SRK INSTITUTE OF TECHNOLOGY

ENIKEPADU, VIJAYAWADA -521108

Approved by AICTE, Affiliated to JNTUK, Kakinada

(ISO 9001:2015 Certified Institution)

Program Outcomes (PO's)

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

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

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 the public health and safety, and the 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 tothe 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.

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PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

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.

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Civil Engineering

PSO1	Graduates shall possess necessary special skills to analyse and design various structural components using analytical and software tools related to civil engineering.
PSO2	Graduates shall have ability to plan, examine and analyse the various laboratory tests required for the professional demands.
PSO3	Graduates shall acquire basic technical skills to pursue their higher education and professional practice in civil engineering domain.

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	ENGINEERING PHYSICS	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic

			materials. • Explain the fundamentals ofquantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable, evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
	I	**BASIC CIVIL& MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through

			surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
	I	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves. • Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	I	**COMMUNICATIVE ENGLISH LAB**	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and

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			group discussions andto a Create effective Course Objectives.
	I	ENGINEERING PHYSICS LAB	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	I	ENGINEERING WORKSHOP	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice
	I	ITWORKSHOP	• Perform Hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and ivergence. • Estimate the work done againsta field, circulation and flux using vector calculus.
	II	**ENGINEERING CHEMISTRY**	• Analyze the suitable method of water treatment depending on the quality treatment • Familiarize construction of electrochemical cells and understand corrosion mechanism andprevention. • Explain applications of polymers and concept of fuel technology. • Explain advanced applications of engineering materials like composites, refractories, lubricants,cement. • Summarize the concepts of colloids, micelles and nano materials.
	II	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment & Safety Measures.

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			• Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	II	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyse a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced featuresof C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	II	**ENGINEERING MECHANICS Lab**	• Understand the fundamental concepts in mechanics and equilibrium of system of forces. • Determinethefrictionalforcesfo rbodiesincontactandanalysisof Trusses • Calculate the centroids, center of gravity of different geometrical shapes. • Calculate the moment of inertia of different geometrical shapes • Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a Particle & Rigid body.
	II	**ENGINEERING CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions.

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			• Prepare advanced polymer materials. • Determine the given substance by performing the suitable chemical procedure.
	II	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	II	**ENGINEERING MECHANICS & BUILDING PRACTICES LAB**	• Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller. • Verify Law of Parallelogram of forces and Law of Moment using force polygon and bell crank lever. • Determine the Centre of gravity different configurations and • Understand the types of bricks, bonds and sizes. • Exposure to precautions in the construction industry.
	II	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to

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			derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.

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YEAR	SEMESTER	SUBJECT	COS
II/IV (R20)	I	MATHEMATICS-III	• interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • estimate the work done against a field, circulation and flux using vector calculus (L5) • apply the Laplace transform for solving differential equations (L3) • find or compute the Fourier series of periodic signals (L3) • know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) • identify solution methods for partial differential equations that model physical processes (L3)
II	I	STRENGTH OF MATERIALS - I	• The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions • The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces • The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions • The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.
II	I	FLUID MECHANICS	• Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics. • Calculate the forces that act on submerged

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			planes and curves. • Ability to analyse various types of fluid flows. • Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces. • Able Measure the quantities of fluid flowing in pipes, tanks and channels.
II	I	**SURVEYING AND GEOMETRICS**	• Apply the knowledge to calculate angles, distances and levels • Identify data collection methods and prepare field notes • Understand the working principles of survey instruments, measurement errors and corrective measures • Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies
II	I	**HIGHWAY ENGINEERING**	• Plan highway network for a given area. • Determine Highway alignment and design highway geometrics. • Design Intersections and prepare traffic management plans • Judge suitability of pavement materials • design flexible and rigid pavements
	I	**CONCRETE TECHNOLOGY LAB**	• Determine consistency and fineness of cement. • Determine setting times of cement. • Determine specific gravity and soundness of cement. • Determine compressive strength of cement. • Determine workability of cement concrete by compaction factor, slump and Vee – Bee tests • Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis. • Determine flakiness and elongation index

			of aggregates. • Determine bulking of sand. • Understand non-destructive testing procedures on concrete.
	I	**HIGHWAY ENGINEERING LAB**	• Test aggregates and judge the suitability of materials for the road construction • Test the given bitumen samples and judge their suitability for the road construction • Obtain the optimum bitumen content for Bituminous Concrete • Determine the traffic volume, speed and parking characteristics. • Draw highway cross sections and intersections.
	I	**SURVEYING FILED WORK – I (Lab)**	• Able to Prepare the survey sheet according to the method used. • Able to survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically. • Able to record the reduced levels using various methods of levelling and measurement of horizontal & vertical angles by Theodolite. • Able to determine the location of any point horizontally and vertically using Tachometry.
III/IV (R20)	I	**STRUCTURAL ANALYSIS**	• To Estimate the bending moment and shear forces in beams for different fixity conditions • To analyse the frames and beams by using slope deflection & moment distribution methods • To determine the forces this was involved in trusses by using different methods. • To the behaviour of structures due to the expected loads, including the moving loads, acting on the structure • To know the student able to analyse the structure by matrix methods
III	I	**DESIGN AND DRAWING OF**	• Work on different types of design methods • Carryout analysis and design of flexural

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		REINFORCED CONCRETE STRUCTURES	members and detailing • Design structures subjected to shear, bond and torsion • Design different type of slabs and staircase • Design different type of compression members and footings
III	**I**	**GEOTECHNICAL ENGINEERING-I**	• The Student will be able to know the methods of soil exploration • Student will be able to analyse the stability of slope and earth pressure theories • The Student will be able to understand the different types of shallow foundations and decide on their location based on soil characteristics. • The student will be able to compute the magnitude of foundation settlements • The student will be able to apply the principles of bearing capacity of piles and design them accurately
III	**I**	**CONSTRUCTION TECHNOLOGY AND MANAGEMENT**	• appreciate the importance of construction planning • understand the functioning of various earth moving equipment • know the methods of production of aggregate products and concreting and usage of machinery required for the works. • • apply the gained knowledge to project management and construction techniques
III	**I**	**SUSTAINABLE ENERGY TECHNOLOGIES**	• Identify the importance of solar energy collection and storage. • Applying the principles of wind energy and biomass energy. • Applying knowledge on geothermal and ocean energy. • Applying knowledge about energy efficient systems. • Applying the concepts of green manufacturing systems.
	I	**GEOTECHNICAL ENGINEERING LAB**	• Determine index properties of soil and classify them. • Determine permeability of soils. • Determine Compaction, Consolidation and

			shear strength characteristics.
	I	**DESIGN OF SPECIAL STRUCTURES**	• Equipping students with the professional knowledge in the design and construction of Industrial chimneys and Water tanks • To get the professional knowledge in the design of service reservoir and Estimation of drains for village • To understand the design of spillway for low and medium height dams • To estimate the concrete roads and rain water harvesting ponds
IV/IV (R20)	I	**UNIVERSAL HUMAN VALUES: UNDERSTANDING HARMONY**	• To train the student for Development of a holistic perspective based on self-exploration about themselves human being), family, society and nature/existence. • To understand Harmony in the Human Being - characteristics and activities and harmony in I and correct appraisal of Physical needs, meaning of Prosperity in detail. • To understand (or develop clarity) the harmony in the human being, family, society and Human Relationship • To strengthen the students in Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence. • To Infuse the student with Humanistic Education, Humanistic Constitution and Humanistic Universal Order
	I	**URBAN TRANSPORTATION PLANNING**	• Estimate travel demand for an urban area • Plan the transportation network for a city • Identify the corridor and plan for providing good transportation facilities. • Evaluate various alternative transportation proposals
	I	**DISASTER MANAGEMENT & MITIGATION**	• the application of Disaster Concepts to Management • Analyzing Relationship between Development and Disasters

			• Ability to understand Categories of Disasters and • realization of the responsibilities to society
	I	**DESIGN AND DRAWING OF IRRIGATION STRUCTURES**	• Design and draw Surplus weir • Design and draw Tank sluice with a tower head • Design and draw Canal drop-Notch type • Design and draw Canal regulator • Design and draw Syphon aqueduct type III
	I	**ADDITIVE MANUFACTURING**	• To understand the principles of prototyping, classification of RP processes and liquidbased RP systems • To understand and apply different types of solid-based RP systems. • To understand and apply powder-based RP systems. • To understand and apply various rapid tooling techniques. • To understand different types of data formats and to explore the applications of AM processes in various fields.
	I	**SAFETY ENGINEERING**	• To understand the concepts of industrial safety and management. • To demonstrate the accident preventions and protective equipment. • To understand and apply the knowledge of safety acts • To have the knowledge about fire prevention and protection systems • To understand and apply fire safety principles in buildings
	I	**SKILL ADVANCED COURSE/ SOFT SKILL COURSE**	• Introducing the important codes and by-laws that will benefit young professionals • Introducing practical knowledge in planning of smart city • Equipping students with the professional knowledge in the design and construction • Procedures of various Civil Engineering projects • Introducing the Knowledge about the existing cities including roads and metros

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YEAR	SEMESTER	SUBJECT	COS
II/IV (R20)	II	COMPLEX VARIABLES AND STATISTICAL METHODS	• apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3) • find the differentiation and integration of complex functions used in engineering problems (L5) • make use of the Cauchy residue theorem to evaluate certain integrals (L3) • apply discrete and continuous probability distributions (L3) • design the components of a classical hypothesis test (L6) • infer the statistical inferential methods based on small and large sampling tests (L4)
	II	STRENGTH OF MATERIALS - II	• The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections. • The student can assess stresses in different engineering applications like shafts, springs,• columns and struts subjected to different loading conditions
	II	HYDRAULICS AND HYDRAULIC MACHINERY	• Solve uniform and non-uniform open channel flow problems. • Apply the principals of dimensional analysis and similitude in hydraulic model testing. • Understand the working principles of various hydraulic machineries and pumps.
	II	ENVIRONMENTAL ENGINEERING	• Select a source based on quality and quantity and Estimate design population and water demand • Design a water treatment plant for a village/city • Design a sewer by estimating DWF and

			Strom water flow and plumbing system for buildings • Design a Sewage Treatment Plant for a town/city.
	II	**MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product. • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis. • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
	II	**EVIRONMENTAL ENGINEERING LAB**	• Estimate some important characteristics of water, wastewater and soil in the laboratory • Draw some conclusion and decide whether the water is suitable for Drinking/Construction / Agriculture/ Industry. • Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture • Estimation of the strength of the sewage in terms of BOD and COD and Decide whether the water body is polluted or not with reference to the stated parameters in the list of experiments • Demonstration of various instruments used in testing of water and soil and study of Drinking water standards, WHO guidelines, Effluent standards and standards for Construction/ Agriculture/ Industry.
	II	**STRENGTH OF**	• Able to study the stress-strain curves of

		MATERIALS LAB	different materials used in the field under different loading conditions. • Able to differentiate between properties of materials affect strength under various conditions. • Able to calculate simple tensile and shear stress using the appropriate guidelines and formats. • Able to analyze the bending stress on different types of sections • Able to understand deflection of different sections at different loading conditions.
	II	**FLUID MECHANICS LAB**	• Able to understand the behaviour of water current in rivers, canal and drains. • Able to use important practical results in common fluid flows. • Able to determine metacentre of a floating vessel • Able to calibrate various flow measuring devices in pipe and open channel flow. • Able to determine various losses and velocity in pipe flow in field.
III/IV (R20)	**II**	**DESIGN AND DRAWING OF STEEL STRUCTURES**	• Work with relevant IS codes • Carryout analysis and design of flexural members and detailing • Design compression members of different types with connection detailing • Design Plate Girder and Gantry Girder with connection detailing • Produce the drawings pertaining to different components of steel structures
	II	**WATER RESOURCES ENGINEERING**	• The student can thoroughly understand the theories and principles of the hydrologic processes. • The student will be able to quantify hydrologic components and apply concepts in hydrologic design of water resources projects. • Develop design storms and carryout frequency analysis • Develop flow mass curve and flow duration curve, apply hydrograph analysis in the design of water resources projects. • Develop unit hydrograph and synthetic hydrograph

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	II	**GEOTECHNICAL ENGINEERING-II**	• The Student will be able to know the methods of soil exploration • student will be able to analyse the stability of slope and earth pressure theories • The Student will be able to understand the different types of shallow foundations and decide on their location based on soil charecterstics. • The student will be able to compute the magnitude of foundation settlements • The student will be able to apply the principles of bearing capacity of piles and design them accurately
	II	**TRAFFIC ENGINEERING**	• To determine various components and characteristics of traffic. • To apply various traffic control devices and principles of highway safety. • To understand the detrimental effects of traffic on environment • To carry out highway capacity and level of service analysis. • To learn about intelligent vehicle highway systems.
	II	**INTRODUCTION TO AUTOMOBILE ENGINEERING**	• Explain the basics of an automobile & its components with applications. • Illustrate the concept of Transmission system with different components in an automobile. • Analyze the working of steering system and Categorize the concepts of Suspension in an automobile. • Categorize the concepts of Braking systems & Electrical in an automobile. • Demonstrate the basics of Engine specification & safety systems in automobile under different conditions.
	II	**ESTIMATION, COSTING AND CONTRACTS LAB**	• The student should be able to determine the quantities of different components of buildings. • The student should be in a position to find the cost of various building components. • The student should be capable of

			finalizing the value of structures.
	II	**REMOTE SENSING & GIS LAB**	• Work comfortably on GIS software • Digitize and create thematic map and extract important features • Develop digital elevation model • Interpretation and Estimation of features from satellite imagery. • Analyze and Modelling using GIS software.
	II	**CIVIL ENGINEERING PRACTICE LAB**	• Introducing practical aspects of Civil Engineering profession to the students • Equipping students with the professional knowledge in the design and construction procedures of various Civil Engineering projects • Introducing the important codes and by-laws that will benefit young professionals
IV/IV R20	II	**MAJOR PROJECT**	• Develop capability to acquire and apply fundamental principles of engineering • Become updated with all the latest changes in technological world • Make deep connections between ideas • Learn to take creative risks • Be ready for the creative economy also engage in iterative thinking and divergent thinking • Identify, formulate and model problems and find engineering solution based on a systems approach

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Electrical and Electronics Engineering

PSO 1	Ability to apply the acquired knowledge of core subjects in design and development of Communications/Signal and Image processing.
PSO2	Analyze and solve complex Electronics and Communication engineering problems using hardware and software tools.
PSO3	Identify and apply domain specific tools for Design, Analysis and Synthesis in the areas of VLSI and Embedded systems.

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	ENGINEERING PHYSICS	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using

			Hall effect
	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable, evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
	I	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	I	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves. • Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications

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			• Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	I	**COMMUNICATIVE ENGLISH LAB**	• Understand the different aspects of the English language proficiency with emphasis on LSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions and to a Create effective Course Objectives.
	I	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	I	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor.

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			• Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
	I	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and divergence. • Estimate the ork done against a field, circulation and flux using vector calculus.
	II	**BASIC CIVIL & MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
	II	**CHEMISTRY**	• Explain basic concepts of quantum mechanics and molecular and bonding. • Apply the principle of band diagrams in the application of conductors and semiconductors. • Compare the materials of construction for battery and electrochemical sensors. • Explain preparation, properties, and applications of thermoplastics & thermosetting & elastomers, conducting polymers. • Explain the principles of spectrometry, hplc in separation of solid and liquid mixtures.

	II	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyse a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Developproblem-solvingskillsandtheabilitytodebugandoptimizethecode.
	II	**ELECTRICAL CIRCUIT ANALYSIS-**	• Remembering the basic electrical element sand different fundament allaws. • Understand the network reduction techniques, transformations, concept of self-inductance and mutual inductance, phasor diagrams, resonance and network theorems. • Apply the concepts to obtain various mathematical and graphical representations. • Analyze nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components). • Evaluation of Network theorems, electrical, magnetic and single-phase circuits.
	II	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. • Prepare advanced polymer materials. • Determine the given substance by performing the suitable chemical procedure.
	II	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming

			constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	II	**ELECTRICAL CIRCUIT ANALYSIS-I LAB**	• Understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams. • Apply various theorems to compare practical results obtained with theoretical calculations. • Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil. • Analyze different circuit characteristics with the help of fundamental laws and various configurations. • Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.
	II	**ITWORKSHOP**	• Perform Hardware troubleshooting. • Understand Hardware components and inter dependencies. • Safeguard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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YEAR	SEMESTER	SUBJECT	COS
II/IV (R20)	I	MATHEMATICS-IV	• Able to apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic • Able to find the differentiation and integration of complex functions used in engineering problems and to make use of the Cauchy residue theorem to evaluate certain integrals • Able to apply discrete and continuous probability distributions • Able to the components of a classical hypothesis test • Able to infer the statistical inferential methods based on small and large sampling tests
	I	ELECTRONIC DEVICES AND CIRCUITS	• Able to Understand the basic concepts of semiconductor physics. • Able to Understand the formation of P-N junction and how it can be used as a P-N junction as diode in different modes of operation. • Able to know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons • Able to Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations. • Able to know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions, Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

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	I	**ELECTRICAL CIRCUIT ANALYSIS – II**	• Able to understand the concepts of balanced and unbalanced three-phase circuits. • Able to know the transient behaviour of electrical networks with DC excitations. • Able to learn the transient behaviour of electrical networks with AC excitations. • Able to Estimate various parameters of a two port network. • Able to understand the significance of filters in electrical networks.
	I	**DC MACHINES AND TRANSFORMERS**	• Assimilate the concepts of electromechanical energy conversion. • Mitigate the ill-effects of armature reaction and improve commutation in dc machines. • Understand the torque production mechanism and control the speed of dc motors, Able to analyze the performance of single phase transformers • Predetermine regulation, losses and efficiency of single phase transformers • Parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.
	I	**ELECTRO MAGNETIC FIELDS**	• Able to Compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions. • Able to calculate the capacitance and energy stored in dielectrics. • Able to calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law. • Estimate self and mutual inductances

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			and the energy stored in the magnetic field. • Able to Understand the concepts of displacement current and Pointing theorem and Pointing vector
	I	**ELECTRICAL CIRCUITS LAB**	• Apply various theorems • Determination of self and mutual inductances • Two port parameters of a given electric circuits • Draw locus diagrams • Draw Waveforms and phasor diagrams for lagging and leading networks
	I	**DC MACHINES AND TRANSFORMERS LAB**	• Determine and predetermine the performance of DC machines and Transformers. • Control the speed of DC motor. • Obtain three phase to two phase transformation.
	I	**ELECTRONIC DEVICES AND CIRCUITS LAB**	• Analyze the characteristics of diodes, transistors and other devices • Design and implement the rectifier circuits, SCR and UJT in the hardware circuits. • Design the biasing and amplifiers of BJT and FET amplifiers. • Measure electrical quantities using CRO in the experimentation
	I	**SKILL ORIENTED COURSE (DESIGN OF ELECTRICAL CIRCUITS USING ENGINEERING SOFTWARE TOOLS)**	• write the MATLAB programs to simulate the electrical circuit problems • simulate various circuits for electrical parameters • simulate various wave form for determination of wave form parameters • simulate RLC series and parallel resonance circuits for resonant parameters • simulate magnetic circuits for determination of self and mutual inductances
	I	**PROFESSIONAL ETHICS &**	• Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field.

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		HUMAN VALUES	• Identify the multiple ethical interests at stake in a real-world situation or practice • Articulate what makes a particular course of action ethically defensible • Assess their own ethical values and the social context of problems • Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects • Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work • Integrate, synthesize, and apply knowledge of ethical dilemmas and solutions in academic settings, including focused and interdisciplinary research.
III/IV (R20)	**I**	**POWER SYSTEMS–II**	• Calculate parameters of transmission lines for different circuit configurations. Determine the performance of short, medium and long transmission lines. • Analyse the effect of travelling waves on transmission lines. • Analyse the various voltage control methods and effect of corona. • Calculate sag/tension of transmission lines and performance of line insulators.
	I	**POWER ELECTRONICS**	• Illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT. • Analyse the operation of phase-controlled rectifiers. • Analyse the operation of three-phase full–wave converters, AC Voltage Controllers and Cycloconverters. • Examine the operation and design of different types of DC-DC converters. • Analyse the operation of PWM inverters for voltage control and harmonic mitigation.

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	I	**CONTROL SYSTEMS**	• Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs. • Determine time response specifications of second order systems and absolute and relative stability of LTI systems using Routh's stability criterion and root locus method. • Analyze the stability of LTI systems using frequency response methods. • Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams. • Represent physical systems as state models and determine the response. Understand the concepts of controllability and observability.
	I	**RENEWABLE ENERGY SOURCES (OPEN ELECTIVE-I)**	• Analyze solar radiation data, extra-terrestrial radiation, radiation on earth's surface and solar Energy Storage. • Illustrate the components of wind energy systems. • Illustrate the working of biomass, digesters and Geothermal plants. • Demonstrate the principle of Energy production from OTEC, Tidal and Waves. • Evaluate the concept and working of Fuel cells & MHD power generation
	I	**CONCEPTS OF OPTIMIZATION TECHNIQUES (OPEN ELECTIVE-I)**	• State and formulate the optimization problem without and with constraints, also apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints and arrive at an optimal solution. • Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the

			concept of dual Simplex method for optimal solutions. • Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies. • Solve transportation and assignment problem by using Linear programming Simplex method. • Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
	I	**CONCEPTS OF CONTROL SYSTEMS (OPEN ELECTIVE-I)**	• Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs. • Determine time response specifications of second order systems and to determine error constants. • Analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method. • Analyze the stability of LTI systems using frequency response methods. • Represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.
	I	**LINEAR IC APPLICATIONS (PROFESSIONAL ELECTIVE – I)**	• Describe the Op-Amp and internal Circuitry: 555 Timer, PLL • Discuss the Applications of Operational amplifier: 555 Timer, PLL. • Design the Active filters using Operational Amplifier • Use the Op-Amp in A to D• & D to A Converters
	I	**UTILIZATION OF ELECTRICAL ENERGY**	• To study the basic principles of illumination and its measurements and to design the different types lighting

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		(PROFESSIONAL ELECTIVE – I)	systems. • To acquaint with the different types of heating and welding techniques. • To understand the operating principles and characteristics of various motors with respect to speed, temperature and loading conditions. • To understand the basic principles of electric traction including speed–time curves of different traction services and calculation of braking, acceleration and other related parameters. • To Introduce the concepts of various types of energy storage systems.
	I	**COMPUTER ARCHITECTURE AND ORGANIZATION (PROFESSIONAL ELECTIVE – I)**	• Explain the instruction cycle of a computer. • Understand various micro operations and register transfer language. • Describe parallel processing and pipelining. • Interface different peripherals with processors. • Know the advantages of cache and virtual memory
	I	**OPTIMIZATION TECHNIQUES (PROFESSIONAL ELECTIVE – I)**	• State and formulate the optimization problem without and with constraints, also apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints and arrive at an optimal solution. • Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions. • Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies. • Solve transportation and assignment problem by using Linear programming Simplex method. • Formulate and apply Dynamic programming technique to inventory

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			control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
	I	**OBJECT ORIENTED PROGRAMMING THROUGH JAVA (PROFESSIONAL ELECTIVE – I)**	• Discuss and understand java programming constructs, Control structures • Illustrate and experiment Object Oriented Concepts like classes, objects • Apply Object Oriented Constructs such as Inheritance, interfaces, and exception handling • Construct applications using multithreading and I/O. • Develop Dynamic User Interfaces using applets and Event Handling in java
	I	**CONTROL SYSTEMS LABORATORY**	• Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros. • Design P,PI,PD and PID controllers • Design lag, lead and lag–lead compensators • Evaluate temperature control of an oven using PID controller • Determine the transfer function of D.C Motor • Analyze the performance of D.C and A.C Servo Motor. • Test the controllability and observability. • Judge the stability in time and frequency domain. • To examine different logic gates and Boolean expressions using PLC.
	I	**POWER ELECTRONICS LABORATORY**	• Analyse characteristics of various power electronic devices and design firing circuits for SCR. • Analyse the performance of single–phase dual, three-phase full–wave bridge converters and dual converter with both resistive and inductive loads. • Examine the operation of Single-phase AC voltage regulator and Cycloconverter with resistive and

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			inductive loads. • Differentiate the working and control of Buck converter and Boost converter. • Differentiate the working & control of Square wave inverter and PWM inverter.
	I	**SOFT SKILL COURSE EMPLOYABILITY SKILLS**	• Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems • Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. • Analyze, summarize and present information in quantitative forms including table, graphs and formulas • Understand the core competencies to succeed in professional and personal life • Learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc.
	I	**HIGH VOLTAGE ENGINEERING**	• Recognise the dielectric properties of gaseous materials used in HV equipment. • Differentiate the break down phenomenon in liquid and solid dielectric materials. • Acquaint with the techniques of generation of high AC and DC voltages. • Acquaint with the techniques of generation of high Impulse voltages and currents. • Getting the knowledge of measurement of high AC - DC - Impulse voltages and currents.
	I	**RENEWABLE AND DISTRIBUTED ENERGY TECHNOLOGIES**	• Illustrate basic concepts of renewable and distributed sources. • Demonstrate the components of wind energy conversion systems. • Model PV systems and analyse MPPT Techniques. • Illustrate the concept of Energy Production from Hydro - Tidal and Geothermal.

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			• Distinguish between standalone and grid connected DG systems and design hybrid renewable energy systems.
	I	**POWER SYSTEM OPERATION AND CONTROL**	• Compute optimal load scheduling of Generators. • Formulate hydrothermal scheduling and unit commitment problem. • Analyse effect of Load Frequency Control for single area systems. • Analyse effect of Load Frequency Control for single area systems. • Describe the effect of reactive power control for transmission lines.
	I	**CLOUD COMPUTING WITH AWS**	• Understand and analyze the architecture of Cloud (Analyze). • Identify and apply deployment and management options of AWS Cloud Architecture (Apply). • Design architectures to decouple infrastructure and reduce interdependencies(Create).
	I	**UNIVERSAL HUMAN VALUES-2**	• Students will be able to discuss a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence, to explain (or developing clarity) of the harmony in the human being ,family,society and nature/existence,to strengthen self-reflection and to judge the commitment and courage to act.
	I	**AI Tools & Techniques**	• Explain the fundamentals of AI and machine learning. • Identify an appropriate AI problem solving method and knowledge representation technique. • Identify appropriate machine learning models for problem solving. • Design and develop the AI applications in real world scenario. • Compare the relationship between AI, ML, and Deep Learning.

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II/IV (R20)	II	DIGITAL ELECTRONICS	• Classify different number systems and apply to generate various codes. • Use the concept of Boolean algebra in minimization of switching functions • Design different types of combinational logic circuits. • Apply knowledge of flip-flops in designing of Registers and counters • The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
	II	POWER SYSTEMS - I	• Identify the different components of thermal power plants. Identify the different components of nuclear Power plants. • Identify the different components of air and gas insulated substations. • Identify single core and three core cables with different insulating materials. • Analyse the different economic factors of power generation and tariffs.
	II	INDUCTION AND SYNCHRONOUS MACHINES	• Explain the operation and performance of three phase induction motor. • Analyze the torque-speed relation, performance of induction motor and induction generator. • Implement the starting of single phase induction motors. • Develop winding design and predetermine the regulation of synchronous generators. • Explain hunting phenomenon, implement methods of staring and correction of power factor with synchronous motor.
	II	MANAGERIAL ECONOMICS & FINANCIAL	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.

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		ANALYSIS	• The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis. • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
	II	**PYTHON PROGRAMMING LAB**	• Write, Test and Debug Python Programs • Use Conditionals and Loops for Python Programs • Use functions and represent Compound data using Lists, Tuples and • Dictionaries Use various applications using python
	II	**INDUCTION AND SYNCHRONOUS MACHINES LAB**	• Assess the performance of single phase and three phase induction motors. • Control the speed of three phase induction motor. • Predetermine the regulation of three–phase alternator by various methods. • Find the Xd/Xq ratio of alternator and asses the performance of three–phase synchronous motor. Determine the performance of single phase AC series motor.
	II	**DIGITAL ELECTRONICS LAB**	• Learn the basics of gates, filp-flops and counters. • Construct basic combinational circuits and verify their functionalities • Apply the design procedures to design basic sequential circuits • To understand the basic digital circuits and to verify their operation • Apply Boolean laws to simplify the

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			digital circuits.
	II	**SKILL ORIENTED COURSE IOT APPLICATIONS O**	• apply various technologies of Internet of Things to real time applications. • apply various communication technologies used in the Internet of Things. • connect the devices using web and internet in the IoT environment. • implement IoT to study Smart Home, Smart city, etc.
III/IV (R20)	II	**MICROPROCESSORS AND MICROCONTROLLERS**	• Know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors. • Analyse the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors • Analyse the Microcontroller and interfacing capability • Describe the architecture and interfacing of 8051 controller • Know the concepts of PIC micro controller and its programming
	II	**ELECTRICAL MEASUREMENTS AND INSTRUMENTATION**	• Know the construction and working of various types of analog instruments. • Describe the construction and working of wattmeter and power factor meters • Know the construction and working various bridges for the measurement resistance - inductance and capacitance • Know the operational concepts of various transducers • Know the construction and operation digital meters.
	II	**POWER SYSTEM ANALYSIS**	• Draw impedance diagram for a power system network and calculate per unit quantities. • Apply the load flow solution to a power system using different methods. • Form Zbus for a power system networks and analyse the effect of symmetrical

			faults. • Find the sequence components for power system Components and analyse its effects of unsymmetrical faults. • Analyse the stability concepts of a power system.
	II	**SIGNALS AND SYSTEMS (PROFESSIONAL ELECTIVE – II)**	• Apply the knowledge of various signals and operations. • Analyze the spectral characteristics of periodic signals using Fourier Analysis. • Classify the systems based on their properties and determine the response of LSI system using convolution. • Understand the process of sampling and the effects of under sampling. • Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete).
	II	**ELECTRIC DRIVES (PROFESSIONAL ELECTIVE – II)**	• Explain the fundamentals of electric drive and different electric braking methods. • Analyze the operation of three-phase converter fed dc motors and four quadrant operations of dc motors using dual converters. • Describe the DC-DC converter fed control of dc motors in various quadrants of operation • Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters and differentiate the stator side control and rotor side control • Learn the concepts of speed control of synchronous motor with different methods
	II	**ADVANCED**	• Analyse different canonical forms - solution of State equation. • Design of control system using the pole placement technique is given after

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		CONTROL SYSTEMS (PROFESSIONAL ELECTIVE – II)	introducing the concept of controllability and observability. • Analyze nonlinear system using describing function technique and phase plane analysis. • Examine the stability analysis using Lyapunov method. • Illustrate the Minimization of functional using calculus of variation - state and quadratic regulator
	II	**ELECTRICAL MEASUREMENTS AND INSRUMENTATION LABORATORY**	• Know about the phantom loading. • Learn the calibration process. • Measure the electrical parameters voltage - current - power - energy and electrical characteristics of resistance - inductance and capacitance. • Gain the skill knowledge of various brides and their applications. • Learn the usage of CT's - PT's for measurement purpose. • Know the characteristics of transducers. • Measure the strains - frequency and phase difference. .
	II	**MICRO PROCESSORS AND MICRO CONTROLLERS LAB**	• Write assembly language program using 8086 microprocessor based on arithmetic - logical - number systems and shift operations. • Write assembly language programs for numeric operations and array handling problems. • Write a assembly program on string operations. • Interface 8086 with I/O and other devices. • Do parallel and serial communication using 8051 & PIC 18 micro controllers. • Program microprocessors and microcontrollers for real world applications.
	II	**POWER SYSTEMS AND SIMULATION LAB**	• Estimate the sequence impedances of 3-phase Transformer and Alternators . • Evaluate the performance of transmission lines

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			• Analyse and simulate power flow methods in power systems • Analyse and simulate the performance of PI controller for load frequency control. • Analyse and simulate stability studies of power systems
	II	**SKILL ADVANCED COURSE** **MACHINE LEARNING WITH PYTHON**	• Illustrate and comprehend the basics of Machine Learning with Python • Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions • Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms • Evaluate the concepts of binning, pipeline Interfaces with examples • Apply the sentiment analysis for various case studies
IV/IV **R20**	II	**MAJOR PROJECT**	• Develop capability to acquire and apply fundamental principles of engineering • Become updated with all the latest changes in technological world • Make deep connections between ideas • Learn to take creative risks • Be ready for the creative economy also engage in iterative thinking and divergent thinking • Identify, formulate and model problems and find engineering solution based on a systems approach

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MECHANICAL ENGINEERING

PSO1	Analyze, design and develop mechanical components to solve engineering problems in design and manufacturing domains.
PSO2	Formulate, analyze and develop thermal systems to solve complex engineering problems using modern technological tools.

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	ENGINEERING PHYSICS	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals ofquantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect

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	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable, evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
	I	**BASIC CIVIL& MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
	I	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves. • Applying the principle of

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			orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	I	**COMMUNICATIVE ENGLISH LAB**	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate dielectric constant, magnetic field for dielectric and magnetic

			materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	I	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice
	I	**ITWORKSHOP**	• Perform Hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and ivergence. • Estimate the work done againsta field, circulation and flux using vector calculus.
	II	**ENGINEERING CHEMISTRY**	• Analyze the suitable method of water treatment depending on the quality treatment • Familiarize construction of electrochemical cells and understand corrosion mechanism andprevention. • Explain applications of polymers and concept of fuel technology. • Explain advanced applications of engineering materials like composites, refractories, lubricants,cement. • Summarize the concepts of colloids, micelles and nano materials.
	II	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures.

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			• Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	II	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyse a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced featuresof C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	II	**ENGINEERING MECHANICS Lab**	• Analyze the coefficient of friction between two different surfaces and between the inclined plane and the roller. • Examine law of Polygon of forces and Law of Moment using force polygon and bellcranklever. • Determine the Centre of gravity and Moment of Inertia of different configurations. • Execute the equilibrium conditions of a rigid body under the action of different force systems.
	II	**ENGINEERING CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. • Prepare advanced polymer materials. • Determine the given substance by performing the suitable chemical procedure.

	II	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	II	**ENGINEERING MECHANICS & BUILDING PRACTICES LAB**	• Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller. • Verify Law of Parallelogram of forces and Law of Moment using force polygon and bell crank lever. • Determine the Centre of gravity different configurations and • Understand the types of bricks, bonds and sizes. • Exposure to precautions in the construction industry.
	II	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the

			measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.

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YEAR	SEMESTER	SUBJECT	CO's
II	I	**Vector Calculus, Fourier Transforms and PDE(M-III)**	• Interpret the physical meaning of different operators such as gradient, curl and divergence. Estimate the work done against a field, circulation and flux using vector calculus. • Apply the Laplace transform for solving differential equations. • Find or compute the Fourier series of periodic signals. Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic wave forms. • To identify solution methods for partial differential equations that model physical process. • Identify solution methods for partial differential equations that model physical processes.
	I	**Mechanics of Solids**	• Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium. • Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment. • Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structural components. Students are able to analyse beams and draw correct and complete shear and bending moment diagrams for beams. • Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior • Design and analysis of Industrial components like pressure vessels.
	I	**Fluid Mechanics & Hydraulic Machines**	• Comprehend different concepts of fluid and its properties, hydrostatic forces acting

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			on different surfaces • Understand the topics of basic laws of fluids, flow patterns, viscous flow through ducts and their corresponding problems • Analyze different concepts related to boundary layer theory, velocity profiles and dimensional analysis • Apply the hydrodynamic forces acting on vanes and their performance evaluation • Explain the working Principles and performance evaluation of hydraulic pump and turbines.
	I	**Production Technology**	• Design the patterns and core boxes for metal casting processes. • Design the gating system for different metallic components. • Interpret the different types of manufacturing processes. • Identify the forging, extrusion processes. • Comprehend the different types of welding processes used for special fabrication.
	I	**Kinematics of Machinery**	• Contrive a mechanism for a given plane motion with single degree of freedom. • Suggest and analyze a mechanism for a given straight line motion and automobile steering motion. CO3: Analyze the motion (velocity and acceleration) of a plane mechanism. • Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc. • Select a power transmission system for a given application and analyze motion of different transmission systems • Contrive a mechanism for a given plane motion with single degree of freedom.
	I	**Computer Aided Engineering Drawing Practice**	• Student get exposed on working of sheet metal with help of development of surfaces. • Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids. • Student shall exposed to modeling

			commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
	I	**Fluid Mechanics & Hydraulic Machines Lab**	• Develop the different types of vanes • Design the different types of hydraulic turbines, pumps. • Develop the hydraulic energy in to mechanical energy using hydraulic turbines.
	I	**Production Technology Lab**	• Analyze the advanced welding and casting processes and can relate variables with performance measures • Apply some of the manufactures process directly in the industry for preparation of complicated jobs • Implement similar features in preparation of jobs can be extended to implement in the preparation of complicated jobs
	I	**Drafting and Modeling Lab**	• Analyze the basic concept to drawing, edit, dimension, hatching etc. to develop 2&3D Modelling. • Construct 3D modelling, Assembling, modification & manipulation along with detailing. • Construct surface modelling through various exercises.
III	I	**Thermal Engineering-II**	• Comprehend the concept of Rankine cycle.Interpret working of boilers including water tube, fire tube and high pressure boilers and determine efficiencies. • Analyze the flow of steam through nozzles.Evaluate the performance steam turbines. • Evaluate the performance of reaction turbines and steam condensers. • Discuss the concepts of reciprocating and rotary type of compressors. • Acquire knowledge about the centrifugal and axial flow compressors
	I	**Design of Machine Members-I**	• Judge about materials and their properties along with manufacturing considerations. • Gain knowledge about the strength of machine elements.

			• Apply the knowledge in designing the riveted and welded joints, keys, cotters and knuckle joints. • Apply the knowledge in designing the shafts and shaft couplings. • Apply the knowledge in designing the mechanical springs.
	I	**Machining, Machine Tools & Metrology**	• Discuss the concepts of machining processes. • Apply the principles of lathe, shaping, slotting and planning machines. • Apply the principles of drilling, milling and boring processes. • Analyze the concepts of finishing processes and the system of limits and fits. • Learn the concepts of surface roughness and optical measuring instruments.
	I	**Data Structures (OE-I)**	• Summarize the properties ,interfaces and behaviour of basic abstract data types. • Discuss the computational efficiency of the principal algorithms for sorting & • searching • Use arrays, records, linked structures, stacks, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees. • Demonstrate different methods for red-black, splaytrees and priority queues
	I	**Advanced Materials (PE-I)**	• Justify the knowledge about metals and alloys and their utility in different environments. • Judge about polymers and ceramics and their applications. • Analyze composite materials along with reinforcements and their applications. • Utilize shape memory alloys and functionally graded materials for different applications. • Justify about the nanomaterials and their applications.
	I	**Machine Tools Lab**	• Demonstrate about general purpose machine tools in the machine shop. • Perceive different operations on drilling machine.

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			• Experiment with basic operations on shaping machine, slotting machine and milling machine.
	I	**Thermal Engineering Lab**	• Identify the different types of the principle of various parameters in boilers. • Analyze the performance characteristics of an internal combustion engines. • Analyze the air compressor characteristics.
	I	**Advanced Communication Skills Lab**	• Acquire vocabulary and use it contextually. • Develop proficiency in academic reading and writing. • Increase possibilities of job prospects.
	I	**Summer Internship**	• Apply science and engineering fundamentals to systematic investigation and interpretation of an engineering problem. • Demonstrate application of engineering techniques and tools. • Demonstrate abilities of a responsible professional and use ethical practices in day to day life.
IV	I	**Unconventional Machining Processes**	• Understand the concepts of modern machining processes. • Learn the principles of ultrasonic machining. • Apply the principles and procedure of electro chemical and chemical machining processes. • Apply the principles and procedure of thermal metal removal processes • Illustrate the principles and procedure of electron beam machining, laser beam machining and plasma machining.
	I	**Power Plant Engineering**	• Identify the different components of the steam power plant for power production. • Illustrate the component used in the diesel and gas power plant for power production • Understand how the power is produced by hydro-electric and nuclear power plants • Interpret the power production by combined power plants and operating principles of different instruments used in power plants. • Analyze power plant economics and implementation of pollution standards and control of pollution caused by the power plants.
	I	**Non Destructive Evaluation**	• Understand the concepts of various NDE techniques and the requirements of radiography

			techniques and safety aspects. • Interpret the principles and procedure of ultrasonic testing. • Understand the principles and procedure of Liquid penetration and eddy current testing. • Illustrate the principles and procedure of Magnetic particle testing Interpret the principles and procedure of infrared testing and thermal testing.
	I	**Universal Human Values: Understanding Harmon**	• To train the student for Development of a holistic perspective based on self-exploration about themselves human being), family, society and nature/existence. • To understand Harmony in the Human Being - characteristics and activities and harmony in I and correct appraisal of Physical needs, meaning of Prosperity in detail. • To understand (or develop clarity) the harmony in the human being, family, society and Human Relationship • To strengthen the students in Understanding Existence as Co-existence of mutually interacting units in all- pervasive space, Holistic perception of harmony at all levels of existence. • To Infuse the student with Humanistic Education, Humanistic Constitution and Humanistic Universal Order
	I	**Mechatronics Lab**	• Measure load, displacement and temperature using analogue and digital sensors. • Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts. • Simulate and analyze PID controllers for a physical system using MATLAB.
	I	**Summer Internship**	• Apply science and engineering fundamentals to systematic investigation and interpretation of an engineering problem. • Demonstrate application of engineering techniques and tools. • Demonstrate abilities of a responsible professional and use ethical practices in day to day life.

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II	II	**Material Science & Metallurgy**	• Understand the crystalline structure of different metals and study the stability of phases in different alloy systems. • Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains • Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals. • Grasp the methods of making of metal powders and applications of powder metallurgy • Comprehend the properties and applications of ceramic, composites and other advanced methods.
	II	**Complex Variables & Statistical Methods**	• Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic • Find the differentiation and integration of complex functions used in engineering problems • Make use of the Cauchy residue theorem to evaluate certain integrals • Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic • Infer the statistical inferential methods based on small and large sampling tests
	II	**Dynamics of Machinery**	• To compute the frictional losses and transmission in clutches, brakes and dynamometers • To determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes • To analyze the forces in four bar and slider crank mechanisms and design a flywheel • To determine the rotary unbalanced mass in reciprocating equipment • To determine the unbalanced forces and couples in reciprocating and radial engines
	II	**Thermal Engineering-I**	• Comprehend the actual cycle from fuel-air cycle and air- standard cycle for all practical applications. • Discuss the working principle and various

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			components of IC engine • Interpret the combustion phenomenon of SI and CI engines and their impact on engine variables. • Analyze the performance of an IC engine based on the performance parameters. • Identify the cycles and systems of a gas turbine and working principle of rockets and jet propulsion.
	II	**Industrial Engineering and Management**	• Design and conduct experiments, analyse, interpret data and synthesize valid conclusions • Design a system, component, or process, and synthesize solutions to achieve desired needs • Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints • Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management
	II	**Mechanics of Solids and Metallurgy Lab**	• Appraise the students with the use of testing machines and Apply methods to determine Mechanical properties and Elastic Constants by Compiling the data & report the findings and observations in the laboratory. • Characterize the micro structures of different ferrous, nonferrous metals, Treated and Untreated materials & identify the effect of heat treatment and cooling rates on the properties of steels • Evaluate the mechanical properties of material through various destructive and non-destructive testing & compare the hardness values of various material
	II	**Machine Drawing Practice**	• Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings. • Draw different types of bearings showing different components. • Assemble components of a machine part and draw the sectional assembly drawing showing

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			the dimensions of all the components of the assembly as per bill of materials • Select and represent fits and geometrical form of different mating parts in assembly drawings • To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements
	II	**Theory of Machines Lab**	• Design the mechanical systems for power transmission such as gears, belts, pulleys. • Design the effect of gyroscopic couple in motor vehicles, ships and aeroplanes • Develop the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.
	II	**Python Programming Lab**	• Solve the different methods for linear, non-linear and differential equations • Learn the PYTHON Programming language • Familiar with the strings and matrices in PYTHON • Write the Program scripts and functions in PYTHON to solve the methods
	II	**Summer Internship**	• Apply science and engineering fundamentals to systematic investigation and interpretation of an engineering problem. • Demonstrate application of engineering techniques and tools. • Demonstrate abilities of a responsible professional and use ethical practices in day to day life.
III	II	**Heat Transfer**	• Apply knowledge about mechanism and modes of heat transfer. • Interpret and analyze the concepts of conduction and convective heat transfer. • Interpret and analyze forced and free convection heat transfer. • Analyze the concepts of heat transfer with phase change and condensation along with heat exchangers. • Interpret the knowledge about radiation mode of heat transfer.
	II	**Design of Machine Members-II**	• Apply knowledge about the design of bearings. • Explain the concepts in designing various engine parts.

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			• Utilize the knowledge to design curved beams and power screws. • Justify power transmission systems and to design pulleys and gear drives. • Apply the concepts in designing various machine tool elements.
	II	**Introduction to Artificial Intelligence and Machine Learning**	• Discuss basic concepts of artificial intelligence, neural networks and genetic algorithms. • Apply the principles of knowledge representation and reasoning. • Learn about bayesian and computational learning and machine learning. • Utilize various machine learning techniques. • Apply the machine learning analytics and deep learning techniques.
	II	**Automobile Engineering (PE-II)**	• Discuss various components of four wheeler automobile. • Apply the knowledge of different parts of transmission system. • Judge about steering and suspension systems. • Justify the braking system and electrical system used in automobiles. • Analyze the concepts about engine specifications and service, safety and electronic
	II	**Disaster Management (OE-II)**	• Affirm the usefulness of integrating management principles in disaster mitigation work. • Distinguish between the different approaches needed to manage pre-during and post-disaster periods. • Explain the process of risk management. • Learn the role of technology in disaster management. • Relate to risk transfer.
	II	**Heat Transfer Lab**	• Apply the knowledge of heat transfer to perform experiments related to conduction heat transfer . • Evaluate heat transfer coefficient in free and forced convection heat transfer situation. • Apply the knowledge of heat transfer to perform experiments related to radiation heat transfer.

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	II	**CAE&CAM Lab**	• Experiment with trusses and beams to determine stress, deflection, natural frequencies, harmonic analysis, HT analysis and buckling analysis. • Create part programmes using FANUC controller. • Apply G-codes for automated tool path using CAM software.
	II	**Measurements & Metrology Lab**	• Demonstrate the calibration experiments with different gauges, transducers, thermocouple and temperature detector. • Demonstrate the calibration experiments with rotameter, seismic apparatus. • Demonstrate the calibration experiments with vernier calipers, micrometer, height and dial gauges.
	II	**Artificial Intelligence and Machine Learning Lab**	• Analyze and Implement the machine learning algorithms to solve the real time applications. • Apply the knowledge of artificial intelligence and machine learning models with image classifiers • Implement automatic facial recognition using various software tools.
IV	**II**	**Project work**	• Assess the Engineering activities with effective presentation. • Perceive in utilizing quality information through various resources • Originate the use of modern presentation techniques. • Happen within the stipulated duration • Justify the presentation content individually to a group

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Electronics and Communication Engineering

PSO1	Ability to solve the problems of core subjects in design and development of Communications/Signal and Image processing.
PSO2	Analyze and solve complex Electronics and Communication engineering problems using hardware and software tools.
PSO3	Identify and apply domain specific tools for Design, Analysis and Synthesis in the areas of VLSI and Embedded systems.

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	ENGINEERING PHYSICS	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect

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	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable, evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
	I	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	I	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves. • Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional

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			views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	I	**COMMUNICATIVE ENGLISH LAB**	• Understand the different aspects of the English language proficiency with emphasis on LSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	I	**ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits.

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			Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
	I	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice

I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and ivergence. • Estimate the work done againsta field, circulation and flux using vector calculus.
	II	**BASIC CIVIL & MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
	II	**CHEMISTRY**	• Explain basic concepts of quantum mechanics and molecular and bonding. • Apply the principle of band diagrams in the application of conductors and semiconductors. • Compare the materials of construction for battery and electrochemical sensors. • Explain preparation, properties, and applications of thermoplastics & thermosetting & elastomers, conducting

			polymers. • Explain the principles of spectrometry, hplc in separation of solid and liquid mixtures.
	II	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyze a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	II	**NETWORK ANALYSIS**	• Understand basic electrical circuits with nodal and mesh analysis. • Analyze the circuit using network simplification theorems. • Find Transient response and Steady state response of Network. • Analyze electrical networks in the Laplace domain. • Compute the parameters of a two-port network.
	II	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. • Prepare advanced polymer materials. • Determine the given substance by performing the suitable chemical procedure.
	II	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute

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			programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	II	**NETWORK ANALYSIS LAB**	• Verify Kirchhoff's laws and network Theorems • Measure time constants of RL& RC circuits. • Analyze behaviour of RLC circuit for different cases. • Design resonant circuit for given specifications. • Characterize and model the network in terms of all network parameters.
	II	**IT WORKSHOP**	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets

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YEAR	SEMESTER	SUBJECT	CO's
II	I	**Electronic Devices and Circuits**	• Able to identify the properties of semiconductor material. Able to identify the properties of various semiconductor devices. To observe the V-I Characteristics of devices. • Students will gain on the applications of P-N Junction Diode. • Able to understand the basic principles of electronic device operation with emphasis on bipolar transistors. • Able to understand the basic parameters of electronic devices, their performance, and limiting factors. • Able to Analysis and design of Electronic Circuits.
	I	**Switching Theory and Logic Design**	• Classify different number systems apply to generate various codes and minimization of Boolean functions using Boolean algebra. • Understand minimization of switching function using K-Maps to design Combinational logic circuits. • Apply knowledge of logic circuits to design of combinational circuits and PLDs • Understand the knowledge of flip-flops in designing of Registers and counters. • Apply knowledge of state machines diagrams and tables to design sequential circuits.
	I	**Signals and Systems**	• Analyze the characteristics of signals, systems and principles of vector space. • Examine the continuous time signals and continuous time systems using Fourier series and Fourier transform. • Apply sampling theorem and evaluate the concept of convolution, correlation energy and power density spectrum and their relationships. • Determine relationship among the various representations of LTI systems. • Apply Laplace transform and Z-transforms to analyze continuous and discrete time signals.

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	I	**Mathematics-III**	• Interpret the physical meaning of different operators such as gradient, curl and divergence. • Apply the Laplace transform for solving differential equations. • Find or compute the Fourier series of periodic signals. • Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms. • Identify solution methods for partial differential equations that model physical processes.
	I	**Random Variables and Stochastic Processes**	• To give an introduction to elementary probability theory and learn basics of random variables and stochastic processes. • Understand and analyze the one random variable with different functions. • Understand and analyze the multiple random variables and their functions. • Introduction to random processes and its classification, functions. • To analyze the LTI systems with stationary random processes as input.
	I	**OOPS through Java Lab**	• Identify classes, objects, members of a class and the relationship among them needed for a specific problem. • Implement programs to distinguish different forms of in heritance, packages and file handling. • Develop programs using Exception handling mechanism, multi threading and GUI applications.
	I	**Electronic Devices and Circuits -Lab**	• Understand the electrical behaviour of different semiconductor Devices like Silicon PN junction diode , Zener Diode, BJT, JFET and UJT by analyzing VI Characteristics under given bias condition • Verify the outputs of different types of Rectifier circuits and voltage Regulator circuit using diodes • Understand frequency responses of various amplifiers like Common Emitter (CE), Common Collector (CC), and Common

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			Source (CS) amplifiers
	I	**Switching Theory and Logic Design–Lab**	• Verification of truth tables ,combinational circuits and sequential circuits with hardware. • Designing of combinational circuits and sequential circuits (counters, flip-flops and SOP's). • Verification of Circuit operation for various functions(Comparator,7-segment displays and counters).
	I	**Python Programming–Lab**	• Understand the basic concepts of scripting and the contributions of scripting language. • Explore and Implement python data structures like Lists, Tuples, Sets and dictionaries. • Create practical applications using Functions, Modules, Exceptional handling and Regular Expressions.
III	I	**Analog ICs and Applications**	• Analyzing various parameters of differential ampliifiers and operational amplifiers. • Implementation of OP-AMP in real time applications. • Application of OP-AMP as a filter. • Evaluating OP-AMP performance in generating various waveforms. Demonstrating PLL and Timer. • Constructing Analog to Digital and Digital to Analog converters using OP-AMP.
	I	**Electromagnetic Waves and Transmission Lines**	• Demonstrate and compute various parameters for transmission lines using either a smith chart or classical theory. • Differentiate matching networks for loaded transmission lines for OC and SC. • Determine E using various laws and applications of electro static fields. • Determine H using various laws and applications of magneto static fields & Derive Maxwell equations in time varying fields. • Demonstrate the reflection and refraction of waves at boundaries & interpret the effects of lossy and low loss dielectrics and conductors upon the propagation of electromagnetic waves, and predict this process in specific applications.

	I	**Digital Communications**	• Explain the working of pulse digital modulation systems such as PCM, DPCM and DM. • Classify the various digital pass band techniques such as PSK, FSK,ASK,QPSK, DPSK and M-ary modulation techniques. • Analyze the performance of various digital pass band modulation systems in terms of probability of error and signal to noise ratio. • Familiarize the concepts of information theory and develop the source code with the probabilities given. • Apply the theorems governing the transmission of information over a noisy channel and perform the efficiency calculations. Develop the communication system with various channel coding techniques.
	I	**Computer Organization and Architecture**	• Demonstrate and understanding of the different number systems, codes and relate postulates of Boolean algebra and minimize combinational functions. • Evaluate different combinational circuits, sequential circuits and able to design them. • Organize and determine basic structure of components register through language, micro operations and able to write micro programs. • Determine and able to develop data transfer and manipulation programs and student able to learn micro program control and central processing unit. • Able to analyze the internal organization of computers and able to evaluate performance of them.
	I	**Electronic Measurements and Instrumentation**	• Analyzing the performance of various measuring systems and metrics. • Recognize various signal generators and acquire knowledge on principle of operation and working of signal analyzers. • Designing of oscilloscopes for different applications. • Compare various measuring bridges and their balancing conditions.

			• Interpret various measuring techniques for measurement of physical parameters using transducers.
	I	**Analog ICs and Applications LAB**	• Implement various linear and nonlinear applications of op-amp. • Design and analyze active filters and oscillator circuits using op-amp. • Understand various applications of IC-555 timer, IC-565 and IC-566.
	I	**Digital Communications Lab**	• To be able to differentiate digital modulation techniques. • To understand different pass band modulation techniques. • Implement various source coding & decoding and channel coding & decoding techniques.
	I	**Data Structures using Java Lab**	• Defend, searching technology and linear data structures like linked list, stack and queue. • Describe nonlinear data structure like tree. • Elaborate nonlinear data structure like graph and sorting techniques.
	I	**Internship**	• Recognize the state of engineering research and modern technology. • Gain expertise in technical writing to create a work that complies with technical documents. • Develop effective presentation skills.
	I	**Optical Communication**	• Demonstrate the necessity of components required in modern Optical communications systems and analyze the step and graded index fibers • Interpret the properties of optical fiber and the amount of light lost going through an Optical system, dispersion of optical fibers. • Analyze the losses in optical fiber connectors, Splices and Joints and acquire understanding on splicing techniques and connectors. • Design and analyze optical receivers and different types of photo detectors • Describe the principles of optical sources and power launching-coupling methods and Evaluate link

			power budget in optical system design
	I	**Satellite Communication**	• Define basic concepts of orbital Mechanics in satellite communication. • Implementation of various satellite subsystems and its functionality • Illustrate the design of basic satellite uplink and downlink transmission models. • Choose appropriate multiple access technique for a given satellite communication application & Explores to earth station architecture • Knows the types of satellite constellation networks & illustrates the basic concepts of global positioning systems
	I	**Internet of Things**	• Describing the architecture of IoT, cloud service models and M2M • Illustrating Arduino , Raspberry pi and ARM processors • Analyzing knowledge on various protocols for IoT • Describing cloud based data acquiring and storage • Illustrating various projects on IoT, describing cloud computing.
	I	**Cyber Security**	• Describing Cyber Security architecture principles and System and application security threats and vulnerabilities • Illustrate different classes of attacks on mobile and wireless devices • Analyzing various Cyber Security attack incidents, apply appropriate tools and methods for analysis • Describing risk management processes and practices using cyber laws • Analyze various computer forensics systems, and tools for data recovery, and data seizure
	I	**Cloud Computing with AWS**	• Understand and analyze the architecture of cloud • Analyze the deployment of cloud service models • Analyze the virtualization and abstraction in cloud computing. • Identify and apply deployment and management options of AWS cloud

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			services. • Design architectures to decouple infrastructure and reduce interdependencies.
	I	**Understanding Harmony**	• Students are expected to become more aware of themselves, and their surroundings (family, society, nature) • They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind • They would have better critical ability • They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society) • It is hoped that they would be apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction
	I	**Designer tools LAB**	• Design different Antennas like Dipole Antenna, Patch Antenna, Conventional Antenna etc • Implementation of Sequential and Combinational Circuits using VIVADO • Able to use HFSS to Design and synthesize an antenna

II	**II**	**Electronic Circuit Analysis**	• Analyze small signal high frequency transistor amplifier using BJT and FET • Analyze multi stage amplifiers and Differential amplifier using BJT • Classify different types of the feedback amplifiers using BJT and compare their analysis with performance. • Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators • Classify different types of the power

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			amplifiers and tuned amplifiers and compare their analysis with performance.
	II	**Digital IC Design**	• Able to understand the IEEE Standards and able to develop complex digital systems at several levels of abstractions, behavioral and structural using HDL. • Student can analyze and design the basic digital circuits with combinatorial logic circuits using VHDL • Student can analyze and design the basic digital circuits with sequential logic circuits using VHDL • Student can be able to design and implement Combinational logic circuits using MOS logic circuits • Student can be able to design and implement Sequential logic circuits using MOS logic circuits
	II	**Analog Communications**	• Explain the basic elements of communication system, need for modulation and elaborately about amplitude modulation. • Describe the time and frequency domain representation, generation and demodulation of DSBSC, SSB and VSB modulation schemes. • Discuss the concepts of angle modulation. • Explain various issues in radio transmitters and receivers. • Describe pulse modulation schemes and estimate the noise in analog modulation schemes

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	II	**Linear control Systems**	• Understanding the concept of control systems, Representing Mechanical and Electrical systems using Differential Equations and introduces the concepts of feedback and its Advantages to various control systems. • Obtaining Transfer Function of a servo motor and the performance metrics to design the Control system in time-domain and frequency domain. • Students can be able to analyze stability of Control systems and using Laplace domain. • Students can be able to design Control systems for various applications using frequency domain analysis. • In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.
	II	**Management and Organizational Behaviour**	• Course the After completion of the student will acquire the knowledge on management functions, global leadership and organizational structure. • Will familiarize with the concepts of functional management that is HRM and Marketing of new product development. • The learner is able to think in strategically through contemporary management practices. • The learner can develop positive attitude through personality development and can equip with motivational theories. • The student can attain the group performance and grievance handling in managing the organizational culture.
	II	**Electronic Circuit Analysis Lab**	• Understand frequency responses of Single stage, Multistage Transistor amplifier and tuned amplifier behaviour • Understand how Different Oscillator Circuits produce sinusoidal signals using BJT • Determine the efficiency of Power amplifiers like Class – A Power amplifier

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	II	**Analog Communications Lab**	• To develop practical knowledge about theories of analog communication • To develop practical knowledge about simulation software • To provide hands-on experience to the students, so that they are able to apply theoretical concepts in practice. • Demonstrate various pulse modulation techniques
	II	**Digital IC Design Lab**	• Design and implementation of Combinational Logic Circuits (MUX, Encoders etc.,) using software tools. • Design and implementation of Sequential Logic Circuits (flip-flops, counters etc.,) using Software tools. • Design and implementation of Complex logic circuits (ALU, MAC etc.,) using Software tools.
	II	**Soft Skills**	• Use language fluently, accurately and appropriately in debates and group discussions • Use their skills of listening comprehensions to communicate effectively in cross-cultural contexts • Learn and use new vocabulary • Write resumes, project reports and reviews • Exhibit interview skills and develop soft skills
III	II	**Microprocessor and Microcontrollers**	• Discuss about the Intel 8086 microprocessor, its architecture, and its pin diagram. • Write assembly language programs for the 8086, execute and debug them. • Interface 8086 with different peripherals and control them through program. • Describe the Intel 8051 microcontroller architecture, its pin diagram and program its onboard peripherals. • Recognize the full power of the ARM Cortex-M3 microcontroller advanced architecture, features and its instruction set.

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	II	**VLSI Design**	• Able to apply the design rules and draw layout of given logic circuit. • Able to design MOSFET based logic circuits. • Able to analyze the behavior of amplifier circuits with various loads. • Able to design amplifier circuits, combinational and sequential circuits. • Able to design CMOS logic circuits with various logic styles like static and dynamic CMOS.
	II	**Digital Signal Processing**	• Students can Estimate the spectra of signals that are to be processed by a discrete time filter, and to verify the performance of a variety of modern and classical spectrum estimation techniques. • Student can Able to Define and use Discrete Fourier Transforms (DFTs) • Student can Able to realize IIR Filters and Use Z - transforms and discrete time Fourier transforms to analyze a digital system • Student can Able to realize FIR Filters and Use Z - transforms and discrete time Fourier transforms to analyze a digital system • Student will be able to understand the Programmable DSP processors and architectures.
	II	**Mobile and Cellular Communication**	• Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems. • Analyze the concepts of interference with respective to various antennas. • Evaluate the frequency management, channel assignment strategies and antennas in cellular systems. • Explain the concepts of handoff and how dropped calls exist. • Acquire the knowledge of digital cellular networks in different generations.

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	II	**Embedded Systems**	• Analyzing the building blocks of typical embedded systems, applications and communication devices • Illustrating about various Communication Devices Used in the Embedded Systems • Describing the concept of firmware design approaches, ISR concept and interrupt sources. • Analyzing of hardware-software tradeoffs and describing the Operating systems basics and RTOS • Illustrating the concept of IDE, Hardware debugging, debugging tools and testing tools.
	II	**Python Programming**	• Analyze small signal high frequency transistor amplifier using BJT and FET • Analyze multi stage amplifiers and Differential amplifier using BJT • Classify different types of the feedback amplifiers using BJT and compare their analysis with performance. • Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators • Classify different types of the power amplifiers and tuned amplifiers and compare their analysis with performance.
	II	**Microprocessor and Microcontrollers - Lab**	• Apply the usage of TASM software for creating assembly language programs and also apply interfacing concepts using 8086 microprocessor trainer kit. • Develop assembly language programs using 8051 IDE and interfacing various peripherals using 8051 microcontroller trainer kit. • Develop and execute programs for ARM CORTEX M3 processor using KEIL MDK ARM.
	II	**VLSI Design Lab**	• Simulate Basic gates with Xilinx VIVADO front and Environment and validate the functionality • Model the sequential circuits using CAD tools in front and environment • Design Simulate and Extract layout of digital IC using EDA tools.

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	II	**Digital Signal Processing Lab**	• Understand basic operation on signals and Generate the response using MATLAB and code composer studio. • Examine linear, circular convolutions and DFT, IDFT using MATLAB and code composer studio. • Understand the Design of IIR and FIR filters using TIDSP starter kit and Cypress FM4 Starter kit.
	II	**ARM based/ Aurdino based Programming LAB**	• Understand the Design of IIR and FIR filters using TIDSP starter kit and Cypress FM4 Starter kit. • Implement interfacing of modules such as led, stepper motor with Arduino using Hyper terminal. • Implement interfacing of various sensors such as LM35, accelerometer with Arduino using Hyper terminal.
	II	**Project work**	• Understand the advanced technology and research in engineering. • Collaborate with team members in analyzing the requirements of the project to be developed • Build necessary design specifications and documents for the chosen project(L5) • Develop apt domain and technical knowledge to implement/code the application(L3) • Test and deploy the project after implementation(L4) • Demonstrate the project comprehensively with necessary tools(L3)
	II	**Seminar**	• List the promising new directions of various cutting edge technologies. • Understand the advanced technology and research in engineering. • Discuss and apply critical thinking about topics of current intellectual importance. • Analyze the detailed literature survey • Develop technical writing skills to build a document with respect to technical publications • Develop effective presentation skills.

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	II	**Internship in industry**	• Recognize the state of engineering research and modern technology. • Gain expertise in technical writing to create a work that complies with technical documents. • Describe use of advanced tools and techniques encountered during industrial training • Interact with industrial personnel and follow engineering practices and discipline prescribed in industry • Develop awareness about general workplace behavior and build interpersonal and team skills • Prepare professional work reports and presentations

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BRANCH: VLSI

PSO1	Ability to solve the problems of core subjects in design and development of Communications/Signal and Image processing.
PSO2	Analyze and solve complex Electronics and Communication engineering problems using hardware and software tools.
PSO3	Identify and apply domain specific tools for Design, Analysis and Synthesis in the areas of VLSI and Embedded systems.

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	ENGINEERING PHYSICS	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
	I	LINEAR ALGEBRA AND CALCULUS	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable, evaluate inverse and power of

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			the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
	I	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	I	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves. • Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	I	**COMMUNICATIVE ENGLISH LAB**	• Understand the different aspects of the English language proficiency with emphasis on LSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division for

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			better listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	I	**ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
	I	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and ivergence. • Estimate the work done againsta field, circulation and flux using vector calculus.
	II	**BASIC CIVIL & MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
	II	**CHEMISTRY**	• Explain basic concepts of quantum mechanics and molecular and bonding. Apply the principle of band diagrams in the application of conductors and semiconductors. Compare the materials of construction for battery and electrochemical sensors. Explain preparation, properties, and

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			applications of thermoplastics & thermosetting & elastomers, conducting polymers. Explain the principles of spectrometry, hplc in separation of solid and liquid mixtures.
	II	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyze a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	II	**NETWORK ANALYSIS**	• Understand basic electrical circuits with nodal and mesh analysis. • Analyze the circuit using network simplification theorems. • Find Transient response and Steady state response of Network. • Analyze electrical networks in the Laplace domain. • Compute the parameters of a two-port network.
	II	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. • Prepare advanced polymer materials. • Determine the given substance by performing the suitable chemical procedure.
	II	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like

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			pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	II	**NETWORK ANALYSIS LAB**	• Verify Kirchhoff's laws and network Theorems • Measure time constants of RL& RC circuits. • Analyze behaviour of RLC circuit for different cases. • Design resonant circuit for given specifications. • Characterize and model the network in terms of all network parameters.
	II	**IT WORKSHOP**	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets

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Computer Science Engineering

PSO 1	The Department of Computer Science and Engineering considered the Graduate attributes defined by National Board of Accreditation for Framing of Program Specific Outcomes.
PSO 2	The Department academics committee after considering the Program Outcomes and the views of internal stakeholders, Program Specific Outcomes are framed

BRANCH: CSE

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	CHEMISTRY	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using

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			Hall effect
	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable; evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
	I	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyze a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	I	**BASIC CIVIL& MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering Measures related to Transportation.

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			Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
		COMMUNICATIVE ENGLISH LAB	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. Prepare advanced polymer materials. Determine the given substance by performing the suitable chemical procedure.
	I	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	I	**IT WORKSHOP**	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and divergence. • Estimate the work done against a field, circulation and flux using vector calculus.
	II	**ENGINEERING PHYSICS**	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
	II	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	II	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves.

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			• Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	II	**DATA STRUCTURES**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. • Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
	II	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate

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			dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	II	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
	II	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice
	II	**DATA STRUCTURES LAB**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle

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			recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

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Computer Science Engineering

PSO 1	The Department of Computer Science and Engineering considered the Graduate attributes defined by National Board of Accreditation for Framing of Program Specific Outcomes.
PSO 2	The Department academics committee after considering the Program Outcomes and the views of internal stakeholders, Program Specific Outcomes are framed

BRANCH: CSE

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
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			Hall effect
	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable; evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
	I	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyze a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	I	**BASIC CIVIL& MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation.

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			Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
		COMMUNICATIVE ENGLISH LAB	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. Prepare advanced polymer materials. Determine the given substance by performing the suitable chemical procedure.
	I	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	I	**IT WORKSHOP**	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and divergence. • Estimate the work done against a field, circulation and flux using vector calculus.
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	II	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	II	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves.

			• Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	II	**DATA STRUCTURES**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. • Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
	II	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate

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			dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	II	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
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Approved by AICTE, Affiliated to JNTUK, Kakinada
(ISO 9001:2015 Certified Institution)

Computer Science Engineering- Artificial Intelligence and Machine Learning

PSO 1	The Department of Computer Science and Engineering considered the Graduate attributes defined by National Board of Accreditation for Framing of Program Specific Outcomes.
PSO 2	The Department academics committee after considering the Program Outcomes and the views of internal stakeholders, Program Specific Outcomes are framed

YEAR	SEMESTER	SUBJECT	COS
I	I	COMMUNICATIVE ENGLISH	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	CHEMISTRY	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect

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	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable; evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
	I	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyze a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	I	**BASIC CIVIL& MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water

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			Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
		COMMUNICATIVE ENGLISH LAB	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. Prepare advanced polymer materials. Determine the given substance by performing the suitable chemical procedure.
	I	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	I	**IT WORKSHOP**	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and divergence. • Estimate the work done against a field, circulation and flux using vector calculus.
	II	**ENGINEERING PHYSICS**	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
	II	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	II	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves.

			• Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	II	**DATA STRUCTURES**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. • Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
	II	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate

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			dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	II	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
	II	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice
	II	**DATA STRUCTURES LAB**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle

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			recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

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YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
II	I	MATHEMATICS-III	• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • Estimate the work done against a field, circulation and flux using vector calculus (L5) • Apply the Laplace transform for solving differential equations (L3) • x Find or compute the Fourier series of periodic signals (L3) • Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) • Identify solution methods for partial differential equations that model physical processes (L3)
	I	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	• Demonstrate skills in solving mathematical problems • Comprehend mathematical principles and logic • Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Manipulate and analyze data numerically and/or graphically using appropriate Software • Communicate effectively mathematical ideas/results verbally or in writing
	I	INTRODUCTION TO ARTIFICIAL INTELLIGENCE &MACHINE LEARNING	• Enumerate the history and foundations of Artificial Intelligence • Apply the basic principles of AI in problem solving • Choose the appropriate representation of Knowledge • Enumerate the Perspectives and Issues in Machine Learning • Identify issues in Decision Tree Learning
	I	OOP WITH JAVA	• Able to realize the concept of Object Oriented Programming & Java Programming Constructs • Able to describe the basic concepts of Java

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			such as operators, classes, objects, inheritance, packages, Enumeration and various keywords • Apply the concept of exception handling and Input/ Output operations • Able to design the applications of Java & Java applet • Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
	I	**DATABASE MANAGEMENT SYSTEMS**	• Describe a relational database and object-oriented database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
III	**I(R20)**	**Compiler Design**	• Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers • Analyze synthesized, inherited attributes and syntax directed translation schemes • Determine algorithms to generate code for a target machine
	I	**Operating Systems**	• Introduce to the internal operation of modern operating systems • Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems • Understand File Systems in Operating System like UNIX/Linux and Windows • Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism

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			• Analyze Security and Protection Mechanism in Operating System
	I	**Machine Learning**	• Explain the fundamental usage of the concept Machine Learning system • Demonstrate on various regression Technique • Analyze the Ensemble Learning Methods • Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning. • Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
	I	**OPTIMIZATION IN OPERATIONS RESEARCH**	• State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem. • Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution. • Apply and Solve transportation and assignment problem by using Linear programming Simplex method. • Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions • Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
	I	**DevOps (Professional Elective-I)**	• Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility. • Describe DevOps&DevSecOps methodologies and their key concepts

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			• Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models • Set up complete private infrastructure using version control systems and CI/CD tools • Acquire the knowledge of maturity model, Maturity Assessment
	I	**OPERATING SYSTEMS & COMPILER DESIGN LAB**	• Implement various scheduling, page replacement algorithms and algorithms related to deadlocks • Design programs for shared memory management and semaphores • Determine predictive parsing table for a CFG • Apply Lex and Yacc tools • Examine LR parser and generating SLR Parsing table
	I	**MACHINE LEARNING LAB**	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Develop Machine Learning algorithms to solve real world problems
	I	**CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING DevOps**	• Understand the why, what and how of DevOps adoption • Attain literacy on Devops • Align capabilities required in the team Create an automated CICD pipeline using a stack of tools
IV	I	**Block Chain Technologies**	• Demonstrate the block chain basics, Crypto currency • To compare and contrast the use of different private vs. public block chain and use cases • Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins • Classify Permission Block chain and use cases – Hyper ledger, Corda • Make Use of Block-chain in E-

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			Governance, Land Registration, Medical Information Systems and others
	I	**Cloud Computing**	• Illustrate the key dimensions of the challenge of Cloud Computing • Classify the Levels of Virtualization and mechanism of tools. • □ Analyze Cloud infrastructure including Google Cloud and Amazon Cloud. • Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud • Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
	I	**AI Chat bots (AICB)**	• Develop an in-depth understanding of conversation design, including • On boarding, flows, utterances, entities, and personality. • Design, build, test, and iterate a fully-functional, interactive chat bot using a commercial platform. • Deploy the finished chat bot for public use and interaction.
	I	**Universal Human Values 2: Understanding Harmony**	students are expected to become more aware of • themselves, and their surroundings (family, society, nature • they would become more responsible in life, and in handling problems with sustainable solutions • They would have better critical ability They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society)
	I	**Principles of Communications (PC)**	• Analyze the performance of analog modulation schemes in time and frequency domains. • Analyze the performance of angle modulated signals. • Characterize analog signals in time

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			domain as random processes and noise • Characterize the influence of channel on analog modulated signals • Determine the performance of analog communication systems in terms of SNR • Analyze pulse amplitude modulation, pulse position modulation, pulse code modulation and TDM systems.

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II	II	**PROBABILITY AND STATISTICS**	• Classify the concepts of data science and its importance. Interpret the association of characteristics and through correlation and regression tools • Make use of the concepts of probability and their applications. • Apply discrete and continuous probability distributions. • Design the components of a classical hypothesis test. Infer the statistical inferential methods based on small and large sampling tests
	II	**COMPUTER ORGANIZATION**	• Develop a detailed understanding of computer systems. • Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations. • Develop a detailed understanding of architecture and functionality of central processing unit. • Exemplify in a better way the I/O and memory organization. • Illustrate concepts of parallel processing, pipelining and inter processor communication.
	II	**DATA WAREHOUSING AND MINING**	• Summarize the architecture of data warehouse. • Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data. • Construct a decision tree and resolve the problem of model overfitting. • Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation. • Apply suitable clustering algorithm for the given data set.
	II	**FORMAL LANGUAGES AND AUTOMATA THEORY**	• Classify machines by their power to recognize languages. • Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy. • Employ finite state machines to solve problems in computing.

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			• Illustrate deterministic and non-deterministic machines. • Quote the hierarchy of problems arising in the computer science
	II	**MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY**	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product. • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis. • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
III	**II**	**Machine Learning**	• Explain the fundamental usage of the concept Machine Learning system • Demonstrate on various regression Technique • Analyze the Ensemble Learning Methods • Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning • Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
	II	**Compiler Design**	• Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers • Analyze synthesized, inherited attributes and syntax directed translation schemes • Determine algorithms to generate code for a target machine
	II	**Cryptography and**	• Explain different security threats and

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		Network Security	countermeasures and foundation course of cryptography mathematics. • Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography • Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more • Design applications of hash algorithms, digital signatures and key management techniques • Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec .
	II	**Mean stack Development**	• Build static web pages using HTML 5 elements.. • Apply JavaScript to embed programming interface for web pages and also to perform Client side validations. • Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js. • Develop JavaScript applications using typescript and work with document database using Mongo DB • Utilize Angular JS to design dynamic and responsive web pages.
	II	**Machine Learning using Python Lab**	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms and Develop Machine Learning algorithms to solve real world problems
	II	**Compiler Design Lab**	• Design simple lexical analyzers • Determine predictive parsing table for a CFG • Apply Lex and Yacc tools and Examine

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			LR parser and generating SLR Parsing table
	II	**Cryptography Network Security Lab**	• Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher • Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm. • Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
	II	**Mean Stack Technologies Lab**	• Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles • Utilize JavaScript for developing interactive HTML web pages and validate form data • Build a basic web server using Node.js and also working with Node Package Manager (NPM) and Build a web server using Express.js
IV/IV R20	II	**MAJOR PROJECT**	• Develop capability to acquire and apply fundamental principles of engineering • Become updated with all the latest changes in technological world • Make deep connections between ideas • Learn to take creative risks • Be ready for the creative economy also engage in iterative thinking and divergent thinking • Identify, formulate and model problems and find engineering solution based on a systems approach

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Computer Science Engineering- Data Science

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PSO 2	The Department academics committee after considering the Program Outcomes and the views of internal stakeholders, Program Specific Outcomes are framed

YEAR	SEMESTER	SUBJECT	COS
I	I	**COMMUNICATIVE ENGLISH**	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
	I	**CHEMISTRY**	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect

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	I	**LINEAR ALGEBRA AND CALCULUS**	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is diagonalizable; evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
	I	**INTRODUCTION TO PROGRAMMING**	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyze a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Develop problem-solving skills and the ability to debug and optimize the code.
	I	**BASIC CIVIL& MECHANICAL ENGINEERING**	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology. • Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water

			Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
		COMMUNICATIVE ENGLISH LAB	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress, rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
	I	**CHEMISTRY LAB**	• Determine the cell constant and conductance of solutions. Prepare advanced polymer materials. Determine the given substance by performing the suitable chemical procedure.
	I	**COMPUTER PROGRAMMING LAB**	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
	I	**IT WORKSHOP**	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets.

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I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and divergence. • Estimate the work done against a field, circulation and flux using vector calculus.
	II	**ENGINEERING PHYSICS**	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
	II	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
	II	**ENGINEERING GRAPHICS**	• Constructing of various engineering curves.

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			• Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
	II	**DATA STRUCTURES**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. • Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
	II	**ENGINEERING PHYSICS LAB**	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate

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			dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
	II	**ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating principles to derive mathematical models for circuits, Electrical machines and measuring instruments; calculations for the measurement of resistance, power and power factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
	II	**ENGINEERING WORKSHOP**	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice
	II	**DATA STRUCTURES LAB**	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle

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			recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

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YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
II/IV (R20)	I	MATHEMATICS-III	• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • Estimate the work done against a field, circulation and flux using vector calculus (L5) • Apply the Laplace transform for solving differential equations (L3) • x Find or compute the Fourier series of periodic signals (L3) • Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) • Identify solution methods for partial differential equations that model physical processes (L3)
	I	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	• Demonstrate skills in solving mathematical problems • Comprehend mathematical principles and logic • Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Manipulate and analyze data numerically and/or graphically using appropriate Software • Communicate effectively mathematical ideas/results verbally or in writing
	I	FUNDAMENTALS OF DATA SCIENCE	• Apply principles of NumPy and Pandas to the analysis of data. • Make use of various file formats in loading and storage of data. • Identify and apply the need and importance of pre-processing techniques. • Show the results and present them in a pictorial format.
	I	OOP WITH JAVA	• Able to realize the concept of Object Oriented Programming & Java Programming Constructs • Able to describe the basic concepts of

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			Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords • Apply the concept of exception handling and Input/ Output operations • Able to design the applications of Java & Java applet • Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
	I	**DATABASE MANAGEMENT SYSTEMS**	• Describe a relational database and object-oriented database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
	I	**MOBILE APP DEVELOPMENT**	• Identify various concepts of mobile programming that make it unique from programming for other platforms 2. Critique mobile applications on their design pros and cons 3. Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, 4. Program mobile applications for the Android operating system that use basic and advanced phone features and 5. Deploy applications to the Android marketplace for distribution
III	I	**Compiler Design**	• Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers • Analyze synthesized, inherited attributes and syntax directed translation schemes

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			• Determine algorithms to generate code for a target machine
	I	**Operating Systems**	• Introduce to the internal operation of modern operating systems • Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems • Understand File Systems in Operating System like UNIX/Linux and Windows • Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism • Analyze Security and Protection Mechanism in Operating System
	I	**Machine Learning**	• Explain the fundamental usage of the concept Machine Learning system • Demonstrate on various regression Technique • Analyze the Ensemble Learning Methods • Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning. • Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
	I	**OPTIMIZATION IN OPERATIONS RESEARCH**	• State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem. • Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution. • Apply and Solve transportation and assignment problem by using Linear programming Simplex method. • Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to

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			derive the optimal solutions • Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
	I	**DevOps (Professional Elective-I)**	• Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility. • Describe DevOps & DevSecOps methodologies and their key concepts • Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models • Set up complete private infrastructure using version control systems and CI/CD tools • Acquire the knowledge of maturity model, Maturity Assessment
		OPERATING SYSTEMS & COMPILER DESIGN LAB	• Implement various scheduling, page replacement algorithms and algorithms related to deadlocks • Design programs for shared memory management and semaphores • Determine predictive parsing table for a CFG • Apply Lex and Yacc tools • Examine LR parser and generating SLR Parsing table
		MACHINE LEARNING LAB	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Develop Machine Learning algorithms to solve real world problems
		CONTINUOUS INTEGRATION	• Understand the why, what and how of

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		AND CONTINUOUS DELIVERY USING DevOps	DevOps adoption • Attain literacy on Devops • Align capabilities required in the team Create an automated CICD pipeline using a stack of tools
IV	**I**	**Block Chain Technologies**	• Demonstrate the block chain basics, Crypto currency • To compare and contrast the use of different private vs. public block chain and use cases • Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins • Classify Permission Block chain and use cases – Hyper ledger, Corda • Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and others
	I	**Cloud Computing**	• Illustrate the key dimensions of the challenge of Cloud Computing • Classify the Levels of Virtualization and mechanism of tools. • □ Analyze Cloud infrastructure including Google Cloud and Amazon Cloud. • Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud • Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
	I	**Data Visualization**	• Understand basics of Data Visualization • Implement visualization of distributions • Write programs on visualization of time series, proportions & • associations • Apply visualization on Trends and uncertainty • Explain principles of proportions
	I	**Universal Human Values 2: Understanding Harmony**	• themselves, and their surroundings (family, society, nature • they would become more responsible in life, and in handling problems with

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			sustainable solutions • They would have better critical ability They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society)
	I	**Principles of Communications (PC)**	• Analyze the performance of analog modulation schemes in time and frequency domains. • Analyze the performance of angle modulated signals. • Characterize analog signals in time domain as random processes and noise • Characterize the influence of channel on analog modulated signals • Determine the performance of analog communication systems in terms of SNR • Analyze pulse amplitude modulation, pulse position modulation, pulse code modulation and TDM systems.
	I	**Additive Manufacturing (AM)**	• Understand the principles of prototyping, classification of RP processes and liquid-based RP systems. • Understand and apply different types of solid-based RP systems. • Apply powder-based RP systems. • Analyze and apply various rapid tooling techniques. • Understand different types of data formats and explore the applications of AM processes in various fields.

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II	II	**PROBABILITY AND STATISTICS**	• Classify the concepts of data science and its importance. • Interpret the association of characteristics and through correlation and regression tools. • Apply discrete and continuous probability distributions.Make use of the concepts of probability and their applications. • Design the components of a classical hypothesis test .Infer the statistical inferential methods based on small and large sampling tests
		COMPUTER ORGANIZATION	• Develop a detailed understanding of computer systems. • Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations. • Develop a detailed understanding of architecture and functionality of central processing • Illustrate concepts of parallel processing, pipelining and inter processor communication
		DATA WAREHOUSING AND MINING	• Summarize the architecture of data warehouse. • Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data. • Construct a decision tree and resolve the problem of model overfitting. Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation. • Apply suitable clustering algorithm for the given data set.
		VISUAL DESIGN AND COMMUNICATION	• Students will develop the ability to create visual compositions using basic elements and apply appropriate principles of visual composition to communicate ideas. • Students will begin to understand the visual language and develop the ability to perceive, visualize and communicate using visual narratives. • Students will develop the ability to apply the visual dynamics of visual language in Typography, Photography and Videography. • Students will begin to understand the visual dynamics that exists in visual

			design as a visualisation process to evolve mental imageries that represent solutions to simple communication problems. • Students will be able to execute design solutions using appropriate software programmes.
		MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product. • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis. • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
III	**II(R20)**	**MACHINE LEARNING**	• Explain the fundamental usage of the concept Machine Learning system • Demonstrate on various regression Technique • Analyze the Ensemble Learning Methods • Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning • Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
		COMPILER DESIGN	• Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers • Analyze synthesized, inherited attributes and syntax directed translation schemes • Determine algorithms to generate code for a target machine

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		CRYPTOGRAPHY AND NETWORK SECURITY	• Explain different security threats and countermeasures and foundation course of cryptography mathematics. • Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography • Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more • Design applications of hash algorithms, digital signatures and key management techniques • Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec .
		MEAN STACK DEVELOPMENT	• Build static web pages using HTML 5 elements.. • Apply JavaScript to embed programming interface for web pages and also to perform Client side validations. • Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js. • Develop JavaScript applications using typescript and work with document database using Mongo DB • Utilize Angular JS to design dynamic and responsive web pages.
		MACHINE LEARNING USING PYTHON LAB	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms and Develop Machine Learning algorithms to solve real world problems
			• Design simple lexical analyzers • Determine predictive parsing table for a CFG

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		COMPILER DESIGN LAB	• Apply Lex and Yacc tools and Examine LR parser and generating SLR Parsing table
		CRYPTOGRAPHY NETWORK SECURITY LAB	• Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher • Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm. • Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
		MEAN STACK TECHNOLOGIES LAB	• Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles • Utilize JavaScript for developing interactive HTML web pages and validate form data • Build a basic web server using Node.js and also working with Node Package Manager (NPM) and Build a web server using Express.js
IV/IV R20	**II**	**MAJOR PROJECT**	• Develop capability to acquire and apply fundamental principles of engineering • Become updated with all the latest changes in technological world • Make deep connections between ideas • Learn to take creative risks • Be ready for the creative economy also engage in iterative thinking and divergent thinking • Identify, formulate and model problems and find engineering solution based on a systems approach

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Information Technology

PSO1	Ability to Understand, Analyse, Design and Develop the computer programmes in various computer-based areas for real-world problems via the development of a software system or process.
PSO2	Develop Application-Oriented IT services with Advanced and efficient software tools.

YEAR	SEMESTER	SUBJECT/CODE	COS
I	I	**COMMUNICATIVE ENGLISH**	• Understand the context, topic, and pieces of specific information • Apply grammatical structures to formulate sentences and correct words • Analyse discourse markers to speak clearly on a specific topic. • Evaluate reading / listening texts and to write summaries based. • Create a coherent paragraph, essay, and resume
		ENGINEERING PHYSICS	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals of quantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
		LINEAR ALGEBRA AND CALCULUS	• Develop and use of matrix algebra techniques that are needed by engineers for practical applications. • Determine whether a given matrix is

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			diagonalizable, evaluate inverse and power of the matrix by Cayley Hamilton Theorem. • Utilize mean value theorems to real life problems. • Familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
		INTRODUCTION TO PROGRAMMING	• Understand basics of computers, the concept of algorithm and algorithmic thinking. • Analyse a problem and develop analgorithm to solve it. • Implement various algorithms using the C programming language. • Understand more advanced features of C language. • Developproblem-solvingskillsandtheabilitytodebugandoptimize thecode.
		BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	• Understand the concepts of AC and DC electrical Circuits. • Understand the Construction and working principles of Electrical Machines and Measuring instruments. • Compare various electrical Power Generation systems and their Equipment Safety Measures. • Identify electronic components and the simple analysis of diodes and transistors • Demonstrate the working of electronic circuits and measuring instruments • Recognize the concepts of Digital Electronics
		COMMUNICATIVE ENGLISH LAB	• Understand the different aspects of the English language proficiency with emphasis onLSRW skills and to apply communication skills through various language learning activities. • Analyze the English speech sounds, stress,

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			rhythm, intonation and syllable division forbetter listening and speaking comprehension. • Evaluate and exhibit professionalism in participating in debates and group discussions andto a Create effective Course Objectives.
		ENGINEERING PHYSICS LAB	• Operate optical instruments like travelling microscope and spectrometer for the determination of radius of curvature and wavelengths of different colours using diffraction grating also verify Brewster's law using optical phenomena. • Estimate Planck's constant using photoelectric effect and calculate dielectric constant, magnetic field for dielectric and magnetic materials. • Calculate acceleration due to gravity, rigidity modulus using pendulum and to determine band gap of a given semiconductor.
		COMPUTER PROGRAMMING LAB	• Read, understand, and trace the execution of programs written in C language. • Select the right control structure for solving the problem. • Develop C programs which utilize memory efficiently using programming constructs like pointers. • Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
		ENGINEERING WORKSHOP	• Identify workshop tools and their operational capabilities • Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding • Apply fitting operations in various applications • Apply basic electrical engineering knowledge for House Wiring Practice
		ELECTRICAL AND ELECTRONICS ENGINEERING LAB	• Understand the Electrical circuit design concept; measurement of resistance, power, power factor; concept of wiring and operation of Electrical Machines and Transformer. • Apply the theoretical concepts and operating

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			principles to derive mathematical modelsfor circuits, Electrical machines and measuring instruments; calculations for the measurementofresistance, power andpower factor. • Apply the theoretical concepts to obtain calculations for the measurement of resistance, power and power factor. • Identify and testing of various electronic components • Plot and discuss the characteristics of various electronic devices • Explain the operation of a digital circuit.
I	II	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**	• Solve the differential equations related to various engineering fields. • Identify solution methods for partial differential equations that model physical process • Interpret engineering fields. • Solve the higher order differential equations related to the physical meaning of different operators such as gradient, curl and divergence. • Estimate the work done against a field, circulation and flux using vector calculus.
		CHEMISTRY	• Analyze the intensity variation of light due to polarization, interference and diffraction. • Familiarize with the basics of crystal and their structures. • Summarize various types of polarization of dielectrics and classify the magnetic materials. • Explain the fundamentals ofquantum mechanics and apply it to one dimensional motion of particles • Identify the type of semiconductors using Hall effect
		BASIC CIVIL& MECHANICAL ENGINEERING	• Understand various sub-divisions of Civil Engineering and to appreciate their role in Ensuring better society. Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.

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			• Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying. • Realize the importance of Transportation in nation's economy and the engineering. Measures related to Transportation. Understand the importance of Water Storage and Conveyance Structures so that the social Responsibilities of water conservation will be appreciated.
		ENGINEERING GRAPHICS	• Constructing of various engineering curves. • Applying the principle of orthographic projection to points and lines. • Identifying the different planes and draw the projections of the planes & solids inclined to both the planes in the first quadrant • Applying the knowledge of sectional views and Development of Solid Surfaces in Real time Applications • Developing the representation and conversion of isometric view to orthographic view and orthographic view to isometric view.
		DATA STRUCTURES	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges. • Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

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		CHEMISTRY LAB	• Determine the cell constant and conductance of solutions. • Prepare advanced polymer materials. • Determine the given substance by performing the suitable chemical procedure.
		IT WORKSHOP	• Perform hard ware troubleshooting. • Understand Hardware components and inter dependencies. • Safe guard computer systems from viruses/worms. • Document/ Presentation preparation. Perform calculations using spreadsheets
		DATA STRUCTURES LAB	• Explain the role of linear data structures in organizing and accessing data efficiently in algorithms. • Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation. • Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems. • Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges. • Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems

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II	**I**	**Mathematics - III**	• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • Estimate the work done against a field, circulation and flux using vector calculus (L5) • Apply the Laplace transform for solving differential equations (L3) • Find or compute the Fourier series of periodic signals (L3) • Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) • Identify solution methods for partial differential equations that model physical processes (L3)
	I	**Object Oriented Programming through C++**	• Classify object oriented programming and procedural programming • Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling • Build C++ classes using appropriate encapsulation and design principles • Apply object oriented or non-object oriented techniques to solve bigger computing problems
	I	**Operating Systems**	• Describe various generations of Operating System and functions of Operating System • Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance • Solve Inter Process Communication problems using Mathematical Equations by various methods • Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement

			Techniques • Outline File Systems in Operating System like UNIX/Linux and Windows
	I	**Database Management Systems**	• Describe a relational database and object-oriented database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
	I	**Discrete Mathematics and Graph Theory**	• Demonstrate skills in solving mathematical problems • Comprehend mathematical principles and logic • Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Manipulate and analyze data numerically and/or graphically using appropriate Software
	I	**Object Oriented Programming Through C++ Lab**	• Apply the various OOPs concepts with the help of programs. • Use various searching and sorting algorithms using arrays and linked list. • programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
	I	**Operating System Lab**	• To use Unix utilities and perform basic shell control of the utilities • To use the Unix file system and file access control • To use of an operating system to develop software • Students will be able to use Linux environment efficiently

			• Solve problems using bash for shell scripting
	I	**Database Management Systems Lab**	• Utilize SQL to execute queries for creating database and performing data manipulation operations • Examine integrity constraints to build efficient databases • Apply Queries using Advanced Concepts of SQL • Build PL/SQL programs including stored procedures, functions, cursors and triggers
	I	**Distributed Technologies-Sqlite**	• Learn about SQ Lite which is a relational database that is present in android and helps the users by storing important information. • Perform various operations on server less database SQ Lite • Implement a small, fast, self-contained, high-reliability, full-featured using SQL database engine.
III	I	**Computer Networks**	• Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards. • Discuss different transmission media and different switching networks. • Analyze data link layer services, functions and protocols like HDLC and PPP. • Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols • Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.
	I		• Analyze the performance of a given algorithm, denote its time complexity

		Design And Analysis Of Algorithms	using the asymptotic notation for recursive and non-recursive algorithms • List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method • Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations • Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches • Demonstrate NP- Completeness theory ,lower bound theory and String Matching
	I	**Data Mining Techniques**	• Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications. • Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms. • Choose appropriate classification technique to perform classification, model building and evaluation. • Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent item sets generation. • Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result
	I	**Advanced Unix Programming**	• Gain good knowledge on Unix commands and awareness of • shell programming • Know about different system calls for files and directories • Ability to know the working of processes and signals • Application of client server program for

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			IPC • Knowledge about socket programming
	I	**Sustainable Energy Technologies**	• Categorize the importance of solar energy collection and storage . • Apply the principles of wind energy and biomass energy. • Analyze knowledge on geothermal and ocean energy. • Justify the knowledge about energy efficient systems. • Discuss the concepts of green manufacturing systems.
	I	**Computer Networks Lab**	• Know how reliable data communication is achieved through data link layer. • Suggest appropriate routing algorithm for the network. • Provide internet connection to the system and its installation • Work on various network management tools
	I	**Data Mining Techniques With R Lab**	• Extend the functionality of R by using add-on packages • Extract data from files and other sources and perform various data manipulation tasks on them • Code statistical functions in R • Use R Graphics and Tables to visualize results of various statistical operations on data • Apply the knowledge of R gained to data Analytics for real life applications
	I	**Continuous Integration And Continuous Delivery Using Dev Ops**	• Understand the why, what and how of Dev Ops adoption • Attain literacy on Dev ops • Align capabilities required in the team • Create an automated CICD pipeline using a stack of tools
IV	I		• Illustrate the key dimensions of the challenge of Cloud • Computing • Classify the Levels of Virtualization and mechanism of tools.

		Cloud Computing	• Analyze Cloud infrastructure including Google Cloud and Amazon Cloud • Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud • Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
		Advanced Databases	• Analyze on normalization techniques. • Elaborate on concurrency control techniques and query optimization. • Summarize the concepts of data mining, data warehousing and data preprocessing strategies • Apply data mining algorithms. • Assess various classification & cluster techniques.
		M-Commerce	• Define mobile commerce and its framework, growth benefits • And limitations • Determine the information distribution for mobile networks in multimedia content • Describe the method how to publish mobile networks and mobile payment models in multimedia • get acquaintance with wireless communications technology with reference to WWAN, Cellular systems 2G, 2.5G, 3G, 4G, 5G and WLAN, and WMAN technology • learn M-COMMERCE applications in various areas like advertising, payment, ticketing, product location, entertainment and shopping
		Universal Human Values 2: Understanding Harmony	• Development of a holistic perspective based on self-exploration about themselves (human being),family, Society and nature/existence. • Understanding Harmony in the Human Being and Harmony in Myself! • Understanding Harmony in the Family

			and Society • Understanding Whole existence as Coexistence • Understanding of Harmony on Professional Ethics
		Safety Engineering	• Understand the concepts of industrial safety and management • Demonstrate the accident preventions and protective equipment • Understand and apply the knowledge of safety acts • Understand the concepts of fire prevention and protection systems • Appling the concepts of fire safety principles in buildings
		Fundamentals Of Electric Vehicle	• Il lustrate different types of electric vehicles. • Select suitable power converters for EV applications. • Design HEV configuration for a specific application. • Choose an effective method for EV and HEV applications. • Analyze a battery management system for EV and HEV.

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II/IV (R20)	**II**	**STATISTICS WITH R COURSE**	• List motivation for learning R programming language • Access online resources for R and import new function packages into the R workspace and manipulating data. • Import, review, manipulate and summarize data-sets in R • Explore data-sets to create testable hypotheses and identify appropriate statistical tests • Perform appropriate statistical tests using R , Create and edit visualizations with R.
	II	**PRINCIPLES OF SOFTWARE ENGINEERING COURSE**	• Students able to understand and gain software engineering skills • Transform an Object-Oriented Design into high quality, executable code • Skills to design, implement, and execute test cases at the Unit and Integration level • Compare conventional and agile software methods
	II	**AUTOMATA THEORY AND COMPILER DESIGN COURSE**	• Ability to design, develop, and implement a compiler for any language • Able to use LEX and YACC tools for developing a scanner and a parser • Able to design and implement LL and LR parsers • Able to design algorithms to perform code optimization in order to improve • the performance of a program in terms of space and time complexity • Ability to design algorithms to generate machine code
	II	**JAVA PROGRAMMING COURSE**	• Discuss and understand java programming constructs, Control structures • Illustrate and experiment Object Oriented Concepts like classes, objects • Apply Object Oriented Constructs such as Inheritance, interfaces, and Exception handling • Construct applications using

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			multithreading and I/O
	II	**MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY**	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
	II	**Unified Modeling Language (Uml) Lab**	• Know the syntax of different UML diagrams • Create use case documents that capture requirements for a software system • Create class diagrams that model both the domain model and design model of a software system
	II	**Foss Lab**	• Demonstrate UNIX commands for file handling and process control • Construct regular expressions for pattern matching and apply them to various filters for a specific task. • Analyze a given problem and apply requisite facets of shell programming in order to devise a shell script to solve the problem
	II	**Java Programming Lab**	• Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings • Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism

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			• Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism • Construct Threads, Event Handling, implement packages, developing applets
	II	**Distributed Technologies-Mongodb**	• Install, configure and setup the drivers to use Mongo DB with your programming language of choice • Gain an in-depth understanding of main features of Mongo DB and their use cases • Retrieve data in the database using advanced querying
III	II	**Machine Learning**	• Explain the fundamental usage of the concept Machine Learning • system • Demonstrate on various regression Technique • Analyze the Ensemble Learning Methods • Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning. • Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
	II	**Big Data Analytics**	• Illustrate big data challenges in different domains including social media, transportation, finance and medicine • Use various techniques for mining data stream • Design and develop Hadoop • Identify the characteristics of datasets and compare the trivial data and big data for various applications • Explore the various search methods and visualization techniques
	II	**Cryptography And Network Security**	• Explain different security threats and countermeasures and foundation course of cryptography mathematics. • Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography

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			• Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more • Design applications of hash algorithms, digital signatures and key management techniques • Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL.TSL, and IP sec .
	II	**Design Patterns**	• Construct a design consisting of a collection of modules • Examine well-known design patterns (such as Iterator, Observer, • Factory and Visitor) • Distinguish between different categories of design patterns • Ability to understand and apply common design patterns to incremental /iterative development • Identify appropriate patterns for design of given problem
	II	**Disaster Management**	• Affirm the usefulness of integrating management principles in disaster mitigation work • Distinguish between the different approaches needed to manage • pre-during and post- disaster periods • Explain the process of risk management • The student will be able to learn the role of technology in disaster management • The student will be able to relate to risk transfer
	II	**Big Data Analytics Lab**	• Demonstrate the knowledge of big data analytics and implement different file management task in Hadoop. • Understand Map Reduce Paradigm and develop data applications using variety of systems • Analyze and perform different operations on data using Pig Latin scripts

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	II	**Machine Learning Using Python Lab**	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Develop Machine Learning algorithms to solve real world problems
	II	**Cryptography And Network Security Lab**	• Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher • Demonstrate the different algorithms like DES, Blow Fish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm. • Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
	II	**Data Science: Natural Language Processing**	• Explore natural language processing (NLP) libraries in Python • Learn various techniques for implementing NLP including parsing & text processing • Understand how to use NLP for text feature engineering
IV	**II**	**PROJECT**	• Selection and initiation of individual projects and portfolios of projects • Illustrate project planning activities that accurately timelines, quality and implement processes • Demonstrate effective project execution and control techniques that result in successful projects • outline project closure activities and obtain formal project acceptance. • Demonstrate a strong working knowledge of ethics and professional responsibility.

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MASTER OF BUSINESS ADMINISTRATION

PSO1	Develop the students into effective leaders and administrators ready to face the challenges of corporate world.
PSO2	Inculcate the social, legal and ethical responsibilities of Business among the students to become responsible citizens of the country.
PSO3	Provide necessary inputs on strategies to be followed to become effective entrepreneurs.

YEAR	SEMESTER	SUBJECT	COS
I/I (SRK23)	**I**	**Management and Organizational Behaviour**	• Student has learned about Evolution of Management thought Scientific management, administrative management, Haw throne experiments systems approach Levels of Management Managerial Skills • student has gained knowledge on Principles of organizing ,Organization Structure and Design ,Types of power , Delegation of Authority and factors affecting delegation , Span of control , Decentralization , Line and staff structure conflicts • obtained knowledge on Organizational behavior: Nature and scope , Linkages with other social sciences , Individual roles and organizational goals , perspectives of human behavior , Perception, perceptual process • student has learned about Content and process Theories of Motivation , Leadership - Styles , Approaches ,Challenges of leaders in globalized era , Groups ,stages formation of groups , Group Dynamics • student has learned about Organizational

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			conflict-causes and consequences-conflict and Negotiation Team Building, Conflict Resolution in Groups and problem solving Techniques
		Managerial Economics	• know the economy and its principles. • understand the relationship between the demand supply • learn the types of production and its factors. • To understand the cost concepts, relationship between cost, volume and profit • To know the market atructure and pricing theories
		Accounting for Managers	• Acquaint the knowledge about accounting process • focus on analysis of Financial Statements • gain knowledge about Inventory issue methods • obtain knowledge about Management accounting applications • Focus on standard costing tools & Break Even Analysis
		Quantitative Techniques for Business Decisions	• the concepts of basic mathematical and statistical techniques are learned which are used in business studies • equipped with statistical decision theory applied in business studies • knowledge on analyising linear programming problems are learned • understand the concepts of assingnment & transportment models • the techniques of networking models are learned
		Legal and Business environment	• Determine the meaning of Business Environment and its significance • Acquaint the knowledge of Political & Economic Environment • Gain knowledge on Legal Environment specially to Indian Context

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			• Obtain the knowledge of Indian Partnership Act 1962 • Focus on miscellaneous acts of Indian Context
		Business Communication and Soft Skills	• uptained knowledge of objectives of communication • Acquaint the knowledgeinterpersonal and intrapersonal communication theories certain integrals • Obtain the knowledge etiquettes of interview • equipped with business correspondence letters • obtained knowledge of interview techniques for group discussion
		Cross Cultural Management	• understand the concepts of cross culture dimensions • obtain knowledge about communication strategy fot Indian MNC/foreign MNC • acquaint knowledge of negotiation overview with two illustrations from multicultural contexts • acquaint knowledge of staffing and training for global operations ,expatriates • understand the concepts of designing the strategy for a culture change building
I/II	**II**	**Financial Management**	• gain knowledge about concepts of financial management • obtain knowledge about Capital structure theories • understand the Investment decision process & its tools • understand the theories of Dividend • acquaint knowledge of Working Capital Cycle.
		Human Resource Management	• undestand the base concept of HRM and its significance in the organisation • undestand the investment perspectives of HRM(Training and Development) • understand the concepts of Performance

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			Appraisal: Importance – Methods – Traditional and Modern methods – • Latest trends in performance appraisal • Enhanced knowledge and skills to Wage Structure- Wage and Salary Policies
		Marketing Management	• understand the concepts of marketing. • Gain the knowledge on market segmentation. • Understand the concepts of pricing and price changes • Gain the knowledge on promotion activities. • Evoluation of marketing department.
		Operations management	• Gain knowledge on Operations Management & its scope • acquaint knowledge on Product Process & Design • gain the knowledge on Forecasting & Capacity Planning • Understand the Productivity & influencing factors • Gain the knowledge on Quality management
		Business Research Methods	• enhanced knowledge and skills to carry out research for business • better awarness on data collection techniques, measurement and scaling • gained knowledge in preparation and presentation of research report • equipped student with statistical techniques • students were in a position to use multivariate techniques
		Technology management	• Student has learned about Evolution of Technology-Effects of New Technology-Technology Innovation, Invention,Innovation, Diffusion, Revolutionary and Evolutionary Innovation- Product and Process Innovation , Strategic Implications of Technology • Student has gained knowledge on Technology Assessment- Technology Choice

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			Technological Leadership and Followership Technology Acquisition Technological Forecasting- Exploratory, Intuitive, Extrapolation, Growth Curves, Technology Monitoring • obtaibned knowledge on Diffusion of Technology Rate of Diffusion; Innovation Time and Innovation Cost Speed of Diffusion Technology Indicators Various Indicators- Organizational Implications of Technology • student has learned abFinancial Aspects in Technology Management- Improving Traditional Cost Management System Barriers to the Evaluation of New Technology Social Issues in Technology Management • learner has got knowlede on Human Aspects in Technology Management- Integration of People and Technology Organizational and Psychological Factors
II/I	**III**	**Strategic Management**	• Gain knowledge about Vision, Mission and Objectives of the Organisation. • Acquaint the student with knowledge about strengths, weakness, opportunities and threats of the organization. • Understand about framing of Strategy at various levels. • Acquaint the student with knowledge about structures of organization and its impact on Strategy. • Obtain knowledge of Evaluation of strategy and its control
		Operations Research	• To acquaint the students with basic knowledge of the overview of Operations Research • To gain knowledge about Transportation Models and assignment Models • To know and Understand about various applications of dynamic programming & replacement models.

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			• To understand the concept of Game Theory and simulations Models • To understand the nature and scope of Netwoking Models.
		Leadership and Change Management	• To acquiredthe student with basic knowledge the concept of New millennium organization, leadership skills. • To acquainted the student with basic knowledge of the concept of organizational development. And the concept of challenges in motivating employees. • To Gained knowledge about characteristics, principles and significance of continuous learning. And leadership attitude • To acquired the student with basic knowledge the concept of change management programmes and value based change • To Gained knowledge aboutOD interventions and total project management model.
		Performance Evaluation and Compensation Management	• Knowledge on performance measurement, its background, influencing factors and consequences of in organization. They can processes for managing performance – critical appraisal- ... Knowledge on Goal Setting-Linkages to Strategic Planning- Competency mapping- Career Development- Monitoring Performance Planning is imparted. • Equipped knowledge in the area of Performance Management Cycle- Competency based Performance Management Systems- If also emphasizes on Traditions and Modern Techniques, Balanced Score Card- 360 Degree Performance Apprising- Merit Rating • Gained in depth knowledge on the compensation program and employee attitude.

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			• The concept on the pay structures and tax planning in Indian context are understood.
		Human Capital Management **ELECTIVE – I)**	• To know the Basic Economic Theories in Human Capital • To gain knowledge related to different Accounting aspects of Human Capital • To understand an assess existing theories and practices in the field of Human capital management • To understand the concept of Quality of workers work life in Human Capital Management • To learn about Industrial Accidents and Safety precautions in Industries.
		Manapower Planning, Recruitment & Selection	• To know the meaning of Human Resource Planning, various factors and techniques affects demand and supply of HRP. • To understand the various human resource distribution mapping and usage of downsizing strategies • To learn the nature and process of job analysis and job design. • To learn the nature and process of job analysis and job design. • To know the importance, methods of recruitment and selection and barriers to effective selection. • To focus on steps involved in training and development and Requisites of Effective Training programs.
		Investment Analysis and Portfolio Management	• To acquaint the student with basic knowledge of Investment, speculation and Investment Process • Gain knowledge about Risk, Return and Shares

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			• To understand tools and techniques of Fundamental and Technical Analysis. • To understand about the elements of Portfolio Management and evaluation of securities • To acquaint knowledge on evaluation of securities through Sharpe and Markowitz Models.
		Managing Banks and Financial Institutions	• Acquaint the knowledge on Banking & Indian Financial System • Focus on uses of bank funds & Non-Performing Assets • Acquaint concepts of Banking Innovations • Equipped the knowledge on Insurance in India • Gain knowledge on Life & General Insurance in India
		Financial Markets & Services	• To Create the awareness on RBI and SEBI • To understand various financial services in India • Able to learn Venture Capital Financing • To understand rating of the customers • To know the need of Micro Finance.
		Taxation	• Able to know the basics of Tax, Tax on agricultural income & Income Tax Act. • Understand all about the Central Value Added Tax (CENVAT • Able to know Tax Plannings and its Principles • Learner understand the Elements of Tax considerations, tax management and tax decisions • Understand about the International Taxation system and legal aspects.
		Hospital Organization & Management	• To know the Role of a professional manager in a Hospital • To understand the Managerial functions in a hospital

			• Able to understand the Behavioural concepts and theories • Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems. • Able to correlate the relationship Descriptive, Analytical and Experimental Epidemiology
		Health Care Policies and Delivery systems	• Gain Knowledge about concepts Internal and External Environment and Environmental Scanning • Understand the Conceptual Approach to the Health Care Systems • Gain the sound knowledge on Overview of Health care sector in India • Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems. • Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems. • Able to correlate the relationship Descriptive, Analytical and Experimental Epidemiology
II/II	**IV**	**Supply Chain Management & Analytics**	• Obtain knowledge on basics of SCM and its drivers • Learner is able to understand tools of supply chain analysis and MRP • Understand the Management of different algorithms relevant to Supply chain • Equip with various concepts of value adding in Supply chain • Gain knowledge on implementation of Supply chain in various industries in practical manner.
		Innovation & Entrepreneurship	• Able to understand meaning, scope and importance of entrepreneurship

			development. • Students obtained the knowledge of creativity & Entrepreneurial plan • Students are able to plan & execute the operation problems • Able to understand Family & non-family entrepreneurs • Able to understand the Innovation & Management
		Labour Welfare & Employment Laws	• Obtain knowledge on Labour welfare. • Learner is able to understand Statutory & Non-statutory labour welfare programmes. • Understand the Labour Legislation. • Equip with Industrial Relations Legislation • Gain knowledge on various acts pertaining to Social Security Legislations.
		International HRM	• To gained knowledge on the Concepts of a Global HR Perspective in New Economy- Challenges of Globalization - Implications of Managing People and Leveraging Human Resource • To attained The concepts of Strategies - International assignments forWomenProblems. • To gained knowledge in Cross Culture Communication and Negotiation, CrossCultureTeams. • To understood The concepts of Compensation Management:Importance, Concepts- Trends, Issues, Methods, FactorsofConsideration–Models • To gained knowledge on Analysis of Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working LifeandProductivity
		Human Resource Development	• To know the meaning, need, scope of Human Resource Development, various functions and techniques affects HRD.

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			• To understand the various human resource development strategies, designing training and development and methods of implementation. • To understand the various human resource development strategies, designing training and development and methods of implementation. • To learn the methods for reducing employee stress and providing wellness and health promotions and career planning. • Focus on steps involved in HRD for innovation, Ethical problems with HRD roles for various workers.
		Strategic HRM	• To Gained the Concepts of Importance of Human Resources to Strategy- Human Resources contribution to strategy • Understood The concepts of Strategies - Efficient utilization of Human resources - Dealing with employee surpluses and shortages • The gained knowledge in Oriented performance measurement systems - Strategically oriented compensation system • The attained The concepts of Building core competencies through Human Resource Development - Competency mapping approaches • Understood the Analysis of Strategic Frame Work of Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas and emerging areas
		Financial Derivatives	• Student has learned about the basics of risk management and different types of risks. • The students has gained knolwedge on Value of Risk, Cash flow risk, Asset liability Management • Student has learned about Derivatives and its types. • Learner has understood about Swaps & its types

			• Student has learned about the Options, Binomial Option Pricing Model.
		Global Financial Management	• Obtain knowledge on Globalization & MNC's • Learner is able to understand Exchange & Interest rate exposures • Understand the Management of Global Business Operations • Equip with International Investment Decisions • Gain knowledge on Global Indebtedness
		Financial Risk Management	• Obtain knowledge on Risk Management framework • Learner is able to understand tools of measuring Risk • Understand the Management of risk in corporate • Equip with regulatory bodies for various markets • Gain knowledge on various models of Risk management
		Strategic Financial Management	• To know the theories of share holders value creation. • To learn Corporate Financial strategies • To understand the techniques of Investment Strategies • To know the Corporate Financial Engineering • To understand Corporate Restructuring.

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IMBA

YEAR	SEMESTER	SUBJECT	COS
I/I (SRK23)	I	Business Mathematics and statistics	• To make the students understand humour and the contributions of Mokshagundam to build modern india, The students also develop their LSRW skills • To make the students aware of Polymer currency and inspire them with the unique journey of Helen Keller. • To make the students aware of Man-made disasters and how to prevent and prepare for them. They learn about the South Indian small town life through R.K. Narayan's work • The students gain awareness about human values and ethics which contain the core values of our education policy and also experience the pathos in the story The Last Leaf. • Students learn about the importance of sports and how they can improve their health and also the motivating speech from technocrat Narayanamurthy of Infosys.
		Business Mathematics and statistics	• to equip students the knowledge of basic mathematical techniques • to understand the concepts of matrices in business studies • To recollect the knowledge of statistics • to provide better knowledge on probability theory • to enhance the understanding of bi variate statistical techniques
		Fundamentls Of Business organisation	• To understand the concepts of business • To know the responsibilities , source of finance for an entreprenuier • To understand various types of business • To find out the difference between public and private companies • To know how to commence the business

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		Financial Accounting -1	• students has understood about basics of accounting • students has got awairness on basics of the journal and the trail balance • Able to know about basic of ledger posting • students has understood about the final accounts and income statement • students has got awairness on basis of ratio analysis and different types of ratios.
		Fundamentals Of Computers	• Able to understand the basics of computers & devices • Learnder able to know the different types of operating system • focus on various application softwares used in day to day manner • Understand the concept of E-Business • Equip with computer networks
I/II	**II**	**English laguage -II**	• The students learn about the definition, types and benefits of Communication • They gain awareness about Time Management and Business Etiquettes • They gain Knowledge of decision making and leadership skills • They understand thinking about logical, lateral and positive thinking askills. • Honesty, Positive attitude, Courtesy and other soft skills are learnt by the students.
		Business Environment	• To know the factors influncing the business environment • To understand economic systems and economic reforms • To learn fiscal policy and balance of payments. • To know the challenges and mechanisms of india trade policy • To understand the legal frame work of indian economic system.
		Managerial Economics	• To know the economy and its principles. • To understand the relationship between the demand supply • To learn the types of production and its factors. • To understand the cost concepts,

			relationship between cost, volume and profit • To know the market atructure and pricing practices.
		Financial Acconting -2	• To understand basics of accounting • To know the accounting forms for Inventory management • Able to know the basic awairness on cashflow and funds flow statements • able to get basic awairness on accounting standards • Able to know the various aspects of financial reporting
		Organisational Comminication	• To understand basics of Objective of Communication – The Process of Human • To understand basics of techniques of presentation – types of presentation – • To understand the basic– Models for Inter Personal Communication – ExchangeTheory • students able to know about the – Barriers of Communication • Gateways to Effective Interpersonal Communication.
II/I (R19)	**III**	**Principles of Management**	• Interpret basic concept and theories of management • Outline plan and different organizational structures • Classify different leadership style in cross culture environment • Develop rationale decision making and problem solving abilities • Cite contemporary isssues and approaches to management
		Cost Accounting	• Student has learned about Evolution of Technology-Effects of New Technology-Technology Innovation, Invention,Innovation, Diffusion, Revolutionary and Evolutionary Innovation- Product and Process Innovation , Strategic Implications of Technology • students able to know about the Direct and Indirect expenses, allocation and apportionment of • overheads, calculation of machine hour rate and labour hour rate • students has got awareness on Application of Marginal costing in terms of cost control,

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			Income determinants under marginal cost-Absorption Cost Vs Marginal Cost. Key or LimitingFactor. • students understood about concept of cost ,volume-profit relationship ,Profit Planning , make or buy decision- Selection of suitable product mix, desired level of Profits , Determination of Breakeven point, Break-even-graph and assumptions of BEP, importance. • Students has got awairness about Standard Cost and Standard Costing, standard costing vs. budgetary control,standard costing vs. estimated cost, standard costing and marginal costing,
		Banking theory and Practices	• understand the functions of commercial banks and credit creation limitations • Determine the functions and components of indian money markets • knowledge of Banking Regulations act 1949 causes of Non Performing Assets • focus on innovative banking and Hi.Tech banking correlate the relationship between banker and customer
		Business Law	• Describe three different relationships that could be created the law of agency • Explain about sale of goods act • Distinguish forms of business organisations • compare consumer protection act 1986 and contract of agency • research negotiable instruments act 1881
		Entreprenuership Development	• Able to understand meaning, scope and importance of entrepreneurship development • students obtained the knowledge of training, progress and feed back system of ED • Students are able to plan and excecute the small projects wth all teh properties of ED • Able to undertand Importance of MSME's • Able to understand the Industrial support to MSME and other Entreprenuers

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II/II	**IV**	**Organisational Behaviour**	• To understand the basic approach of organisation behaviour • To understand the ways of personality development • To understand the decision making system and importance in organisation • To understand the interpersonal communication system with in the organisation • To understand the organisation development(goals, objectives and process)
		Management Accounting	• Prepare independently different accouting statements • prepare and analyse fiancial statement and reports independentl • analyze cost accounting concepts • Interpret cost bahaviour and decision methods • understand the management audit system.
		Companny Law	• Gain knowledge of the environment about in and around of company act • Able to understand the procedure of incorporation of a company • will understand concepts, rules or procedures of Company Prospects • The learner will understand the procedure or rules of directors appointments ,qualifications,and other aspects • the learner can interpret the procedure in winding up of a company
		GST(Goods and Services Taxes)	• Describe the meaning and concepts of Direct and Indirect Taxes. • Explain about issues in Tax management. • Distinguish between various factors affecting CENVAT and other Tax management Issues • Compare Tax Planning in Indian context with other countries. • Research on Multinational Taxation.
		Management of Information system	• Able to get information about MIS and its applictions in digital firm • Able to know various types of Information System • Able to gain knowledge about various IS models • Able to understand the steps involved in the process of IS planning

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			• Able to know about security of systems
III/I (R19)	**V**	**Financial Management**	• gain knowledge about concepts of financial management • obtain knowledge about Capital structure theories • understand the Investment decision process & its tools • understand the theories of Dividend • acquaint knowledge of Working Capital Cycle.
		Marketing Managemet	• Determine the Concept of Market and Marketing and Marketing Mix • Outline the essentials of Market Segmentation and Targeting and positionaning • Correlate the drivers of pricing strategy • Determine the communication process and communication mix elements • Focus on Marketing Organization and different Control strategies
		Human Resource Management	• undestand the base concept of HRM and its significance in the organisation • undestand the investment perspectives of HRM(Training and Development) • understand the concepts of Performance Appraisal: Importance – Methods – Traditional and Modern methods • –Latest trends in performance appraisal • Enhanced knowledge and skills to Wage Structure- Wage and Salary Policies • Gain the knowledge on Employee Participation Schemes, Grievances and disputes resolution mechanism
		Operations Management	• The Learner albe to know the basics of Production & Operations Management • Gain the knowledge on Production Planning & Control • Better understand of the Work Environment • Equip with Quality aspects of Production • Acquaint with Store Management of Production

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		Business Research Methodology	• Enhanced knowledge and skills to carry out research in business • Better awareness on data collection techniques,measurement and scaling • To gain knowledge in preparation and presentation of research report • Equipped students with statistical techniques • To gain knowledge in multivariate statistical techniques
III/II	**VI**	**Operations Research**	• to understand the basic concepts of linear programming • to provide the knowledge of integer programming problem • to gain knowledge of assignment and transportation models • to equip students with the knowledge network analysis • to provide the knowledge of game theory
		International Business	• obtained knowledge about free trade & trade strategies • Gained knowledge of balance of payments • understand the basic concept of foreign exchange markets • obtained knowledge about GDR's & SEZ • provide the knowledge of international liquidity
		Strategic Management	• Gained knowledge about Vission, Mission and Objectives of the Organisation • Obtained knowledge of strengths, weakness, opportunities and threats of the Organisation • Gained knowledge about framining of Strategy at Various levels • Obtained knowlege about Stuctures of organisation and its impact on Strategy • Obtained knowledge of Evaluation of strategy and its control
		Decision Support Systems	• able to understand the difference between MIS and DSS • able to gain knowledge about deterministic models and it will be helpful to deal with uncertainity • able to know DSS can be used in the various functional areas • able to get knowledge about simulation techniques and its applications

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			• able to identify the adcantages and limitations of DSS
IV/I (R19)	**VII**	**Knowledge management**	• Describe the major roles and responsibilities in knowledge management implementations • Describe how valuable individual, group and organizational knowledge is managed throughout the knowledge management cycle • Understand and apply various success factors of knowledge management implementations • Apply appropriate systems and tools for Knowledge Mapping Techniques • Understand and apply various concepts like information technology , E- Commerce, TQM, & Benchmarking in knowledge
		Strategic Cost Management	• Understand the Cost management and International Issues in Cost Management • Describe the Process of Strategic Cost Audit • Equip the Strategic Cost Management & its framework • The Learner will outlines the Balanced Score Card, Strategic based responsibility accounting • Able to get knowledge on Quality aspects of Cost Management
		Human Resource Planning	• The learner will outline the History of HRM and HR Policies and Strategies. • The learners can list and define the Human Resource Planning role and responibilities of HR • able to understand the HRP Process outline and Productive • The learner can able to gain the knowledge on Recruitment Selection and Induction • can able to focus on Training and Performance Appraisal
		Security Analysis	• Able to understand about Investment Vs Speculation, Investment alternatives - Investment Process - Sources of Investment Information and basics of secondary markets. • students has understood about Preference Shares and Equity Shares Earning valuation- Cashflow valuation,Asset Valuation ,

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			Dividend,discount model; Valuation of Bonds , Bond Returns and Risks -Bond Pricing Theorems convexity. • student has got awairness on Fundamental Analysis , Economy, Industry and Company Analysis,Technical Analysis , Dow Theory, Elliot Wave Theory , Trends and Trend Reversals ,Efficient Market Theory. • students has understood about Risk and Returns Security Analysis, Economic Analysis , Security Analysis and Investment • Able to understnad Importance of Industry Analysis ,Classification of Industries , Key • Indicators in Analysis , Analytical Frame Works
		Leadership Management	• Determine the meaning of leadership and its importance • Outline motivational theories and cultural dimensions • Correlate leadership with learning and attitude • Determine the factors necessary developing leadership • Focus on leadership styles in other countries
		Banking and insurance Management	• Understand indian financial system • Focus on indian banking practices • understand innovative banking systems in india • Outline the indian life insurance practice • understand the concepts of LIC and GIC
		Compensation and Reward management	• able to understand the outline of compensation • able to get awareness about compensation structure • able to get the clear view about wage and salary administration • able to know about types of workers and wage analysis • to gain the knowledge about pay structure and importance tax planning in compensation structure
		Advanced Management Accounting	• Gain Knowledge on International Accounting Standards • Obtained knowledge on Analysis of Financial statements • Gain knowledge on preparation of functional

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			budgets • Equippped with applications of marginal costing • understand applications of break even analysis
IV/II	**VIII**	**Total Quality management**	• able to gain the knowledge about the need ofor ISO 9000-2000 Quality system • to identify the needs of customer and satisfy their needs • apply appropriate tools and strategies of quality in TQM • to provide information and understand the deployment of quality circles and performance measures • able to gain the knowledge about the need ofor ISO 9000-2000 Quality system
		Project management	• The learner will understands the basics of Project characteristics, Screening of the Projects • Able to understand the different Tax Incentives & Tax Planning • Gain the sound knowledge on Project Appraisal techniques and Social cost benefit analysis • understands the Cost estimate for the Projects & Risk Analysis • The learner able to know the Project Evaluation and Auditing of the Projects
		Performance Management	• The learner will outline the Over view of performance management • The learners can define the Performance Management Planning • able to understand the Management System: objectives – Functions- Phases of Performance Management System • The learner will able to gain the knowledge on Performance Monitoring and Counseling • The learner will able to focus on Performance management skills
		Strategic Financial Management	• Decribe the meaning and concept of strategic financial management and corporate policy • Explain the concept of corporate financial strategies • Distinguish between net present value and rate of return. • Compare and contrast corporate financial

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			engineering concepts • Research on corporate restructuring.
		Strategic Human Resource management	• The learner will outline the Importance of Human Resources to Strategy- Human Resources contribution to strategy • The learner will able to gain the knowledge on Efficient utilization of Human resources • To gain the knowledge about Reward and Development Systems Strategically oriented performance • Able to understand theThe learner will able to gain the knowledge on Organizing and structuring of Human Resource Development in an organization Building core competencies through Human Resource Development • The learners can define the Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas
		Portfolio management	• student has understood about Elements of Portfolio Management, Portfolio Models , Markowitz Model, Efficient Frontier and Selection of Optimal Portfolio. • student has got awairness on Performance Evaluation of Portfolios; Sharpe Model Jensen's Model for PF Evaluation, Evaluation of Mutual Fund • obtained knowledge on Neural Networks ,Artificial Neural Networks , Fuzzylogic , Behavioral Models , .Portfolio Management. • student has got awairness on The Indian Connection with Commodity Market Commodity and • Currency Derivatives Legal Frame Work Policy Liberization
		Organisational development and Change management	• gain the knowledge on importance of change management • obtain the knowledge on mapping change • able to learn about OD interventions • provide awareness about negoitated change • understand the importance of team building

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		Financial Markets and Servicies	• Gain knowedge on Indian Capital Market & Money Market issues • Able to understand the Regulatory framework of Financial Services • Understand the concept of Venture Capital and its growth in India • Acquaint knolwedge on Credit Rating Agencies in India • The learner able to understand the classfication & evaluation of Mutual Funds.
V/I (R19)	**IX**	**Corporate Governance**	• Able to understand meaning, scope and importance of Corporate Governance • students obtained the knowledge of Board of Directors, Duties & responsibilities of auditors. • Students are able to plan and execute the models of governance, obligations towards stake holders. • Able to understand Importance of Corporate Governance & Stake holders • Able to understand the capabilities& responsibilities of directors, corporate social responsibility.
		Intellectual Property Rights	• Acquainted knowledge of Laws Relating to IPR and the Agencies Responsible to IPR Registration • Gain the sound knowledge on Copyrights and Neighboring Rightsand Law Relating to Copyrights • Acquaint knowledge on Laws Relating to Patents in India,New developments in Patents. • Understood the Concep of Trademarks Claims and Infringement,Remedies • Acquainted knowledge on Cyber Law and Cyber Crime, Liability of Network Providers.
		Risk Management	• Obtain knowledge on Risk Management framework • Learner is able to understand tools of measuring Risk • Understand the Management of risk in corporate • Equip with regulatory bodies for various markets • Gain knowledge on various models of Risk management

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		Global Financial Management	• Obtain knowledge on Globalization & MNC's • Learner is able to understand Exchange & Interest rate exposures • Understand the Management of Global Business Operations • Equip with International Investment Decisions • Gain knowledge on Global Indebtedness
		Tax Management	• Able to know the basics of Tax, Tax on agricultural income & Income Tax Act. • Understand all about the Central Value Added Tax (CENVAT) • Able to know Tax Plannings and its Principles • Learner understand the Elements of Tax considerations, tax management and tax decisions • Understand about the International Taxation system and legal aspects.
		Global HRM	• To gained knowledge on the Concepts of a Global HR Perspective in New Economy- Challenges of Globalization - Implications of Managing People and Leveraging Human Resource • To attained The concepts of Strategies - International assignments for Women Problems. • To gained knowledge in Cross Culture Communication and Negotiation, Cross Culture Teams • To understood The concepts of Compensation Management: Importance, Concepts- Trends, Issues, Methods, Factors of Consideration– Models • To gained knowledge on Analysis of Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working Life and Productivity
		Management of Industrial Relations	• To Understand the basics of Industrial Relations • Able to know the Trade Unions Act, 1926. • To acquaint the knowledge on Quality of Work Life. • To know the concepts of Social Security Measures in India • To understand the Employee Grievances and

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			Seettlement of Industrial disputes.
		Labour Welfare Legislation	• Obtain knowledge on Labour welfare. • Learner is able to understand Statutory & Non-statutory labour welfare programmes. • Understand the Labour Legislation. • Equip with Industrial Relations Legislation • Gain knowledge on various acts pertaining to Social Security Legislations.

Master of Computer Application

PSO1	Design, develop and implement interdisciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.
PSO2	Analyze the societal needs to provide novel solutions through technological based research

YEAR	SEMESTER	SUBJECT	Course Outcomes
I	I	**Mathematical And Statistical Foundations**	• Apply the basic rules and theorems of probability theory such as Baye's Theorem, determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution. • Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters. • Learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests. • Design various ciphers using number theory. • Apply graph theory for real time problems like network routing problem.
	I	**Computer Organization**	• Understand, analyze and design various digital circuits. • Analyze data representations and basic organization and design. • Understand the theory and architecture

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			of central processing unit. • Analyze some of the design issues in terms of speed, technology, cost, performance. • Exemplify in a better way the I/O and memory organization.
	I	**Data Structures**	• Implement basic programs by using C concepts. • Select the data structures that efficiently model the information in a problem. • Assess efficiency trade-offs among different data structure implementations or combinations • Implement and know the application of algorithms for sorting and pattern matching
	I	**Object Oriented Programming With Java**	• Describe the uses OOP concepts. • Apply OOP concepts to solve real world problems. • Distinguish the concept of packages and interfaces. • Demonstrate the exception handing, multithread applications with synchronization • Design the GUI based applications using AWT and Swings • Discuss the Collection Framework
	I	**Operating Systems**	• Understand, analyze and design various digital circuits. • Understand the Operating System fundamentals, design concepts, and get familiar with the debugging and implementation of system structures. • Interpret the need of multithreaded programming and implement these concepts in Process Scheduling. • Apply Synchronization, Deadlock Handling methods and identify the demand of Memory-Management concepts during the execution of a process. • Recognize the importance of Virtual Memory Management Schemes and File

			System concepts.
	I	**Operating Systems And Linux Lab**	• Implement various CPU scheduling algorithms and compare results • Implement various disk scheduling algorithms and compare results • Implement page replace algorithms • Implement various memory management techniques. • Execute basic Linux commands
	I	**Data Structures Lab**	• Implement various basic data structures and its operations. • Apply sorting and searching algorithms to given numbers • Implement various tree operations. • Implement various graphs algorithms. • Develop applications using various data structures.
	I	**Java Programming Lab**	• Apply OOP concepts to solve real world problems • Implement different forms of inheritance • Create packages and to reuse them. • Implement multi threaded programs using synchronization concepts • Create user defined exceptions • Design GUI applications using AWT and SWINGS.
I	II	**Database Management Systems**	• Illustrate the concept of databases, database management systems, database languages, database structures and their work • Apply ER modeling and Relational modeling for designing simple databases. • Summarize the concepts related to relational model and SQL and Write database queries using relational algebra and structured query language. • Design and develop databases from the real world by applying the concepts of Normalization. • Outline the issues associated with Transaction Management and Recovery. Tree

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			Structured and Hash-Based Indexing
	II	**Software Engineering And Design Patterns**	• Define various software application domains and remember different process model used in software development. • Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques. • Convert the requirements model into the design model and demonstrate use of software and user interface design principles. • Illustrate the appropriate design patterns to solve object-oriented design problems. • Apply structural patterns to solve design problems. • Evaluate the design solutions by using behavioral patterns.
	II	**Data Warehousing And Mining**	• Understand the basics of types of data, quality of data, suitable techniques required for preprocessing and measures required to perform data analysis. • Describe the need of classification, identify suitable technique(s) to perform classification, model building and evaluation. • Identify the requirements and usage of association rule mining on categorical and continuous data. • Compare and Identify suitable clustering algorithm(s) (apply with open source tools), interpret, evaluate and report the result. • Describe the requirements and the need of web mining
	II	**Nosql DATABASES**	• Identify what type of NoSQL database to implement based on business requirements (key-value, document, full text, graph, etc.) • Apply NoSQL data modeling from application specific queries. • Use Atomic Aggregates and denormalization as data modelling

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			techniques to optimize query processing
	II	**DBMS LAB**	• Utilize SQL to execute queries for creating database and performing data manipulation operations • Examine integrity constraints to build efficient databases • Apply Queries using Advanced Concepts of SQL • Build PL/SQL programs including stored procedures, functions, cursors and triggers
	II	**Python Programming Lab**	• Understand the basic concepts in development of applications using Python. • Create and use different libraries in Python. • Implement handling exceptions and files. • Implement basic data structures in Python.
	II	**Software Engineering And Design Patterns Lab**	• Understanding of Software Requirement Specification Sheet (SRS) • Implementation of COCOMO Model • Implementation of E-R diagrams, DFD, CFD and structured charts for the project. • Implementation of Design Patterns
II	I(R20)	**Machine Learning With Python**	• Illustrate and comprehend the basics of Machine Learning with Python. • Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions • Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms. • Evaluate the concepts of binning, pipeline Interfaces with examples. • Apply the sentiment analysis for various case studies
		Internet Of Things	• Explain the definition and usage of the term 'the internet of things' in different contexts.

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			• Discover the various network protocols used in IoT • Define the role of big data, cloud computing and data analytics in a typical IoT system. • Compare and contrast the threat environment based on industry and/or device type. • Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software
	I	**Web Technologies**	• Analyze a web page and identify its elements and attributes. • To acquire knowledge of xml fundamentals and usage of xml technology in electronic data interchange. • Build dynamic web pages using JavaScript (client side programming). • To design and develop web based enterprise systems for the enterprises using technologies like jsp, servlet. • Build web applications using PHP
	I	**Cryptography And Network Security**	• Explain Basic Principles, different security threats, countermeasures, foundation course of cryptography mathematics and Symmetric Encryption. • Classify the basic principles of Asymmetric key algorithms and operations of asymmetric key cryptography. • Design Cryptographic Hash Functions as SHA-3 and Digital Signatures as Elgamal. • Explain the concept of Revise Key Management and Distribution and User Authentication. • • Determine the knowledge of Network and Internet Security Protocols such as S/MIME
	I	**Software Project Management**	• Apply the process to be followed in the software development life-cycle models.

			• Apply the concepts of project management & planning. • Implement the project plans through managing people, communications and change. • Conduct activities necessary to successfully complete and close the Software projects. • Implement communication, modeling, and construction & deployment practices in software development
	I	**Machine Learning With Python Lab**	• Implement procedures for the machine learning algorithms • Design Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Identify and apply Machine Learning algorithms to solve real world problems
	I	**IOT Lab**	• Interpret the impact and challenges posed by IoT networks leading to new architectural models. • Compare and contrast the deployment of smart objects and the technologies to connect them to network. • Appraise the role of IoT protocols for efficient network communication. • Elaborate the need for Data Analytics and Security in IoT. • Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.
	I	**Web Technologies Lab**	• Create dynamic and interactive web pages using HTML, CSS & Java Script • Experiment with Learn and implement XML concepts • Develop web applications using PHP • Show the Install Tomcat Server and execute client-server programs • Implement programs using Ruby programming

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	II(R20)	**Human Resource Management**	• Explain the importance of human resources and their effective management in organizations • Demonstrate a basic understanding of different tools used in forecasting and planning, human resource need. • Describe the meanings of terminology and tools used in managing employees effectively • Make use of Record governmental regulations affecting employees and employers • Analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training
	II	**Software Testing Methodologies**	• Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods • Design and conduct a software test process for a software project • Analyze the needs of software test automation • Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects • Basic understanding and knowledge of contemporary issues in software testing, such as component-based, web based and object oriented software testing problems • Write test cases for given software to test it before delivery to the customer and write test scripts for both desktop and web based applications

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