

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(An Autonomous Institution)

Vision

To be a premier Institute in the country, striving continuously in pursuit of excellence in educational environment wherein the students are prepared to meet the challenges of the modern industry and society.

Mission

- To provide a healthy educational environment for students and staff to cater to the needs of the Society
- To provide a creative environment and innovative approach to the learning process.
- To spread engineering/technological awareness at all levels.
- To contribute for the development of this region in particular and the nation in general.

Program Outcomes

PO-1: Engineering Knowledge: An ability to apply knowledge of mathematics, computing, science, Electrical and Electronics Engineering.

PO-2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and Engineering sciences.

PO-3: 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 public health and safety, and cultural, societal, and environmental considerations.

PO-4: 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.

PO-5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO-6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Engineering practice.

- PO-7: Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO-8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.
- PO-9: Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO-10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with the 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.
- PO-11: 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.
- PO-12: Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Electronics and Communication Engineering

Program Educational Objectives (PEOs)

PEO1: The graduates should have a solid foundation of conceptual knowledge in mathematics, sciences and basic engineering and other support courses that are requisites for understanding the core subjects of the curriculum.

PEO2: The graduates should have the professional competency in cutting edge technologies and skills to handle modern tools to solve complex technological problems and become proficient in research, design and development of products, processes and systems as may be required in their career in Electronics engineering in a global scenario.

PEO3: The graduates should be endowed with professionalism, ethical behavior, effective communication skills, spirit of teamwork, multidisciplinary approach and ability to relate engineering issues to broader social and environmental issues.

PEO4: The graduates should have the inbuilt capacity for lifelong learning to keep updated constantly with emerging technologies and tools and create a niche for themselves and the institute attracting high demand for employability in the area of their choice in industry, in research, in academics or as an entrepreneur.

PEO5: To communicate the ideas of the students for effective collaboration with other members of Engineering streams.

Program Specific Outcomes (PSOs)

PSO1: Ability to apply the acquired knowledge of core subjects in design and development of communications/ Signal Processing/VLSI /Embedded Systems.

PSO2: Analyze and solve the complex Electronics and Communication Engineering problems using state-of-art hardware and software tools.

PSO3: Develop innovative technologies for Entrepreneurship based on the research outcomes of Electronics and communication Engineering,

Computer Science and Engineering

Program Educational Objectives(PEOs)

PEO1:To gain the ability to identify, formulate and solve challenging Computer Science and Engineering problems.

PEO2:To develop professional skills that prepares the students for immediate employment and/or for higher studies in Computer Science and Engineering as well as related disciplines.

PEO3:To provide an educational foundation that prepares the students for leadership roles along diverse career paths.

PEO4:To develop an understanding of the social and human context in which engineering contributions will be utilized.

PEO5:To train the students to be able to communicate their ideas for effective collaboration with other members of engineering streams.

Civil Engineering

Program Educational Objectives(PEOs)

PEO1:Expose the professional competency in multi-disciplinary fields of the engineering industry and/or pursue higher education by nourishing mathematical scientific and engineering precepts.

PEO2:Investigate, develop and analyze the solutions for complex civil engineering problems by confirming safety, sustainability, and ecological harmony.

PEO3:Create the environment for exploring professionalism through the latest technology and understanding societal impacts to protect the interests of the public at large.

PEO4: Educate the students to be able to communicate their ideas for effective collaboration with other members of engineering streams by following the ethical and moral values in their professional careers.

Electrical and Electronics Engineering

Program Educational Objectives(PEOs)

PEO 1:To prepare the students to be graduated in B.Tech EEE Program.

PEO 2:To motivate the students towards Research and innovation.

PEO 3:To make the students to pursue their Higher Education at National/International level.

PEO 4: To Train the students to become an Entrepreneur.

PEO 5: To enhance the skills of a student such as Professional skills, Communication skills and Technical Skills etc. for Industry ready.

Mechanical Engineering

Program Educational Objectives(PEOs)

PEO1: To prepare the students for Successful professional careers with strong fundamental knowledge in Science, Mathematics, English and Engineering Sciences so as to enable them to analyze the Mechanical Engineering related problems leading to leadership, entrepreneurship or pursuing higher education (Preparation).

PEO2: To prepare the students for successful careers in industry that means the needs of Industries.

PEO3: Strengthen themselves, using the infrastructure at their disposal to get placed in the areas of their interest, enter in to higher education and take up research assignments so as to meet the challenges of engineering world.

PEO4: To promote the students for continuous learning, research and development with strong professional, moral and ethical values and zeal for life-long learning.

PEO5: To train the students to be able to communicate their ideas for effective collaboration with other members of engineering.

Program Specific Outcomes (PSOs)

PS01: Apply the acquired knowledge in design, thermal, manufacturing and interdisciplinary areas for solving industry and socially relevant problems.

PS02: To enhance the abilities of students by imparting knowledge in emerging technologies to make them confident mechanical engineers.

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES			
UGC-AUTONOMOUS-Affiliated to JNTUH,Narsampet Warangal (R) – 506 332			
DEPARTMENT OF CIVIL ENGINEERING			
S.NO	DEGREE / UG	R22: SYLLABUS A.Y.2023-2024	
	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)
1	I-I	MATRICES AND CALCULUS	CO1:Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods. CO2:Determine Eigen values, Eigen vectors of matrices. CO3:Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions. CO4:Calculate Partial derivatives, extreme of functions of multiple variables CO5:Evaluate the multiple integrals in various coordinate systems.
2	I-I	APPLIED MECHANICS	CO1:Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2: Identify the role of semiconductor devices in science and engineering Applications. CO3:Explore the fundamental properties of dielectric, magnetic materials and energy for their applications. CO4:Appreciate the features and applications of Nano materials. CO5:Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
3	I-I	C PROGRAMMING AND DATA STRUCTURES	CO1: Understand the various steps in Program development. CO2:Explore the basic concepts in C Programming Language. CO3: Develop modular and readable C Programs CO4:Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures. CO5:Apply data structures such as stacks, queues in problem solving
3	I-I	ENGINEERING WORKSHOP	CO1:Study and practice on machine tools and their operations CO2:Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding. CO3:Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling. CO4:Apply basic electrical engineering knowledge for house wiring practice.
4	I-I	ENGLISH FOR SKILL ENHANCEMENT	CO1: Understand the importance of vocabulary and sentence structures. CO2:Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3:Demonstrate their understanding of the rules of functional grammar. CO4:Develop comprehension skills from the known and unknown passages. CO5:Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts. CO6. Acquire basic proficiency in reading and writing modules of English.
5	I-I	ELEMENTS OF CIVIL ENGINEERING	CO1:Understands the method and ways of investigations required for Civil Engineering projects CO2:Identify the various rocks, minerals depending on geological classifications CO3:Evaluate the properties of cement, fine and coarse aggregates and determine its suitability for construction
6	I-I	APPLIED PHYSICS LABORATORY	CO1: Understand the optical phenomenon of interference and diffraction . CO2: Know the determination of the energy gap of semiconductor materials. CO3:Gain the knowledge of applications of fiber optics in communication. CO4:Appreciate quantum physics in semiconductor devices and optoelectronics CO5: Apply the various procedures, mathematical concepts and techniques for the experiments to obtain quantitative results
7	I-I	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	CO1. Understand the nuances of English language through audio- visual experience and group activities CO2. Understand and respond to their speakers. CO3.Neutralize their accent for intelligibility CO4. Speak with clarity and confidence which in turn enhances their employability skills
8	I-I	C PROGRAMMING AND DATA STRUCTURES LABORATORY	CO1: Develop modular and readable C Programs CO2: Solve problems using strings, functions CO3: Handle data in files CO4: Implement stacks, queues using arrays, linked lists. CO5 To understand and analyze various searching and sorting algorithms
			CO1:Understanding of Ecosystem CO2:Natural resources, Depletion of natural resources and prevention methods

9	I-I	Environmental Sciences	CO3:.: Biodiversity, Protection, sharing of the biodiversity.
			CO4:.: Environmental pollution- Understanding of water, soil, noise and air pollution and their control measures.
			CO5:.: Students can understand about global environmental problems and they are aware of global efforts.
10	I-II	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1: Identify whether the given differential equation of first order is exact or not
			CO2: Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.
			CO3: Solving ODE's by using Laplace transforms techniques.
			CO4: Apply the concepts of gradient, divergence and curl to formulate Engineering problems.
			CO5: Analyse line, surface and volume integrals using fundamental theorems.
11	I-II	ENGINEERING CHEMISTRY	CO1: Students will acquire the basic knowledge of MOT and CFT.
			CO2:The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
			CO3:The students are able to gain knowledge electrochemical procedures related to corrosion and it's control.
			CO4:They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs
12	I-II	COMPUTER AIDED ENGINEERING GRAPHICS	CO1:Apply computer aided drafting tools to create CO2:D and CO3:D objects
			CO2: sketch conics and different types of solids
			CO3: Appreciate the need of Sectional views of solids and Development of surfaces of solids
			CO4: Read and interpret engineering drawings
			CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
13	I-II	APPLIED MECHANICS	CO1:Determine resultant of forces acting on a body and analyze equilibrium of a body subjected to a system of forces.
			CO2: Solve problem of bodies subjected to friction.
			CO3: Find the location of Centroid and calculate moment of inertia of a given section.
			CO4:Evaluate the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
			CO5:..Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration
14	I-II	SURVEYING	CO1:Calculate angles, distances and levels
			CO2:Identify data collection methods and prepare field notes
			CO3:Understand the working principles of survey instruments
			CO4:Estimate measurement errors and apply corrections
			CO5: Interpret survey data and compute areas and volume
15	I-II	PYTHON PROGRAMMING LABORATORY	CO1:Develop the application specific codes using python.
			CO2:Understand Strings, Lists, Tuples and Dictionaries in Python
			CO3:Verify programs using modular approach, file I/O, Python standard library
			CO4:Implement Digital Systems using Python
16	I-II	ENGINEERING CHEMISTRY LABORATORY	CO1:Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
			CO2:Able to perform methods such as conductometry, potentiometry in order to find out the concentrations or equivalence points of acids and bases.
			CO3:Students are able to prepare Drugs like aspirin and paracetamol.
			CO4:Estimations saponification value, surface tension and viscosity of lubricant oils.
17	I-II	SURVEYING LABORATORY – I	CO1: Student will be able to prepare Map and Plan for required site with suitable scale.
			CO2: Student will be able to prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
			CO3:Student will be able to judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area.
			CO4:Student will be able to judge the profile of ground by observing the available existing contour map.
18	II-I	BUILDING MATERIALS, CONSTRUCTION AND PLANNING	CO1: Understand the different construction material.
			CO2: Understand the different component parts of building and their construction practices and techniques
			CO3:Understand the functional requirements to be considered for design and construction of building
			CO4: Identify the factors to be considered in planning and construction of buildings
			CO5: Plan a building based on the factors and principles of planning
19	II-I	ENGINEERING GEOLOGY	CO1:Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice.
			CO2:The fundamentals of the engineering properties of Earth materials and fluids.

		CELESTIAL	CO3: Rock mass characterization and the mechanics of planar rock slides and topples
20	II-I	STRENGTH OF MATERIALS – I	CO1: Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components. CO2: Recognize various types loads applied on structural components of simple framing geometries and understand the nature of internal stresses that will develop within the components. CO3: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading. CO4: Analyze various situations involving structural members subjected to plane stresses by application of Mohr's circle of stress
21	II-I	FLUID MECHANICS	CO1: Understand the broad principles of fluid statics, kinematics and dynamics. CO2: Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow. CO3: Understand classifications of fluid flow. CO4: Be able to apply the continuity, momentum and energy principles
22	II-I	SURVEYING LABORATORY – II	CO1: Prepare Map and Plan for required site with suitable scale. CO2: Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment. CO3: Judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area. CO4: Judge the profile of ground by observing the available existing contour map.
23	II-I	STRENGTH OF MATERIALS LABORATORY	CO1: Determine the yield stress, ultimate tensile stress, percentage elongation of steel, compressive strength of brick and concrete CO2: Determine the ultimate shear stress, modulus of elasticity of steel CO3: Determine the stiffness of the close coiled helical spring and hardness number of mild steel, brass, copper and aluminium. CO4: Determine the modulus of rigidity and impact strength of steel.
24	II-I	COMPUTER AIDED DRAFTING LABORATORY	CO1: Understand the different construction material. CO2: Understand the different component parts of building and their construction practices and techniques CO3: Understand the functional requirements to be considered for design and construction of building CO4: Identify the factors to be considered in planning and construction of buildings CO5: Plan a building based on the factors and principles of planning
25	II-I	CONSTITUTION OF INDIA	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. CO2: Discuss the intellectual origins of the frame work of argument that informed the conceptualization of social reforms leading to revolution in India. CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution CO4: Discuss the passage of the Hindu Code Bill of CO1:9CO5:6.
26	II-II	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1: To analyze and solve electrical circuits using network laws and theorems. CO2: To understand and analyze basic Electric and Magnetic circuits CO3: To study the working principles of Electrical Machines CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors
27	II-II	CONCRETE TECHNOLOGY	CO1: Determine the properties of concrete ingredients i.e., cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology and early age properties of concrete on its long-term behavior. CO2: Apply the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties CO3: Use advanced laboratory techniques to characterize cement-based materials. CO4: Perform mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, and fiber reinforced concrete
28	II-II	STRENGTH OF MATERIALS – II	CO1: Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression. CO2: To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading. CO3: Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses. CO4: Understand and evaluate the shear center and unsymmetrical bending. CO1: An ability to apply knowledge of mathematics, science, and engineering

29	II-II	STRUCTURAL ANALYSIS – I	CO2:Analyse the statically indeterminate bars and continuous beams
			CO3:Draw strength behaviour of members for static and dynamic loading.
			CO4:Calculate the stiffness parameters in beams and pin jointed trusses.
			CO5:Understand the indeterminacy aspects to consider for a total structural system.
			CO6. Identify, formulate, and solve engineering problems with real time loading
30	II-II	HYDRAULICS AND HYDRAULICS MACHINERY	CO1:Apply their knowledge of fluid mechanics in addressing problems in open channels and hydraulic machinery.
			CO2: Understand and solve problems in uniform, gradually and rapidly varied flows in open channel in steady state conditions.
			CO3: Apply dimensional analysis and to differentiate the model, prototype and similitude conditions for practical problems.
			CO4:Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages.
31	II-II	FLUID MECHANICS AND HYDRAULICS MACHINERY LABORATORY	CO1: Describe the basic measurement techniques of fluid mechanics and its appropriate application.
			CO2:Interpret the results obtained in the laboratory for various experiments.
			CO3:Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
			CO4:Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.
			CO5: Write a technical laboratory report
32	II-II	BASIC ELECTRICAL ANDELECTRONIC SENGINEERING LABORATORY	CO1: To analyze and solve electrical circuits using network laws and theorems.
			CO2: To understand and analyze basic Electric and Magnetic circuits
			CO3:To study the working principles of Electrical Machines
			CO4:To introduce components of Low Voltage Electrical Installations
33	II-II	CONCRETE TECHNOLOGY LABORATORY	CO1:Perform various tests required to assess the characteristics of cement
			CO2:Test and evaluate the properties of fine and coarse aggregates and determine its suitability for construction
			CO3: Evaluate the fresh and hardened properties of concrete
			CO4:Design the concrete mix for required strength and test its performance characteristics
34	III-I	STRUCTURAL ANALYSIS – II	CO1:Analyze the two hinged arches.
			CO2:Solve statically indeterminate beams and portal frames using classical methods.
			CO3:Sketch the shearforce and bending moment diagrams for indeterminate structures.
35	III-I	GEOTECHNICAL ENGINEERING	CO1:Characterize and classify the soils.
			CO2: Estimate seepage, stresses under various loading conditions.
			CO3: Understand laboratory and field compaction characteristics.
			CO4: Analyze the compressibility of the soils.
36	III-I	STRUCTURAL ENGINEERING – I (RCC)	CO1:Compare and Design the singly reinforced, doubly reinforced and flanged sections.
			CO2:Design the axially loaded, uni-axial and bi-axial bending columns.
			CO3:Classify the footings and Design the isolated square, rectangular and circular footings
			Distinguish and Design the one-way and two-way slabs
37	III-I	TRANSPORTATION ENGINEERING	CO1:An ability to apply the knowledge of mathematics, science and engineering in the areas of traffic engineering, highway development and maintenance.
			CO2:An ability to design, conduct experiments to assess the suitability of the highway materials like soil, bitumen, aggregates and a variety of bituminous mixtures. Also the students will develop the ability to interpret the results and assess the suitability of these materials for construction of highways.
			CO3:An ability to design flexible and rigid highway pavements for varying traffic compositions as well as soil sub grade and environmental conditions using the standards stipulated by Indian Roads Congress.
			CO4:An ability to evaluate the structural and functional conditions of in-service highway pavements and provide solution in the form of routine maintenance measures or designed overlays using Indian Roads congress guidelines.
			CO5:An ability to assess the issues related to road traffic and provide engineering solutions supported with an understanding of road user psychological and behavioural patterns.
38	III-I	WATER RESOURCE ENGINEERING – I	CO1: Understand the different concepts and terms used in engineering hydrology.
			CO2:Identify and explain various formulae used in estimation of surface and Ground water hydrology components
			CO3: Demonstrate their knowledge to connect hydrology to the field requirement.
39	III-I	TRANSPORTATION ENGINEERING	CO1: Categorize the test on materials used for Bituminous constructions.
			CO2:Evaluate the tests performed for Bitumen and mixes.

		LABORATORY	CO3:Prepare a laboratory report
40	III-II	ENVIRONMENTAL ENGINEERING	CO1: Assess characteristics of water and waste water. CO2: Estimate quantities of water and waste water and plan conveyance components. CO3:Design components of water and waste water treatment plants. CO4: Be conversant with issues of air pollution and control.
41	III-II	QUANTITY SURVEYING AND VALUATION	CO1:Understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure. CO2:Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure. CO3:Understand how competitive bidding works and how to submit a competitive bid proposal
42	III-II	STRUCTURAL ENGINEERING – II (STEEL STRUCTURES)	CO1: Analyze the tension members, compression members. CO2: Design the tension members, compression members and column bases and joints and connections. CO3:Analyze and Design the beams including built-up sections and beam and connections. CO4:Identify and Design the various components of welded plate girder including stiffeners
43	III-II	REHABILITATION AND RETROFITTING OF STRUCTURES (PE-I)	CO1: Describe the distress & damage of structures. CO2: Explain about the partial Destruction and Non Destruction Test . CO3: Predict the Causes and prevention of corrosion of steel CO4:Illustrate different techniques of repairs of Structures. CO5:Develop the Monitoring of Structures by Sensors
44	III-II	ADVANCED CONCRETE TECHNOLOGY (PE-I)	CO1Determine the application of different types of cement CO2: Develop the advanced knowledge on admixture and chemical usage in construction. CO3: Develop an advanced knowledge in Ready mix concrete and modern curing processes CO4: To understand the rheology of creep and shrinkage CO5: Understand the engineering properties of special concretes such as high-performance concrete, self-compacting concrete, fibre reinforced concrete, etc.
45	III-II	PRESTRESSED CONCRETE (PE-I)	CO1:Acquire the knowledge of evolution of process of pre-stressing. CO2:Acquire the knowledge of various pre-stressing techniques. CO3:Develop skills in analysis design of pre-stressed structural elements as per the IS-codal provisions.
46	III-II	ENVIRONMENTAL ENGINEERING LABORATORY	CO1: Understand about the equipment used to conduct the test procedures. CO2: Perform the experiments in the lab. CO3:Examine and Estimate water, waste water, air and soil Quality. CO4:Compare the water, air quality standards with prescribed standards set by the local governments. CO5: Develop a report on the quality aspects of the environment.
47	III-II	STRUCTURAL ENGINEERING LABORATORY	CO1: Illustrate the working drawings for Beams, Slabs, Columns, and Footings CO2: Summarize working drawings RCC Water Tank CO3: Generate the working drawings for steel braced column and grillage foundation
48	IV-I	FOUNDATION ENGINEERING	CO1. Understand the principles and methods of Geotechnical CO2. Exploration assess the stability of slopes CO3. Calculate lateral earth pressures and check the stability of retaining walls CO4. Analyse and design the shallow and deep foundations
49	IV-I	CONSTRUCTION PROJECT MANAGEMENT	CO1. Importance of Project Management. CO2.Project Planning, Execution and implementation. CO3. Significance of teams in projects. CO4.Project evaluation techniques.
50	IV-I	GREEN BUILDING TECHNOLOGIES (PE-II)	CO1. Relate safety to Green Technology. CO2. Identify Renewable Energy systems. CO3.Understand the impact of continued use of non – renewable energy resources. CO4. Investigate renewable energy systems. CO5.Understand energy consumption, efficiency & waste management.
51	IV-I	GEOMATIC APPLICATIONS IN CIVIL ENGINEERING (PE-II)	CO1.Describe different concepts and terms used in Remote Sensing and its data. CO2.Understand the Data conversion and Process in different coordinate systems of GIS interface. CO3.Evaluate the accuracy of Data and implementing a GIS. CO4.Understand the applicability of RS and GIS for various applications
52	IV-I	SMART CITIES PLANNING AND MANAGEMENT	CO1.Recognize smart city concepts and their international and national standards. CO2.Recognize smart community, transportation and building concepts. CO3.Develop and calibrate energy demand and their capacity limits.

		MANAGEMENT (PE-II)	CO4.Predict the various smart urban transportation systems and the transition from existing city towards a smart city
53	IV-I	DESIGN OF HYDRAULIC STRUCTURES (PE-III)	CO1 Know types of water retaining structures for multiple purpose sand its key parameters considered for planning and designing. CO2 Understand details in any Irrigation System and its requirements. CO3.Analyze and Design of an irrigation system components
54	IV-I	ADVANCED WATER RESOURCES ENGINEERING (PE-III)	CO1:Ability to apply statistical techniques for flood frequency studies and hydrological events and Applications of Regression Models for estimation of various parameters. CO2.Applications of flood routing, flood forecasting techniques for real time flood studies. CO3:Understanding of various mitigation measures for control of floods. CO4. Understanding of climate change using GCM models. CO5. Ability to formulate optimization models and soft computing applications
55	IV-I	ENGINEERING HYDROLOGY (PE-III)	CO1: Identify different fundamental equations and concepts as applied in the Ground water studies. CO2:Discuss and derive differential equation governing ground water flow in three dimensions. CO3:Solve ground water mathematical equations and analyze pumping tests in steady and non- steady flow cases. CO4:Distinguish and understand the saline water intrusion problem in costal aquifers.
56	IV-I	EARTH RETAINING STRUCTURES (PE-IV)	CO1:Calculate the earth pressures under different applied loads and ground conditions. CO2:Assess stability of conventional retaining walls. CO3:Design flexible retaining walls under different soil and fixity conditions. CO4:Design the supporting systems for excavations. CO5: Design geosynthetic reinforced earth walls.
57	IV-I	GROUND IMPROVEMENT TECHNIQUES (PE-IV)	CO1:Understand the various ground improvement methods. CO2:Assess different compaction methods for ground modification. CO3:Design dewatering systems to reduce the settlements. CO4:Comprehend stabilizations with chemical and grouting techniques. CO5:Understand the principles of soil reinforcement and confinement in engineering constructions
58	IV-I	STABILITY ANALYSIS OF SLOPES (PE-IV)	CO1: Select suitable site and materials for the construction of earth / rock fill dams. CO2:Analyse seepage through a given earth / rock fill dam section and propose suitable seepage control measures. CO3:Analyse the stability of earthen dams. CO4:Design the slopes by using different analytical methods. CO5:Implement slope protection methods.
59	IV-I	COMPUTER AIDED DESIGN LABORATORY	CO1:Model the geometry of real –world structure Represent the physical model of structural element / structure. CO2:Perform analysis. CO3:Interpret from the Post processing results. CO4:Design the structural elements and a system as per IS Codes.
60	IV-II	ENVIRONMENTAL IMPACT ASSESSMENT FOR CIVIL ENGG (PE-IV)	CO1:Identify the environmental attributes to be considered for the EIA study. CO2:Formulate objectives of the EIA studies. CO3:Identify the methodology to prepare rapid EIA. CO4: Prepare EIA reports and environmental management Plans
61	IV-II	SOLID WASTE MANAGEMENT (PE-V)	CO1. Identify the physical and chemical composition of solid wastes. CO2.Analyze the functional elements for solid waste management. CO3.Understand the techniques and methods used in transformation, conservation, and recovery of materials from solid wastes. CO4.Identify and design waste disposal systems
62	IV-II	AIR & NOISE POLLUTION AND CONTROL (PE-V)	CO1. Define the type's air pollution. CO2. Discuss about the Control of Particulates in air and its procedures. CO3. Identify the Control of gaseous emission in air and its procedures. CO4. Evaluate the air quality management and its application. CO5. Understanding about the Noise pollution and its control methods.
63	IV-II	AIRPORTS, RAILWAYS AND WATERWAYS (PE-VI)	CO1.An ability to design of runways and taxiways. CO2.An ability to design the infrastructure for large and small airports. CO3.An ability to design Super elevation and transition curve for railway horizontal curves. CO4.An ability to design various crossing sturnout and signals in Railway Projects.
64	IV-II	PAVEMENT ASSET MANAGEMENT (PE-VI)	CO1:Understand the role of Pavement Asset Management. CO2.:Understand the Flexible and Rigid pavement failures and importance of maintenance. CO3.:Understand importance of pavement evaluation. CO4:Understand pavement performance and deterioration modeling.

65	IV-II	PAVEMENT ANALYSIS & DESIGN (PE-VI)	CO1:Understand Factors Affecting Pavement Design.
			CO2:Understand Stresses In Pavements and Material Characteristics.
			CO3:Design Flexible and Rigid Pavements.
			CO4:Design of Pavement for Low Volume Roads
EEE			
	DEGREE : UG	A.Y: 2020-2021	II YEAR I SEMESTER
S.No	Year/Sem	Course Name	Course Outcome
1	II-I	NUMERICAL METHODS AND COMPLEX VARIABLES	CO1:Express any periodic function in terms of sine and cosine
			CO2:Find the root of a given polynomial and transcendental equations
			CO3:3.Estimate the value for the given data using interpolation.
			CO4:Find the numerical solutions for a given first order ODE's
			CO5:Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems
			CO6:Taylor's and Laurent's series expansions in complex function
2	II-I	MECHANICS AND HYDRAULIC MACHINES	CO1:Solve problems dealing with forces, SOLID beam and cable problems and understand distributed force systems
			CO2:Solve friction problems and determine moments of Inertia and centroid of practical shapes
			CO3:3.Apply knowledge of mechanics in addressing problems in hydraulic machinery and its principles that will be utilized in Hydropower development and for other practical usages.
3	II-I	ANALOG ELECTRONIC CIRCUITS	CO1:Know the characteristics, utilization of various components
			CO2:Understand the biasing techniques
			CO3:Design and analyze various rectifiers, small signal amplifier circuits.
			CO4:Design sinusoidal and non-sinusoidal oscillators.
			CO5:Designs OP-AMP based circuits with linear integrated circuits.
4	II-I	ELECTRICAL MACHINES - I	CO1:Identify different parts of a DC machines & understand their operation.
			CO2:CAy out different excitation, starting, speed control methods and testing of DC machines
			CO3:Analyze single & three phase transformers and their performance through testing
5	II-I	ELECTRICAL MACHINES - I	CO1:Identify different parts of a DC machines & understand their operation.
			CO2:2.Carry out different excitation, starting, speed control methods and testing of DC machines
			CO3:Analyze single & three phase transformers and their performance through testing.
6	II-I	ELECTROMAGNETIC FIELDS	CO1:Understand the basic laws of electromagnetism and their applications
			CO2:Analyze time varying electric and magnetic fields
			CO3:Understand the propagation of EM waves
7	II-I	ELECTRICAL MACHINES LABORATORY – I	CO1:Start and control the Different DC Machines
			CO2:Assess the performance of different machines using different testing methods
			CO3:Evaluate the performance of different Transformers using different testing methods
8	II-I	ANALOG ELECTRONIC CIRCUITS LABORATORY	CO1:1.Know the characteristics, utilization of various components
			CO2:Understand the biasing techniques
			CO3:3.Design and analyze various rectifiers, small signal amplifier circuits
			CO4:Design sinusoidal and non-sinusoidal oscillators
			CO5:Design OP-AMP based circuits with linear integrated circuits.
9	II-I	ELECTRICAL SIMULATION TOOLS LABORATORY	CO1:Develop knowledge of software packages to model and program electrical and electronics systems
			CO2:Model different electrical and electronic systems and analyze the results.
			CO3:Articulate importance of software packages used for simulation in laboratory experimentation by analyzing the simulation results
			CO4:Students will have developed a better understanding of important issues related to gender in contemporary India
10	II-I	GENDER SENSITIZATION LAB	CO2:Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
			CO3:Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO4:Students will acquire insight into the gendered division of labor and its relation to politics and economics
			CO5:Men and women students and professionals will be better equipped to work and live together as equals
			CO6:Students will develop a sense of appreciation of women in all walks of life

			CO7:7.Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence
II YEAR II SEMESTER			
10	II-II	Electrical Circuits - II	CO1:Understand the concepts of rotating magnetic fields CO2:Examine the operation of ac machines. CO3:Analyze performance characteristics of ac machines.
11	II-II	MEASUREMENTS AND INSTRUMENTATION	CO1:Understand different types of measuring instruments, their construction, operation and characteristics and identify the instruments suitable for typical measurements. CO2:Apply the knowledge about transducers and instrument transformers to use them effectively. CO3:Apply the knowledge of smart and digital metering for industrial applications.
12	II-II	Power Systems - I	CO1:Understand the operation of conventional and renewable electrical power generating stations. CO2:Evaluate the power tariff methods and Economics associated with power generation CO3:Analyze the operations of AIS & GIS, Insulators and Distribution systems.
13	II-II	DIGITAL ELECTRONICS	CO1:Understand the working of logic families and logic gates CO2:Design and implement Combinational and Sequential logic circuits CO3:Implement the given logical problems using programmable logic devices.
14	II-II	CONTROL SYSTEMS	CO1:Understand the concepts of open loop and closed control systems. CO2:Determine the transfer function & Stability of the system using S-domain and Frequency Domain. CO3:3. Analyse the transfer function and Steady state analysis of continuous systems
15	II-II	DIGITAL ELECTRONICS LAB	CO1:Understand the working of logic families and logic gates CO2:Design and implement Combinational and Sequential logic circuits CO3:Analyze different types of semiconductor memories
16	II-II	MEASUREMENTS AND INSTRUMENTATION LABORATORY	CO1:Choose and test any measuring instruments CO2:2.Find the accuracy of any instrument by performing experiments CO3:Calculate the various parameters using different types of measuring instruments.
17	II-II	ELECTRICAL MACHINES LABORATORY – II	CO1:Assess the performance of different types of AC machines using different testing methods CO2:Analyze the suitability of AC machines and Transformers for real world applications CO3:Design the machine models based on the application requirements
18	II-II	ENVIRONMENTAL SCIENCE	CO1:Understanding of Ecosystem CO2:Natural resources, Depletion of natural resources and prevention methods CO3:Biodiversity, Protection, sharing of the biodiversity CO4:Environmental pollution- Understanding of water, soil, noise and air pollution and their control measures. CO5:Students can understand about global environmental problems and they are aware of global efforts.
III YEAR I SEMESTER			
19	III-I	Power System - II	CO1:On calculation of transmission line parameters CO2:analysis of short, medium, long length transmission lines CO3:the factors affecting the performance of transmission lines, transients in transmission lines. CO4:Operation of different types of overhead line insulators, sag and tension calculation of transmission lines CO5:On calculation of underground cables for power transmission as well for distribution. With this subject which he/she can be able to apply the above conceptual things to real-world electrical systems and its applications
20	III-I	Control Systems	CO1:Open loop and closed loop systems, concept of feedback in control systems, mathematical modeling and transfer function derivations of translational and rotational systems and transfer functions of servomotors and concepts of synchros CO2:2. Transfer function representation through block diagram algebra and signal flow graphs CO3:3. Time response analysis of different ordered systems through their characteristic equation and time-domain specifications CO4:Stability analysis of control systems in s-domain through R-H criteria and root-locus techniques CO5:Frequency response analysis through bode diagrams. With which he/she can be able to apply the above conceptual things to real world electrical and Electronic problems and its applications

21	III-I	Power Electronics	CO1:Characteristics of different types of power semiconductor devices
			CO2:Analyze single Phase Half wave and full wave controlled converters
			CO3:Analyze the Three Phase Line Commutated Converters
			CO4:Analyze the AC voltage controllers and Cyclo converters
			CO5:Analyze DC –DC Choppers and analyze DC-AC Inverters.
22	III-I	Digital System Design	CO1: Understands Digital logic Principles, Number systems etc.
			CO2: Understands the Binary logic principles in implementing Gate level Design
			CO3: Understands and applying the Combinational Circuits
			CO4: Understands and applying the sequential circuit logic in applications of Memeories,
			CO5: Understands and applying the Various logic level in Logic families
22	III-I	Renewable Energy Sources(OE-1)	CO1:1.Apply the technology to capture the energy from the renewable sources like sun, wind, ocean, biomass, geothermal
			CO22.Use different renewable energy sources to produce electrical power.
			CO3:3.Minimize the use of conventional energy sources to produce electrical energy
			CO4:4.Identify the fact that the conventional energy resources are depleted
			CO55.Identify the Direct Energy Conversion
23	III-I	Energy Storage Systems	CO1:Apply the technology to have energy storage system for electrical Loads.
			CO2:To save the electrical power in peak time loads using ESS
			CO3:To store energy and to avoid the environmental pollution.
			CO4:Design different types of Electrical storage systems.
			CO5:Adopt the new trends in applications of Renewable energy generation and Smart Grid.
24	III-I	Special Electrical Machines	CO1:Ability to acquire the knowledge on construction and operation of stepper motor.
			CO2:Ability to construction, principle of operation, switched reluctance motors.
			CO3:Ability to acquire the knowledge on construction and operation of permanent magnet brushless D.C. motors.
			CO4:Ability to acquire the knowledge on construction and operation of permanent magnet synchronous motors.
			CO5:Ability to select a special Machine for a particular application
27	III-I	Constitution of India	CO1: To Impart the basic knowledge about the constitution of India.
			CO2: To Understand the role, powers of members of LokSabha and RajyaSabha
			CO3: To know the rules to govern the country
			CO4: To get the knowledge on role and function of Election Commissioner
			CO5: To understand the power and duties of elected Representatives for Panchayat raj, Zilla Parishad,Corporation and also the importance and Democracy
III YEAR II SEMESTER			
28	III-II	Static Drives	CO1.Explain the fundamentals of electric drive and different electric braking methods. Analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters
			CO2:Explain the converter control of DC motors in various quadrants
			CO3:Explain the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
			CO4:Explain the principles of static rotor resistance control and various slip power recovery schemes.
			CO5:Explain the speed control mechanism of synchronous motors
29	III-II	Switch Gear & Protection	CO1:Students are knowledgeable in the field of power system protection, and circuit breakers
			CO2:Students are knowledgeable in the field of instrument transformers and relays
			CO3.Students will demonstrate and ability to design the relevant protection systems for the main elements of a power system.
			CO4.Students are knowledgeable in the field of switchgear
			CO5.Students are knowledgeable in the field of over- voltage protection and the basics of data transmission
30	III-II	Computer Methods in Power Systems	CO1.power system network matrices through graph theory
			CO2.power flow studies (load-flow) through various computer methods, short- circuit analysis, per-unit system of representation
			CO3:concept of sequence impedance, symmetrical and unsymmetrical fault analysis.
			CO4:steady-state, dynamic-state and transient- state stability analysis.
			CO5:Determination of Transient Stability by Equal Area Criterion, With which he/she can able to apply the above conceptual things to real-world electrical power systems problems and applications.
			CO1:The student will learn internal architecture and organization of 8085 and 8086.

31	III-II	Microprocessors & Microcontrollers	CO2: The student will learn instruction set, Addressing Modes and Assembly level language programmings.
			CO3:The student understands how to interface the various I/O and Communication interface modules
			CO4:The student will learn the internal Architecture, Register Organization and instruction set of 8051 microcontrollers and their interfacings.
			CO5:Understands advance microcontrollers and their importance in the field of Embedded systems and IOT.
33	III-II	Electrical Distribution Systems	CO1:1.General aspects of electrical distribution systems
			CO2:2.Design and analysis of distribution feeders and substations
			CO3:3.Distribution systems analysis through voltage-drop and power loss calculations.
			CO4:4.Operation of protective devices used in distribution systems and their co- ordination voltage control and power factor improvement through capacitor compensation
			CO5:5.Voltage Control & P.F Improvement of system. Faults analysis, with which he/she can able to apply the above conceptual things to real-world electrical power system and its applications
34	III-II	Electrical Estimation and Costing	CO1:Electric Supply System Design Considerations, Indian Electricity rules, Service connections, Service Mains.
			CO2:Estimating costing aspects of all electrical equipment, installation for residential buildings and designs to analyze the cost viability.
			CO3:Design of Illumination Schemes, with which he/she can able to apply the above conceptual things to real-world electrical power system and its applications. Exposure to design and estimation of wiring, design of overhead and underground distribution lines.
			CO4:Installation and Estimation analyze of various types of sub station.
			CO5:Design of Illumination Schemes, with which he/she can able to apply the above conceptual things to real-world electrical power system and its applications.
35	III-II	Power Quality(PE-II)	CO1:Power quality in supplies of domestic and industrial applications.
			CO2:Different types of Interruptions and sags and swells applications.
			CO3:1-Phase and 3-Phase Voltage SAG Characterization.
			CO4:Power quality issues in Industrial Power Systems.
			CO5:Mitigation of Interruptions & Voltage Sags, current Harmonics and frequency harmonics of supply.
IV YEAR I SEMESTER			
39	IV-I	Power System Operation & Control	CO1:1.Economic operation of power systems
			CO2:2.Scheduling of hydro-thermal power plants
			CO3:3.modeling of the power system components like turbine, generator, governor and Excitation systems
			CO4:4.necessity of keeping the frequency of the power system constant , load frequency control in single and two area systems, operation of load frequency controllers
			CO5:5.reactive power control, uncompensated transmission line Compensation in transmission systems.
40	IV-I	Utilization of Electrical Energy	CO1:1.Knowledge of drives with real world problems
			CO2:2.An ability to function effectively in industry related to drives.
			CO3:3.Ability to work in industry related to lightening
			CO4:4.Ability to apply the technical knowledge in electric traction
			CO5:5.Ability to work in electric traction and application involved in motion control
41	IV-I	High Voltage Engineering	CO1:1.Basics of high voltage engineering.
			CO2:2.Break-down phenomenon in different types of dielectrics, generation
			CO3:3.Measurement of high voltages and currents, the phenomenon of over- voltages
			CO4:4.Concept of insulation coordination
			CO5:5.Testing of various materials and electrical apparatus used in high voltage engineering. With which he/she can able to apply the above conceptual things to real-world electrical power system and its applications.
42	IV-I	Advanced Power System Protection	CO1:Basic construction of static relays.
			CO2:Phase Comparators and Static Over Current Relays characteristics.
			CO3:Static Differential Relays and Static Distance Relays characteristics.
			CO4:Multi-Input Comparators characteristics.
			CO5:Basic principle of Digital computer relaying and Realization of MHO characteristics.
		Industrial Electrical	CO1:Understand the electrical systems Components
			CO2:Understand the electrical wiring systems for residential, commercial and industrial.

43	IV-I	Industrial Electrical Systems	CO3: Consumers, representing the systems with standard symbols and drawings, SLD.
			CO4: Understand various components of industrial electrical systems.
			CO5: Analyze and select the proper size of various electrical system components.
44	IV-I	Advanced Control Systems	CO1: Remember the Properties of Laplace transform, Fourier Transform and State Transition matrix
			CO2: Understand the stability in frequency domain, nonlinear systems, phase- plane analysis, and Lyapunov's stability and Instability Theorem Analysis of linear and nonlinear systems
			CO3: Apply the describing function analysis method to Solve the nonlinear system Performance, Draw the Phase Trajectories using various methods of Isocline for nonlinear systems
			CO4: Analyze the describing function analysis and Phase plane Analysis of Nonlinear Systems
			CO5: Test the Controllability and Observability of the Systems and design compensators for improving system performance
45	IV-I	Power System Dynamic	CO1: Choose the fundamental dynamic behavior and controls of power systems to perform basic stability analysis.
			CO2: Comprehend concepts in modeling and simulating the dynamic phenomena of power systems.
			CO3: Interpret results of system stability studies
			CO4: Analyze theory and practice of modeling main power system components, such as synchronous machines, excitation systems and governors.
			CO5: The applications of power stabilizers.
46	IV-I	Linear System Analysis	CO1: Learn students with the modeling of electrical systems.
			CO2: To familiarize the students with the state space analysis of dynamic systems and Fourier series representation.
			CO3: To make students understand the concepts forurier transforms and Laplace transforms approach to have the different methods of representation of network synthesis.
			CO4: Testing of polynomials.
			CO5: To familiarize the students with the concepts of sampling and ztransformations
47	IV-I	Power Systems Simulation Lab	CO1: Ability to understand the concept of MATLAB programming in solving power systems problems.
			CO2: Ability to understand power system planning and operational studies.
			CO3: Ability to acquire knowledge on Formation of Bus Admittance and solution of Networks.
			CO4: Ability to analyze the power flow using GS and NR method.
			CO5: Ability to understand the economic dispatch.
			CO6: Ability to find Symmetric and Unsymmetrical fault.
			CO7: Ability to analyze the electromagnetic transients.
IV YEAR II SEMESTER			
48	IV-II	Fundamentals of HVDC & FACTS	CO1: Basics of HVDC system. and comparison of AC and DC transmission System
			CO2: Operation of Converters control schemes
			CO3: Harmonics filters reactive power control and power flow analysis in HVDC systems
			CO4: Basic concepts of FACTS, necessity of FACTS controllers and their operation
			CO5: Shunt and series compensation through various static compensators with which he/she can able to apply the above conceptual things to real-world electrical power system and its applications.
49	IV-II	Smart Grid	CO1: Basic concepts of smart grid and Local energy networks.
			CO2: Benefits of DC power delivery systems and Smart grid vision based on the intelligent grid architecture
			CO3: Energy management and Distributed energy resources.
			CO4: Concept of energy -Port.
			CO5: The Industrial energy management programs, Manufacturing process and Efficient Electric End.
50	IV-II	Modern Power Electronic Converters	CO1: Modern power semiconductor devices structures and applications.
			CO2: Operation and design of Resonant pulse inverters.
			CO3: Operation and design of Flying capacitors multilevel inverter
			CO4: Operation and design of Cascaded multilevel inverter
			CO5: Design of AC and DC power supplies Multilevel operations.
51	IV-II	Power System Reliability	CO1: Basic probability theory
			CO2: Distribution functions, reliability analysis of various models through different, ethics, reliability functions.
			CO3: Repairable irreparable systems reliability through markov modeling frequency

			CO4: Duration techniques, with which he/she can able to apply the above conceptual things.
			CO5: Real-world electrical and electronics problems and applications.
52	IV-II	ft Computing Techniq	CO1:Ability to understand the concepts of ANN, different features of fuzzy logic and their modeling, control aspects and different hybrid control schemes. CO2:Ability to understand the basics of artificial neural network CO3: Ability to get knowledge on modelling and Fuzzy control. CO4:Ability to get knowledge on fuzziness involved in various control schemes. CO5:Ability to acquire knowledge on hybrid control schemes.
53	IV-II	Digital Control System	CO1: After going through this course the student gets a thorough knowledge on, basics of digital control systems. CO2: z-transforms, mapping between S-plane and Z-plane, state-space analysis, concept of controllability and observability. CO3: derivation of pulse-transfer function, stability analysis in S-domain and Z domains, stability through jury-stability test, stability through bilinear transformation CO4:R-H criteria, design of discrete-time control systems, design of lag, lead, lead-lag compensators, design of PID controllers. CO5: Design of state feedback controllers, observers. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications
54	IV-II	Extra high Voltage AC Transmission	CO1:Remembering the effects of corona, electro static fields and Traveling wave theory. CO2:Understand the Necessity of EHV AC transmission and the concepts of Voltage Gradients of Conductors CO3:Apply the distribution of voltage gradient on sub-conductors of bundle and Calculate Line inductance and capacitances of bundled conductors, reflection and refraction coefficients-Lumped parameters of distributed lines. CO4: Analyze the corona pulses generation properties& limits CO5: Design the static VAR compensating system and Draw the Power circle diagram
55	IV-II	Technical Seminar	CO1: Able to express and master public speaking during technical presentations. CO2: Able to get an opportunity; where in individuals can meet others with the same Interests/problems/concerns and also to envisage emerging technologies. CO3: Able to have a sense of renewed hope and inspiration, as sometimes business concerns are lessened by sharing experiences with others. CO4: Able to have a great morale booster for students for career making advancement CO5: Able to become speaker and it will motivate students in facing technical and HR interview rounds.
56	IV-II	Comprehensive Viva-Voce	CO1: Able to communicate orally about analyzing a problem. CO2: Able to express the effectively to accomplish a common goal. CO3: Able to recapitulate fundamentals from across all semesters of B-Tech course work [4 years of learning]. CO4: Handle difficult scenario during Viva Voce in the event of plenty of subjects under question
56	IV-II	Major Project	CO1: Able to analyze a problem, identify and define the computing requirements appropriate to its solutions. CO2: Able to function effectively on teams to accomplish a common goal. CO3: Able to use current techniques, skill and tools necessary for computing practices. CO4: Able to design and development principles in the construction of software systems of varying complexity. CO5: Able to get an eye opener to bridge gap between Academia and real time industry issues on technological front CO6: Able to meet industrial requirement and to improve technical interview skills of a student.
Department of MECH			
PROGRAM ME: B.TECH	DEGREE : UG	A.Y: 2020-2021	I YEAR I SEMESTER
S.NO	Year/Sem	Course Name	Course Outcomes
1	II	ENGINEERING	CO 1: Study and practice on machine tools and their operations CO 2: Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.

1	I-I	WORKSHOP	CO 3: Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling CO 4: Apply basic electrical engineering knowledge for house wiring practice
2	I-I	ELEMENTS OF MECHANICAL ENGINEERING	CO 1: Understand the operation, usage and applications of different measuring instruments and tools. CO 2: Examine the different characteristics of instruments like accuracy, precision etc CO 3: Prepare simple composite components and joining different materials using soldering process CO 4: Identify tools & learn practically the process of turning, milling, grinding on mild steel pieces. CO 5: Understand the basic components of IC engine, Gear box and boiler
B.Tech. I Year II SEM (R-22)			
3	I-II	COMPUTER AIDED ENGINEERING GRAPHICS	CO1:Apply computer aided drafting tools to create 2D and 3D objects CO2:sketch conics and different types of solids CO3:Appreciate the need of Sectional views of solids and Development of surfaces of solids CO4:Read and interpret engineering drawings CO5: Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting.
4	I-II	ENGINEERING MECHANICS	CO 1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces CO 2: Solve problem of bodies subjected to friction. CO 3: Find the location of centroid and calculate moment of inertia of a given section CO 4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion. CO 5: Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration
5	I-II	ENGINEERING MATERIALS	CO1:Classify the various materials that will be essential for the mechanical engineering applications CO2:Express the mechanical properties of metals and their testing procedures CO3:Understand the application of materials and their processing CO4:Understand the requirement and need for the development of the new materials.
6	I-II	PYTHON PROGRAMMING LABORATORY	CO1:Develop the application specific codes using python. CO2: Understand Strings, Lists, Tuples and Dictionaries in Python CO3: Verify programs using modular approach, file I/O, Python standard library CO4: Implement Digital Systems using Python
7	I-II	FUELS AND LUBRICANTS LABORATORY	CO1:Find the kinematic viscosity of lubricants and its variation with temperature CO2:Determine the flash point, fire point, cloud point and pour point of liquid fuels CO3:Determine the calorific value of solid, liquid and gaseous fuels CO4:Determination of the dropping point of lubricating grease CO5:Determination of distillation characteristics of petroleum products
8	I-II	PROBABILITY, STATISTICS & COMPLEX VARIABLES	CO1:Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data. CO2: Apply concept of estimation and testing of hypothesis to case studies. CO3: Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems. CO4:Taylor's and Laurent's series expansions of complex function
B.Tech. II Year I Sem MECH (R-22)			
9	II-I	MECHANICS OF SOLIDS	CO1:Evaluate the internal forces, moments, stresses, strains, and deformations in structures made of various materials acted on by a variety of loads. CO2:Draw axial force, shear force and bending moment diagrams for beams and frames. CO3:Develop the Bending and Torsion formula and apply to the design of beams and shafts. CO4:Use the stress transformation equations to find the state of stress at a point for various rotated positions of the stress element and display the same in graphical form as Mohr's circle
10	II-I	METALLURGY & MATERIAL SCIENCE	CO1:Memorize the types of Crystal structures and their defects. CO2:Learn the necessity of alloying and identify types of alloy phases. CO3:Demonstrate importance of critical understanding of heat treatment in achieving required properties. CO4:Apply the knowledge of heat treatment to enhance surface properties CO5: Analyze the properties and micro structure of ferrous and non-ferrous alloys. CO6:Develop new materials and enhance properties for the advanced applications
			CO1 Elaborate the fundamentals of various moulding, casting techniques and furnaces.

11	II-I	PRODUCTION TECHNOLOGY	CO2: Identify the importance of permanent joining and principle behind different welding processes.
			CO3: Explain the concepts of solid-state welding processes
			CO4: Understand the concepts of rolling and sheet metal operations in metal working.
			CO5: Elaborates the uniqueness of extrusion, forging and high energy rate forming processes in metal working.
12	II-I	THERMODYNAMICS	CO1: Understand the basics of Thermodynamics
			CO2: Apply first and second laws of thermodynamics to different systems
			CO3: Determine the feasibility of a process w.r.to entropy changes
			CO4: Apply concepts of thermodynamic property relations to ideal gas and real gases
			CO5: Evaluate performance of power cycles and refrigeration cycles
13	II-I	PRODUCTION TECHNOLOGY LABORATORY	CO1: Analyze the given problem and conducts investigation on the experimental setup.
			CO2: Operate different types of welding machines
			CO3: Perform operations on mechanical press.
			CO4: get familiarity with processing of Plastics.
			CO5: Effectively communicate and explain the experimental analysis.
14	II-I	MATERIAL SCIENCE & MECHANICS OF SOLIDS LABORATORY	CO1: Design different crystal structures and their models.
			CO2: Infer the microstructures developed for different ferrous and non-ferrous metals.
			CO3: Correlate the microstructures, properties, performance and processing of alloys.
15	II-I	COMPUTER AIDED MACHINE DRAWING	CO1: Preparation of engineering and working drawings with dimensions and bill of material during design and development. Developing assembly drawings using part drawings of machine components.
			CO2: Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
			CO3: Types of sections – selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
			CO4: Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
			CO5: Title boxes, their size, location and details - common abbreviations and their liberal usage
			CO6: Types of Drawings – working drawings for machine parts.
B.Tech. II Year II Sem.			
16	II-II	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1: To analyze and solve electrical circuits using network laws and theorems.
			CO2: To understand and analyze basic Electric and Magnetic circuits
			CO3: To study the working principles of Electrical Machines
			CO4: To introduce components of Low Voltage Electrical Installations
			CO5: To identify and characterize diodes and various types of transistors
17	II-II	KINEMATICS OF MACHINERY	CO1: Understand the various elements in mechanism and the inversions of commonly used mechanisms such as four bar, slider crank and double slider crank mechanisms.
			CO2: Draw the velocity and acceleration polygons for a given configuration of a mechanism.
			CO3: Understand the conditions for straight line motion mechanisms, steering mechanism and the usage of Hooke's joint.
			CO4: Draw the displacement diagrams and cam profile diagram for followers executing different types of motions and various configurations of followers.
			CO5: Calculate the number of teeth and velocity ratio required for a given combination of gears.
18	II-II	FLUID MECHANICS & HYDRAULIC MACHINES	CO1: Able to explain the effect of fluid properties on a flow system.
			CO2: Able to identify type of fluid flow patterns and describe continuity equation.
			CO3: To analyze a variety of practical fluid flow and measuring devices and utilize Fluid Mechanics principles in design.
			CO4: To select and analyze an appropriate turbine with reference to given situation in power plants.
			CO5: To estimate performance parameters of a given Centrifugal and Reciprocating pump.
			CO6: Able to demonstrate boundary layer concepts
19	II-II	IC ENGINES & GAS TURBINES	CO1: Elaborate the working principles of IC Engine systems and its classification.
			CO2: Explore the combustion stages of SI and CI engines, and factors influence for better combustion.
			CO3: Evaluate the testing and performance parameters of IC engines.
			CO4: Explain the function and working principles of rotary, reciprocating, dynamic axial compressors.

			CO5:Understand the working principle of gas turbine and its classification with thermodynamic analysis.
20	II-II	INSTRUMENTATION AND CONTROL SYSTEMS	CO1: Know the basic knowledge of the functional blocks of measurement systems. CO2: Describe the working of various physical variable Temperature and pressure measuring instruments. CO3: Explain the working of various physical variable Level, flow, Speed and Acceleration measuring instruments. CO4: Understand the working of various physical and Electrical variables Stress, Humidity, Force, Torque and Power measuring instruments. CO5: Understand the concept of control system and calculate transfer functions of mechanical and translational systems with different techniques.
21	II-II	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	CO1: To analyze and solve electrical circuits using network laws and theorems. CO2: To understand and analyze basic Electric and Magnetic circuits CO3: To study the working principles of Electrical Machines CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors
22	II-II	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	CO1: To analyze and solve electrical circuits using network laws and theorems. CO2: To understand and analyze basic Electric and Magnetic circuits CO3: To study the working principles of Electrical Machines CO4: To introduce components of Low Voltage Electrical Installations CO5: To identify and characterize diodes and various types of transistors
23	II-II	FLUID MECHANICS & HYDRAULIC MACHINES LABORATORY	CO1. Able to explain the effect of fluid properties on a flow system. CO2. Able to identify type of fluid flow patterns and describe continuity equation. CO3. To analyze a variety of practical fluid flow and measuring devices and utilize fluid mechanics principles in design. CO4. To select and analyze an appropriate turbine with reference to given situation in power plants. CO5. To estimate performance parameters of a given Centrifugal and Reciprocating pump. CO6. Able to demonstrate boundary layer concepts
24	II-II	INSTRUMENTATION AND CONTROL SYSTEMS LABORATORY	CO1. Characterize and calibrate measuring devices. CO2. Identify and analyze errors in measurement. CO3. Analyze measured data using regression analysis. CO4. Calibration of Pressure Gauges, temperature, LVDT, capacitive transducer, rotameter.
25	II-II	GENDER SENSITIZATION LAB	CO1: Students will have developed a better understanding of important issues related to gender in contemporary India. CO2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film. CO3: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. CO4: Students will acquire insight into the gendered division of labor and its relation to politics and economics. CO5: Men and women students and professionals will be better equipped to work and live together as equals. CO6: Students will develop a sense of appreciation of women in all walks of life. CO7: Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence
B.TECH. III YEAR – I SEM			
26	III-I	(J5E01) MANAGEMENT SCIENCE	CO1: Strong emphasis on the practical skills essential to successful management Careers CO2: Identify the theories and practices of the business ethics and social responsibilities CO3: The learning outcomes are used in evaluating students decision making in building up their career CO4: Apply management science to case studies in finding solutions CO5: It guides them in establishing themselves as effective professionals by solving real problems
27	III-I	(J5318) DYNAMICS OF MACHINERY	CO1: Ability to solve the practical problems on clutches and brakes under various conditions CO2: Ability to recognize the needs of various principles of dynamics and application of brakes and dynamometers CO3: Ability to analyze the energy storage in the flywheels and speed regulations of various Governors CO4: Ability to balance the unbalanced forces developed in the rotating and reciprocating masses

			CO5:Ability to analyze the concepts of vibrations & take measures to minimize vibration and noise vibration and noise
28	III-I	(J5319) THERMAL ENGINEERING-II	CO1:Ability to analyze the different steam power plants and working of boilers. CO2. Ability to demonstrate the working of steam nozzles. CO3. Capability to analyze the working of different steam turbines. CO4. Ability to interpret about stem condenser and gas turbine components. CO5. Illustrate the working of jet propulsion and rocket engines
29	III-I	(J5321) MANUFACTURING TECHNOLOGY	CO1:Ability to define and explain nomenclature of single point cutting tool in various systems and select CO2:Ability to classify various types of machine tools and their operations CO3:Ability to comprehend the features, operations and applications of various machine tools like lathe, drilling, milling, shaper and grinding CO4:Ability to describe various mechanisms of feed and speed changing in lathe, quick return in slotting quill in drilling, indexing in milling CO5:Ability to summarize features, operations and applications of various surface finishing process
30	III-I	(J5333) FINITE ELEMENT METHOD	CO1Ability to summarize the numerical methods involved in Finite Element Theory and the role and significance of shape functions in finite element formulations and use linear, quadratic, and cubic shape functions for interpolation. CO2:Ability to familiarize direct and formal (basic energy and weighted residual) methods for deriving finite element equations CO3:Ability to formulate one-dimensional elements (truss and beam). CO4:Ability to formulate two-dimensional elements (triangle and quadrilateral continuum and shell elements). CO5:Ability to formulate three-dimensional elements
31	III-I	(J5334) ROBOTICS	CO1:Ability to apply robot fundamentals in designing various types of endeffectors. CO2. Ability to design the end effectors required for different applications. CO3. Ability to formulate D-H matrices for forward kinematics problems & Developdynamic equations for robot dynamic problems. CO4. Ability to determine the robot trajectory to robotic motion & Basics of RobotLanguage. CO5. Ability to select the sensors depending upon robotic application & its usesin various areas.
32	III-I	(J5335) PRODUCTION PLANNING AND CONTROL	CO1. Ability to recognize the objectives, functions, applications of PPC and forecasting techniques. CO2. Ability to explain different Inventory control techniques. CO3. Ability to solve routing and scheduling problems CO4. Ability to summarize various aggregate production planning techniques. CO5.Ability to describe way of integrating different departments to execute PPC functions
33	III-I	(J5320) THERMAL ENGINEERING LAB	CO1. Ability to find the efficiency and performance of an engine system for a given set of conditions. CO2. Ability to calculate the Volumetric efficiency of air compressor. CO3. Ability to develop skills in data acquisition systems. CO4. Ability to evaluate the engine performance and explore the ways to improve the efficiency of engines. CO5. Ability to realize the need to minimize the losses in engines.
34	III-I	(J5322) MANUFACTURING TECHNOLOGY LAB	CO1. Ability to exhibit the developing sequence of machining operations required for in industry. CO2. Capability of manufacturing components according to given working drawings.
35	III-I	(JMC03) CONSTITUTION OF INDIA	CO1. It also tells us about the rights and also the duties of its citizens. CO2. They know about the role, powers of members of local sabha and raj sabha. CO3. It lays down the rules to govern the country. CO4. Role and function of election commissioner. CO5. Power and duties of elected represented s for panchayatraj , ZP, corporation and Importance of democracy
B.TECH. III YEAR –II SEM			
36	III-II	(J6323) DESIGN OF MACHINE ELEMENTS	CO1. Graduates will be able to apply the concepts of various types of stress concentration factors and application of failure theory geometries. CO2. Ability to design riveted, welded, bolted joints for eccentric loading. CO3. Capability to design keys, cotters and knuckle joints using the concepts of stresses. CO4. Ability to design bearings, shafts and different engine parts. CO5. Ability to design and analyze spur and helical gears
			CO1. Ability to analyze the basic heat transfer concepts and their practical relevance in Plates, Cylinders and Spherical components.

37	III-II	(J6324) HEAT TRANSFER	CO2. Ability to solve practical problems of steady and unsteady state heat transfer.
			CO3. Ability to develop skills to identify suitable Nusselt number empirical correlation for Plates, Cylinders.
			CO4. Ability to design simple heat exchanger units of moderate capacity.
			CO5. Ability to differentiate the phase changes in boiling and condensation, and formulate the radiation heat exchange between two surfaces
38	III-II	REFRIGERATION AND AIR CONDITIONING	CO1. Ability to demonstrate the basic concepts of refrigeration and related performance parameters.
			CO2. Ability to analyze the performance of Vapour Compression system.
			CO3. Ability to illustrate different Vapour Absorption Refrigeration systems
			CO4. Ability to demonstrate psychrometric properties and processes used in Air Conditioning.
39	III-II	(J6337) ADVANCED STRENGTH OF MATERIALS	CO1. Ability to develop an approximate solution for the location of shear centre.
			CO2. Ability to analyze the torsion problems of circular cross section.
			CO3. Ability to analyze the local buckling of thin wall flanges of elastic columns.
			CO4. Ability to apply the knowledge of curved beams in the field of engineering.
40	III-II	(J6338) THEORY OF METAL CUTTING	CO1. Identify the cutting tool geometry, tool material, conditions for formation of different chips and their significance in metal cutting.
			CO2. Calculate cutting force in orthogonal machining using merchant circle diagram.
			CO3. Measure the cutting forces, temperatures and their importance role in machining.
			CO4. Evaluate the tool wear, tool life, machinability and proper selection of cutting fluids for economical metal cutting.
41	III-II	(J6339) OPERATION RESEARCH	CO1. Formulate and solve problems as graphs. Develop linear programming (LP) models for optimization problems.
			CO2. Identify and express a decision problem in mathematical form and solve it graphically and by simplex method.
			CO3. Recognize and formulate transportation, assignment problems and drive their optimal solution.
			CO4. Graduates understand that game theory is to determine which outcomes are stable according to solution concept.
42	III-II	(J6340) TRIBOLOGY	CO1. Capability to apply the concepts of principles of Tribology with particular emphasis on lubricated systems.
			CO2. Graduates will be able to analyze the various design parameters of bearings under different loads, temperature conditions.
			CO3. Ability to calculate the wear percentage by using different wear theories.
			CO4. Ability to identify the wear mechanisms on rubbing surfaces.
43	III-II	(J6341) ADDITIVE MANUFACTURING	CO1. Explain the process, working principle and application of liquid base RP processes.
			CO2. Explain the process, working principle and application of solid base RP processes.
			CO3. Explain the process, working principle and application of powder base RP processes.
			CO4. Explain the process and working principles of extrusion based RP processes.
44	III-II	(J6325) HEAT TRANSFER LAB	CO1. Ability to obtain the practical knowledge of heat transfer by conduction, convection, and radiations.
			CO2. Ability to gain knowledge about how heat transfer will take place practically.
			CO3. Ability to obtain how heat transfer takes place in extended surfaces.
			CO4. Ability to analyze about phase changes in different applications like heat exchanger, boiling and condensation.
45	III-II	(J6326) PRODUCTION DRAWING	CO1. Draw part drawings from given assembly drawings of machine parts.
			CO2. Indicate tolerance values on the parts drawn on sheet as per alpha numeric codes for given assembly drawings.
			CO3. Indicate form tolerances and position tolerances on the parts drawn on the sheet as per universally accepted norms for a given assembly drawing.

		DRAWING PRACTICE	CO4. Indicate values of surface finished and heat treatment process on the parts drawn for a given assembly drawings.
			CO5. Write process sheet for every part that is drawn from given assembly drawings.
B.TECH. IV YEAR –I SEM			
46	IV-I	(J7327) METROLOGY AND INSTRUMENTATION	CO1. Ability to apply different measuring techniques in quality control departments of industries and to ensure quality of products.
			CO2. Ability to design and use effectively the instruments for measure linear, angular and optical.
			CO3. Ability to analyze measuring systems of surface roughness and perform alignment/acceptance test effectively.
			CO4. Ability to design and use effectively the instruments for measuring stress, strain, force, torque etc.
			CO5. Ability to analyze measuring systems of Pressure, Fluid flow and Temperature.
47	IV-I	(J7329) CAD/CAM	CO1. Ability to apply CAD/CAM principles for geometric modelling, design and manufacturing.
			CO2. Ability to generate codes for part profiles and can accomplish machining.
			CO3. Ability to codify the part using GT codes and can apply GT system in automated manufacturing firm.
			CO4. Ability to familiarize cognizant of CAQC techniques that are to be applied in manufacturing.
			CO5. Ability to comprehend the applications of Computer Integrated Manufacturing
48	IV-I	(J7342) POWER PLANT ENGINEERING	CO1. Ability to develop awareness on different types of power generation systems.
			CO2. Ability to differentiate conventional and non conventional power plants.
			CO3. Ability to distinguish between polluting and non polluting power plants.
			CO4. Ability to acquire knowledge on the economic viability of various power generation systems.
			CO5. Ability to apply the power plant engineering concepts practically in developing low cost systems.
49	IV-I	(J7343) AUTOMATION IN MANUFACTURING	CO1. Ability to Accomplish automation in manufacturing industry.
			CO2. Ability to apply the techniques of Automation material handling and storage equipments depending upon the application.
			CO3. Ability to analyze progress functions of manufacturing systems.
			CO4. Ability to apply various algorithms to solve manual and automated flow lines.
			CO5. Ability to apply the optimized Adaptive Control System in automation
50	IV-I	(J7344) MECHANICS OF COMPOSITE MATERIALS	CO1. Ability to categorizes of types, manufacturing processes, and applications of composite materials.
			CO2. Ability to identifies problems on macromechanical behavior of lamina.
			CO3. Ability to analyze problems on micromechanical behavior of lamina.
			CO4. Ability to analyze problems on macromechanical behavior of laminate.
			CO5. Ability to analyze problems on bending, buckling, and vibration of laminated plates and beams
51	IV-I	(J7328) METROLOGY AND INSTRUMENTATION LAB	CO1. Ability to develop quality standards of engineering products in industries.
			CO2. Ability to demonstrate work in quality control departments of industries and to ensure quality of products.
			CO3. Ability to analyze the measurement of the surface roughness and perform alignment tests.
			CO4. Ability to develop the ability to apply the principles in instruments and measuring techniques.
			CO5. Ability to demonstrate work in designing the instrumentation for a particular purpose and special purpose devices
52	IV-I	(J7330) CAD/CAM LAB	CO1. Able to model and assemble the various parts using Pro/E software.
			CO2. Able to Model complex shapes including freeform curves and surfaces.
			CO3. Able to perform analysis of various parts using ANSYS software.
			CO4. Able to Implement CNC programs for milling and turning machining operations, - Create a computer aided manufacturing (CAM) model and generate the machining codes automatically using the CAM system.
B.TECH. IV YEAR –II SEM			
53	IV-II	(J8345) UNCONVENTIONAL MACHINING PROCESSES	CO1. Ability to select suitable machining process for suitable materials.
			CO2. Ability to select optimum parameters for the respective machining process.
			CO3. Ability to influence of difference process parameters on the performance and their applications.
			CO4. Ability to solve most relevant industrial solutions pertaining to machining of hard materials.
			CO5. Ability to design soft tools for machining hard materials.
			CO1. Ability to develop different components of an automobile.

54	IV-II	(J8346) AUTOMOBILE ENGINEERING	CO2. Ability to develop the fuel feed systems in SI and CI engines, Sensors and Ignition systems.
			CO3. Ability to design various transmission systems.
			CO4. Ability to analyze the simple design oriented problems related to suspension systems.
			CO5. Ability to analyze the steering systems and braking systems.
55	IV-II	J8347) MECHANICAL VIBRATIONS	CO1. Ability to learn how to develop mathematical models for mechanical systems using mass, spring and dampers.
			CO2. Ability to gain experience in deriving governing equations.
			CO3. Ability to model a vibrating mechanical system, develop and solve its governing equations in order to obtain the response of the system under various types of excitation conditions.
			CO4. Ability to learn how to interpret the response of a mechanical system and use the response information in its design and testing in both time and frequency domains.
56	IV-II	(J8348) COMPUTATIONAL FLUID DYNAMICS	CO5. Ability to assess the sources of vibration and noise in machines and make design modifications to reduce the vibration and noise and improve the life of the components for smooth operation.
			CO1. Ability to acquire the CFD techniques for the fluid flow fields of combustion chamber of IC engines and consequently analyze the behavior of fluid.
			CO2. Ability to analyze the effects of important parameters on the performance and efficiency of the system.
			CO3. Ability to carry out the simulation studies for various thermal systems.
			CO4. Ability to compare the importance of the simulation studies where there is no scope for carrying out the experimental work.
57	IV-II	(J8349) THEORY OF ELASTICITY	CO5. Ability to improve the performance and efficiency of thermal systems based on the simulation results.
			CO1. To analyze the equations of compatibility by using plane stress and plane strain conditions.
			CO2. To apply Saint Venant's principles to determine the displacements of simple beams.
			CO3. To analyze the stresses and strains in 3-Dimensional problems.
			CO4. To solve the linear elasticity problems using various analytical techniques.
58	IV-II	(J8350) PLANT LAYOUT & MATERIAL HANDLING	CO5. To analyze the vectors and tensors to enhance the theory of elasticity where ever necessary.
			CO1. Ability to analyze the importance of proper material handling and storage techniques.
			CO2. Ability to learn proper material handling engineering techniques regarding hoisting and conveying equipment.
			CO3. Ability to infer about toxic hazards of materials being handled, such as chemicals, dusts and poisons.
			CO4. Ability to refer the formal training requirements for material handling personnel, especially equipment operators.
58	IV-II	(J8350) PLANT LAYOUT & MATERIAL HANDLING	CO5. Ability to summarize the product line Integrate concepts and techniques learned through this course in order to design and efficient plant layout in a team environment.
			CO1. Ability to analyze the importance of proper material handling and storage techniques.
			CO2. Ability to learn proper material handling engineering techniques regarding hoisting and conveying equipment.
			CO3. Ability to infer about toxic hazards of materials being handled, such as chemicals, dusts and poisons.
			CO4. Ability to refer the formal training requirements for material handling personnel, especially equipment operators.
Department of ECE			
PROG RAM ME-	DEGREE : UG	A.Y: 2020-2021	II YEAR I SEMESTER
S.No	Year/Sem	Course Name	Course Outcomes
1	I-I	ELEMENTS OF ELECTRONICS AND COMMUNICATION	CO1. Identify the different components used for electronics applications.
			CO2. Measure different parameters using various measuring instruments.
			CO3. Distinguish various signal used for analog and digital communications
2	I-II	BASIC ELECTRICAL ENGINEERING	CO1. Remember the basic electrical laws
			CO2. Understand and analyze basic Electrical circuits
			CO3. Apply the concepts of KVL,KCL and network theorems in solving DC Circuits
			CO4. Compare the Electrical AC and DC Machines.
3	I-II	Electronics Devices and Circuits	CO1. Acquire the knowledge of various electronic devices and their use on real life.
			CO2. Know the applications of various devices.
			CO3. Acquire the knowledge about the role of special purpose devices and their applications.
			CO1. Acquire the knowledge of various semiconductor devices and their use in real life.

4	I-II	Electronics Devices and Circuits Lab	CO2. Design aspects of biasing and keep them in active region of the device for functional circuits CO3.Acquire the knowledge about the role of special purpose devices and their applications.
5	II-I	Analog Circuits	CO1. Design the amplifiers with various biasing techniques. CO2. Design single stage amplifiers using BJT and FET CO3. Design multistage amplifiers and understand the concepts of High Frequency Analysis of BJT. CO4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to sustained oscillations.
6	II-I	Network Analysis & Synthesis	CO1. Gain the knowledge on basic RLC circuits behaviour. CO2. Analyse the Steady state and transient analysis of RLC Circuits. CO3. Characterization of two port network parameters. CO4. Analyse the Design aspect of various filters and attenuators.
7	II-I	Digital Logic Design	CO1. Acquire the knowledge on numerical information in different forms and Boolean Algebra theorems. CO2. Define Postulates of Boolean algebra and to minimize combinational functions, and design the combinational circuits. CO3. Design and analyse sequential circuits for various cyclic functions. CO4. Characterize logic families and analyze them for the purpose of AC and DC parameters.
8	II-I	Signals and Systems	CO1. Characterize various signals, systems and their time and frequency domain analysis, using transform techniques. CO2. Identify the conditions for transmission of signals through systems and conditions for physical realization of systems. CO3. Use sampling theorem for baseband and band pass signals for various types of sampling and for different duty cycles. CO4. Apply the correlation and PSD functions for various applications.
9	II-I	Probability Theory and Stochastic Process	CO1. Perform operations on single and multiple Random variables. CO2. Determine the Spectral and temporal characteristics of Random Signals. CO3. Characterize LTI systems driven by stationary random process by using ACFs and PSDs. CO4. Understand the concepts of Noise and Information theory in Communication systems.
10	II-I	Analog Circuits Laboratory	1. Design amplifiers with required Q point and analyse amplifier characteristics. 2. Examine the effect multistage amplification on frequency response. 3. Investigate feedback concept in amplifiers and oscillator.
11	II- I	Digital Logic Design Laboratory	CO1. Acquire the knowledge on numerical information in different forms and Boolean Algebra theorems. CO2. Define Postulates of Boolean algebra and to minimize combinational functions, and design the combinational circuits. CO3. Design and analyze sequential circuits for various cyclic functions. CO4. Characterize logic families and analyze them for the purpose of AC and DC parameters.
12	II- I	Basic Simulation Laboratory	CO1. Generate, analyze and perform various operations on Signals/Sequences both in time and Frequency domain CO2. Analyze and Characterize Continuous and Discrete Time Systems both in Time and Frequency domain along with the concept of Sampling CO3. Generate different Random Signals and capable to analyze their Characteristics. CO4. Apply the Concepts of Deterministic and Random Signals for Noise removal Applications and on other Real Time Signals.
13	II- I	Constitution of India	CO1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. CO2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. CO3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution CO4. Discuss the passage of the Hindu Code Bill of 1956.
14	II- II	Numerical Methods & Complex Variables	CO1. Express any periodic function in terms of sine and cosine CO2. Find the root of a given polynomial and transcendental equations. CO3. Estimate the value for the given data using interpolation CO4. Find the numerical solutions for a given first order ODE's CO5. Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems. CO6. Taylor's and Laurent's series expansions in complex function
15	II. II	Electromagnetic Fields And	CO1. Acquire the knowledge of Basic Laws, Concept sand proofs related to Electrostatic Fields and Magneto static Fields. CO2. Characterize the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.

15	II- II	Transmission Lines	CO3. Analyze the Wave Equations and classify conductors, dielectrics and evaluate the UPW Characteristics for several practical media of interest.
			CO4. Analyze the Design aspect of transmission line parameters and configurations.
16	II- II	Analog and Digital Communications	CO1. Design and analyze various Analog and Digital Modulation and Demodulation techniques.
			CO2. Model the noise present in continuous wave Modulation techniques.
			CO3. Implement the Super heterodyne Receiver concept and Pulse Modulation Techniques in various applications.
			CO4. Analyze and design the base band Transmission.
17	II- II	Linear & Digital IC Applications	CO1. A thorough understanding of operational amplifiers with linear integrated circuits.
			CO2. Attain the knowledge of functional diagrams and design applications of IC555 and IC565.
			CO3. Acquire the knowledge and design the Data converters.
			CO4. Choose the proper digital integrated circuits by knowing their characteristics.
18	II- II	Electronic Circuit analysis	CO1. Design the power amplifiers
			CO2. Design the tuned amplifiers and analyse its frequency response
			CO3. Design Multivibrators and sweep circuits for various applications.
			CO4. Utilize the concepts of synchronization, frequency division and sampling gates
19	II- II	Analog and Digital Communications Laboratory	CO1. Design and implement various Analog modulation and demodulation Techniques and observe the time and frequency domain characteristics
			CO2. Design and implement various Pulse modulation and demodulation Techniques and observe the time and frequency domain characteristics.
			CO3. Apply different types of Sampling with various Sampling rates and duty Cycles.
			CO4. Design and implement various Digital modulation and demodulation Techniques and observe the waveforms of these modulated Signals practically.
20	II- II	Linear & Digital IC Applications Laboratory	CO1. Design and implementation of various analog circuits using 741 ICs.
			CO2. Design and implementation of various Multivibrators using 555 timer.
			CO3. Design and implement various circuits using digital ICs.
			CO4. Design and implement ADC, DAC and voltage regulators.
21	II- II	Electronic Circuit analysis Laboratory	CO1. Design power amplifiers and find its efficiency
			CO2. Design tuned amplifiers and find its Q-factor
			CO3. Design various multivibrators and sweep circuits. Understand the necessity of linearity.
			CO4. Design sampling gates and understanding the concepts of frequency division.
22	II- II	Gender Sensitization Lab	CO1. Students will have developed a better understanding of important issues related to gender in contemporary India.
			CO2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
			CO3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO4. Students will acquire insight into the gendered division of labor and its relation to politics and economics.
			CO5. Men and women students and professionals will be better equipped to work and live together as equals.
			CO6. Students will develop a sense of appreciation of women in all walks of life.
			CO7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
23	III-I	IC Applications	CO1. A thorough understanding of Operational amplifiers with Linear Integrated Circuits.
			CO2. Understanding of the Different families of Digital Integrated Circuits and their characteristics.
			CO3. Also student will be able to design circuits using Operational amplifiers for various applications such as Timers and Filters.
			CO4. Understands ADC & DAC along with types for Real world problems
			CO5. Learned the concepts on Digital ICs for VLSI Technology and Design
24	III- I	Digital Signal Processing	CO1. To understand the concept of DT Signal and perform signal manipulation.
			CO2. Understand the Properties of DFT in mathematical problem solving, and FFT Algorithms.
			CO3. Understand the Physical Realization of Digital filters.
			CO4. Understand Design of Digital filters.
			CO5. Understand the Multirate DSP Techniques and applications.
25	III- I	Digital Communication	CO1. Understand basic components of Digital Communication Systems.
			CO2. Design optimum receiver for Digital Modulation techniques.
			CO3. Analyze the error performance of Digital Modulation Techniques.
			CO4. Understand the redundancy present in Digital Communication by using various source coding techniques.

			CO5. Know about different error detecting and error correction codes like block codes, cyclic codes and convolution codes and to understand advantage of spread spectrum
26	III-I	Antennas and Wave Propagation (PE-I)	CO1. Explain the various types of antennas and wave propagation.
			CO2. Write about the radiation from a current element.
			CO3. Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band
			CO4. Understands about the propagation of waves
			CO5. Measure the Antenna parameters for designing applications.
27	III-I	Power Electronics (PE-I)	CO1. Distinguish between different types of power semiconductor devices and their characteristics.
			CO2. Analyze single Phase Half wave and full wave controlled converters.
			CO3. Analyze the Three Phase Line Commutated Converters
			CO4. Analyze the AC voltage controllers and Cyclo converters.
			CO5. Analyze DC –DC Choppers and analyze DC-AC Inverters.
28	III-I	Biomedical Electronics (PE-I)	CO1. Understand the application of the electronic systems in biological and medical applications.
			CO2. Understand the practical limitations on the electronic components while handling bio substances.
			3. Understand and analyze the biological processes like other electronic processes.
			4. Understand the Diagnosing system by different techniques
			5. Understand the Prostheses and aids
29	III-I	Constitution of India (MC)	CO1. It Tells about the rights and duties of citizens
			CO2. They know about the role, powers of members of local sabha and raj sabha
			CO3. It lays down the rules to govern the country
			CO4. Role and function of election commissioner
			CO5. power and duties of elected represented for Panchayatraj, ZP, corporation and importance of democracy.
30	III-II	Linear Control Systems	CO1. Open loop and closed loop systems, concept of feedback in control systems, mathematical modeling and transfer function derivations of translational and rotational systems and transfer functions of servomotors and concepts of synchros.
			CO2. Transfer function representation through block diagram algebra and signal flow graphs,
			CO3. Time response analysis of different ordered systems through their characteristic equation and time-domain specifications.
			CO4. Stability analysis of control systems in s-domain through R-H criteria and root-locus techniques.
			CO5. Frequency response analysis through bode diagrams. With which he/she can be able to apply the above conceptual things to real world electrical and Electronic problems and applications.
31	III-II	VLSI Technology	CO1. Understand the fundamentals of VLSI design flow.
			CO2. Understand the fundamentals behind integrated circuit design and manufacturing process.
			CO3. Understand the basic principles of design rules and scaling standards.
			CO4. Apply the acquired knowledge to projects at work.
			CO5. Take advanced courses in this area.
32	III-II	Microprocessors and Microcontrollers	CO1. The student will learn internal architecture and organization of 8085 and 8086.
			CO2. The student will learn instruction set, Addressing Modes and Assembly level language programming
			CO3. The student understands how to interface the various I/O and Communication interface modules.
			CO4. The student will learn the internal Architecture, Register Organization and instruction set of 8051 microcontrollers and their interfacing.
			CO5. Understands advance microcontrollers and their importance in the field of Embedded systems and IOT.
33	III-II	Electronic Measurements and Instrumentation	CO1. Describe the fundamental concepts and principles of instrumentation.
			CO2. Explain the operations of the various instruments required in measurements.
			CO3. Apply the measurement techniques for different types of tests.
			CO4. To select specific instrument for specific measurement function.
			CO5. Learners will apply knowledge of different oscilloscopes like CRO, DSO. Students will understand functions, specification, and applications of signal analyzing instruments
34	III-II	Information Theory & Coding (PE-II)	CO1. Understand the concept of information and entropy
			CO2. Understand Shannon's theorem for coding
			CO3. Calculation of channel capacity
			CO4. Apply coding techniques
35	III-II	Speech and Audio Processing (PE-II)	CO1. Mathematically model the speech signal
			CO2. Analyze the quality and properties of speech signal.
			CO3. Modify and enhance the speech and audio signals.
			CO4. Analyze LPC model
			CO5. Understand different coding standards
			CO1. Understand various aspects of nano-technology and the processes involved in making nano components and material.

36	III-II	Nano Electronics (PE-II)	CO2. Leverage advantages of the nano-materials and appropriate use in solving practical problems. CO3. Understand various aspects of nano-technology and the processes involved in making nano components and material. CO4. Leverage advantages of the nano-materials and appropriate use in solving practical problems. CO5. Applications of Nano Electronics.
37	IV-I	Microwave & Optical Communication Engineering	CO1. Understand basic components of Micro-Wave Communication Systems. CO2. Understand S Parameters for different Micro-Wave Devices. CO3. Understand basics of Optical Fiber. CO4. Understand the working principle of optical sources, detector. CO5. Understand various Optical Modulation techniques.
38	IV-I	Computer Networks	CO1. Demonstrate computer network architecture, OSI and TCP/IP reference models CO2. Determine types of data link and medium access control protocols CO3. Use Routing algorithms and internetworking CO4. Design network protocols for real time application CO5. Understand internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP
39	IV-I	Adaptive Signal Processing (PE-III)	CO1. Understand the non-linear control and the need and significance of changing the control parameters w.r.t. real time situation. CO2. Mathematically represent the 'adaptability requirement'. CO3. Understand the mathematical treatment for the modeling and design of the signal processing systems CO4. Understand the Joint process estimator and gradient adaptive lattice CO5. Understand and apply RLS algorithms to different signal estimators.
40	IV-I	Image & Video Processing (PE-III)	CO1. Understand the basic steps of image processing, pixels . CO2. Familiarize Image enhancement methods such as spatial and frequency domain enhancement CO3. Understand the Image Segmentation, Image compression fundamentals and compression models CO4. Understand the 2-D motion estimation and coding techniques CO5. Understand the basic steps of video processing and 3-D motion models
41	IV-I	Wireless Communication Networks(PE-III)	CO1. Understand the working principles of the mobile communication systems. CO2. Understand the relation between the user features and underlying technology. CO3. Analyze mobile communication systems for improved performance.
42	IV-I	High Speed Electronics (PE-IV)	CO1. Understand significance and the areas of application of high-speed electronics circuits. CO2. Understand the properties of various components used in high speed electronics CO3. Design High-speed electronic system using appropriate components.
43	IV-I	Wavelet (PE-IV)	CO1. Understand time-frequency nature of the signals. CO2. Apply the concept of wavelets to practical problems. CO3. Mathematically analyze the systems or process the signals using appropriate wavelet functions
44	IV-I	EMBEDDED SYSTEMS(PE-IV)	CO1. Understand and design embedded systems CO2. Learn basic of OS and RTOS CO3. Understand types of memory and interfacing to external world CO4. Understand embedded firmware design approaches. CO5. Understands different operating systems for Embedded Systems
45	IV-I	Introduction to MEMS (PE-V)	CO1. Appreciate the underlying working principles of MEMS and NEMS devices. CO2. Design and model MEM devices. CO3. Understand the concept of Micromachining CO4. Understands the MEMS/NEMS. CO5. Understand the Finite Element method.
46	IV-I	RF Circuit Design (PE-V)	CO1. Understand basic components of Micro-Wave Communication Systems. CO2. Understand basics of advanced amplifiers. CO3. Understand basics of RFID Systems. CO4. Understand the Various Optical Sources. CO5. Understand various integrated circuits.
47	IV-I	Error Correcting Codes (PE-V)	CO1. Understand the error sources. CO2. Understand error control coding applied in digital communication. CO3. Understand the spectral properties of cyclic code. CO4. understand the decoding algorithms. CO5. Understand and analyze the convolution codes.
48	IV-I	Mini Project	CO1: Student will be able to gather the requirements of the problem. CO2: Students will be able to analyze, design and develop the application, tool with the explored technologies. CO3: Students will be able to initiate efforts to solve real time problems
49	IV-II	CMOS Design (PE-	CO1. Design different CMOS circuits using various logic families along with their circuit layout. CO2. Use tools for VLSI IC design.

72	IV-II	VI)	CO3. Know CMOS circuits design paths. CO4.Design Combinational circuits using CMOS CO5. Design Sequential circuits using CMOS
50	IV-II	Scientific Computing (PE-VI)	CO1. Understand the significance of computing methods, their strengths and application areas. CO2. Perform the computations on various data using appropriate computation tools. CO3. Understands about linear least equations CO4. understand and apply Non linear Equations for engineering problems CO5. understand the concept of Interpolation
51	IV-II	Radar Systems (PE-VI)	CO1. Understand the principle of radar system and derive the Range equation and the nature of detection CO2. Understand various technologies involved in the design of radar transmitters and receivers. CO3. To learn various radars like MTI, Doppler and tracking radars and their comparison. CO4. Explain principles of navigation, in addition to approach and landing aids as related to navigation. CO5. Describe about the navigation systems using the satellite.
52	IV-II	Mixed Signal Design (PE-VII)	CO1. To understand the designing of combinational and sequential logic circuits CO2. To understand the Analog CMOS modeling CO3. To understand the basic building blocks of switched capacitor CO4. To understand the designing of A/D and D/A converters CO5. To understand PLL circuits
53	IV-II	Wireless Sensor Networks(PE-VII)	CO1. Understand the Concept of sensor networks, challenges and architectures of sensor networks CO2. Analyze the Networking technologies and MAC protocols for wireless sensor networks CO1. Understand the the different routing, transport layer and security protocols in WSN CO2. Analyze the Infrastructure establishment and security issues in WSN CO1. Understand the Sensor network platforms tools and applications of WSN's
54	IV-II	Satellite Communications (PE-VII)	CO1. Analyze the satellite orbits. CO2. Analyze the earth segment and space segment. CO3. To understand the satellite access methods. CO4. To understand the earth station technology. CO5. To Design various satellite applications.
55	IV-II	Technical Seminar	CO1: Able to express and master public speaking during technical presentations. CO2: Able to get an opportunity; where in individuals can meet others with the same Interests/problems/concerns and also to envisage emerging technologies. CO3: Able to have a sense of renewed hope and inspiration, as sometimes business concerns are lessened by sharing experiences with others. CO4: Able to have a great morale booster for students for career making advancement CO5: Able to become speaker and it will motivate students in facing technical and HR interview rounds.
56	IV-II	Comprehensive Viva Voce	CO1: Able to communicate orally about analyzing a problem. CO2: Able to express the effectively to accomplish a common goal. CO3: Able to recapitulate fundamentals from across all semesters of B-Tech course work [4 years of learning]. CO4: Handle difficult scenario during Viva Voce in the event of plenty of subjects under question
57	IV-II	Major Project	CO1: Able to analyze a problem, identify and define the computing requirements appropriate to its solutions. CO2: Able to function effectively on teams to accomplish a common goal. CO3: Able to use current techniques, skill and tools necessary for computing practices. CO4: Able to design and development principles in the construction of software systems of varying complexity. CO5: Able to get an eye opener to bridge gap between Academia and real time industry issues on technological front CO6: Able to meet industrial requirement and to improve technical interview skills of a student.

Department of CSE

PROG RAM ME(C SE)	DEGREE / UG	A.Y:2023- 2024	
S.NO	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)

1	I-I	Matrices and Calculus	CO1. Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.
			CO2. Determine Eigen values, Eigen vectors of matrices.
			CO3. Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions.
			CO4. Calculate Partial derivatives, extreme of functions of multiple variables CO5. Evaluate the multiple integrals in various coordinate systems.
2	I-I	Engineering Chemistry	COCO1. Students will acquire the basic knowledge of MOT and CFT.
			CO2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
			CO3. The students are able to again knowledge electrochemical procedures related to corrosion and it's control.
			CO4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs
3	I-I	Programming for Problem Solving	CO1. To convert the algorithms/flowcharts to C programs.
			CO2. To code and test a given logic in the C programming language.
			CO3. To decompose a problem into functions and to develop modular reusable code.
			CO4. To use arrays, pointers, strings and structures to write C programs.
			CO5. Searching and sorting problems
4	I-I	Basic Electrical Engineering	CO1. Understand and analyze basic Electrical circuits
			CO2. Apply the concepts of KVL, KCL and network theorems in solving DC Circuits
			CO3. Compare the Electrical AC and DC Machines.
			CO4. Introduce components of Low Voltage Electrical Installations. □
5	I-I	Computer Aided Engineering Graphics	CO1. Apply computer aided drafting tools to create 2D and 3D objects
			CO2. sketch conics and different types of solids
			CO3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
			CO4. Read and interpret engineering drawings
			CO5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
6	I-I	Elements of Computer Science & Engineering	CO1. Know the working principles of functional units of a basic Computer
			CO2. Understand program development, the use of data structures and algorithms in problem solving.
			CO3. Know the need and types of operating system, database systems.
			CO4. Understand the significance of networks, internet, WWW and cyber security.
			CO5. Understand Autonomous systems, the application of artificial intelligence.
7	I-I	Engineering Chemistry Laboratory	CO1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
			CO2. Able to perform methods such as conductometry, potentiometry in order to find out the concentrations or equivalence points of acids and bases
			CO3. Students are able to prepare Drugs like aspirin and paracetamol.
			CO4. Estimations saponification value, surface tension and viscosity of lubricant oils.
8	I-I	Programming for Problem Solving Laboratory	CO1 To analyze the various steps in program development.
			CO2 To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
			CO3 To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
			CO4 To Write programs using the Dynamic Memory Allocation concept.
			CO5 To create, read from and write to text and binary files
9	I-I	Basic Electrical Engineering Laboratory	CO1. Measure the electrical Parameters for different laws.. Analyze the transient response of various R, L and C circuits using different excitations.
			CO2 Evaluate the performance calculations of different types of networks.
			CO3 Draw the Performance Characteristics of DC and AC Machines
			CO4 Identify the Basic Electrical LT switchgear components □
10	I-II	Ordinary Differential Equations and Vector Calculus	CO1. Identify whether the given differential equation of first order is exact or not
			CO2. Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.
			CO3. Solving ODE's by using Laplace transforms techniques.
			CO4. Apply the concepts of gradient, divergence and curl to formulate Engineering problems.
			CO5. Analyse line, surface and volume integrals using fundamental theorems
11	I-II	Applied Physics	CO1. Understand the basic principles of quantum physics and band theory of solids.
			CO2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
			CO3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
			CO4. Identify the importance of nano scale, quantum confinement and various fabrications techniques.

			CO5. Study the characteristics of lasers and optical fibres.
12	I-II	Engineering Workshop	CO1.Study and practice on machine tools and their operations Practice on manufacturing of components using workshop trades including plumbing
			CO2 fitting, carpentry, foundry, house wiring and welding. Identify and apply suitable tools for different trades of Engineering processes including
			CO3. drilling, material removing, measuring, chiseling. Apply basic electrical engineering
			CO4. knowledge for house wiring practice
13	I-II	English for skill Enhancement	CO1. Understand the importance of vocabulary and sentence structures
			CO2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
			CO3. Demonstrate their understanding of the rules of functional grammar.
			CO4. Develop comprehension skills from the known and unknown passages.
			CO5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts. 6. Acquire basic proficiency in reading and writing modules of English
14	I-II	Python Programming	CO1.To be able to introduce core programming basics and program design with functions using Python programming language.
			CO2. To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
			CO3. To understand the high-performance programs designed to strengthen the practical expertise.
15	I-II	Applied Physics Laboratory	CO1. Understand the optical phenomenon of interference and diffraction .
			CO2. Know the determination of the energy gap of semiconductor materials.
			CO3. Gain the knowledge of applications of fiber optics in communication.
			CO4. Appreciate quantum physics in semiconductor devices and optoelectronics
			CO5. Apply the various procedures, mathematical concepts and techniques for the experiments to obtain quantitative results
16	I-II	Python Programming Laboratory	CO1. Develop the application specific codes using python.
			CO2 Understand Strings, Lists, Tuples and Dictionaries in Python
			3 Verify programs using modular approach, file I/O, Python standard library
			4 Implement Digital Systems using Python Note: The lab experiments will be like the following experiment examples
17	I-II	English Language and Communication Skills Laboratory	CO1.Understand the nuances of English language through audio- visual experience and group activities Neutralise their accent for intelligibility
			CO2.Speak with clarity and confidence which in turn enhances their employability skills
18	I-II	IT Workshop	CO1.Perform Hardware troubleshooting
			CO2. Understand Hardware components and inter dependencies Safeguard computer systems from viruses/worms
			CO3. Document/ Presentation preparation
			CO4.Perform calculations using spreadsheets
19	II-I	Computer Oriented Statistical Methods	CO1. Apply the concepts of probability and distributions to case studies.
			CO2. Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
			CO3. Apply concept of estimation and testing of hypothesis to case studies.
			CO4. Correlate the concepts of one unit to the concepts in other units.
20	II-I	Computer Organization and Architecture	CO1. Understand the basics of instruction sets and their impact on processor design.
			CO2. Demonstrate an understanding of the design of the functional units of a digital computer system.
			CO3. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
			CO4. Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5. Recognize and manipulate representations of numbers stored in digital computers.
21	II-I	Object Oriented Programming through Java	CO1. Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
			CO2. Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
			CO3. Use multithreading concepts to develop inter process communication.
			CO4. Understand the process of graphical user interface design and implementation using AWT or swings.
			CO5. Develop applets that interact abundantly with the client environment and deploy on the server.
22	II-I	Data Structures Lab	CO1. Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2. Ability to Implement, searching and sorting algorithms

23	II-I	Object Oriented Programming through Java Lab	CO1. Able to write programs for solving real world problems using the java collection framework. CO2. Able to write programs using abstract classes. CO3. Able to write multithreaded programs. CO4. Able to write GUI programs using swing controls in Java.
24	II-I	Gender Sensitization Lab	CO1. Students will have developed a better understanding of important issues related to gender in contemporary India. CO2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film. CO3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. CO4. Students will acquire insight into the gendered division of labor and its relation to politics and economics CO5. Men and women students and professionals will be better equipped to work and live together as equals. 6. Students will develop a sense of appreciation of women in all walks of life. 7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
25	II-I	Skill Development Course (Data visualization- R Programming/ Power BI)	CO1. Understand How to import data into Tableau. CO2. Understand Tableau concepts of Dimensions and Measures. CO3. Develop Programs and understand how to map Visual Layouts and Graphical Properties. CO4. Create a Dashboard that links multiple visualizations. CO5. Use graphical user interfaces to create Frames for providing solutions to real world problems.
26	II-II	Discrete Mathematics	CO1. Understand and construct precise mathematical proofs CO2. Apply logic and set theory to formulate precise statements CO3. Analyze and solve counting problems on finite and discrete structures CO4. Describe and manipulate sequences CO5. Apply graph theory in solving computing problems
27	II-II	Business Economics And Financial	CO1.The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students
28	II-II	Operating Systems	CO1. Will be able to control access to a computer and the files that may be shared CO2. Demonstrate the knowledge of the components of computers and their respective roles in computing. CO3. Ability to recognize and resolve user problems with standard operating environments. CO4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.
29	II-II	Database Management Systems	CO1. Gain knowledge of fundamentals of DBMS, database design and normal forms CO2. Master the basics of SQL for retrieval and management of data. CO3. Be acquainted with the basics of transaction processing and concurrency control. CO4. Familiarity with database storage structures and access techniques
30	II-II	Software Engineering	CO1. Ability to translate end-user requirements into system and software requirements, using e.g.UML, and structure the requirements in a Software Requirements Document (SRD). CO2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices. CO3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
31	II-II	Operating Systems Lab	CO1. Simulate and implement operating system concepts such as scheduling, dead lock management, file management and memory management. CO2. Able to implement C programs using Unix system calls
32	II-II	Database Management Systems Lab	CO1. Design database schema for a given application and apply normalization CO2. Acquire skills in using SQL commands for data definition and data manipulation. CO3. Develop solutions for database applications using procedures, cursors and triggers
33	II-II	Constitution of India	CO1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. CO2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. CO3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution CO4. Discuss the passage of the Hindu Code Bill of 1956.
			CO1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.

34	II-II	Skill Development Course (Node JS/ React JS/Django)	CO2. Demonstrate Advanced features of JavaScript and learn about JDBC
			CO3. Develop Server – side implementation using Java technologies like
			CO4. Develop the server – side implementation using Node JS.
			CO5. Design a Single Page Application using React.
35	III-I	Database Management Systems	CO1. Differentiate database systems from file system by understanding the features of database system and design a ER model for a database system.
			CO2. Develop solutions to a broad range of query and data update problems using relational algebra, relational calculus and SQL
			CO3. Apply the normalization theory in relational databases for removing anomalies.
			CO4: Analyze the basic issues of transaction processing, concurrency control, deadlock and its recovery schemes.
			CO5: Compare database storage and access techniques for file organization, indexing methods and Query Processing.
36	III-I	Principles of Programming Languages	CO1. Master using syntax related concepts including context free grammars, parse trees, recursive descent parsing, printing, and interpretation.
			CO2. Master analyzing semantic issues associated with function implementations, including variable binding, scoping rules, parameter passing, and exception handling.
			CO3. Master implementation techniques for interpreted functional languages.
			CO4. Be familiar with design issues of object oriented and functional languages.
			CO5. Be familiar with language abstraction constructs of classes, interfaces, packages, and procedures.
37	III-I	Micro Processors and Interfacing	CO1. Understands the internal architecture and organization of 8085 and 8086 and 8051 processors/controllers.
			CO2. Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems.
38	III-I	Web Programming	CO1. Design a static web page using HTML Tags, CSS properties, javascripts.
			CO2. Design and develop a dynamic web page using JDBC, XML schema, servlets.
			CO3. Design and develop a web page to access data from the databases using JSP concepts.
			CO4. Design and demonstrate on secured web page with PHP scripting.
			CO5. Design architecture for accessing MySQL database with PHP.
39	III-I	Artificial Intelligence	CO1. Differentiate between a rudimentary Problem and an AI problem, it's Characteristics and problem solving Techniques.
			CO2. Determine and evaluate the various search strategies.
			CO3. Compare and contrast the various “knowledge representation” schemes of AI.
			CO4. Understand and analyze the various reasoning techniques involved in solving AI problems.
			CO5. Understand the different learning techniques, apply the AI techniques to solve the real world problems.
40	III-I	Database Management System Lab	CO1. Ability to design and implement a database schema for given problem.
			CO2. Be capable to Design and build a UI application.
			CO3. Apply the normalization techniques for development of application software to realistic problems.
			CO4. Ability to formulate queries using SQL DML/DDl/DCL commands.
			CO5. Ability to design cursors and procedures.
41	III-I	Web Programming Lab	CO1. Develop a static web page using HTML Tags, CSS, javascripts.
			CO2. Implement with JDBC connections, XML schema, servlets.
			CO3. Implement a web page in JSP, accessing the data from different database.
			CO4. Implement a web page in PHP scripting.
			CO5. To retrieve the data using MySQL and other different types of databases.
42	III-I	Constitution of India	CO1. It also tells us about the rights and also the duties of its citizens.
			CO2. They know about the role, powers of members of local sabha and raj sabha.
			CO3. It lays down the rules to govern the country.
			CO4. Role and function of election commissioner.
			CO5. Power and duties of elected representatives for panchayatraj , ZP, corporation and Importance of democracy.
43	III-II	Compiler Design	CO1. Understand the different phases of compiler.
			CO2. Design a lexical analyzer for a sample language.
			CO3. Apply different parsing algorithms to develop the parsers for a given grammar.
			CO4. Understand syntax-directed translation and run-time environment.
			CO5. Learn to implement code optimization techniques and a simple code generator. Design and implement a scanner and a parser using LEX and YACC tools.

44	III-II	Computer Networks	CO1. Demonstrate computer network architecture, OSI and TCP/IP reference models.
			CO2. Determine types of data link and medium access control protocols.
			CO3. Use Routing algorithms and internetworking.
			CO4. Design network protocols for real time application.
			CO5. Understand internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP.
45	III-II	Machine Learning	CO1. Design a neural network for an application of your choice.
			CO2. Implement probabilistic discriminative and generative algorithms for an application of your choice and analyze the results.
			CO3. Use a tool to implement typical clustering algorithms for different types of applications.
			CO4. Design and implement an HMM for a sequence model type of application.
			CO5. Identify applications suitable for different types of machine learning with suitable justification.
46	III-II	Software Engineering	CO1. Apply the functional and non-functional requirements to model an effective software product.
			CO2. Analyze, design and implement an object oriented approach system.
			CO3. Enhance the testing tools for effective debugging.
			CO4. Analyze the metrics, risk and the quality issues for designing a process product.
			CO5. Test security levels of a software and manage security software's.
47	IV-I	Data Mining	CO1. Understand operational database, warehousing and multidimensional need of data base to meet industrial needs.
			CO2. Apply the association rules for mining the data.
			CO3. Design and deploy appropriate classification techniques.
			CO4. Cluster the high dimensional data for better organization of the data.
			CO5. Compare and contrast the dominant data mining algorithms.
48	IV-I	Network Programming	CO1. Analyse the requirements of a networked programming environment and identify the issues to be solved
			CO2. Create conceptual solutions to those issues and implement a programming solution.
			CO3. Apply several common programming interfaces to network communication.
			CO4. Understand the use of TCP/UDP Sockets.
			CO5. Apply advanced programming techniques such as Broadcasting, Multicasting.
49	IV-I	Cloud Computing	CO1. Assess the knowledge and the important role of cloud computing in the development of various applications.
			CO2. Describe the of various services offered in cloud computing.
			CO3. Summarize the knowledge of underlying technologies used in cloud computing.
			CO4. Identify the security related issues involved in cloud computing.
			CO5. Identify the common standards in cloud computing.
50	IV-I	Mini Project	CO1. Ability to engage in independent study to research literature in the identified domain .
			CO2. Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions .
			CO3. Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem.
			CO4: Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation.
			CO5: Ability to abide by the norms of professional ethics.
51	IV-I	Technical Seminar	CO1. Ability to engage in independent study to research literature in the identified domain.
			CO2. Ability to analyze various work to identify and formulate the engineering problem.
			CO3. Ability to work independently.
			CO4: Ability to communicate effectively.
			CO5: Ability to abide by the norms of professional ethics.
52	IV-II	Cryptography & Network Security	CO1. Differentiate services, attacks and mechanisms.
			CO2. Apply the mathematical concepts in cryptographic algorithms.
			CO3. Acquire the knowledge on key management and message authentication techniques.
			CO4. Acquire the knowledge on IP security and Web security.
			CO5. Protect the data from unauthorized persons, intruders and malicious software.
			CO1. Ability to define, understand and explain the concepts of Web Intelligence.
			CO2. Ability to apply the Knowledge of Semantic web.

53	IV-II	Semantic Web & Social Networks	CO3. Ability to analyze Web applications including search engines and social networking sites..
			CO4: Ability to make an effective written document on Ontology Development Tools.
			CO5: Analysis and Submit report on Building Semantic Web Applications with social network features.
54	IV-II	Comprehensive Viva-Voce	CO1. Ability to engage in independent study to research literature in the identified domain.
			CO2. Ability to analyze various work to identify and formulate the engineering problem.
			CO3. Ability to work independently.
			CO4: Ability to communicate effectively.
55	IV-II	Major Project	CO5: Ability to abide by the norms of professional ethics.
			CO1. Ability to engage in independent study to research literature in the identified domain .
			CO2. Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions .
			CO3. Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem.
			CO4: Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation.
DEPARTMENT OF CSE (AI & ML)			
PROGRAMME CSE (AI & ML)	DEGREE / UG	A.Y:2023-2024	
S.NO	Year/Sem	Course Name	Course Outcomes (student can able to understand)
1	I-I	MATRICES AND CALCULUS	1.Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.
			2.Determine Eigen values, Eigen vectors of matrices.
			3.Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions.
			4.Calculate Partial derivatives, extreme of functions of multiple variables
			5.Evaluate the multiple integrals in various coordinate systems.
2	I-I	APPLIED PHYSICS	1.Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
			2.Identify the role of semiconductor devices in science and engineering Applications.
			3.Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
			4.Appreciate the features and applications of Nano materials.
			5.Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
3	I-I	PROGRAMMING FOR PROBLEM SOLVING	1.Write algorithms and to draw flowcharts for solving problems.
			2.Convert the algorithms/flowcharts to C programs.
			3.Code and test a given logic in the C programming language.
			4.Decompose a problem into functions and to develop modular reusable code.
			5.Use arrays, pointers, strings and structures to write C programs.
			6.Searching and sorting problems.
4	I-I	ENGINEERING WORKSHOP	1.Study and practice on machine tools and their operations
			2.Practice on manufacturing of components using workshop trades including plumbing,fitting, carpentry, house wiring.
			3.Identify and apply suitable tools for different trades of engineering processes includingdrilling, material removing, measuring, chiseling.
			4.Apply basic electrical engineering knowledge for house wiring practice.
5	I-I	ENGLISH FOR SKILL ENHANCEMENT	1.Understand the importance of vocabulary and sentence structures
			2.Choose appropriate vocabulary and sentence structures for their oral and writtencommunication
			3.Demonstrate their understanding of the rules of functional grammar.
			4.Develop comprehension skills from the known and unknown passages.
			5.Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
			6. Acquire basic proficiency in reading and writing modules of English.

6	I-I	ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING	1.Know the working principles of functional units of a basic Computer
			2.Understand program development, the use of data structures and algorithms in problem solving.
			3.Know the need and types of operating system, database systems.
			4.Understand the significance of networks, internet, WWW and cyber security.
			5.Understand Autonomous systems, the application of artificial intelligence.
7	I-I	APPLIED PHYSICS LABORATORY	1.Understand the optical phenomenon of interference and diffraction .
			2.Know the determination of the energy gap of semiconductor materials.
			3.Gain the knowledge of applications of fiber optics in communication.
			4.Appreciate quantum physics in semiconductor devices and optoelectronics
			5.Apply the various procedures, mathematical concepts and techniques for the experiments to obtain quantitative results.
8	I-I	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	1.To work with an IDE to create, edit, compile, run and debug programs
			2.To analyze the various steps in program development.
			3.To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
			4.To develop modular, reusable and readable C Programs using the concepts like functions, arraysetc.
			5.To Write programs using the Dynamic Memory Allocation concept.
			6.To create, read from and write to text and binary files
9	I-I	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	1.Understand the nuances of English language through audio- visual experience and Group activities
			2.Understand and respond to their speakers.
			3.Neutralize their accent for intelligibility
			4.Speak with clarity and confidence which in turn enhances their employability skills
			5.Make presentations with proper communicative and body language.
10	I-II	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	1.Identify whether the given differential equation of first order is exact or not
			2.Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.
			3. Solving ODE"s by using Laplace transforms techniques.
			4.Apply the concepts of gradient, divergence and curl to formulate Engineering problem
			5.Analyse line, surface and volume integrals using fundamental theorems.
11	I-II	ENGINEERING CHEMISTRY	tudents will acquire the basic knowledge of MOT and CFT.
			2.The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
			3.The students are able to gain knowledge electrochemical procedures related to corrosion and it's control.
			4.They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs
12	I-II	COMPUTER AIDED ENGINEERING GRAPHICS	1.Apply computer aided drafting tools to create 2D and 3D objects
			2.Sketch conics and different types of solids
			3.Appreciate the need of Sectional views of solids and Development of surfaces of solids
			4.Read and interpret engineering drawings
			5.Conversion of orthographic projection into isometric view and vice versa manually and By using computer aided drafting
13	I-II	BASIC ELECTRICAL ENGINEERING	1.Remember the basic electrical laws
			2.Understand and analyze basic Electrical circuits
			3.Apply the concepts of KVL, KCL and network theorems in solving DC Circuits
			4.Compare the Electrical AC and DC Machines.
			5.Introduce components of Low Voltage Electrical Installations.
14	I-II	PYTHON PROGRAMMING	1.Student should be able to understand the basic concepts scripting and the contributions of scripting language
			2.Ability to explore python especially the object oriented concepts, and the built in objects of Python.
			3.Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications discrete event simulations
15	I-II	ENGINEERING CHEMISTRY LABORATORY	1.Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
			2.Able to perform methods such as conductometry, potentiometry in order to find out the concentrations or equivalence points of acids and bases.
			3.Students are able to prepare Drugs like aspirin and paracetamol.
			4.Estimation of saponification value, surface tension and viscosity of lubricant oils.
16	I-II	Basic Electrical Engineering Laboratory	1.Measure the electrical Parameters for different laws..
			2.Analyze the transient response of various R, L and C circuits using different excitations.
			3.Evaluate the performance calculations of different types of networks.

		Laboratory	
			4.Draw the Performance Characteristics of DC and AC Machines. 5.Identify the Basic Electrical LT switchgear components.
17	I-II	PYTHON PROGRAMMING LABORATORY	1.Develop the application specific codes using python. 2.Understand Strings, Lists,Tuples and Dictionaries in Python 3.Verify programs using modular approach, file I/O, Python standard library 4.Implement Digital Systems using Python
18	I-II	IT WORKSHOP	1.Perform Hardware troubleshooting 2.Understand Hardware components and inter dependencies 3.Safeguard computer systems from viruses/worms 4.Document/ Presentation preparation 5.Perform calculations using spreadsheets
19	II-I	DISCRETE MATHEMATICS	1. Understand and construct precise mathematical proofs 2. Apply logic and set theory to formulate precise statements 3.Analyze and solve counting problems on finite and discrete structures 4. Describe and manipulate sequences 5. Apply graph theory in solving computing problems
20	II-I	DATA STRUCTURES	1.Ability to select the data structures that efficiently model the information in a problem. 2.Ability to assess efficiency trade-offs among different data structure implementations or combinations. 3.Implement and know the application of algorithms for sorting and pattern matching. 4.Design programs using a variety of data structures, including hash tables, binary and general treestructures, search trees, tries, heaps,graphs,and AVL-trees.
21	II-I	COMPUTER ORGANIZATION AND ARCHITECTURE	1.Understand the basics of instruction sets and their impact on processor design. 2.Demonstrate an understanding of the design of the functional units of a digital computer system. 3.Evaluate cost performance and design trade-offs in designing and constructing a computer processor Including memory. 4.Design a pipeline for consistent execution of instructions with minimum hazards. 5.Recognize and manipulate representations of numbers stored in digital computers
22	II-I	SOFTWARE ENGINEERING	1.Ability to translate end-user requirements into system and software requirements, using e.g.UML,and structure the requirements in a Software Requirements Document (SRD). 2.Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices. 3.Will have experience and/or awareness of testing problems and will be able to develop a simple testing
23	II-I	OPERATING SYSTEMS	1.Will be able to control access to a computer and the files that may be shared 2.Demonstrate the knowledge of the components of computers and their respective roles in computing. 3.Ability to recognize and resolve user problems with standard operating environments. 4.Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.
24	II-I	DATA STRUCTURES LAB	1.Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists. 2.Ability to implement searching and sorting algorithms
25	II-I	OPERATING SYSTEMS LAB	1.Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management. 2.Able to implement C programs using Unix system calls
26	II-I	SOFTWARE ENGINEERING LAB	1.Ability to translate end-user requirements into system and software requirements 2.Ability to generate a high-level design of the system from the software requirements 3.Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
27	II-I	CONSTITUTION OF INDIA	1.Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. 2.Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. 3.Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution 4.Discuss the passage of the Hindu Code Bill of 1956.
28	II-I	SKILL DEVELOPMENT COURSE (NODE JS/ REACT JS/	1.Build a custom website with HTML, CSS, and Bootstrap and little JavaScript. 2.Demonstrate Advanced features of JavaScript and learn about JDBC 3.Develop Server – side implementation using Java technologies like 4.Develop the server – side implementation using Node JS.

		DJANGO)	5.Design a Single Page Application using React.
29	II-II	MATHEMATICAL AND STATISTICAL FOUNDATIONS	1.Apply the number theory concepts to cryptography domain 2.Apply the concepts of probability and distributions to some case studies 3.Correlate the material of one unit to the material in other units 4.Resolve the potential misconceptions and hazards in each topic of study.
30	II-II	AUTOMATA THEORY AND COMPILER DESIGN	1.Able to employ finite state machines for modeling and solving computing problems. 2.Able to design context free grammars for formal languages. 3.Able to distinguish between decidability and undecidability. 4.Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis. 5.Acquire skills in using lex tool and design LR parsers
31	II-II	DATABASE MANAGEMENT SYSTEMS	1.Gain knowledge of fundamentals of DBMS, database design and normal forms 2.Master the basics of SQL for retrieval and management of data. 3.Be acquainted with the basics of transaction processing and concurrency control. 4.Familiarity with database storage structures and access techniques
32	II-II	INTRODUCTION TO ARTIFICIAL INTELLIGENCE	1.Learn the distinction between optimal reasoning Vs human like reasoning and formulate an efficient problem space for a problem expressed in natural language. Also select a search algorithm for a problem and estimate its time and space complexities. 2.Apply AI techniques to solve problems of game playing, theorem proving, and machine learning. 3.Learn different knowledge representation techniques. 4.Understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities. 5.Comprehend the applications of Probabilistic Reasoning and Bayesian Networks. 6.Analyze Supervised Learning Vs. Learning Decision Trees
33	II-II	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	1.Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection. 2.Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords 3.Use multithreading concepts to develop inter process communication. 4.Understand the process of graphical user interface design and implementation using AWT or Swings. 5.Develop applets that interact abundantly with the client environment and deploy on the server.
34	II-II	DATABASE MANAGEMENT SYSTEMS LAB	1.Design database schema for a given application and apply normalization 2.Acquire skills in using SQL commands for data definition and data manipulation. 3.Develop solutions for database applications using procedures, cursors and triggers
35	II-II	JAVA PROGRAMMING LAB	1.Able to write the programs for solving real world problems using Java OOP principles. 2.Able to write programs using Exceptional Handling approach. 3.Able to write multithreaded applications. 4.Able to write GUI programs using swing controls in Java.and film.
36	II-II	GENDER SENSITIZATION LAB	1.Students will have developed a better understanding of important issues related to gender in contemporary India. 2.Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film. 3.Students will attain a finer grasp of how gender discrimination works in our society and how to counter it. 4.Students will acquire insight into the gendered division of labor and its relation to politics and economics. 5.Men and women students and professionals will be better equipped to work and live together as equals. 6. Students will develop a sense of appreciation of women in all walks of life. 7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
37	III-I	COMPUTER NETWORKS	1.Demonstrate computer network architecture, OSI and TCP/IP reference models 2.Determine types of data link and medium access control protocols 3.Use Routing algorithms and internetworking 4.Design network protocols for real time application 5.Understand internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP

38	III-I	AUTOMATA AND COMPILER DESIGN	1. Employ finite state machines to solve problems in computing and classify machines by their power to recognize languages.
			2. Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.
			3. Ability to implement semantic rules into a parser that performs attribution while parsing and apply error detection and correction methods.
			4. Apply the code optimization techniques to improve the space and time complexity of programs while programming.
			5. Ability to design a compiler for a concise programming
39	III-I	INTRODUCTION TO DATA SCIENCE	1. Understands the terms and concepts in Data Science.
			2. Understands the different methods used for data cleaning and preparation.
			3. Plots and visualize the data using different tools.
			4. Develops the methods using statistics in Data Science.
			5. Demonstrates the concepts in Data Warehouse and Online Analytical Processing.
40	III-I	DATA MINING	1. Understand operational database, warehousing and multidimensional need of data base to meet industrial needs.
			2. Apply the association rules for mining the data.
			3. Design and deploy appropriate classification techniques.
			4. Cluster the high dimensional data for better organization of the data.
			5. Compare and contrast the dominant data mining algorithms.
41	III-I	CLOUD COMPUTING	1. Assess the knowledge and the important role of cloud computing in the development of various applications
			2. Describe the of various services offered in cloud computing
			3. Summarize the knowledge of underlying technologies used in cloud computing
			4. Identify the security related issues involved in cloud Computing
			5. Identify the common standards in cloud computing
42	III-I	DATA SCIENCE LAB	1. Experiment with basic statistics and data manipulation
			2. utilize data visualization techniques to visualize the given data set
			3. choose proper classification techniques to predict the class and apply inferential statistics to analyze the samples
			4. apply regular expression, linear regression and hypothesis testing for optimal solutions
43	III-I	COMPUTER NETWORKS AND COMPILER DESIGN LAB	1. Identify the different types of network topologies and protocols.
			2. Identify the different types of network devices and their functions within a network
			3. Implement DES and RSA algorithms
			4. Implement a lexical analyzer from a specification of a language's lexical rules.
			5. Compute the FIRST set for a BNF grammar and Compute follow set - Compute the FOLLOW set for a BNF grammar.
44	III-I	DATA MINING LAB	1. The data mining process and important issues around data cleaning, pre-processing and integration.
			2. The principle algorithms and techniques used in data mining, such as clustering, association mining, classification and prediction.
			3. To evaluate the different models of OLAP and data preprocessing.
			4. To enlist various algorithms used in information analysis of Data Mining Techniques.
			5. To demonstrate the knowledge retrieved through solving problems
45	III-II	CONSTITUTION OF INDIA	1. It also tells us about the rights and also the duties of its citizens.
			2. They know about the role, powers of members of local sabha and raj sabha.
			3. It lays down the rules to govern the country.
			4. Role and function of election commissioner.
			5. Power and duties of elected represented s for panchayatraj , ZP, corporation and Importance of democracy.
46	III-II	WEB PROGRAMMING	1. Design a static web page using HTML Tags, CSS properties, javascripts
			2. Design and develop a dynamic web page using JDBC, XML schema, servlets.
			3. Design and develop a web page to access data from the databases using JSP concepts
			4. Design and demonstrate on secured web page with PHP scripting
			5. Design architecture for accessing My SQL database with PHP
47	III-II	SOFTWARE ENGINEERING	1. understand the software life cycle system and the different software architectural views.
			2. understand the software requirement engineering and SRS document.
			3. A general understanding of software process models.
			4. aware of Software Engineering methods and practices, and their appropriate application.
			5. understand the V and V techniques, design of software product.
48	III-II	CYBER SECURITY	1. learn about cyber crimes and how they are planned.
			2. learn the vulnerabilities of mobile and wireless devices.

			3.learn about the crimes in mobile and wireless devices.
49	III-II	ARTIFICIAL NEURAL NETWORKS	1.Understand the similarity of Biological networks and Neural networks. 2.Perform the training of neural networks using various learning rules. 3.Understanding the concepts of forward and backward propagations. 4.Understand and Construct the Hopfield models.
50	III-II	WEB PROGRAMMING LAB	1.Develop a static web page using HTML Tags, CSS, javascripts 2.Implement with JDBC connections, XML schema, servlets 3.Implement a web page in JSP, accessing the data from different database 4.Implement a web page in PHP scripting 5.To retrieve the data using MySQL and other different types of databases
51	III-II	OBJECT ORIENTED ANALYSIS AND DESIGN LAB	1.Explain basic object oriented concepts such as types, inheritance & interfaces 2.Implement Forward and Reverse Engineering Techniques. 3.Explain the facets of the Unified Process approach to designing and building software system 4.Develop object oriented designs of software using Unified Modeling Language 5.Develop UML models for real world applications.
52	IV-I	INFORMATION SECURITY	1.Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues. 2.Ability to identify information system requirements for both of them such as client and server. 3.Ability to understand the current legal issues towards information security.
53	IV-I	RENEWABLE ENERGY SOURCES	1.Technology to capture the energy from the renewable sources like sun,wind,ocean,biomass, geothermal. 2.Use different renewable energy sources to produce electrical power. 3.Minimise the use of conventional energy sources to produce electrical energy. 4.Identify the fact that the conventional energy sources are depleted. 5.Identify the direct energy conversion.
54	IV-I	NATURAL LANGUAGE PROCESSING	1.Show sensitivity to linguistic phenomena and an ability to model them with formal grammars. 2.Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems 3.Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods. 4.Able to design, implement, and analyze NLP algorithms 5.Able to design different language modeling Techniques.
55	IV-I	DATA ANALYTICS	1.Understand the impact of data analytics for business decisions and strategy 2.Carry out data analysis/statistical analysis 3.To carry out standard data visualization and formal inference procedures 4.Design Data Architecture; Understand various Data Sources
56	IV-I	Information Security Lab	1.Develop code for classical Encryption Techniques to solve the problems. 2.Build cryptosystems by applying symmetric and public key encryption algorithms. 3.Construct code for authentication algorithms. 4.Develop a signature scheme using Digital signature standard. 5.Demonstrate the network security system using open source tools
57	IV-I	DATA ANALYTICS LAB	1.Understand linear regression and logistic regression. 2.Understand the functionality of different classifiers. 3.Implement visualization techniques using different graphs. 4.Apply descriptive and predictive analytics for different types of data.
58	IV-II	Virtual Reality	1.Understand fundamental Computer Vision, Computer Graphics and HumanComputer Interaction, Techniques related to VR/AR . 2.Understand Geometric Modeling Techniques 3.Understand the Virtual Environment 4.ANALYZE and EVALUATE VR/AR Technologies 5.APPLY various types of Hardware and Software in Virtual Reality systems 6.DESIGN and FORMULATE Virtual/Augmented Reality Applications
59	IV-II	MAJOR PROJECT	CO1: Ability to engage in independent study to research literature in the identified domain . CO2: Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions . CO3: Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem. CO4: Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation. CO5: Ability to abide by the norms of professional ethics.
		Comprehensive Viva-	CO1: Ability to engage in independent study to research literature in the identified domain.

60	IV-II	Voce	CO2: Ability to analyze various work to identify and formulate the engineering problem.
			CO3: Ability to work independently.
			CO4: Ability to communicate effectively.
			CO5: Ability to abide by the norms of professional ethics.
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)			
PROGRAMME COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)	DEGREE / UG	A.Y:2023- 2024	
S.NO	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)
1	I-I	MATRICES AND CALCULUS	CO1. Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.
			CO2. Determine Eigen values, Eigen vectors of matrices.
			CO3. Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions.
			CO4. Calculate Partial derivatives, extreme of functions of multiple variables
			CO5. Evaluate the multiple integrals in various coordinate systems.
2	I-I	ENGINEERING CHEMISTRY	CO1. Students will acquire the basic knowledge of MOT and CFT.
			CO2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
			CO3. The students are able to again knowledge electrochemical procedures related to corrosion and it's control.
			CO4. They can predict potential applications of chemistry and practical utility in order to became good engineers an entrepreneurs
3	I-I	ENGINEERING CHEMISTRY LABORATORY	CO1. Students will acquire the basic knowledge of MOT and CFT.
			CO2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
			CO3. The students are able to again knowledge electrochemical procedures related to corrosion and it's control.
			CO4. They can predict potential applications of chemistry and practical utility in order to became good engineers an entrepreneurs
4	I-I	PROGRAMMING FOR PROBLEM SOLVING	CO1. To write algorithms and to draw flowcharts for solving problems.
			CO2. To convert the algorithms/flowcharts to C programs.
			CO3. To code and test a given logic in the C programming language.
			CO4. To decompose a problem into functions and to develop modular reusable code.
			CO5. To use arrays, pointers, strings and structures to write C programs.
			CO6. Searching and sorting problems.
5	I-I	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	CO1. formulate the algorithms for simple problems
			CO2. translate given algorithms to a working and correct program
			CO3. correct syntax errors as reported by the compilers
			CO4. identify and correct logical errors encountered during execution
			CO5. represent and manipulate data with arrays, strings and structures
			CO6. use pointers of different types
			CO7. create, read and write to and from simple text and binary files
			CO8. modularize the code with functions so that they can be reused
6	I-I	BASIC ELECTRICAL ENGINEERING	CO1. Remember the basic electrical laws
			CO2. Understand and analyze basic Electrical circuits
			CO3. Apply the concepts of KVL,KCL and network theorems in solving DC Circuits
			CO4. Compare the Electrical AC and DC Machines.
			CO5. Introduce components of Low Voltage Electrical Installations.
			CO1.Measure the electrical Parameters for different laws..

7	I-I	BASIC ELECTRICAL ENGINEERING LABORATORY	CO2. Analyze the transient response of various R, L and C circuits using different excitations.
			CO3. Evaluate the performance calculations of different types of networks.
			CO4. Draw the Performance Characteristics of DC and AC Machines.
			CO5. Identify the Basic Electrical LT switchgear components
8	I-I	COMPUTER AIDED ENGINEERING GRAPHICS	CO1. Apply computer aided drafting tools to create 2D and 3D objects
			CO2. sketch conics and different types of solids
			CO3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
			CO4. Read and interpret engineering drawings
			CO5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
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			CO2. Understand program development, the use of data structures and algorithms in problem solving.
			CO3. Know the need and types of operating system, database systems.
			CO4. Understand the significance of networks, internet, WWW and cyber security.
			CO5. Understand Autonomous systems, the application of artificial intelligence
10	I-II	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1. Identify whether the given differential equation of first order is exact or not
			CO2. Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.
			CO3. Solving ODE"s by using Laplace transforms techniques.
			CO4. Apply the concepts of gradient, divergence and curl to formulate Engineering problems.
			CO5. Analyze line, surface and volume integrals using fundamental theorems.
11	I-II	APPLIED PHYSICS	CO1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
			CO2. Identify the role of semiconductor devices in science and engineering Applications.
			CO3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
			CO4. Appreciate the features and applications of Nano materials.
			CO5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
12	I-II	APPLIED PHYSICS LABORATORY	CO1. Understand the optical phenomenon of interference and diffraction .
			CO2. Know the determination of the energy gap of semiconductor materials.
			CO3. Gain the knowledge of applications of fiber optics in communication.
			CO4. Appreciate quantum physics in semiconductor devices and optoelectronics
			CO5. Apply the various procedures, mathematical concepts and techniques for the experiments to obtain quantitative results
13	I-II	ENGINEERING WORKSHOP	CO1. Study and practice on machine tools and their operations
			CO2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
			CO3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
			CO4. Apply basic electrical engineering knowledge for house wiring practice.
14	I-II	ENGLISH FOR SKILL ENHANCEMENT	CO1. Understand the importance of vocabulary and sentence structures.
			CO2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
			CO3. Demonstrate their understanding of the rules of functional grammar.
			CO4. Develop comprehension skills from the known and unknown passages.
			CO5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
			CO6. Acquire basic proficiency in reading and writing modules of English
15	I-II	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	CO1. Understand the nuances of English language through audio- visual experience and Group activities
			CO2. Understand and respond to their speakers.
			CO3. Neutralize their accent for intelligibility
			CO4. Speak with clarity and confidence which in turn enhances their employability skills
			CO5. Make presentations with proper communicative and body language
16	I-II	PYTHON PROGRAMMING	CO1. Student should be able to understand the basic concepts scripting and the contributions of scripting language
			CO2. Ability to explore python especially the object oriented concepts, and the built in objects of Python.
			CO3. Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

17	I-II	PYTHON PROGRAMMING LABORATORY	CO1. Develop the application specific codes using python.
			CO2. Understand Strings, Lists, Tuples and Dictionaries in Python
			CO3. Verify programs using modular approach, file I/O, Python standard library
			CO4. Implement Digital Systems using Python
18	I-II	IT WORKSHOP	CO1. Perform Hardware troubleshooting
			CO2. Understand Hardware components and inter dependencies
			CO3. Safeguard computer systems from viruses/worms
			CO4. Document/ Presentation preparation
			CO5. Perform calculations using spreadsheets
19	II-I	DIGITAL ELECTRONICS	CO1. This course aims at through understanding of binary number system, logic gates, combination logic and synchronous and asynchronous logic
20	II-I	DATA STRUCTURES	CO1. Ability to select the data structures that efficiently model the information in a problem.
			CO2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
			CO3. Implement and know the application of algorithms for sorting and pattern matching.
			CO4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
21	II-I	DATA STRUCTURES LAB	CO1. Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
			CO2. Ability to Implement searching and sorting algorithms
22	II-I	COMPUTER ORIENTED STATISTICAL METHODS	CO1. Apply the concepts of probability and distributions to case studies.
			CO2. Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
			CO3. Apply concept of estimation and testing of hypothesis to case studies.
			CO4. Correlate the concepts of one unit to the concepts in other units
23	II-I	COMPUTER ORGANIZATION AND ARCHITECTURE	CO1. Understand the basics of instruction sets and their impact on processor design.
			CO2. Demonstrate an understanding of the design of the functional units of a digital computer system.
			CO3. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
			CO4. Design a pipeline for consistent execution of instructions with minimum hazards.
			CO5. Recognize and manipulate representations of numbers stored in digital computer
24	II-I	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	CO1. Demonstrate the behavior of programs involving the basic programming constructs like control structures, constructors, string handling and garbage collection.
			CO2. Demonstrate the implementation of inheritance (multilevel, hierarchical and multiple) by using extend and implement keywords
			CO3. Use multithreading concepts to develop inter process communication.
			CO4. Understand the process of graphical user interface design and implementation using AWT or swings.
			CO5. Develop applets that interact abundantly with the client environment and deploy on the server.
25	II-I	OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	CO1. Able to write programs for solving real world problems using the java collection framework.
			CO2. Able to write programs using abstract classes.
			CO3. Able to write multithreaded programs.
			CO4. Able to write GUI programs using swing controls in Java
26	II-I	GENDER SENSITIZATION LAB	CO1. Students will have developed a better understanding of important issues related to gender in contemporary India.
			CO2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
			CO3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
			CO4. Students will acquire insight into the gendered division of labor and its relation to politics and economics.
			CO5. Men and women students and professionals will be better equipped to work and live together as equals.
			CO6. Students will develop a sense of appreciation of women in all walks of life.
			CO7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

27	II-I	Skill Development Course (Data visualization- R Programming/ Power BI)	1.Understand How to import data into Tableau.
			CO2. Understand Tableau concepts of Dimensions and Measures.
			CO3. Develop Programs and understand how to map Visual Layouts and Graphical Properties.
			CO4. Create a Dashboard that links multiple visualizations.
			CO5. Use graphical user interfaces to create Frames for providing solutions to real world
			CO6. problems.
28	II-II	DISCRETE MATHEMATICS	CO1. Understand and construct precise mathematical proofs
			CO2. Apply logic and set theory to formulate precise statements
			CO3. Analyze and solve counting problems on finite and discrete structures
			CO4. Describe and manipulate sequences
			CO5. Apply graph theory in solving computing problems
29	II-II	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	CO1. The students will understand the various Forms of Business and the impact of economic variables on the Business.
			CO2. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
			CO3. The Students can study the firms financial position by analyzing the Financial Statements of a Compan
30	II-II	OPERATING SYSTEMS	CO1. Will be able to control access to a computer and the files that may be shared
			CO2. Demonstrate the knowledge of the components of computers and their respective roles in computing.
			CO3. Ability to recognize and resolve user problems with standard operating environments.
			CO4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively
31	II-II	OPERATING SYSTEMS LAB	CO1. Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
			CO2. Able to implement C programs using Unix system calls
32	II-II	DATABASE MANAGEMENT SYSTEMS	CO1. Gain knowledge of fundamentals of DBMS, database design and normal forms
			CO2. Master the basics of SQL for retrieval and management of data.
			CO3. Be acquainted with the basics of transaction processing and concurrency control.
			CO4. Familiarity with database storage structures and access techniques
33	II-II	DATABASE MANAGEMENT SYSTEMS LAB	CO1. Design database schema for a given application and apply normalization
			CO2. Acquire skills in using SQL commands for data definition and data manipulation.
			CO3. Develop solutions for database applications using procedures, cursors and triggers
34	II-II	SOFTWARE ENGINEERING	CO1. Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
			CO2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
			CO3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.
35	II-II	CONSTITUTION OF INDIA	CO1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
			CO2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
			CO3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
			CO4. Discuss the passage of the Hindu Code Bill of 1956
36	II-II	SKILL DEVELOPMENT COURSE (NODE JS/ REACT JS/ DJANGO)	CO1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
			CO2. Demonstrate Advanced features of JavaScript and learn about JDBC
			CO3. Develop Server – side implementation using Java technologies like
			CO4. Develop the server – side implementation using Node JS.
			CO5. Design a Single Page Application using React.
DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY			

PROGRAM ME COM PUTE R SCIE NCE AND INFO RMA TION TECH NOLO GY	DEGREE /UG	A.Y.:2023- 2024	
S.NO	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)
1	I-I	MATRICES AND CALCULUS	CO1. Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods. CO2. Determine Eigen values, Eigen vectors of matrices. CO3. Evaluate limits of single-variable functions graphically and computationally. Analyse improper integrals using Beta and Gamma functions. CO4. Calculate Partial derivatives, extreme of functions of multiple variables CO5. Evaluate the multiple integrals in various coordinate systems.
2	I-I	ENGINEERING CHEMISTRY	CO1. Students will acquire the basic knowledge of MOT and CFT. CO2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3. The students are able to again knowledge electrochemical procedures related to corrosion and it's control. CO4. They can predict potential applications of chemistry and practical utility in order to became good engineers an entrepreneurs
3	I-I	ENGINEERING CHEMISTRY LABORATORY	CO1. Students will acquire the basic knowledge of MOT and CFT. CO2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes. CO3. The students are able to again knowledge electrochemical procedures related to corrosion and it's control. CO4. They can predict potential applications of chemistry and practical utility in order to became good engineers an entrepreneurs
4	I-I	PROGRAMMING FOR PROBLEM SOLVING	CO1. To write algorithms and to draw flowcharts for solving problems. CO2. To convert the algorithms/flowcharts to C programs. CO3. To code and test a given logic in the C programming language. CO4. To decompose a problem into functions and to develop modular reusable code. CO5. To use arrays, pointers, strings and structures to write C programs. CO6. Searching and sorting problems.
5	I-I	PROGRAMMING FOR PROBLEM SOLVING LABORATORY	CO1. formulate the algorithms for simple problems CO2. translate given algorithms to a working and correct program CO3. correct syntax errors as reported by the compilers CO4. identify and correct logical errors encountered during execution CO5. represent and manipulate data with arrays, strings and structures CO6. use pointers of different types CO7. create, read and write to and from simple text and binary files CO8. modularize the code with functions so that they can be reused
6	I-I	BASIC ELECTRICAL ENGINEERING	CO1.Remember the basic electrical laws CO2. Understand and analyze basic Electrical circuits CO3. Apply the concepts of KVL,KCL and network theorems in solving DC Circuits CO4. Compare the Electrical AC and DC Machines. CO5. Introduce components of Low Voltage Electrical Installations.
7	I-I	BASIC ELECTRICAL ENGINEERING LABORATORY	CO1.Measure the electrical Parameters for different laws.. CO2. Analyze the transient response of various R, L and C circuits using different excitations. CO3. Evaluate the performance calculations of different types of networks. CO4. Draw the Performance Characteristics of DC and AC Machines. CO5. Identify the Basic Electrical LT switchgear components
8	I-I	COMPUTER AIDED ENGINEERING	CO1.Apply computer aided drafting tools to create 2D and 3D objects CO2. sketch conics and different types of solids CO3. Appreciate the need of Sectional views of solids and Development of surfaces of solids

		ENGINEERING GRAPHICS	CO4. Read and interpret engineering drawings CO5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting
9	I-I	ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING	CO1. Know the working principles of functional units of a basic Computer CO2. Understand program development, the use of data structures and algorithms in problem solving. CO3. Know the need and types of operating system, database systems. CO4. Understand the significance of networks, internet, WWW and cyber security. CO5. Understand Autonomous systems, the application of artificial intelligence
10	I-II	ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1. Identify whether the given differential equation of first order is exact or not CO2. Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems. CO3. Solving ODE"s by using Laplace transforms techniques. CO4. Apply the concepts of gradient, divergence and curl to formulate Engineering problems. CO5. Analyze line, surface and volume integrals using fundamental theorems.
11	I-II	APPLIED PHYSICS	CO1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. CO2. Identify the role of semiconductor devices in science and engineering Applications. CO3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications. CO4. Appreciate the features and applications of Nano materials. CO5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
12	I-II	APPLIED PHYSICS LABORATORY	CO1. Understand the optical phenomenon of interference and diffraction . CO2. Know the determination of the energy gap of semiconductor materials. CO3. Gain the knowledge of applications of fiber optics in communication. CO4. Appreciate quantum physics in semiconductor devices and optoelectronics CO5. Apply the various procedures, mathematical concepts and techniques for the experiments to obtain quantitative results
13	I-II	ENGINEERING WORKSHOP	CO1. Study and practice on machine tools and their operations CO2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding. CO3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling. CO4. Apply basic electrical engineering knowledge for house wiring practice.
14	I-II	ENGLISH FOR SKILL ENHANCEMENT	CO1. Understand the importance of vocabulary and sentence structures. CO2. Choose appropriate vocabulary and sentence structures for their oral and written communication. CO3. Demonstrate their understanding of the rules of functional grammar. CO4. Develop comprehension skills from the known and unknown passages. CO5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts. CO6. Acquire basic proficiency in reading and writing modules of English
15	I-II	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	CO1. Understand the nuances of English language through audio- visual experience and Group activities CO2. Understand and respond to their speakers. CO3. Neutralize their accent for intelligibility CO4. Speak with clarity and confidence which in turn enhances their employability skills CO5. Make presentations with proper communicative and body language
16	I-II	PYTHON PROGRAMMING	CO1. Student should be able to understand the basic concepts scripting and the contributions of scripting language CO2. Ability to explore python especially the object oriented concepts, and the built in objects of Python. CO3. Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations
17	I-II	PYTHON PROGRAMMING LABORATORY	CO1. Develop the application specific codes using python. CO2. Understand Strings, Lists, Tuples and Dictionaries in Python CO3. Verify programs using modular approach, file I/O, Python standard library CO4. Implement Digital Systems using Python
18	I-II	IT WORKSHOP	CO1. Perform Hardware troubleshooting CO2. Understand Hardware components and inter dependencies CO3. Safeguard computer systems from viruses/worms CO4. Document/ Presentation preparation CO5. Perform calculations using spreadsheets

M. Tech. COMPUTER SCIENCE AND ENGINEERING

PROG RAM ME(C SE)	DEGREE / PG	A.Y:2023- 2024	
S.NO	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)
1	I-I	Mathematical Foundations of Computer Science	CO1. Ability to understand and construct precise mathematical proofs.
			CO2. Ability to use logic and set theory to formulate precise statements.
			CO3. Ability to analyze and solve counting problems on finite and discrete structures.
			CO4. Ability to describe and manipulate sequences.
			CO5. Ability to apply graph theory in solving computing problems.
2	I-I	Advanced Data Structures	CO1. Ability to select the data structures that efficiently model the information in a problem
			CO2. Ability to understand how the choice of data structures impact the performance of programs
			CO3. Design programs using a variety of data structures, including hash tables, search structures and digital
3	I-I	Software Quality Engineering	CO1. Understand software quality and its perspectives
			CO2. Analyze defect prevention and defect reduction in software quality assurance
			CO3. Illustrate software quality engineering activities and its process
4	I-I	Database Programming with PL/SQL	CO1. Understand importance of PL/SQL basics
			CO2. Implement functions and procedures using PL/SQL
			CO3. Understand the importance of triggers in database
5	I-I	Advanced Data Structures Lab	CO1. Introduces the basic concepts of Abstract Data Types.
			CO2. Reviews basic data structures such as stacks and queues.
			CO3. Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs, and B-trees.
			CO4. Introduces sorting and pattern matching algorithms.
6	I-I	Database Programming with PL/SQL Lab	CO1. Understand importance of PL/SQL basics
			CO2. Implement functions and procedures using PL/SQL
			CO3. Understand the importance of triggers in database
7	I-I	RESEARCH METHODOLOGY & IPR	CO1. Understand research problem formulation.
			CO2. Analyze research related information
			CO3. Follow research ethics
			CO4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
			CO5. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
			CO6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
8	I-II	Advanced Algorithms	CO1. Analyze the complexity/performance of different algorithms.
			CO2. Determine the appropriate data structure for solving a particular set of problems.
			CO3. Categorize the different problems in various classes according to their complexity.
9	I-II	Advanced Architecture Computer	CO1. Computational models and Computer Architectures.
			CO2. Concepts of parallel computer models.
			CO3. Scalable Architectures, Pipelining, Superscalar processors
10	I-II	Advanced Computer Networks	CO1. Understanding of holistic approach to computer networking
			CO2. Ability to understand the computer network protocols and their applications
			CO3. Ability to design simulation concepts related to packet forwarding in networks
11	I-II	Nature Inspired Computing	CO1. Familiar with Genetic algorithm and its applications.
			CO2. Compare different Ant Colony Optimization algorithmic models.
			CO3. Compare different Artificial Bee Colony Optimization algorithmic models.
			CO4. Illustrate Particle swarm optimization algorithm with an example.
12	I-II	Advanced Algorithms Lab	CO1. The student can able to analyze the performance of algorithms
13	I-II	Advanced Computer Networks Lab	CO1. Understand and analyze the existing protocols
			CO2. Understand the use of network packet capturing tools
14	I-II	Mini Project with Seminar	CO1. Ability to engage in independent study to research literature in the identified domain.
			CO2. Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions.
			CO3. Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem.
			CO4. Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation.

15	II-I	High Performance Computing	CO1. Understanding the concepts in grid computing
			CO2. Ability to set up cluster and run parallel applications
			CO3. Ability to understand the cluster projects and cluster OS
			CO4. Understanding the concepts of pervasive computing & quantum computing.
16	II-I	IPR	CO1. Understand types of Intellectual Property
			CO2. Analyze trademarks and its functionality
			CO3. Illustrate law of copy rights and law of patents
17	II-II	Major Project	CO1. Ability to engage in independent study to research literature in the identified domain .
			CO2. Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions .
			CO3. Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem.
			CO4. Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation.
			CO5. Ability to abide by the norms of professional
18	II-II	Comprehensive Viva-Voce	CO1. Ability to engage in independent study to research literature in the identified domain.
			CO2. Ability to analyze various work to identify and formulate the engineering problem.
			CO3. Ability to work independently.
			CO4. Ability to communicate effectively.
			CO5. Ability to abide by the norms of professional ethics.
M.Tech Embedded Systems (ECE)			
PROG RAM ME	PG	A.Y:2023- 2024	
S.NO	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)
1	I-I	DIGITAL SYSTEM DESIGN WITH FPGAs (PC – I)	CO1. To exposes the design approaches using FPGAs.
			CO2. To provide in depth understanding of Fault models.
			CO3. To understands test pattern generation techniques for fault detection.
			CO4. To design fault diagnosis in sequential circuits.
			CO5. To provide understanding in the design of flow using case studies.
2	I-I	SYSTEM DESIGN WITH EMBEDDED LINUX (PC – II)	CO1. Familiarity of the embedded Linux development model.
			CO2. Write, debug, and profile applications and drivers in embedded Linux.
			CO3. Create Linux BSP for a hardwareplatform
3	I-I	CMOS VLSI DESIGN (PE -I)	CO1. Design of combinational MOS logic and sequential MOS logic circuits
			CO2. Design of different Memories using MOS transistors
			CO3. Design a circuits based on dynamic logic
			CO4. Apply CMOS transmission gates in various applications
			CO5. Understand the various semiconductor memories, types and their applications
4	I-I	PATTERN RECOGNITION AND MACHINE LEARNING (PE – I)	CO1. Familiar the basics of pattern classes and functionality.
			CO2. Construct the various linearmodels.
			CO3. Use the different kernelmetholds.
			CO4. Design the Markov and Mixed models.
5	I-I	WIRELESS SENSOR NETWORKS (PE –I)	CO1. Analyze and compare various architectures of Wireless Sensor Networks
			CO2. Understand Design issues and challenges in wireless sensornetworks
			CO3. Analyze and compare various data gathering and data dissemination methods.
			CO4. Design, Simulate and Compare the performance of various routing and MAC protocol
6	I-I	COMMUNICATION BUSES AND INTERFACES (PE - II)	CO1. Select a particular serial bus suitable for a particularapplication.
			CO2. Develop APIs for configuration, reading and writing data onto serial bus.
			CO3. Design and develop peripherals that can be interfaced to desired serial bus.
7	I-I	ADVANCED COMPUTER ARCHITECTURE (PE -II)	CO1. Familiarize the instruction set, memory addressing of Computer.
			CO2. Handle the issues in pipelining and parallelism..
			CO3. Familiarize the practical issues in internetwork.
8	I-I	CMOS ANALOG IC DESIGN (PE -II)	CO1. Design basic building blocks of CMOS analog ICs.
			CO2. Carry out the design of single and two stage operational amplifiers and voltage references.
			CO3. Determine the device dimensions of each MOSFETsinvolved.
			CO4. Design various amplifiers like differential, current and operationalamplifiers.
9	I-I	RESEARCH METHODOLOGY AND IPR	CO1. Understand research problem formulation.
			CO2. Analyze research related information
			CO3. Follow research ethics
			CO4. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
			CO5. UnderstandingthatwhenIPRwouldtakesuchimportantplaceingrowthofindividuals&nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

			CO6. Understand that IPR protection provides an incentive to inventors for further research work and investment in R &D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
10	I-II	ARM MICROCONTROLLERS (PC-III)	CO1. Explore the selection criteria of ARM processors by understanding the functional level trade off issues. CO2. Explore the ARM development towards the functional capabilities. CO3. Work with ASM level program using the instruction set. CO4. Programming the ARM Cortex M.
11	I-II	DIGITAL CONTROL SYSTEMS (PC -IV)	CO1. Obtain discrete representation of LTI systems. CO2. Find the state space analysis of discrete time systems. CO3. Test and analyze the controllability and observability for discrete time systems. CO4. Analyze stability of discrete time systems using various methods CO5. Design and analyze digital controllers. CO6. Design state feedback controllers and observers.
12	I-II	IOT ARCHITECTURES AND SYSTEM DESIGN (PE- III)	CO1. Integrate the sensors and actuator depending on the applications CO2. Interface the IoT and M2M with valuechains CO3. Write Python programming for Arduino, Raspberry Pi devices CO4. Design IoT based systems such as Agricultural IoT, Vehicular IoTetc.,
13	I-II	DESIGN FOR TESTABILITY (PE - III)	CO1. Acquire verification knowledge and test evaluation CO2. Design for testability rules and techniques. CO3. Utilize the scan architectures for different digital circuits. CO4. Acquire the knowledge of design of built-in-self test.
14	I-II	SOC DESIGN (PE - III)	CO1. Identify and formulate a given problem in the framework of SoC based design approaches. CO2. Design SoC based system for engineering applications. CO3. Realize impact of SoC on electronic design philosophy and Macro-electronics thereby incline towards entrepreneurship & skill development.
15	I-II	HARDWARE AND SOFTWARE CO-DESIGN (PE - IV)	CO1. Acquire the knowledge on various models of Co-design. CO2. Explore the interrelationship between Hardware and software in a embedded system CO3. Acquire the knowledge of firmware development process and tools during Co-design. CO4. Implement validation methods and adaptability.
16	I-II	SECURE NETWORKS(PE -IV)	CO1. Identify and utilize different forms of cryptography techniques. CO2. Incorporate authentication and security in the network applications. CO3. Distinguish among different types of threats to the system and handle the same.
17	I-II	PHYSICAL DESIGN AUTOMATION (PE - IV)	CO1. Implement automation process for VLSI System design. CO2. Familiarize to use various physical design CAD tools. CO3. Develop and enhance the existing algorithms and computational techniques for physical design process of VLSI systems.
18	I-II	ARM MICROCONTROLLERS LAB (Lab - III)	CO1. Install, configure and utilize tool sets for developing applications based on ARM processor core SoC and DSP processor. CO2. Develop prototype codes using commonly available on and off chip peripherals on the Cortex M3 and DSP development boards.
19	II-I	CMOS MIXED SIGNAL DESIGN (PE-V)	CO1. Designing CMOS analog circuits to achieve performance specifications. CO2. Analyzing CMOS based switched capacitor circuits. CO3. Designing data converters and know how to use these in specific applications CO4. Design a mixed-signal circuits with understanding design flow.
20	II-I	HUMAN MACHINE INTERFACE (PE-V)	CO1. Design effective dialog for HCI CO2. Design effective HCI for individuals and persons with disabilities CO3. Assess the importance of user feedback. CO4. Explain the HCI implications for designing multimedia/ e-learning Websites CO5. Develop meaningful user interface.
21	II-I	VALUE EDUCATION (AUDIT COURSE I & II)	CO1. Knowledge of self-development. CO2. Learn the importance of Human values. CO3. Developing the overall personality.
22	II-I	CONSTITUTION OF INDIA (Audit Course - I & II)	CO1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics. CO2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India. CO3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution. CO4. Discuss the passage of the Hindu Code Bill of 1956.
23	II-I	DISSERTATION WORK REVIEW-I	CO1. Ability to engage in independent study to research literature in the identified domain . CO2. Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions . CO3. Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem.

			CO4. Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation.
			CO5. Ability to abide by the norms of professional.
24	II-II	DISSERTATION WORK REVIEW - II	CO1. Ability to engage in independent study to research literature in the identified domain . CO2. Ability to analyse and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions . CO3. Ability to apply the identified concepts and engineering tools to arrive at design solution(s) for the identified engineering problem. CO4. Ability to perform in the team, contribute to the team and mentor/lead the team, engage in effective oral communication through presentation. CO5. Ability to abide by the norms of professional.
25	II-II	DISSERTATION VIVA-VOCE	CO1. Ability to engage in independent study to research literature in the identified domain. CO2. Ability to analyze various work to identify and formulate the engineering problem. CO3. Ability to work independently. CO4. Ability to communicate effectively. CO5. Ability to abide by the norms of professional ethics.
Department of Business Management (MBA)			
PROG RAM ME	PG	A.Y:2023- 2024	
S.NO	Year/ Sem	Course Name	Course Outcomes (student can able to undertand)
1	I SEM	MANAGEMENT AND ORGANIZATIONAL BEHAVIOR	CO1. Gain understanding of the Concepts of Management, its Evolution, Functions and the Theories contributed by various Management Thinkers. CO2. Learn the process of planning, goal setting and the process of decision making with the help of various models. CO3. Learn the processes of Organizing and Controlling with the help of various Organizational Structures. CO4. Appreciate the relevance of Individual and group behaviour in an organization and the role of Culture and dynamics CO5. Identify different Leadership Styles, Skills and the Theories of Motivation
2	I SEM	BUSINESS ECONOMICS	CO1. Understand the Concepts and Principles of Business Economics. CO2. Learn various concepts and practical applications of Demand and Supply viz. Laws, Types, Elasticity, Forecasting and Equilibrium. CO3. Learn concepts and applications related to Production and Cost of a firm. CO4.V Learn the features of various Market Structures along with the Decision-making with regards to Price and Output in Short and Long Terms. CO5. Understand the concepts of Pricing Practices, Theory of Firm and Managerial & Behavioral Theories of a Firm
3	I SEM	FINANCIAL REPORTING AND ANALYSIS	CO1. Understand the Concepts and Principles of Accounting. CO2. Understand the Accounting Process in detail. CO3. Learn various aspects in depreciation, Inventory and Goodwill. CO4. Analyze the Working Capital and Flow of Funds and Cash into the Business CO5. Prepare, analyze and Interpret Financial Statements.
4	I SEM	RESEARCH METHODOLOGY AND STATISTICAL ANALYSIS	CO1. Gain a conceptual overview of Research and the relevant concepts to Research. CO2. Learn the different types of Research Designs, Data Collection Tools and Procedures. CO3. Use different methods of representing data through Graphs and Tables; gain an overview of Statistics and relevant concepts and conduct Small Sample Tests. CO4. Learn to solve mathematical problems related to ANOVA (One-way and Two-way), Correlation and Regression. CO5. Learn the application of Time Series and Index Numbers; appreciate the need for preparing and presenting a structured Research Report.
5	I SEM	LEGAL AND BUSINESS ENVIRONMENT	CO1. Understand the Business Laws related to Incorporation of a company. CO2. Learn the Law of Contract & Sale of Goods CO3. Learn the salient features of Negotiable Instruments Act 1881 CO4. Learn the Reforms Undertaken by the Government with respect to the challenging business environments. CO5. Gain insights of the Regulatory Framework in India.
6	I SEM	BUSINESS ETHICS AND CORPORATE GOVERNANCE (OE-I)	CO1. Understand the Need for Business Ethics and Corporate Governance in India. CO2. Apply Knowledge of Established Methodologies of Solving Professional Ethical Issues. CO3. Learn Codes and Committees in Corporate Governance. CO4. Understand the Role of Board in Corporate Governance. CO5. Assess the Stakeholder perspective of Corporate Governance.
7	I SEM	PROJECT MANAGEMENT (OPEN ELECTIVE - I)	CO1. Understand and appreciate the importance of Project Management. CO2. Learn Project Planning, Execution and implementation. CO3. Apply Project Appraisal Methods to Cash Flows and Corporate Practices of Dividend Payment CO4. Understand intricacies of Project Evaluation techniques for better decision making. CO5. Appreciate the significance of Organizational & Team Behaviors in projects.
			CO1. Understand the importance of Climate change and global warming.

8	I SEM	SUSTAINABILITY MANAGEMENT (OPEN ELECTIVE – I)	CO2. Learn about environment pollution and sustainability, economic approaches to sustainable development. CO3. Assess the steps in sustainable planning for competitive advantage. CO4. Understand sustainable and circular value chain, sustainability marketing. CO5. Appreciate the relevance of Market Sustainability.
9	I SEM	CROSS CULTURAL MANAGEMENT (OPEN ELECTIVE - I)	CO1. Understand the importance of the influence of national culture on business culture. CO2. Learn about value orientations and dimensions. CO3. Assess culture and leadership, culture and strategy, cultural change in organizations. CO4. Understand cross cultural team management. CO5. Learn the aspects of working with international teams and multiple cultures and management of conflicts
10	I SEM	BUSINESS COMMUNICATION LAB	CO1. Appreciate the importance and influence of Business Communication and learn its applications for the purpose of self-development. CO2. Learn by practice of writing a variety of formal and informal letters & e-mails and reports and improve the readability of written documents CO3. Identify the intricacies of writing Business Reports and Proposals CO4. Develop verbal (oral) skills by giving presentations and participating in group discussions; appreciate the impact of body language in the process of communication CO5. Polish their etiquette, improve telephonic skills and appreciate the need for culture in maintenance of public relations.
11	I SEM	STATISTICAL DATA ANALYSIS LAB	CO1. Understand the importance of the main functions of MS- Excel /SPSS. CO2. Practice advance Excel Tools for conduction of Data Analysis CO3. Evaluate Data Analysis using Pivot Tables and Pivot Charts. CO4. Analyze the Data using Descriptive Statistics CO5. Conduct various Parametric and Non-parametric Tests using MS Excel / SPSS
12	II SEM	HUMAN RESOURCE MANAGEMENT	CO1. Understand the concepts, role and functions of HRM and appreciate the need of HR to act as a Strategic Business Partner of the Organization. CO2. Learn the methods of conducting Job Analysis, process of writing Job Descriptions & Specifications and the processes of recruitment and selection. CO3. Gain an understanding of various concepts and practices of Employee Training & Development and Performance Management & Appraisals. CO4. Learn the principles and practices of Employee Compensation and Rewards, with the help of Job Evaluation & Broadbanding etc. and the salient features of Workmen Compensation Act and Minimum Wages Act. CO5. Appreciate the need for effective Employee Relations and learn the salient features of Industrial Disputes Act and Factories Act.
13	II SEM	MARKETING MANAGEMENT	CO1. Understand the important concepts and principles of Marketing Management and Marketing Research. CO2. Learn about the analysis of Market Opportunities and Customer Value with the help of Marketing Mix Elements. CO3. Learn the significance of designing a customer driven strategy through Marketing Segmentation, Targeting and Positioning. CO4. Assess Global marketing, green marketing strategies for sustainable development. CO5. Gain insights of the key aspects of pricing decisions and the role of communication
14	II SEM	FINANCIAL MANAGEMENT	CO1. Understand the concept of time value of money. CO2. Learn about the capital budgeting techniques and cost of capital. CO3. Learn the significance of Capital structure vs. financial structure. CO4. Assess dividend policies of Indian companies, determinants of working capital, analysis of investment in inventory. CO5. Understand the Concepts and Applications of Working Capital Management and Management of Current Asset
15	II SEM	QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS	CO1. Understand the origin and application of operations research. CO2. Learn about the Formulation of Linear Programming Problem for different areas. CO3. appreciate the significance of variations of assignment problem, methods for finding Initial feasible solution. CO4. Learn the aspects of Decision Theory and Network Analysis CO5. Gain insights of the theoretical principles and practical applications of different queuing models.
16	II SEM	ENTREPRENEURSHIP AND DESIGN THINKING	CO1. Understand the approaches to entrepreneurship. CO2. Learn about the individual entrepreneurial mind-set and Personality. CO3. Learn the significance of Feasibility Analysis, Industry, competitor analysis, new venture development. CO4. Understand the principles of implementation of Design Thinking. CO5. Appreciate the relevance of Creativity in the process of implementation of Design Thinking
17	II SEM	LOGISTICS AND SUPPLY CHAIN MANAGEMENT	CO1. Understand the cyclical perspective of logistics and supply chain process. CO2. Learn about the distribution, transportation, warehousing related issues and challenges in supply chain. CO3. Appreciate the significance of network design in the supply chain. CO4. Gain knowledge of various models / tools of measuring the Supply Chain Performance. CO5. Appreciate the role of coordination and technology in supply chain management.
18	II SEM	TOTAL QUALITY MANAGEMENT (OPEN ELECTIVE-II)	CO1. Understand the need for Quality. CO2. Learn the relevant TQM models like PDCA Cycle, 5S, Kaizen, Quality Circles. CO3. Learn statistical aspects relevant for process control. CO4. Assess the relevance of Total Productive Maintenance, FMEA, Six Sigma. CO5. Learn different Quality Management Systems.
			CO1. Understands Management Functions and Organizational Structure

19	II SEM	SUMMER INTERNSHIP	CO2. Understands Organizational Dynamics in terms of Organizational Behaviour, Culture and Climate
			CO3. Understands Functional Domain Knowledge
			CO4. Knows Processes and Systems
			CO5. learn about External and Internal Environment Impact on the Organization.
			CO1. Understand the importance concepts of operations management.
20	III SEM	PRODUCTION AND OPERATIONS MANAGEMENT	CO2. Learn various strategies in product and process design, analysis.
			CO3. Learn examine the various aspects of plant location and product layout.
			CO4. Understand the aspects of scheduling.
			CO5. Gain insights of integrated materials management, e-procurement, materials planning.
			CO1. Understand the importance of MIS for strategic advantages.
21	III SEM	MANAGEMENT INFORMATION SYSTEMS	CO2. Learn various business applications of information systems like e-business, BPR, DSS.
			CO3. Learn examine the information system planning.
			CO4. Understand alternative methods for building information system.
			CO5. Learn cyber security with inter networks security defenses.
			CO1. Understand the importance of business analytics in practice.
22	III SEM	BUSINESS ANALYTICS	CO2. Learn various rural marketing strategies
			CO3. Learn challenges of data modelling.
			CO4. Understand the aspects data mining.
			CO5. Learn Monte Carlo simulation, risk analysis and decision tree analysis.
			CO1. Understand the importance of strategic management process.
23	IV SEM	STRATEGIC MANAGEMENT	CO2. Learn various market life cycle models for strategic analysis.
			CO3. Learn Strategies for competing in global markets and internet economy.
			CO4. Appreciate the need for having appropriate Turnaround and Diversification Strategies.
			CO5. Understand the aspects of strategy evaluation and control.
			CO1. Gain an overview of the nature, scope and importance of International Human Resource Management
24	IV SEM	INTERNATIONAL HUMAN RESOURCE MANAGEMENT(HRE)	CO2. Understand and appreciate the role of International Human Resource Management indevelopment and execution of strategies for success of multinational corporations.
			CO3. Learn the role of International Human Resource Management in long-term planning and staffingof manpower globally
			CO4. Gain insights of the strategic role of Training and Development of Expatriates in managementof international assignments.
			CO5. Acquaint themselves with the process of global performance management and understand the complexities of global compensation
			CO1. Gain an understanding of the relevance of HR Analytics in the current business scenario.
25	IV SEM	HR ANALYTICS(ME)	CO2. Have an understanding of the models of conducting HR Analytics and understanding of themethods of capturing, examining & purifying data for conduction of HR Analytics.
			CO3. Use MS Excel for conduction of HR Analytics for key HR Processes
			CO4. Have an overview of various tools and software technologies used for conduction of DescriptiveHR Analytics and Visualization of HR Data.
			CO5. Appreciate the significance of Predictive and Prescriptive Analytics.
			CO1. Understand various Startup opportunities.
26	IV SEM	STARTUP AND MSME MANAGEMENT(EE)	CO2. Learn Business Startup, Ideation, and Venture Choices.
			CO3. Learn Legal and other requirements for new ventures.
			CO4. Learn Problems of entrepreneurs.
			CO5. Understand the Forms of Financial support.
			CO1. Ability to engage in independent study to research literature in the identified domain.
27	IV SEM	MAIN PROJECT VIVA-VOCE	CO2. Ability to analyze various work to identify and formulate the engineering problem.
			CO3. Ability to work independently.
			CO4. Ability to communicate effectively.
			CO5. Ability to abide by the norms of professional ethics.


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