CO2	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values
CO3	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin
CO4	Determine surface emissivity of a test plate

CO5	Estimate performance of a refrigerator and effectiveness of fin
CO6	Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach

Modeling andAnalysisLab	**Sub Code:17ME664**
CO1	Demonstrate the basic features of an analysis package
CO2	Use the modern tools to formulate the problem, and able to create geometry, discretize, apply boundary condition to solve problems of bars, truss, beams, plate to find stress with different loading conditions
CO3	Demonstrate the deflection of beams subjected to point, uniformly distributed and varying loads further to use the available results to draw shear force and bending moment diagrams
CO4	Analyze the given problem by applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions
CO5	Carry out dynamic analysis and finding natural frequencies for various boundary conditions and also analyze with forcing function

EnergyEngineering	**SUB Code:15ME71**
CO1	Discuss the layout of thermal power plant and working principle of various types of boilers.
CO2	Explain the working of diesel and gas turbine power plant along with optimization technique
CO3	Discuss the various types of nuclear reactors used in nuclear power plant .Summarize the principles and working of various renewable energy power plants.
CO4	Explain the energy, economic and environmental issues of power plants Paraphrase the different types of power plant, its function and issues related

FluidPowerSystems	**SUB Code:15ME72**
CO1	Describe the construction, structure & working Principle of various Hydraulic pumps, motors and Actuators and their Performance Characteristics
CO2	Comprehend &Analyze Single& Double Acting Hydraulic Cylinder circuits and their Control Components and Maintenance of Hydraulic Systems

CO3	Describe the construction, structure & working Principle of various Pneumatic Actuators, Pneumatic Control Valves Applications
CO4	Recall the Signal Processing Elements such as OR & AND gates in pneumatic applications and Multi cylinder applications and Electro-Pneumatic Control

ControlEngineering	**SUB Code:15ME73**
CO1	Identifythetypeofcontrolsystem,theirapplications,limitations,Conceptsoffeedback, Types of controllers and also arrive at the transfer functions of the given physical system (i.e. Mechanical , Electrical , Thermal, Hydraulic) models by writing Differential
	Equations using Laplace Transformation
CO2	Produce the Transfer Function by Block Reduction Technique and also using Mason's Formula for Signal Flow Graph and also Interpret the S-plane with the terms like settling time, rise-time and overshoot to step-response. Apply Routh-Hurwitz criterion to determine the stability of time- invariant systems
CO3	Apply frequency domain analysis techniques, and design control systems to achieve specific dynamic characteristics, Possess knowledge of stability and controls, Determine the stability of control systems using Nyquist methods and also by using Bode Attenuation diagrams
CO4	Determine the stability of control systems using Root-Locus Technique and feedback control systems using frequency domain and state-variable methods. Possess knowledge of stability and controls

Tribology	**SUB Code:15ME742**
CO1	Identify the type of control system, their applications, limitations, Concepts of feedback, Types of controllers and also arrive at the transfer functions of the given physical system (i.e. Mechanical , Electrical , Thermal, Hydraulic) models by writing Differential Equations using Laplace Transformation
CO2	Produce the Transfer Function by Block Reduction Technique and also using Mason's Formula for Signal Flow Graph and also Interpret the S-plane with the terms like settling time, rise-time and overshoot to step-response. Apply Routh-Hurwitz criterion to determine the stability of time- invariantsystems

CO3	Apply frequency domain analysis techniques, and design control systems to achieve specific dynamic characteristics, Possess knowledge of stability and controls, Determine the stability of control systems using Nyquist methods and also by using Bode Attenuation diagrams
CO4	Determine the stability of control systems using Root-Locus Technique and feedback control systems using frequency domain and state-variable methods. Possess knowledge of stability and controls

Mechatronics	**SUB Code: 15ME753**
CO1	Identify the type of control system, their applications, limitations, Concepts of feedback, Types of controllers and also arrive at the transfer functions of the given physical system (i.e. Mechanical , Electrical , Thermal, Hydraulic) models by writing Differential Equations using Laplace Transformation
CO2	Produce the Transfer Function by Block Reduction Technique and also using Mason's Formula for Signal Flow Graph and also Interpret the S-plane with the terms like settling time, rise-time and overshoot to step-response. Apply Routh-Hurwitz criterion to determine the stability of time- invariant systems
CO3	Apply frequency domain analysis techniques, and design control systems to achieve specific dynamic characteristics, Possess knowledge of stability and controls, Determine the stability of control systems using Nyquist methods and also by using Bode Attenuation diagrams
CO4	Determine the stability of control systems using Root-Locus Technique and feedback control systems using frequency domain and state-variable methods. Possess knowledge of stability and controls

DESIGNLAB	**SUB Code:15MEL76**
CO1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system
CO2	Students are able analyze the balancing of rotating and reciprocating masses by using static and dynamic balance

CO3	Ability to demonstrate the concept of stress concentration for different photo- elastic materials
CO4	Students are able to determine pressure distribution in journal bearings

CIM &AUTOMOTAION LAB	**SUB Code:15MEL77**
CO1	Ability to identify the type of machining center for the geometry given (cylindrical or prismatic), write the part program, explain the instructions, examine for the error in theprogram and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software
CO2	To practically relate to concepts discussed in Computer Integrated Manufacturing course to write CNC part programs using SWAN SOFT CNC simulation packagefor simulationof machining operations such as Turning, Drilling & Milling. To understand & write programs for Flexible Manufacturing Systems &Robotics

OperationResearch	**Sub Code:15ME81**
CO1	Understand the meaning, definitions, scope, need, phases and techniques of operations research.
CO2	Formulate as L.P.P and derive optimal solutions to linear programming problems by graphical method, Simplex method, Big-M method and Dual Simplex method.
CO3	Formulate as Transportation and Assignment problems and derive optimum solutions for transportation, Assignment and travelling salesman problems.
CO4	Solve problems on game theory for pure and mixed strategy under competitive environment.
CO5	Solve waiting line problems for M/M/1 and M/M/K queuing models.
CO6	Construct network diagrams and determine critical path, floats for deterministic and PERT networks including crashing of Networks.
CO7	Determine minimum processing times for sequencing of n jobs-2 machines, n jobs-3machines,n jobs-m machinesand 2 jobs-n machines using Johnson's algorithm.
AdditiveManufacturing	**Sub Code:15ME82**
CO1	Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.
CO2	Analyse the different characterization techniques.

CO3	Describe the various NC, CNC machine programing and Automation techniques.

ExperimentalStressAnalysis	**SUB Code:15832**
CO1	Explain characterize the elastic behavior of solid bodies.
CO2	Describe stress strain analysis of mechanical systems using electrical resistance strain gauges.
CO3	Discuss skills for experimental investigations an accompanying laboratory course is desirable
CO4	Discuss experimental investigations by predictions by other methods.
CO5	Describe various coating techniques

Internship/ProfessionalPractice**SUB Code:15ME84**	
CO1	Acquire practical experience within industry in which the internship is done.
CO2	Apply knowledge and skills learned to classroom work.
CO3	Experience the activities and functions of professionals.
CO4	Develop and refine oral and written communication skills.

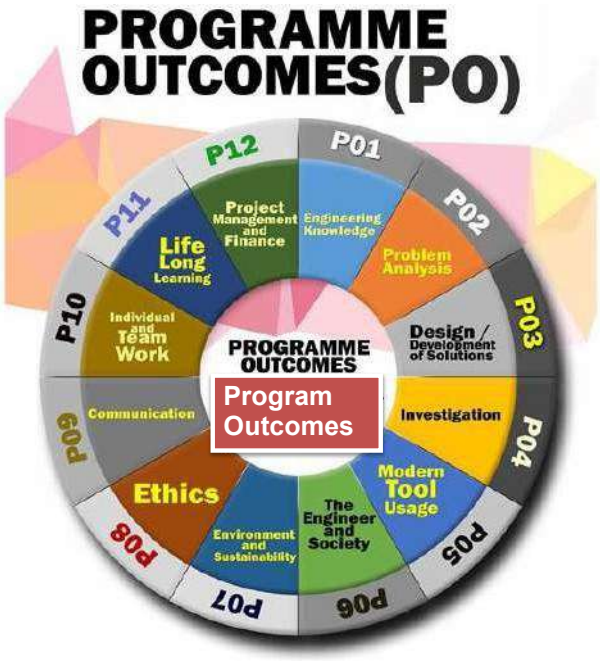
Project Work,PhaseII**SUB Code:**15MEP85	
CO1	Describe the project and be able to defend it.
CO2	Develop critical thinking and problem solving skills.
CO3	Learn to use modern tools and techniques.
CO4	Communicate effectively and to present ideas clearly and coherently both in written and oral forms.

SeminarSUB Code:15MES86	
CO1	Develop knowledge in the field of Biomedical Engineering and other disciplines through independent learning and collaborative study.
CO2	Identify and discuss the current, real-time issues and challenges in engineering & technology.
CO3	Develop written and oral communication skills.
CO4	Explore concepts in larger diverse social and academic contexts.

Department of Information Science and Engineering

2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:



PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: 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.

PO6: 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.

PO7: 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.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: 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(PSOs):

Engineering Graduates will be able to:

PSO-1:	Understand the principles of Information Science and Engineering and enrich knowledge in recent advancements and developments in Information Technology.
PSO-2:	Competent in programming and computing skills, ability to apply software development methodologies and modeling to solve real world problems in the field of Information Technology.

Course Outcomes:

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: --DATA STRUCTURES AND APPLICATIONS-18CS32	
CO1	Use different types of data structures, operations and algorithms
CO2	Apply searching and sorting operations on files
CO3	Use stack, Queue, Lists, Trees and Graphs in problem solving
CO4	Implement all data structures in a high-level language for problem solving.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ANALOG AND DIGITAL ELECTRONICS – 18CS33	
CO1	Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
CO2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
CO3	Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods
CO4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
CO5	Develop simple HDL programs

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: COMPUTER ORGANIZATION – 18CS34	
CO1	Explain the basic organization of a computer system.
CO2	Demonstrate functioning of different sub systems, such as processor, Input/output,andmemory.
CO3	Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
CO4	Design and analyse simple arithmetic and logical units.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: SOFTWARE ENGINEERING– **18CS35**	
CO1	Design a software system, component, or process to meet desired needs within realistic constraints.
CO2	Assess professional and ethical responsibility
CO3	Function on multi-disciplinary teams
CO4	Use the techniques, skills, and modern engineering tools necessary for engineering practice
CO5	Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: DISCRETE MATHEMATICAL STRUCTURES – 18CS36	
CO1	Use propositional and predicate logic in knowledge representation and truth verification..
CO2	Demonstrate the application of discrete structures in different fields of computer science.
CO3	Solve problems using recurrence relations and generating functions.
CO4	Application of different mathematical proofs techniques in proving theorems in the courses..
CO5	Compare graphs, trees and their applications.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ANALOG AND DIGITAL ELECTRONICS LABORATORY – 18CSL37	
CO1	Use appropriate design equations / methods to design the given circuit..
CO2	Examine and verify the design of both analog and digital circuits using simulators.
CO3	Make us of electronic components, ICs, instruments and tools for design and testing of circuits for the given the appropriate inputs.
CO4	Compile a laboratory journal which includes; aim, tool/instruments/software/components used, design equations used and designs, schematics, program listing, procedure followed, relevant theory, results as graphs and tables, interpreting and concluding the findings.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: DATA STRUCTURES LABORATORY – 18CSL38	
CO1	Analyze and Compare various linear and non-linear data structures
CO2	Code, debug and demonstrate the working nature of different types of data structures and their applications
CO3	Implement, analyze and evaluate the searching and sorting algorithms
CO4	Choose the appropriate data structure for solving real world problems
Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: DESIGN AND ANALYSIS OF ALGORITHMS – 18CS42	
CO1	Describe computational solution to well known problems like searching, sorting etc.
CO2	Estimate the computational complexity of different algorithms.
CO3	Devise an algorithm using appropriate design strategies for problem solving.

Year / SEM : 2nd year / 4th sem	Year of Study : 2020-21
Course Name: OPERATING SYSTEMS – 18CS43	
CO1	Demonstrate need for OS and different types of OS
CO2	Apply suitable techniques for management of different resources
CO3	Use processor, memory, storage and file system commands.
CO4	Realize the different concepts of OS in platform of usage through case studies

Year / SEM : 2nd year / 4th sem	Year of Study : 2020-21
Course Name: MICROCONTROLLER AND EMBEDDED SYSTEMS – 18CS44	
CO1	Describe the architectural features and instructions of ARM microcontroller
CO2	Apply the knowledge gained for Programming ARM for different applications.
CO3	Interface external devices and I/O with ARM microcontroller.
CO4	Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
CO5	Develop the hardware /software co-design and firmware design approaches.

CO6	Demonstrate the need of real time operating system for embedded system applications

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: OBJECT ORIENTED CONCEPTS – 18CS45	
CO1	Explain the object-oriented concepts and JAVA.
CO2	Develop computer programs to solve real world problems in Java.
CO3	Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: DATA COMMUNICATION – 18CS46	
CO1	Explain the various components of data communication.
CO2	Explain the fundamentals of digital communication and switching.
CO3	Compare and contrast data link layer protocols.
CO4	Summarize IEEE 802.xx standards

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: DESIGN AND ANALYSIS OF ALGORITHM LABORATORY– 18CSL47	
CO1	Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
CO2	Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
CO3	Analyze and compare the performance of algorithms using language features..
CO4	Apply and implement learned algorithm design techniques and data structuresto solve real-world problems.

Year / SEM : 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: MICROCONTROLLER AND EMBEDDED SYSTEMS LABORATORY – 18CSL48	
CO1	Develop and test program using ARM7TDMI/LPC2148.
CO2	Conduct the following experiments on an ARM7TDMI/LPC2148evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4tool/compiler.

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY – 17CS51	
CO1	Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
CO2	Utilize the resources available effectively through ERP
CO3	Make use of IPRs and institutional support in entrepreneurship

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: COMPUTER NETWORKS – 17CS52	
CO1	Explain principles of application layer protocols
CO2	Outline transport layer services and infer UDP and TCP protocols
CO3	Classify routers, IP and Routing Algorithms in network layer
CO4	Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
CO5	Describe Multimedia Networking and Network Management

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: DATABASE MANAGEMENT SYSTEM – 17CS53	
CO1	Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.
CO2	Use Structured Query Language (SQL) for database manipulation.
CO3	Design and build simple database systems
CO4	Develop application to interact with databases.

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: AUTOMATA THEORY AND COMPUTABILITY – 17CS54	
CO1	Tell the core concepts in automata theory and Theory of Computation
CO2	Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
CO3	Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
CO4	Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness
CO5	Classify a problem with respect to different models of Computation.

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: ADVANCED JAVA AND J2EE– 17CS553	
CO1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
CO2	Build client-server applications and TCP/IP socket programs
CO3	Illustrate database access and details for managing information using the JDBC API
CO4	Describe how servlets fit into Java-based web application architecture
CO5	Develop reusable software components using Java Beans

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: ARTIFICIAL INTELLIGENCE– 17CS562	
CO1	Identify the AI based problems.
CO2	Apply techniques to solve the AI problems
CO3	Define learning and explain various learning techniques
CO4	Discuss expert systems

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: COMPUTER NETWORK LABORATORY– 17CSL57	
CO1	Analyze and Compare various networking protocols.
CO2	Demonstrate the working of different concepts of networking.
CO3	Implement, analyze and evaluate networking protocols in NS2 / NS3

Year / SEM : 3rd year / 5th sem	Year of Study : 2020-21
Course Name: DBMS LABORATORY WITH MINI PROJECT – 15CSL58	
CO1	Use Structured Query Language (SQL) for database Creation and manipulation
CO2	Demonstrate the working of different concepts of DBMS
CO3	Implement and test the project developed for an application.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW – 17CS61	
CO1	Discuss cryptography and its need to various applications
CO2	Design and develop simple cryptography algorithms
CO3	Understand cyber security and need cyber Law

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: COMPUTER GRAPHICS AND VISUALIZATION – 17CS62	
CO1	Design and implement algorithms for 2D graphics primitives and attributes.
CO2	Illustrate Geometric transformations on both 2D and 3D objects.
CO3	Understand the concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models.
CO4	Discussabout suitable hardware and software for developing graphics packages using OpenGL.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: SYSTEM SOFTWARE AND COMPILER DESIGN-17CS63	
CO1	Illustrate system software such as assemblers, loaders, linkers and macroprocessors
CO2	Design and develop lexical analyzers, parsers and code generators
CO3	Discuss about lex and yacc tools for implementing different concepts of system software

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: OPERATING SYSTEMS – 17CS64	
CO1	Demonstrate need for OS and different types of OS
CO2	Discuss suitable techniques for management of different resources
CO3	Illustrate processor, memory, storage and file system commands
CO4	Explain the different concepts of OS in platform of usage through case studies

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: OPERATION RESEARCH– 17CS653	
CO1	Explain optimization techniques for various problems.
CO2	Understand the given problem as transportation and assignment problem and solve.
CO3	Illustrate game theory for decision support system.

Year / SEM : 3rd year / 6th sem	Year of Study : 2020-21
Course Name: PYTHON APPLICATION PROGRAMMING– 17CS664	
CO1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO2	Demonstrate proficiency in handling Strings and File Systems.
CO3	Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.

CO5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python

Year / SEM : 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY – 17CSL67	
CO1	Implement and demonstrate Lexer's and Parser's
CO2	Implement different algorithms required for management, scheduling, allocation and communication used in operating system..

Year / SEM : 3rd year / 6th sem	**Year of Study : 2020-21**
Course Name: COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT – 17CSL68	
CO1	Apply the concepts of computer graphics
CO2	Implement computer graphics applications using OpenGL
CO3	Implement real world problems using OpenGL

Year / SEM : 4th year / 7th sem	**Year of Study : 2020-21**
Course Name: TECHNOLOGY AND ITS APPLICATIONS – 15CS71	
CO1	Adapt HTML and CSS syntax and semantics to build web pages.
CO2	Construct and visually format tables and forms using HTML and CSS
CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO4	Appraise the principles of object oriented development using PHP
CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: ADVANCED COMPUTER ARCHITECTURES– 15CS72	
CO1	Explain the concepts of parallel computing and hardware technologies
CO2	Compare and contrast the parallel architectures
CO3	Illustrate parallel programming concepts

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: MACHINE LEARNING– 15CS73	
CO1	Identify the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
CO2	Explain theory of probability and statistics related to machine learning
CO3	Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: UNIX SYSTEM PROGRAMMING– 15CS744	
CO1	Ability to understand and reason out the working of Unix Systems
CO2	Build an application/service over a Unix system.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: STORAGE AREA NETWORKS– 15CS754	
CO1	Identify key challenges in managing information and analyze different storage networking technologies and virtualization
CO2	Explain components and the implementation of NAS
CO3	Describe CAS architecture and types of archives and forms of virtualization
CO4	Ilustrate the storage infrastructure and management activities

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: MACHINE LEARNING LABORATORY– 15CSL76	
CO1	Understand the implementation procedures for the machine learning algorithms.
CO2	Design Java/Python programs for various Learning algorithms.
CO3	Apply appropriate data sets to the Machine Learning algorithms.
CO4	Identify and apply Machine Learning algorithms to solve real world problems.

Year / SEM : 4th year / 7th sem	Year of Study : 2020-21
Course Name: WEB TECHNOLOGY LABORATORY WITH MINI PROJECT– 15CSL77	
CO1	Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
CO2	Have a good understanding of Web Application Terminologies, Internet Tools other web services.
CO3	Learn how to link and publish web sites

Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: IOT TECHNOLOGY– 15CS81	
CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models
CO2	Compare and contrast the deployment of smart objects and the technologies to connect them to network.
CO3	Appraise the role of IoT protocols for efficient network communication
CO4	Elaborate the need for Data Analytics and Security in IoT.
CO5	Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT inIndustry.

Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: BIG DATA ANALYTICS– 15CS82	
CO1	Master the concepts of HDFS and MapReduce framework
CO2	Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
CO3	Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
CO4	Infer the importance of core data mining techniques for data analytics
CO5	Compare and contrast different Text Mining Techniques

Year / SEM : 4th year / 8th sem	Year of Study : 2020-21
Course Name: MODERN INTERFACE DESIGN – 15CS832	
CO1	Design the user interface, design, menu creation and windows creation and connection between menu and windows

Department of Electrical and Electronics and Engineering

2.6.1 Program outcomes, program specific outcomes and course outcomes

ProgramOutcomes:

PO1. Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2. Apply mathematical foundations, algorithmic principles, and computer Science theory in the modelling and design of computer based systems in a way that demonstrates comprehension of tradeoffs involved in design choices.

PO3. Analyze a problem, and identify and define the computing requirements appropriate to its solution

PO4. Design and development principles in the construction of software systems of varying complexity

PO5. Design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as

well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;

PO6. Use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;

PO7. Work effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary environment

PO8. Demonstrate knowledge of contemporary issues and understand professional, ethical,legal, security and social issues andresponsibilities

PO9. Analyze the local and global impact of computing on individuals, organizations, and society;

PO10. Demonstrate knowledge and understanding of the engineering and management principles including financial implications and apply these to his/her work, as a member and leader in a team, and to manage project work as part of a multidisciplinaryteam

PO11. Communicate effectively in both verbal and written forms;

PO12. Recognize the need for, and be motivated to engage in life-long learning and continuing professional development

PROGRAM SPECIFIC OUTCOMES(PSOs):

Engineering Graduates will be able to:

PSO-1:	The graduate will succeed in industries/technical profession and/or pursue post graduate program in Electrical & Electronics Engineering and allied fields by providing solid foundation in fundamentals of Mathematics, Science and Electrical & Electronics Engineering using modern tools and equipment to correlate theoretical aspects with practical needs.
PSO-2:	Graduates will be thorough professionals equipped with sound leadership, interdisciplinary teamwork, communication skills, and ethical practices along with concerns for environment and societal well being.
PSO-3:	Graduates will possess the capability to acquire new knowledge through skills of analysis, synthesis and knowledge generation, transmission and distribution in designing electrical systems to solve engineering problems and remain life-long learners in an increasingly technology-dependent society.

Course Outcomes:

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES(18MAT31)	
CO1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
CO2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
CO5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ELECTRIC CIRCUIT ANALYSISTECHNIQUES(18EE32)	
CO1	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations
CO2	Solve complex electric circuits using network theorems.
CO3	Discuss resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.
CO4	Synthesize typical waveforms using Laplace transformation.
CO5	Solve unbalanced three phase systems and also evaluate the performance of two port networks.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: TRANSFORMERS AND GENERATORS(18EE33)	
CO1	Understand the construction and operation of 1-phase, 3-Phase transformers and Autotransformer
CO2	Analyze the performance of transformers by polarity test, Sumpner's Test, phase conversion, 3-phase connection, and parallel operation
CO3	Understand the construction and working of AC and DC Generators.
CO4	Analyze the performance of the AC Generators on infinite bus and parallel operation.
CO5	Determine the regulation of AC Generator by Slip test, EMF, MMF, and ZPF Methods

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ANALOG ELECTRONIC CIRCUITS(18EE34)	
CO1	Obtain the output characteristics of clipper and clamper circuits.
CO2	Design and compare biasing circuits for transistor amplifiers & explain the transistor switching
CO3	Explain the concept of feedback, its types and design of feedback circuits
CO4	Design and analyze the power amplifier circuits and oscillators for different frequencies.
CO5	Design and analysis of FET and MOSFET amplifiers

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: DIGITAL SYSTEM DESIGN(18EE35)	
CO1	Develop simplified switching equation using Karnaugh Maps and QuineMcClusky techniques
CO2	Design Multiplexer, Encoder, Decoder, Adder, Subtractors and Comparator as digital combinational control circuits.
CO3	Design flip flops, counters, shift registers as sequential control circuits.
CO4	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits.
CO5	Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory.

Year / SEM : 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: ELECTRICAL AND ELECTRONIC MEASUREMENTS (18EE36)	

CO1	Measure resistance, inductance and capacitance using bridges and determine earth resistance.
CO2	Explain the working of various meters used for measurement of Power, Energy & understand the adjustments, calibration & errors in energy meters.
CO3	Understand methods of extending the range of instruments & instrument transformers.
CO4	Explain the working of different electronic instruments.
CO5	Explain the working of different display and recording devices.

Year / SEM : 2^{nd}year / 3^{rd}sem	**Year of Study : 2020-21**
Course Name: ELECTRICAL MACHINES LABORATORY - 1 (18EEL37)	
CO1	Evaluate the performance of transformers from the test data obtained.
CO2	Connect and operate two single phase transformers of different KVA rating in parallel.
CO3	Connect single phase transformers for three phase operation and phase conversion.
CO4	Compute the voltage regulation of synchronous generator using the test data obtained in the laboratory.
CO5	Evaluate the performance of synchronous generators from the test data and assess the performance of synchronous generator connected to infinite bus.

Year / SEM : 2^{nd}year / 3^{rd}sem	**Year of Study : 2020-21**
Course Name: ELECTRONICS LABORATORY (18EEL38)	
CO1	Design and test rectifier circuits with and without capacitor filters.

CO2	Determine h-parameter models of transistor for all modes.
CO3	Design and test BJT and FET amplifier and oscillator circuits.
CO4	Realize Boolean expressions, adders and subtractors using gates.
CO5	Design and test Ring counter/Johnson counter, Sequence generator and 3 bit counters.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: ADDITIONAL MATHEMATICS – I (18MATDIP31) only for lateral entry students	
CO1	Apply concepts of complex numbers and vector algebra to analyze the problems arising in related area
CO2	Use derivatives and partial derivatives to calculate rate of change of multivariate functions.
CO3	Analyze position, velocity and acceleration in two and three dimensions of vector valued functions
CO4	Learn techniques of integration including the evaluation of double and triple integrals.
CO5	Identify and solve first order ordinary differential equations.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS (18MAT41)	
CO1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory
CO2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.

CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
CO4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data
CO5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: POWER GENERATION AND ECONOMICS (18EE42)	
CO1	Describe the working of hydroelectric, steam, nuclear power plants and state functions of major equipment of the power plants.
CO2	Classify various substations and explain the functions of major equipments in substations.
CO3	Explain the types of grounding and its importance.
CO4	Infer the economic aspects of power system operation and its effects.
CO5	Explain the importance of power factor improvement.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: TRANSMISSION AND DISTRIBUTION (18EE43)	
CO1	Explain transmission and distribution scheme, identify the importance of different transmission systems and types of insulators
CO2	Analyze and compute the parameters of the transmission line for different configurations.
CO3	Assess the performance of overhead lines.
CO4	Interpret corona, explain the use of underground cables.

CO5	Classify different types of distribution systems; examine its quality & reliability

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: ELECTRIC MOTORS (18EE44)	
CO1	Explain the construction, operation and classification of DC Motor, AC motor and Special purpose motors.
CO2	Describe the performance characteristics & applications of Electric motors.
CO3	Demonstrate and explain the methods of testing of DC machines and determine losses and efficiency.
CO4	Control the speed of DC motor and induction motor.
CO5	Explain the starting methods, equivalent circuit and phasor diagrams, torque angle, effect of change in excitation and change in load, hunting and damping of synchronous motors

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: ELECTROMAGNETIC FIELD THEORY (18EE45)	
CO1	Use different coordinate systems , Coulomb's Law and Gauss Law for the evaluation of electric fields produced by different charge configurations.
CO2	Calculate the energy and potential due to a system of charges & Explain the behavior of electric field across a boundary conditions.
CO3	Explain the Poisson's, Laplace equations and behavior of steady magnetic fields
CO4	Explain the behavior of magnetic fields and magnetic materials.
CO5	Asses time varying fields and propagation of waves in different media.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: OPERATIONAL AMPLIFIERS AND LINEAR ICs (18EE46)	
CO1	Describe the characteristics of ideal and practical operational amplifier.

CO2	Design filters and signal generators using linear ICs.
CO3	Demonstrate the application of Linear ICs as comparators and rectifiers.
CO4	Analyze voltage regulators for given specification using op-amp and IC voltage regulators.
CO5	Summarize the basics of PLL and Timer.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: ELECTRICAL MACHINES LABORATORY - 2 (18EEL47)	
CO1	Test DC machines to determine their characteristics and also to control the speed of DC motor.
CO2	Pre-determine the performance characteristics of DC machines by conducting suitable tests.
CO3	Perform load test on single phase and three phase induction motor to assess its performance.
CO4	Conduct test on induction motor to pre-determine the performance characteristics.
CO5	Conduct test on synchronous motor to draw the performance curves.

Year / SEM : 2nd year / 4 th sem	**Year of Study : 2020-21**
Course Name: OP- AMP AND LINEAR ICS LABORATORY (18EEL48)	
CO1	To conduct experiment to determine the characteristic parameters of OP-Amp
CO2	To design test the OP-Amp as Amplifier, adder, subtractor, differentiator and integrator.
CO3	To design test the OP-Amp as oscillators and filters.
CO4	Design and study of Linear IC's as multivibrator power supplies.

Year / SEM : 3rd year / 5 th sem	Year of Study : 2020-21
Course Name: MANAGEMENT AND ENTREPRENEURSHIP (15EE51/17EE51)	
CO1	Explain the field of management, task of the manager, planning and steps in decision making
CO2	Discuss the structure of organization, importance of staffing, leadership styles, modes of communication, techniques of coordination and importance of managerial control in business
CO3	Explain the concepts of entrepreneurship and a businessman's social responsibilities towards different groups
CO4	Show an understanding of role of SSI's in the development of country and state/central level institutions/agencies supporting business enterprises.
CO5	Discuss the concepts of project management, capital budgeting, project feasibility studies, need for project report and new control techniques

Year / SEM : 3rd year / 5 th sem	Year of Study : 2020-21
Course Name: MICROCONTROLLER (15EE52/17EE52)	
CO1	Outline the 8051 architecture, registers, internal memory organization, addressing modes.
CO2	Discuss 8051 addressing modes, instruction set of 8051, accessing data and I/O port programming.
CO3	Develop 8051C programs for time delay, I/O operations, I/O bit manipulation, logic and arithmetic operations, data conversion and timer/counter programming.
CO4	Summarize the basics of serial communication and interrupts, also develop 8051 programs for serial data communication and interrupt programming.
CO5	Program 8051 to work with external devices for ADC, DAC, Stepper motor control, DC motor control, Elevator control

Year / SEM : 3rd year / 5 th sem	Year of Study : 2020-21
Course Name: POWER ELECTRONICS (15EE53/17EE53)	
CO1	To give an overview of applications power electronics, different types of power semiconductor devices, their switching characteristics, power diode characteristics, types, their operation and the effects of power diodes on RL circuits

CO2	To explain the techniques for design and analysis of single phase diode rectifier circuits
CO3	To explain different power transistors, their steady state and switching characteristics and limitations.
CO4	To explain different types of Thyristors, their gate characteristics and gate control requirements
CO5	To explain the design, analysis techniques, performance parameters and characteristics of controlled rectifiers, DC- DC, DC -AC converters and Voltage controllers.

Year / SEM : 3rd year / 5 th sem	**Year of Study : 2020-21**
Course Name: SIGNALS AND SYSTEMS (15EE54/17EE54)	
CO1	Explain the generation of signals, behavior of system and the basic operations that can be performed on signals and properties of systems.
CO2	Apply convolution in both continuous and discrete domain for the analysis of systems given impulse response of a system.
CO3	Solve the continuous time and discrete time systems by various methods and their representation by block diagram
CO4	Perform Fourier analysis for continuous and discrete time, linear time invariant systems
CO5	Apply Z-transform and properties of Z transform for the analysis of discrete time systems.

Year / SEM : 3rd year / 5 th sem	**Year of Study : 2020-21**
Course Name: ELECTRICAL MACHINE DESIGN (15EE55/17EE55)	
CO1	Identify and list, limitations, modern trends in design, manufacturing of electrical machines and properties of materials used in the electrical machines
CO2	Derive the output equation of DC machine, discuss selection of specific loadings and magnetic circuits of DC machines, design the field windings of DC machine, and design stator and rotor circuits of a DC machine.
CO3	Derive the output equations of transformer, discuss selection of specific loadings, estimate the number of cooling tubes, no load current and leakage reactance of core type transformer.
CO4	Develop the output equation of induction motor, discuss selection of specific loadings and magnetic circuits of induction motor, design stator and rotor circuits of a induction motor.

CO5	Formulate the output equation of alternator, design the field windings of Synchronous machine, discuss short circuit ratio and its effects on performance of synchronous machines, design salient pole and non-salient pole alternators for given specifications
Year / SEM : 3rdyear / 5 th sem	**Year of Study : 2020-21**
Course Name: HIGH VOLTAGE ENGINEERING (15EE56/17EE56)	
CO1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics and breakdown phenomenon in solid dielectrics.
CO2	Summarize generation of high voltages and currents
CO3	Outline measurement techniques for high voltages and currents
CO4	Summarize overvoltage phenomenon and insulation coordination in electric power systems.
CO5	Explain non-destructive testing of materials and electric apparatus, high-voltage testing of electric apparatus

Year / SEM : 3rdyear / 5 th sem	**Year of Study : 2020-21**
Course Name: MICROCONTROLLER LABORATORY (15EEL57/17EEL57)	
CO1	Write assembly language programs for data transfer, arithmetic, Boolean and logical instructions and code conversions.
CO2	Write ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication and timers
CO3	Perform interfacing of stepper motor and dc motor for controlling the speed, elevator, LCD, external ADC and temperature control.
CO4	Generate different waveforms using DAC interface.
CO5	Work with a small team to carryout experiments using microcontroller concepts and prepare reports that present lab work.

Year / SEM : 3rd year / 5 th sem	Year of Study : 2020-21
Course Name: POWER ELECTRONICS LABORATORY (15EEL58/17EEL58)	
CO1	Obtain static characteristics of semiconductor devices to discuss their performance.
CO2	Trigger the SCR by different methods
CO3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads.
CO4	Control the speed of a DC motor, universal motor and stepper motors.
CO5	Verify the performance of single phase full bridge inverter connected to resistive load.

Year / SEM : 3rd year / 6 th sem	Year of Study : 2020-21
Course Name: CONTROL SYSTEMS (15EE61/17EE61)	
CO1	Analyze and model electrical and mechanical system using analogous.
CO2	Formulate transfer functions using block diagram and signal flow graphs.
CO3	Analyze the stability of control system, ability to determine transient and steady state time response.
CO4	Illustrate the performance of a given system in time and frequency domains, stability analysis using Root locus and Bode plots.
CO5	Discuss stability analysis using Nyquist plots, Design controller and compensator for a given specification.

Year / SEM : 3rd year / 6 th sem	Year of Study : 2020-21

Course Name: POWER SYSTEM ANALYSIS – 1 (15EE62/17EE62)	
CO1	Model the power system components & construct per unit impedance diagram of power system.
CO2	Analyze three phase symmetrical faults on power system.
CO3	Compute unbalanced phasors in terms of sequence components and vice versa, also develop sequence networks.
CO4	Analyze various unsymmetrical faults on power system.
CO5	Examine dynamics of synchronous machine and determine the power system stability.

Year / SEM : 3rd year / 6 th sem	Year of Study : 2020-21
Course Name: DIGITAL SIGNAL PROCESSING (15EE63/17EE63)	
CO1	Apply DFT and IDFT to perform linear filtering techniques on given sequences to determine the output.
CO2	Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence
CO3	Design and realize infinite impulse response Butterworth and Chebyshev digital filters using impulse invariant and bilinear transformation techniques.
CO4	Develop a digital IIR filter by direct, cascade, parallel, ladder and FIR filter by direct, cascade and linear phase methods of realization
CO5	Design and realize FIR filters by use of window function and frequency sampling method.

Year / SEM : 3rd year / 6 th sem	Year of Study : 2020-21
Course Name: DIGITAL SIGNAL PROCESSING (15EE64/17EE64)	
CO1	Apply DFT and IDFT to perform linear filtering techniques on given sequences to determine the output.

CO2	Apply fast and efficient algorithms for computing DFT and inverse DFT of a given sequence
CO3	Design and realize infinite impulse response Butterworth and Chebyshev digital filters using impulse invariant and bilinear transformation techniques.
CO4	Develop a digital IIR filter by direct, cascade, parallel, ladder and FIR filter by direct, cascade and linear phase methods of realization
CO5	Design and realize FIR filters by use of window function and frequency sampling method.

Year / SEM : 3rd year / 6 th sem	**Year of Study : 2020-21**
Course Name: COMPUTER AIDED ELECTRICAL DRAWING (15EE651/17EE651)	
CO1	Discuss the terminology and types of DC and AC armature windings.
CO2	Develop armature winding diagram for DC and AC machines
CO3	Develop a layout for substation using the standard symbols for substation equipment. .
CO4	Draw sectional views of core and shell types transformers using the design data
CO5	Draw sectional views of assembled DC machine or its parts using the design data or the sketches

Year / SEM : 3rd year / 6 th sem	**Year of Study : 2020-21**
Course Name: SENSORS AND TRANSDUCERS (15EE662/17EE662)	
CO1	Discuss need of transducers, their classification, advantages and disadvantages
CO2	Show an understanding of working of various transducers and sensors
CO3	Discuss recent trends in sensor technology and their selection
CO4	Discuss basics of signal conditioning and signal conditioning equipment.

CO5	Explain measurement of non-electrical quantities -temperature, flow, speed, force, torque, power and viscosity

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: POWER SYSTEM ANALYSIS – 2– 15EE71	
CO1	Formulate network matrices and models for solving load flow problems.
CO2	Perform steady state power flow analysis of power systems using numerical iterative techniques.
CO3	Suggest a method to control voltage profile.
CO4	Show knowledge of optimal operation of generators on a bus bar, optimal unit commitment,
CO5	Discuss optimal scheduling for hydro-thermal system, power system security and reliability.
CO6	Analyze short circuit faults in power system networks using bus impedance matrix.
CO7	Perform numerical solution of swing equation for multi-machine stability

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: POWER SYSTEM PROTECTION– 15EE72	
CO1	Discuss performance of protective relays, components of protection scheme and relay terminology overcurrent protection.
CO2	Explain the working of distance relays and the effects ofarc resistance, power swings, line length and source impedance on performance of distance relays.
CO3	Discuss pilot protection; wire pilot relaying and carrier pilot relaying.

CO4	Discuss construction, operating principles and performance of differential relays for differential protection.
CO5	Discuss protection of generators, motors, Transformer and Bus Zone Protection.
CO6	Explain the principle of circuit interruption in different types of circuit breakers.
CO7	Describe the construction and operating principle of different types of fuses and to give the definitions of different terminologies related to a fuse.
CO8	Discuss protection against Overvoltages and Gas Insulated Substation (GIS)

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: HIGH VOLTAGE ENGINEERING – 15EE73	
CO1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics.
CO2	Explain breakdown phenomenon in solid dielectrics.
CO3	To explain different geological storage methods including storage in coal seams, depleted gas reservoirs
CO4	Explain generation of high voltages and currents
CO5	Discuss measurement techniques for high voltages and currents.
CO6	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
CO7	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus

Year / SEM : 4 th year / 7 th sem	Year of Study : 2020-21
Course Name: ADVANCED CONTROL SYSTEMSS(Professional Elective) – 15EE741	
CO1	Discuss state variable approach for linear time invariant systems in both the continuous and discrete time systems.
CO2	Develop of state models for linear continuous – time and discrete – time systems.
CO3	Apply vector and matrix algebra to find the solution of state equations for linear continuous – time and discrete – time systems.
CO4	Define controllability and observability of a system and test for controllability and observability of a given system.
CO5	Design pole assignment and state observer using state feedback.
CO6	Develop the describing function for the nonlinearity present to assess the stability of the system.
CO7	Develop Lyapunov function for the stability analysis of nonlinear systems.

Year / SEM : 4 th year / 7 th sem	Year of Study : 2020-21
Course Name: UTILIZATION OF ELECTRICAL POWER(Professional Elective) – 15EE742	
CO1	Discuss electric heating, air-conditioning and electric welding.
CO2	Explain laws of electrolysis, extraction and refining of metals and electro deposition.
CO3	Explain the terminology of illumination, laws of illumination, construction and working of electric lamps.
CO4	Design interior and exterior lighting systems- illumination levels for factory lighting- flood lighting-street lighting.
CO5	Discuss systems of electric traction, speed time curves and mechanics of train movement.

CO6	Explain the motors used for electric traction and their control.
CO7	Discuss braking of electric motors, traction systems and power supply and other traction systems.
CO8	Explain the working of electric and hybrid electric vehicles.

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: CARBON CAPTURE AND STORAGE(Professional Elective)-15EE743	
CO1	Discuss the impacts of climate change and the measures that can be taken to reduce emissions.
CO2	Discuss carbon capture and carbon storage.
CO3	Explain the fundamentals of power generation.
CO4	Explain methods of carbon capture from power generation and industrial processes.
CO5	Explain different carbon storage methods: storage in coal seams, depleted gas reservoirs and saline formations.
CO6	Explain Carbon dioxide compression and pipeline transport.

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: POWER SYSTEM PLANNING (Professional Elective)–15EE744	
CO1	Discuss primary components of power system planning, planning methodology for optimum power system expansion, various types of generation, transmission and distribution.
CO2	Show knowledge of forecasting of future load requirements of both demand and energy by deterministic and statistical techniques using forecasting tools.
CO3	Discuss methods to mobilize resources to meet the investment requirement for the power sector

CO4	Understand economic appraisal to allocate the resources efficiently and appreciate the investment decisions
CO5	Discuss expansion of power generation and planning for system energy in the country, evaluation of operating states of transmission system, their associated contingencies and the stability of the system.
CO6	Discuss principles of distribution planning, supply rules, network development and the system studies
CO7	Discuss reliability criteria for generation, transmission, distribution and reliability evaluation and analysis, grid reliability, voltage disturbances and their remedies
CO8	Discuss planning and implementation of electric –utility activities, market principles and the norms framed by CERC for online trading and exchange in the interstate power market.

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: FACTS AND HVDC TRANSMISSION (Professional Elective)-15EE751	
CO1	Discuss transmission interconnections, flow of Power in an AC System, limits of the loading capability, dynamic stability considerations of a transmission interconnection and controllable parameters.
CO2	Explain the basic concepts, definitions of flexible ac transmission systems and benefits from FACTS technology.
CO3	Describe shunt controllers, Static Var Compensator and Static Compensator for injecting reactive power in the transmission system in enhancing the controllability and power transfer capability.
CO4	Describe series Controllers Thyristor-Controlled Series Capacitor (TCSC) and the Static Synchronous Series Compensator (SSSC) for control of the transmission line current.
CO5	Explain advantages of HVDC power transmission, overview and organization of HVDC system
CO6	Describe the basic components of a converter, the methods for compensating the reactive power demanded by the converter.
CO7	Explain converter control for HVDC systems, commutation failure, control functions

Year / SEM : 4 th year / 7 th sem	Year of Study : 2020-21
Course Name: TESTING AND COMMISSIONING OF POWER SYSTEM APPARATUS(Professional Elective)– 15EE752	
CO1	Describe the process to plan, control and implement commissioning of electrical equipment's.
CO2	Differentiate the performance specifications of transformer and induction motor.
CO3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.
CO4	Describe corrective and preventive maintenance of electrical equipment's.
CO5	Explain the operation of an electrical equipment's such as isolators, circuit breakers, induction motorand synchronous machines.

Year / SEM : 4 th year / 7 th sem	Year of Study : 2020-21
Course Name: POWER SYSTEM SIMULATION LABORATORY–15EEL76	
CO1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
CO2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator.
CO3	Develop a program in MATLAB to assess the transient stability under three phase fault at differen locations in a of radial power systems.
CO4	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
CO5	Use Mi-Power package to solve power flow problem for simple power systems.
CO6	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems

CO7	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants.

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: POWER SYSTEM SIMULATION LABORATORY–15EEL76	
CO1	Develop a program in MATLAB to assess the performance of medium and long transmission lines.
CO2	Develop a program in MATLAB to obtain the power angle characteristics of salient and non-salient pole alternator.
CO3	Develop a program in MATLAB to assess the transient stability under three phase fault at different locations in a of radial power systems.
CO4	Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
CO5	Use Mi-Power package to solve power flow problem for simple power systems.
CO6	Use Mi-Power package to study unsymmetrical faults at different locations in radial power systems
CO7	Use of Mi-Power package to study optimal generation scheduling problems for thermal power plants.

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: RELY AND HIGH VOLTAGE LABORATORY–15EEL77	
CO1	Experimentally verify the characteristics of over current, over voltage, under voltage and negative sequence relays both electromagnetic and static type.
CO2	Experimentally verify the characteristics of microprocessor based over current, over voltage, under voltage relays and distance relay.
CO3	Show knowledge of protecting generator, motor and feeders.

CO4	Analyze the spark over characteristics for both uniform and non-uniform configurations using High AC nd DC voltages
CO5	Measure high AC and DC voltages and breakdown strength of transformer oil**.**
CO6	**Draw electric field and** measure the capacitance of different electrode configuration models.
CO7	Show knowledge of generating standard lightning impulse voltage to determine efficiency, energy ofimpulse generator and 50% probability flashover voltage for air insulation.

Year / SEM : 4 th year / 7 th sem	**Year of Study : 2020-21**
Course Name: PROJECT PHASE – I AND SEMINAR–15EEP78	
CO1	Demonstrate a sound technical knowledge of their selected project topic.
CO2	Undertake problem identification, formulation and solution.
CO3	Design engineering solutions to complex problems utilising a systems approach.
CO4	Communicate with engineers and the community at large in written an oral forms.
CO5	Demonstrate the knowledge, skills and attitudes of a professional engineer.

Year / SEM : 4 th year / 8 th sem	**Year of Study : 2020-21**
Course Name: POWER SYSTEM OPERATION AND CONTROL(Core Course) – 15EE81	
CO1	Describe various levels of controls in power systems, the vulnerability of the system,components, architecture and configuration of SCADA.
CO2	Solve unit commitment problems

CO3	Explain issues of hydrothermal scheduling and solutions to hydro thermal problems
CO4	Explain basic generator control loops, functions of Automatic generation control, speed governors
CO5	Develop and analyze mathematical models of Automatic Load Frequency Control
CO6	Explain automatic generation control, voltage and reactive power control in an interconnected power system.
CO7	Explain reliability, security, contingency analysis, state estimation and related issues of power systems.■

Year / SEM : 4 th year / 8 th sem	**Year of Study : 2020-21**
Course Name: INDUSTRIAL DRIVES AND APPLICATIONS(Core Course) –15EE82	
CO1	Explain the advantages and choice of electric drive.
CO2	Explain dynamics and different modes of operation of electric drives.
CO3	Suggest a motor for a drive and control of dc motor using controlled rectifiers.
CO4	Analyze the performance of induction motor drives under different conditions.
CO5	Control induction motor, synchronous motor and stepper motor drives.
CO6	Suggest a suitable electrical drive for specific application in the industry.

Year / SEM : 4 th year / 8 th sem	**Year of Study : 2020-21**

Course Name: OPERATION AND MAINTENANCE OF SOLAR ELECTRICSYSTEMS (Professional Elective)–15EE832	
CO1	Discuss basics of solar resource data, its acquisition and usage.
CO2	Explain PV technology, buying the PV modules and connecting the modules to form arrays.
CO3	Explain the use of inverters, other system components, cabling used to connect the components and mounting methods of the PV system.
CO4	Assess the site for PV system installation.
CO5	Design a grid connected system and compute its size.
CO6	Explain installation, commissioning, operation and maintenance of PV systems.
CO7	Explain the types of financial incentives available, calculation of payback time

Year / SEM : 4 th year / 8 th sem	Year of Study : 2020-21
Course Name: INTERNSHIP / PROFESSIONAL PRACTICE –15EE84	
CO1	Gain practical experience within industry in which the internship is done.
CO2	Acquire knowledge of the industry in which the internship is done.
CO3	Apply knowledge and skills learned to classroom work.
CO4	Develop a greater understanding about career options while more clearly defining personal career goals
CO5	Experience the activities and functions of professionals.

Year / SEM : 4 th year / 8 th sem	Year of Study : 2020-21
Course Name: PROJECT WORK PHASE -II–15EEP85	
CO1	Present the project and be able to defend it.
CO2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
CO3	Habituated to critical thinking and use problem solving skills
CO4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
CO5	Work in a team to achieve common goal.
CO6	Learn on their own, reflect on their learning and take appropriate actions to improve it.

Year / SEM : 4 th year / 8 th sem	Year of Study : 2020-21
Course Name: SEMINAR15EES86	
CO1	Attain, use and develop knowledge in the field of electrical and electronics engineering and other disciplines through independent learning and collaborative study.
CO2	Identify, understand and discuss current, real-time issues
CO3	Improve oral and written communication skills
CO4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.
CO5	Apply principles of ethics and respect in interaction with others.

Department of Master of Business Administration

2.6.1 Program outcomes, program specific outcomes and course outcomes

Program Outcomes:

PO1: Students are given sufficient theoretical knowledge and are enabled to apply them to solve practical problems in business and other organizations/institutions of importance

PO2 : Students are provided effective communication skills with a high degree of lateral and critical thinking that enhances learn ability, developed for being continuously employable. Students are instilled with leadership qualities, ethically sound, enabled with decision making skills that reflect a high degree of social consciousness

PO3: Students are trained for sustained research orientation to comprehend a growingly complex, economic, Legal and ethical environment

PO4: Students are equipped with self sustaining entrepreneurship qualities that encourages calculated risk taking.

Course outcomes (COs)

Year/ SEM: 1st year/1st sem	Year of Study:2020-21
Course Name: MANAGEMENT & ORGANIZATIONAL BEHAVIOUR – 20MBA11	
CO1	Gain practical experience in the field of Management and Organization Behaviour
CO2	Acquire the conceptual knowledge of Management, various functions of Management and theories in Organizational Behaviour.
CO3	Apply managerial and behaviour knowledge in real world situations.
CO4	Develop a greater understanding about Management and Behavioural aspects to analyse the concepts related to individual behavior, attitude, perception and personality.
CO5	Understand and demonstrate their exposure on recent trends in management.

Year/ SEM: 1st year/1st sem	Year ofStudy:2020-21
Course Name: MANAGERIAL ECONOMICS - 20MBA12	
CO1	The student will understand the application of Economic Principles in Management decision making.
CO2	The student will learn the micro economic concepts and apply them for effective functioning of a Firm and Industry.
CO3	The Student will be able to understand, assess and forecast Demand.
CO4	The student will apply the concepts of production and cost for optimization of production.
CO5	The student will design Competitive strategies like pricing, product differentiation etc. and marketing according to the market structure.
CO6	The student will be able to understand macroeconomic concepts.

Year/ SEM: 1st year/1st sem	Year ofStudy:2020-21
Course Name: ACCOUNTING FOR MANAGERS - 20MBA13	
CO1	Demonstrate theoretical knowledge and its application in real time accounting.
CO2	Capable of preparing financial statement of companies.
CO3	Independently undertake financial statement analysis and take decisions.
CO4	Comprehend emerging trends in accounting and computerization of Accounting systems.

Year/ SEM: 1st year/1st sem	Year ofStudy:2020-21
Course Name: BUSINESS STATISTICS 20MBA14	
CO1	Facilitate objective solutions in business decision making under subjective conditions.
CO2	Demonstrate different statistical techniques in business/real-life situations.
CO3	Understand the importance of probability in decision making.
CO4	Understand the need and application of analytics.
CO05	Understand and apply various data analysis functions for business problems.

Year/SEM:1st year /1st sem	Year ofStudy:2020-21
Course Name: MARKETING MANAGEMENT – 20MBA15	
CO1	Develop an ability to assess the impact of the environment on marketing function.
CO2	To formulate marketing strategies that incorporate psychological and sociological factors which influence buying .
CO3	Understand concept of Branding, development of product and significance of market segmentation , targeting and positioning.

CO4	Identifying marketing channels and the concept of product distribution.
CO5	Identifying techniques of sales promotion , significance of marketing research.
CO6	Synthesize ideas into a viable marketing plan for various modes of marketing

Year/ SEM: 1st year/1st sem	**Year ofStudy:2020-21**
Course Name: MANAGERIAL COMMUNICATION -20MBA16	
CO1	The students will be aware of their communication skills and know their potential to become successful managers.
CO2	The students will get enabled with the mechanics of writing and can compose the business letters in English precisely and effectively.
CO3	Students will get exposure in drafting business proposals to meet the challenges of competitive environment.
CO4	The students will be introduced to the managerial communication practices in business those are in vogue.
CO5	Students will get trained in the art of Interpersonal communication and technological advancement and social media usage in communications, with emphasis on analysing business situations.

Year/ SEM:1st Year/2nd sem	**Year ofStudy:2020-21**
Course Name: HUMAN RESOURCE MANAGEMENT -20MBA21	
CO1	Gain practical experience in the field of Human Resource Concepts, functions and theories.

CO2	Acquire the conceptual insight of Human Resource and various functions of HR.
CO3	Apply personnel, managerial and welfare aspects of HR.
CO4	Develop a greater understanding about HR practices, analyse the trends in the field of HR.

Year/ SEM:1st Year/2nd sem	**Year ofStudy:2020-21**
Course Name: FINANCIAL MANAGEMENT -20MBA22	
CO1	Understand the basic financial concepts
CO2	Apply time value of money
CO3	Evaluate the investment decisions
CO4	Estimate working capital requirements
CO5	Analyze the capital structure and dividend decisions

Year/ SEM:1st Year/2nd sem	**Year ofStudy:2020-21**
Course Name: RESEARCH METHODOLOGY -20MBA23	
CO1	Understand various research approaches, techniques and strategies in the appropriate in business.
CO2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems.
CO3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing.
CO4	Develop necessary critical thinking skills in order to evaluate different research approaches in Business using excel in particular

Year/ SEM:1st Year/2nd sem	Year ofStudy:2020-21
Course Name: OPERATIONS RESEARCH -20MBA24	
CO1	Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases
CO2	Use appropriate quantitative techniques to get feasible and optimal solutions
CO3	Understand the usage of game theory , Queuing Theory and Simulation for Solving Business Problems
CO4	Understand and apply the network diagram for project completion

Year/ SEM:1st Year/2nd sem	Year ofStudy:2020-21
Course Name: -STRATEGIC MANAGEMENT -20MBA25	
CO1	Students should get clear idea about the concept of Strategic Management, its relevance, Characteristics, process nature and purpose.
CO2	Student to acquire an understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage.
CO3	To give the students an insight on strategy at different levels of an organization to gain competitive advantage.
CO4	To help students understand the strategic drive in multinational firms and their decisions in different markets.
CO5	To enable the students to gain knowledge of strategy implementation and the control measures for effective decision-making.

Year/ SEM:1st Year/2nd sem	Year ofStudy:2020-21
Course Name: - ENTREPRENEURSHIP AND LEGAL ASPECTS -20MBA26	
CO1	Display keen interest and orientation towards entrepreneurship, entrepreneurial opportunity Modules' in order to setup a business and to think creatively.

CO2	To know about the various business models and B-Plans across Business sectors.
CO3	Able to understand the importance of marketing and different forms of businesses.
CO4	Become aware about various sources of funding and institutions supporting entrepreneurs.
CO5	Awareness about legal aspects and ways to protect the ideas.
CO6	To understand the ways of starting a company and to know how to protect their ideas.

Year/ SEM:2nd Year/3rd sem	**Year ofStudy:2020-21**
Course Name: EMERGING EXPONENTIAL TECHNOLOGIES -20MBA301	
CO1	Identify different emerging technologies
CO2	Select appropriate technology and tools for a given task
CO3	Identify necessary inputs for application of emerging technologies
CO4	Understand the latest developments in the area of technology to support business

Year/ SEM:2nd Year/3rd sem	**Year ofStudy:2020-21**
Course Name: Technology & Operational Strategy -20MBA302	
CO1	Acquire the knowledge about the concepts of production and operation management
CO2	Demonstrate the basic concepts of process mapping
CO3	Evaluate the importance of Lean Manufacturing
CO4	Develop strategies of Total quality management
CO5	Understand the roles of ISO standards and production system

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: - SERVICES MARKETING -20MBA303	
CO1	Develop an understanding about the various concepts and importance of Services Marketing.
CO2	Enhance knowledge about emerging issues and trends in the service sector.
CO3	Learn to implement service strategies to meet new challenges.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: MARKETING RESEARCH &ANALYTIC -20MBA304	
CO1	Comprehend the objectives of Market research & its application in solving marketing problems.
CO2	Appreciate the use of different data collection methods, sampling design techniques, measurement methods to analyze the data.
CO3	Generalize and interpret the data with the help of various measurement techniques.
CO4	To understand the emergence of new trends in research.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: -CONSUMER BEHAVIOUR -20MBA305	
CO1	Explain the background and concepts vital for understanding Consumer Behaviour.
CO2	Identify the role of variables that determines Consumer Behaviour in Social & cultural domain.
CO3	Identifying the psychological and behavioural practices adopted by organizations to enhance the Consumer Behaviour.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: -RETAIL MANAGEMENT-20MBA306	
CO1	Career development in the field of sales
CO2	Management of sales
CO3	Find out the contemporary retail management, issues, and strategies.
CO4	Evaluate the recent trends in retailing and its impact in the success of modern business.
CO5	Relate store management and visual merchandising practices for effective retailing.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: -INVESTMENT MANAGEMENT-20MBAFM303	
CO1	The student will understand the capital market and various Instruments for Investment.
CO2	The learner will be able to assess the risk and return associated with investments and methods to value securities.
CO3	The student will be able to analyse the Economy, Industry and Company framework for Investment Management.
CO4	The student will learn the theories of Portfolio management and also the tools and techniques for efficient portfolio management.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: -DIRECT TAXATION-20MBAFM304	
CO1	Understand the basics of taxation and process of computing residential status.
CO2	Calculate taxable income under different heads.
CO3	Understand deductions and calculation of tax liability of Individuals.
CO4	Know the corporate tax system.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: -BANKING & FINANCIAL SERVICES-20MBAFM305	
CO1	The Student will be acquainted to various Banking and Non-Banking financial services in India.
CO2	The Student will understand the activities of Merchant Banking and credit rating.
CO3	The Student will be equipped to understand micro financing and other financial services in India.
CO4	The Student will understand how to evaluate and compare leasing & hire purchase.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: ADVANCED FINANCIAL MANAGEMENT-20MBAFM306	
CO1	Get an overview of capital structure theories.
CO2	Understand and assess the dividend policy of the firm.
CO3	Realize the importance of management of working capital in an organization.
CO4	Be aware of the techniques of cash, inventory and receivables management

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: -RECRUITMENT AND SELECTION-20MBAHR303	
CO1	Gain the practical insight of various principles and practices of recruitment and selection.
CO2	Acquire knowledge of latest conceptual framework used in recruitment and selection process and procedure applied in various industries.
CO3	Illustrate the application of recruitment and selection tools and techniques in various sectors.
CO4	Develop a greater understanding about strategies for workforce planning and assessment, analyse the hiring management system followed in various industries.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: HUMAN RESOURCE ANALYTICS-20MBAHR304	
CO1	Gain practical insight of HR Processes, HR analytics and predictive modelling used in HR functions.
CO2	Acquire conceptual knowledge of HRA frameworks, models and approaches.
CO3	Illustrate the application of datafication of HR, predictive analytics tools and techniques.
CO4	Analyse the employee data set, considering the various concepts and functions of HR, facilitating the decision making in business context.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: INDUSTRIAL RELATIONS AND LABOUR LAWS-20MBAHR305	
CO1	Gain practical experience related to labour legislations in India across various sectors.
CO2	Acquire conceptual knowledge of Industrial relations and labour laws followed within industries.
CO3	Develop the greater understanding of IR concepts and its application in solving various issues in IR.
CO4	Apply the IR and labour laws concepts in various industries in India.

Year/ SEM:2nd Year/3rd sem	Year ofStudy:2020-21
Course Name: COMPENSATION MANAGEMENT AND REWARD SYSTEM-20MBAHR306	
CO1	Gain insights of various conceptual aspects of Compensation and Benefits to achieve organizational goals.
CO2	Determine the performance based compensation system for business excellence and solve various cases.
CO3	Designing the compensation strategies for attraction, motivation and retaining high quality workforce.

CO4	Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wage survey and calculate various bonus.

Year/ SEM:2nd Year/4th sem	**Year ofStudy:2020-21**
Course Name: B2B MARKETING MANAGEMENT-20MBAMM401	
CO1	Understand significance of B2B marketing .
CO2	Ability to create an integrated marketing communications plan which includes promotional strategies.
CO3	Effectively use marketing communication for customer acquisition
CO4	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics.

Year/ SEM:2nd Year/4th sem	**Year ofStudy:2020-21**
Course Name:LOGISTICS AND SUPPLY CHAIN MANAGEMENT-20MBAMM402	
CO1	Demonstrate knowledge of the functions of logistics and supply chain management.
CO2	To relate concepts and activities of the supply chain to actual organizations.
CO3	Highlight the role of technology in logistics and supply chain management.
CO4	Evaluate cases for effective supply chain management and its implementation.

Year/ SEM:2nd Year/4th sem	**Year ofStudy:2020-21**
Course Name: DIGITAL MARKETING MANAGEMENT-20MBAMM403	
CO1	Recognize appropriate e-marketing objectives.
CO2	Appreciate the e-commerce framework and technology.
CO3	Illustrate the use of search engine marketing, online advertising and marketing strategies.
CO4	Develop social media strategy’s to solve business problems.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: -STRATEGIC BRAND MANAGEMENT-20MBAMM404	
CO1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management.
CO2	Understand the overview of management, theory of management and practical applications of the same.
CO3	Effectively use their skills for self-grooming, working in groups and to achieve organizational goals .
CO4	Demonstrate their acumen in applying managerial and behavioral concept in real world/situation.
CO5	Understand and demonstrate their exposure on recent trends in management

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: AGRI BUSINESS MARKETING-20MBAMM405	
CO1	Highlight the characteristics of Indian rural markets and describe the differences between rural and the urban economy.
CO2	Analyze the roadblocks of Indian rural market and advocate solutions for the problems of rural markets.
CO3	Emphasize the different strategies adopted by Indian companies for rural markets.
CO4	Apply the strategies to be adopted for influencing the rural consumers

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: INTERNATIONAL MARKETING MANAGEMENT- 20MBAMM406	
CO1	Understand the differences between domestic marketing and international marketing.
CO2	Understand the concept of international pricing and distribution decision.
CO3	Acquire the knowledge of import export documentation.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: FINANCIAL DERIVATIVES-20MBAFM402	
CO1	Understand the mechanism of forwards/futures, options, financial swaps, various credit derivatives and VaR with their features, merits and demerits.
CO2	Assess the application of forwards/futures, options, financial swaps, various credit derivatives and VaR using numerical problems.
CO3	Application of financial derivatives in risk management.
CO4	Critically evaluate various financial derivatives.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: INDIRECT TAXATION-20MBAFM403	
CO1	Have clarity about GST system in India
CO2	Understanding of levy and collection of GST in India
CO3	Have an overview of customs duty in India
CO4	Understanding of valuation for customs duty.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: MERGERS, ACQUISITIONS & CORPORATE RESTRUCTURING -20MBAFM404	
CO1	Understand M&A with its different classifications, strategies, theories, synergy etc.
CO2	Conduct financial evaluation of M&A
CO3	Critically evaluate different types of M&A, takeover and antitakeover strategies
CO4	Analyse the results after evaluation

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: CORPORATE VALUATION-20MBAFM405	
CO1	Understand corporate valuation and valuation process
CO2	Familiarize with the standard techniques of corporate valuation
CO3	Develop analytical skills relevant for corporate valuation and value based management
CO4	Critically evaluate IPOs, M&As, Bankruptacy cases

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: INTERNATIONAL FINANCIAL MANAGEMENT -20MBAFM406	
CO1	The student will have an understanding of the International Financial Environment.
CO2	The student will learn about the foreign exchange market, participants and transactions.
CO3	The student will be able to use derivatives in foreign exchange risk management.
CO4	The student will be able to evaluate the Firm's Exposure to risk in International environment and various theories associated with it.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: ORGANISATIONAL LEADERSHIP -20MBAHR401	
CO1	Understand the fundamental concepts and principles, theories of Organizational Leadership.
CO2	Analyze the organizational leadership style, approaches and traits, its impact on the followers by using leadership theories and instruments.
CO3	Developing better insight in understanding the leadership traits that influence them to work effectively in group.
CO4	Demonstrate their ability to apply of their knowledge in organizational leadership.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: PERSONAL GROWTH AND INTERPERSONAL EFFECTIVENESS -20MBAHR402	
CO1	Have in-depth understanding the various personality traits which promotes personal growth.
CO2	Analyze the concepts of human personality, behaviour and functioning of mind
CO3	Learn and apply the psychometrics tests in understanding the personality traits.
CO4	Develop the greater insight of self, and others through various theories and prepare the developmental plan for interpersonal effectiveness.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
CourseName: - INTERNATIONAL HUMAN RESOURCES MANAGEMENT -20MBAHR403	
CO1	Gain conceptual knowledge and practical experience in understanding the HR concepts globally.
CO2	Comprehend and correlate the strategic approaches to HR aspects amongst PCN's, TCN's and HCN's
CO3	Develop knowledge and apply the concepts of HR in global perspective
CO4	Have a better insight of HR concepts, policies and practices by critically analysing the impact of contemporary issues globally.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: ORGANISATIONAL CHANGE AND DEVELOPMENT -20MBAHR404	
CO1	Gain conceptual insight of change management models, OD processes and interventions.
CO2	Develop the understanding of OD to apply OD aspects in private and public sectors in India
CO3	Analyse the tools and techniques available to implement changes in the organization environment
CO4	Handle the OD interventions by analysing the role of OD consultant.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name:HUMAN RECOURSE AUDIT -20MBAHR405	
CO1	Gain conceptual knowledge and practical experience in understanding the HR Audit.
CO2	Comprehend and correlate the strategic approaches to HR Audit aspects
CO3	Develop knowledge and apply the concepts of HR Audit in the organisation
CO4	Have a better insight of HR Audit concepts, policies and practices by critically analysing the impact of contemporary issues in the organisation.

Year/ SEM:2nd Year/4th sem	Year ofStudy:2020-21
Course Name: MANAGEMENT CONSULTING FOR BUSINESS EXCELLENCE -20MBAHR406	
CO1	Gain the practical insight of various principles and practices of Consultant and Consultancy
CO2	Acquire knowledge of latest conceptual framework used by Consultant and Consultancy process and procedure applied in various sectors
CO3	Illustrate the application of Consultant and Consultancy tools and techniques in various sectors.
CO4	Develop a greater understanding about strategies adopted/undertaken by Consultant and Consultancy

Department of Master of Computer Applications

2.6.1 Program outcomes, program specific outcomes and course outcomes

Program Outcomes:

Program Outcomes (POs)
At the end of the MCA program, students are expected to have developed the following outcomes.
PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5: 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.
PO6: 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.
PO7: 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
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12: 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 (PSOs):

Engineering Graduates will be able to:

PSO-1:	Understand the principles of Computer Applications and enrich knowledge in recent advancements and developments in Software Industries.
PSO-2:	Competent in programming and computing skills, ability to apply software development methodologies and modeling to solve real world problems.

Course outcomes (COs)

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Database Management system	**Sub Code: 18MCA31**
CO1	Demonstrate the fundamentals of data models and conceptualize and depict a database system and make use of ER diagram in developing ER Model
CO2	To summarize SQL and relational database design
CO3	Illustrate transaction processing, concurrency control techniques and recovery
CO4	Inference database design n the real world entities

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Programming using python	**Sub Code: 18MCA32**
CO1	Understand and comprehend the basics of python programming
CO2	Apply knowledge in real time applications
CO3	Understand about files and its applications
CO4	Use standard programming concepts

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Design and analysis of algorithms	**Sub Code: 18MCA33**
CO1	**CO1**: problems based on their characteristics and practical importance.
CO2	**CO2**: Develop Algorithms using iterative/recursive approach
CO3	**CO3**: Compute the efficiency of algorithms in terms of asymptotic notations
CO4	**CO4**: Design algorithm using an appropriate design paradigm for solving a given problem

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: System Software	**Sub Code: 18MCA34**
CO1	Understand the introductory concepts of system software, sic and sic/xe machine architecture.
CO2	Understand the design and implementation of assemblers with implementation examples
CO3	Design and implement the linkers and loaders, macro implementation examples
CO4	Learn the basic design and working of compilers

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Software Testing	**Sub Code: 18MCA351**
CO1	Acquire knowledge of basic principles and knowledge of software testing and Debugging and test cases.
CO2	Understand the perceptions on testing like levels of testing, generalizedpseudo code and with related examples
CO3	Study the various types of testing.
CO4	Analyze the difference between functional testing and structural testing.

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: DBMS Lab	**Sub Code: 18MCA36**
CO1	Understand, appreciate the underlying concepts of database technologies
CO2	Able to create database with different types of integrity constraints and use the SQLcommands such as DDL, DML, DCL, TCL to access data from database objects.
CO3	Design and implement a database schema for a given problem domain
CO4	Perform embedded and nested queries

Year / SEM: 2nd year / 3rd sem	Year of Study : 2020-21
Course Name: Python Programming Lab	**Sub Name: 18MCA37**
CO1	Apply object-oriented programming concepts to develop dynamic interactive Python applications.
CO2	Use the procedural statements: assignments, conditional statements, loops, method calls and arrays
CO3	Design, code, and test small Python programs with a basic understanding of top-downdesign.
CO4	Learn how to create GUI and solve real-world problem using language idioms, datastructures and standard library

Year / SEM: 2nd year / 3rd sem		Year of Study : 2020-21
Course Name: Algorithms Lab		**Sub Name: 18MCA38**
CO1	Implement the concepts of time and space complexity, divide-and-conquer strategy, dynamic programming, greedy and approximate algorithms.	
CO2	Describe the methodologies of how to analyze an algorithm	
CO3	Choose a better algorithm to solve the problems.	

Year / SEM: 2nd year / 4th sem		Year of Study : 2020-21
Course Name: Advanced Java Programming		**Sub Code: 18MCA41**
CO1	Learn the concept of Servlet and its life cycle, understand JSP tags and its services	
CO2	Create packages and interfaces, Build Database connection	
CO3	Develop java server pages applications using JSP tags and develop Enterprise java bean applications.	
CO4	Develop Java Server Pages applications using JSP Tags.	

Year / SEM: 2nd year / 4th sem		Year of Study : 2020-21
Course Name: Advanced Web Programming		**Sub Code: 18MCA42**
CO1	Acquire knowledge of building the web applications using PHP, Ruby, Bootstrap, AJAX, and XML.	
CO2	Design the Asynchronous Web Application using AJAX, Understand the terminology of building web Application using MVC architecture.	
CO3	Design responsive web applications using Bootstrap.	
CO4	Acquire the knowledge of web application.	

Year / SEM: 2nd year / 4th sem		Year of Study : 2020-21
Course Name: Object Oriented Modeling and Design		**Sub Code: 18MCA43**
CO1	Acquire knowledge of Basic UML concepts and terminologies, Life Cycle of Object oriented Development, Modeling Concepts.	
CO2	Identify the basic principles of software modeling and apply them in real world applications, Produce conceptual models for solving operational problems in software and IT environment using UML.	
CO3	Analyze the development of object oriented software models in terms of static behavior, Evaluate and implement various design patterns.	
CO4	Analyze the development of Object Oriented Software models in terms of	

	Static behaviour – Dynamic behaviour

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: : Cyber Security	**Sub Code: 18MCA442**
CO1	Define and illustrate cyber security concepts and applications, Analyze the working of cyber security principles to system design.
CO2	Illustrate appropriate techniques to solve cyber security threats.
CO3	Evaluate and implement cyber security through network security protocols.
CO4	Evaluate and implement cyber security through network security protocols

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: Big Data Analytics	**Sub Code: 18MCA454**
CO1	Understand the Map Reduce technique for solving Big data problems; understand algorithms for Big Data by deciding on the apt Features set.
CO2	Apply algorithms for handling peta bytes of datasets, Analyze main memory consumption for Big Data analytics.
CO3	Understand and analyze the usage of map reduce techniques for solving big data problems.
CO4	Analyze main memory consumption for Big Data analytics

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: Professional Communication & Report Writing	**Sub Code: 18MCA46**
CO1	Understand the professional communication at work place, Acquire the knowledge technical writing and business reporting.
CO2	Develop the leadership qualities.
CO3	Acquire the knowledge technical writing and business reporting.
CO4	Understand and implement ethical behavior at work place.

Year / SEM: 2nd year / 4th sem	Year of Study : 2020-21
Course Name: Advanced Java Programming Lab	**Sub Code: 18MCA47**
CO1	Designing HTML pages to demonstrate Java Servlets, JSP, Bean and EJB programs.

CO2	Implementing Dynamic HTML using Servlet and demonstration of service methods, auto webpage refresh, Session tracking using cookie and Http Session in Servlet.
CO3	Learn the fundamental of connecting to the database.
CO4	Demonstrate JSP (page attributes, action tags and all basic tags)and types of EJB applications.

Year / SEM: 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Advanced Web Programming Lab	**Sub Code: 18MCA48**
CO1	Understand, analyze and apply the role of server side scripting languages.
CO2	Build web application using PHP, Ruby, jQuery, XML and store values in MYSQL.
CO3	Build web applications using Ruby and Rails

Year / SEM: 2nd year / 4th sem	**Year of Study : 2020-21**
Course Name: Object Oriented Modeling and Design Lab	**Sub Code: 18MCA49**
CO1	Understand the fundamental principles of Object-Oriented analysis, design, development and programming
CO2	Demonstrate and represent the UML model elements, to enable visual representation of the system being developed
CO3	Implement object oriented design model with the help of modern tool, Rational software Architect
CO4	Analyze and differentiate the static and dynamic behavior of the system for achieving the intended functionalities of the system

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Sub Code: 18MCA51	**Sub Name: Programming Using C# .NET**
CO1	Understand C# & client server concepts using .Net Frame work components.
CO2	Apply delagates,events and exception handling to incorporate with ASP,winform,ADO.NET,Analyze the use of .NET components depending on the problem statement
CO3	Implement & Develop a web based and console based application with database connectivity.
CO4	Analyze the use of .Net Components depending on the problem statement.

Year / SEM: 3rd year / 5th sem	Year of Study : 2020-21
Sub Code : 18MCA52	**Sub Name: Mobile Applications**
CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities and develop applications using software development kits, frameworks and toolkits.
CO2	Establish various methods to integrate database and server side technologies and develop open source software based mobile applications.
CO3	Build and deploy competent mobile development applications
CO4	Design and develop open source software based mobile applications

Year / SEM: 3rd year / 5th sem	Year of Study : 2020-21
Sub Code: 18MCA53	**Sub Name: Machine Learning**
CO1	Develop and appreciation for what is involved in learning models from data
CO2	Differentiate supervised and unsupervised learning; understand neural network and classification techniques.
CO3	Understand machine learning algorithms and statistical analysis
CO4	Understand theory of probability and statistics related to machine learning.

Year / SEM: 3rd year / 5th sem	Year of Study : 2020-21
Course Name: 18MCA542	**Sub Name: Internet Of Things**
CO1	Understand the challenges of IOT networks, Smart objects.
CO2	Appraise the role of IOT protocol and understand the need of data analysis and security in IOT network
CO3	Learn different sensor technologies for sensing real world entities
CO4	Analyze, design or develop parts of an Internet of Things solution and map it towardselected business model(s)

Year / SEM: 3rd year / 5th sem	Year of Study : 2020-21
Sub Code: 18MCA553	**Sub Name: Software Architecture**
CO1	**Acquire knowledge of applications of architectural patterns**

CO2	**Modeling quality attributes and understand the requirement gathering techniques**
CO3	**Understand different design patterns**
CO4	**Understand** techniques of requirements gathering through interviewing stake holders, etc.

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Sub Code: 18MCA56	**Sub Name: C#.net Lab**
CO1	Understand C# and client-server concepts using .Net Frame Work Components
CO2	Apply delegates, event and exception handling to incorporate with ASP, Win Form, ADO.NET
CO3	Analyze the use of .Net Components depending on the problem statement
CO4	Implement & develop a web based and Console based application with Database

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Sub Code: 18MCA57	**Sub Name: Mobile Applications Lab**
CO1	Illustrate effective user interfaces that leverage evolving mobile device capabilities
CO2	Develop applications using software development kits (SDKs), frameworks and toolkits
CO3	Establish various methods to integrate database and server-side technologies
CO4	Design and develop open source software based mobile applications.

Year / SEM: 3rd year / 5th sem	**Year of Study : 2020-21**
Sub Code: 18MCA58	**Sub Name: Mini Project**
CO1	Identify a suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and their ethical responsibilities.
CO2	Ability to segregate work and execute/implement projects using appropriate tools.
CO3	Develop skills to disseminate technical and general information by means of oral as well as written presentation skills.

Year / SEM: 3rd year / 6th sem		Year of Study : 2020-21
Course Name: Sub code: 18MCA61, 62, 63		**Sub name: Intership, Project work, Seminar**
CO1	Identify the suitable problem making use of the technical and engineering knowledge gained from previous courses with the awareness of impact of technology on the society and ethical responsibilities	
CO2	Ability to segregate work and execute/implement project using appropriate tools	
CO3	Develop skills to disseminate technical and general information by means of oral as well as return presentation and professional skills.	