



## SRK INSTITUTE OF TECHNOLOGY

ENIKEPADU, VIJAYAWADA -521108

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(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 to the professional engineering practice.

**PO 7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO 8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO 9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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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**

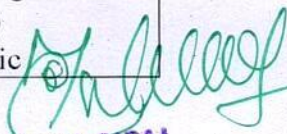
<b>PSO1</b>	Graduates shall possess necessary special skills to analyse and design various structural components using analytical and software tools related to civil engineering.
<b>PSO2</b>	Graduates shall have ability to plan, examine and analyse the various laboratory tests required for the professional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

<b>YEAR</b>	<b>SEMESTER</b>	<b>SUBJECT</b>	<b>COS</b>
<b>I/IV (R20)</b>	<b>I</b>	<b>ENGINEERING DRAWING</b>	<ul style="list-style-type: none"> <li>• Creating to draw the polygons, engineering curves, and scales.</li> <li>• Creating the projections of lines inclined to both the planes and its traces.</li> <li>• Understanding the different plans and draw the projections of the plane inclined to both the planes.</li> <li>• Analyzing the basic solids and draw the projections of the solids inclined to one of the planes.</li> <li>• Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.</li> </ul>
		<b>ENGINEERING PHYSICS</b>	<ul style="list-style-type: none"> <li>• Able to know the differences between interference, diffraction and polarization with its Engineering applications.</li> <li>• Able to understand the concepts of LASER and optical fibers. Apply these concepts in various Engineering and medical fields.</li> <li>• Able to apply the concepts of dielectric and magnetic materials in emerging micro devices.</li> <li>• Able to identify acoustic properties of materials in architecture and use of</li> </ul>

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			<p>Ultrasonics in different fields</p> <ul style="list-style-type: none"> <li>• Able to apply the knowledge of crystal diffraction methods to measure the various properties of crystals.</li> </ul>
		<b>ENGINEERING GEOLOGY</b>	<ul style="list-style-type: none"> <li>• Able to identify and classify the geological minerals</li> <li>• Able to measure the rock strengths of various rocks</li> <li>• Able to classify, monitor and measure the Landslides and earthquake prone areas to practice the hazard zonation</li> <li>• Able to analyses the ground conditions through geophysical surveys.</li> <li>• Able to investigate the geological material and ground to check the suitability of civil engineering project construction for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.</li> </ul>
		<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials</li> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> <li>• Able to gain knowledge on solving first order differential equations and its applications to various engineering fields.</li> <li>• Able to solve the higher order differential equations related to various engineering fields.</li> </ul>

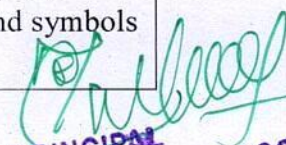
			<ul style="list-style-type: none"> <li>• Able to use functions of several variables in optimization.</li> <li>• Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals</li> </ul>
		<b>English Communication Skills Laboratory</b>	<ul style="list-style-type: none"> <li>• Analyze the English speech sounds, Stress, Rhythm and Intonation. Understand the different aspects of the English language proficiency with emphasis on Pronunciation tone and accent neutralization.</li> <li>• Exhibit professionalism in participating in Debates and Group Discussion. Develop and enhance their language skills by participating in oral presentations and public speaking.</li> <li>• Enhance their knowledge through Interview skills</li> </ul>
		<b>Engineering Physics Lab</b>	<ul style="list-style-type: none"> <li>• Calculation of the physical values like radius of curvature of lens , wavelength of source, thickness of thin object, numerical aperture and Planks constant using principles of optical phenomenon.</li> <li>• Explain the magnetic and electric field effects involved in B-H curve experiment, Stewart Gee's apparatus and dielectric constant experiment.</li> <li>• Demonstrate the phenomena of resonance in stretched strings and verifying the laws of transverse vibrations.</li> </ul>
		<b>BASICS OF CIVIL ENGG. WORK SHOP</b>	<ul style="list-style-type: none"> <li>• Identify various components of a building and give lump-sum estimate.</li> <li>• Determine distances and irregular areas using conventional survey instruments like chain, tape, cross-staff and compass</li> <li>• Identify different soils, Know various traffic signs &amp; signals Determine centre of gravity and moment of inertia of channel and I-sections</li> <li>• Set out a signal room building as per given plan, Install simple sanitary filling and find discharge/velocity in a water pipe line as density of water</li> <li>• Know to the process of making cement mortar / concrete for nominal mix</li> </ul>
<b>I/IV</b>	<b>II</b>	<b>Mathematics-II</b>	<ul style="list-style-type: none"> <li>• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)</li> <li>• Solve system of linear algebraic</li> </ul>

  
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			<p>equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)</p> <ul style="list-style-type: none"> <li>• Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)</li> <li>• Apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)</li> <li>• Apply numerical integral techniques to different Engineering problems (L3)</li> <li>• Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)</li> </ul>
I	II	<b>Engineering Chemistry</b>	<ul style="list-style-type: none"> <li>• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.</li> <li>• Synthesize nano materials for modern advances of engineering technology. Summarize the techniques that detect and measure changes of state of reaction. Illustrate the commonly used industrial materials.</li> <li>• Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. Study alternate fuels and analyse flue gases</li> <li>• Analyze the suitable methods for purification and treatment of hard water and brackish water.</li> </ul>
		<b>Engineering Mechanics</b>	<ul style="list-style-type: none"> <li>• The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters.</li> <li>• He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites.</li> <li>• He should be able to determine area and mass movement of inertia for composite sections He should be able to analyze motion of particles and rigid bodies and</li> </ul>

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			<p>apply the principles of motion, work energy and impulse – momentum.</p>
		<p><b>Programming For Problem Solving Using C</b></p>	<ul style="list-style-type: none"> <li>• Upon the completion of the course the student will learn</li> <li>• To write algorithms and to draw flowcharts for solving problems</li> <li>• To convert flowcharts/algorithms to C Programs, compile and debug programs</li> <li>• To use different operators, data types and write programs that use two-way/ multi-way selection</li> <li>• To select the best loop construct for a given problem</li> <li>• To design and implement programs to analyze the different pointer applications</li> <li>• To decompose a problem into functions and to develop modular reusable code</li> <li>• To apply File I/O operations</li> </ul>
		<p><b>Building Materials And Concrete Technology</b></p>	<ul style="list-style-type: none"> <li>• Know various engineering properties of building construction materials and suggest their suitability</li> <li>• Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design</li> <li>• Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete</li> </ul>
		<p><b>Engineering Chemistry Lab</b></p>	<ul style="list-style-type: none"> <li>• Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus (Understand – L2)</li> <li>• Learn and apply basic techniques used in chemistry laboratory for volumetric analysis; red ox titrations with different indicators; EDTA titrations.</li> <li>• Explain and demonstrate a few instrumental methods</li> </ul>
		<p><b>Programming For Problem Solving Using C Lab</b></p>	<ul style="list-style-type: none"> <li>• Develop programs using basic data types, variables and conditional statements</li> <li>• Develop programs using Arrays, strings</li> <li>• Develop programs using functions, pointers, Files and dynamic memory allocation</li> </ul>
		<p><b>Building Planning And Computer Aided Building Drawing</b></p>	<ul style="list-style-type: none"> <li>• Perform basic commands of any suitable CAD, software to draw 2D drawings</li> <li>• Interpret the conditions, signs and symbols from a given drawing</li> </ul>

  
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			<ul style="list-style-type: none"><li>• Prepare line, planes of residential and public buildings using principles of planning</li><li>• Prepare submission and working drawing from the given requirement for load, bearing and framed structures</li></ul>
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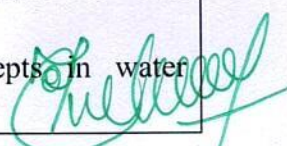
YEAR	SEMESTER	SUBJECT	COS
II/IV (R20)	I	MATHEMATICS-III	<ul style="list-style-type: none"> <li>• interpret the physical meaning of different operators such as gradient, curl and divergence (L5)</li> <li>• estimate the work done against a field, circulation and flux using vector calculus (L5)</li> <li>• apply the Laplace transform for solving differential equations (L3)</li> <li>• find or compute the Fourier series of periodic signals (L3)</li> <li>• know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)</li> <li>• identify solution methods for partial differential equations that model physical processes (L3)</li> </ul>
II	I	STRENGTH OF MATERIALS - I	<ul style="list-style-type: none"> <li>• The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions</li> <li>• The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces</li> <li>• 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</li> <li>• 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 Lamé's equation.</li> </ul>
II	I	FLUID MECHANICS	<ul style="list-style-type: none"> <li>• Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics.</li> <li>• Calculate the forces that act on submerged</li> </ul>

			<p>planes and curves.</p> <ul style="list-style-type: none"> <li>• Ability to analyse various types of fluid flows.</li> <li>• 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.</li> <li>• Able Measure the quantities of fluid flowing in pipes, tanks and channels.</li> </ul>
<b>II</b>	<b>I</b>	<b>SURVEYING AND GEOMETRICS</b>	<ul style="list-style-type: none"> <li>• Apply the knowledge to calculate angles, distances and levels</li> <li>• Identify data collection methods and prepare field notes</li> <li>• Understand the working principles of survey instruments, measurement errors and corrective measures</li> <li>• Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies</li> </ul>
<b>II</b>	<b>I</b>	<b>HIGHWAY ENGINEERING</b>	<ul style="list-style-type: none"> <li>• Plan highway network for a given area.</li> <li>• Determine Highway alignment and design highway geometrics.</li> <li>• Design Intersections and prepare traffic management plans</li> <li>• Judge suitability of pavement materials</li> <li>• design flexible and rigid pavements</li> </ul>
		<b>CONCRETE TECHNOLOGY LAB</b>	<ul style="list-style-type: none"> <li>• Determine consistency and fineness of cement.</li> <li>• Determine setting times of cement.</li> <li>• Determine specific gravity and soundness of cement.</li> <li>• Determine compressive strength of cement.</li> <li>• Determine workability of cement concrete by compaction factor, slump and Vee – Bee tests</li> <li>• Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis.</li> <li>• Determine flakiness and elongation index of aggregates.</li> <li>• Determine bulking of sand.</li> </ul>

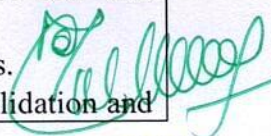
			<ul style="list-style-type: none"> <li>• Understand non-destructive testing procedures on concrete.</li> </ul>
		<b>HIGHWAY ENGINEERING LAB</b>	<ul style="list-style-type: none"> <li>• Test aggregates and judge the suitability of materials for the road construction</li> <li>• Test the given bitumen samples and judge their suitability for the road construction</li> <li>• Obtain the optimum bitumen content for Bituminous Concrete</li> <li>• Determine the traffic volume, speed and parking characteristics.</li> <li>• Draw highway cross sections and intersections.</li> </ul>
		<b>SURVEYING FILED WORK – I (Lab)</b>	<ul style="list-style-type: none"> <li>• Able to Prepare the survey sheet according to the method used.</li> <li>• Able to survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically.</li> <li>• Able to record the reduced levels using various methods of levelling and measurement of horizontal &amp; vertical angles by Theodolite.</li> <li>• Able to determine the location of any point horizontally and vertically using Tachometry.</li> </ul>
<b>III/IV (R20)</b>	<b>I</b>	<b>STRUCTURAL ANALYSIS</b>	<ul style="list-style-type: none"> <li>• To Estimate the bending moment and shear forces in beams for different fixity conditions</li> <li>• To analyse the frames and beams by using slope deflection &amp; moment distribution methods</li> <li>• To determine the forces which was involved in trusses by using different methods.</li> <li>• To the behaviour of structures due to the</li> </ul>

			<p>expected loads, including the moving loads, acting on the structure</p> <ul style="list-style-type: none"> <li>• To know the student able to analyse the structure by matrix methods</li> </ul>
III	I	<b>DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES</b>	<ul style="list-style-type: none"> <li>• Work on different types of design methods</li> <li>• Carryout analysis and design of flexural members and detailing</li> <li>• Design structures subjected to shear, bond and torsion</li> <li>• Design different type of slabs and staircase</li> <li>• Design different type of compression members and footings</li> </ul>
III	I	<b>GEOTECHNICAL ENGINEERING-I</b>	<ul style="list-style-type: none"> <li>• The Student will be able to know the methods of soil exploration</li> <li>• Student will be able to analyse the stability of slope and earth pressure theories</li> <li>• The Student will be able to understand the different types of shallow foundations and decide on their location based on soil characteristics.</li> <li>• The student will be able to compute the magnitude of foundation settlements</li> <li>• The student will be able to apply the principles of bearing capacity of piles and design them accurately</li> </ul>
III	I	<b>CONSTRUCTION TECHNOLOGY AND MANAGEMENT</b>	<ul style="list-style-type: none"> <li>• appreciate the importance of construction planning</li> <li>• understand the functioning of various earth moving equipment</li> <li>• know the methods of production of aggregate products and concreting and usage of machinery required for the works.</li> <li>• apply the gained knowledge to project management and construction techniques</li> </ul>
III	I	<b>SUSTAINABLE ENERGY TECHNOLOGIES</b>	<ul style="list-style-type: none"> <li>• Identify the importance of solar energy collection and storage.</li> <li>• Applying the principles of wind energy and biomass energy.</li> <li>• Applying knowledge on geothermal and ocean energy.</li> <li>• Applying knowledge about energy efficient systems.</li> </ul>

			<ul style="list-style-type: none"> <li>• Applying the concepts of green manufacturing systems.</li> </ul>
		<b>GEOTECHNICAL ENGINEERING LAB</b>	<ul style="list-style-type: none"> <li>• Determine index properties of soil and classify them.</li> <li>• Determine permeability of soils.</li> <li>• Determine Compaction, Consolidation and shear strength characteristics.</li> </ul>
		<b>DESIGN OF SPECIAL STRUCTURES</b>	<ul style="list-style-type: none"> <li>• Equipping students with the professional knowledge in the design and construction of Industrial chimneys and Water tanks</li> <li>• To get the professional knowledge in the design of service reservoir and Estimation of drains for village</li> <li>• To understand the design of spillway for low and medium height dams</li> <li>• To estimate the concrete roads and rain water harvesting ponds</li> </ul>
<b>IV/IV (R19)</b>	<b>I</b>	<b>DESIGN AND DRAWING OF STEEL STRUCTURES</b>	<ul style="list-style-type: none"> <li>• Work with relevant IS codes</li> <li>• Carryout analysis and design of flexural members and detailing</li> <li>• Design compression members of different types with connection detailing</li> <li>• Design Plate Girder and Gantry Girder with connection detailing</li> <li>• Produce the drawings pertaining to different components of steel structures</li> </ul>
<b>IV</b>	<b>I</b>	<b>GEOTECHNICAL ENGINEERING – II</b>	<ul style="list-style-type: none"> <li>• The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.</li> <li>• The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.</li> <li>• The student must be able to use the field test data and arrive at the bearing capacity.</li> <li>• The student must be able to design Piles based on the principles of bearing capacity.</li> </ul>
<b>IV</b>	<b>I</b>	<b>REMOTE SENSING AND GIS APPLICATIONS</b>	<ul style="list-style-type: none"> <li>• be familiar with ground, air and satellite based sensor platforms.</li> <li>• interpret the aerial photographs and satellite imageries</li> <li>• create and input spatial data for GIS application</li> <li>• apply RS and GIS concepts in water resources engineering</li> </ul>

  
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			<ul style="list-style-type: none"> <li>• applications of various satellite data</li> </ul>
IV	I	<b>INDUSTRIAL WASTE WATER TREATMENT</b>	<ul style="list-style-type: none"> <li>• Know the quality and quantity of water for various industries and Advanced water treatment methods</li> <li>• Learn the common methods of treatment of wastewaters and Biological treatment methods</li> <li>• Study of methods to reduce impacts of disposal of wasters into environment and CETPs.</li> <li>• Study of methods of treatment of wastewaters from specific industries like steel</li> <li>• plants, refineries, and power plants, that imply biological treatment methods</li> <li>• Study of methods of treatment of wastewaters from industries like Aqua, dairy, sugar plants, and distilleries that imply biological treatment methods</li> </ul>
IV	I	<b>DISASTER MANAGEMENT</b>	<ul style="list-style-type: none"> <li>• The student will be able to Affirm the usefulness of integrating management principles in disaster mitigation work.</li> <li>• The student will be able Distinguish between the different approaches needed to manage pre- during and post- disaster periods.</li> <li>• The student will be able to explain the process of risk management.</li> <li>• The student will be able to learn the role of technology in disaster management.</li> <li>• The student will be able to relate to risk transfer.</li> </ul>
		<b>Remote Sensing &amp; GIS Lab</b>	<ul style="list-style-type: none"> <li>• Work comfortably on GIS software</li> <li>• Digitize and create thematic map and extract important features</li> <li>• Develop digital elevation model</li> <li>• Interpretation and Estimation of features from satellite imagery.</li> <li>• Analyze and Modelling using GIS software.</li> </ul>
		<b>Geotechnical Engineering Lab</b>	<ul style="list-style-type: none"> <li>• Determine index properties of soil and classify them.</li> <li>• Determine permeability of soils.</li> <li>• Determine Compaction, Consolidation and</li> </ul>

  
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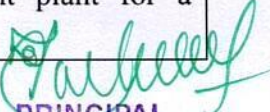
			shear strength characteristics.
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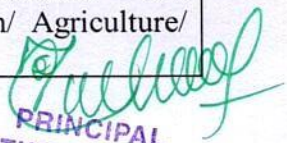
**SEMESTER-II**

YEAR	SEMESTER	SUBJECT	COS
II/IV (R20)	II	<b>COMPLEX VARIABLES AND STATISTICAL METHODS</b>	<ul style="list-style-type: none"> <li>• apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)</li> <li>• find the differentiation and integration of complex functions used in engineering problems (L5)</li> <li>• make use of the Cauchy residue theorem to evaluate certain integrals (L3)</li> <li>• apply discrete and continuous probability distributions (L3)</li> <li>• design the components of a classical hypothesis test (L6)</li> <li>• infer the statistical inferential methods based on small and large sampling tests (L4)</li> </ul>
		<b>STRENGTH OF MATERIALS - II</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions</li> </ul>
		<b>HYDRAULICS AND HYDRAULIC MACHINERY</b>	<ul style="list-style-type: none"> <li>• Solve uniform and non-uniform open channel flow problems.</li> <li>• Apply the principals of dimensional analysis and similitude in hydraulic model testing.</li> <li>• Understand the working principles of various hydraulic machineries and pumps.</li> </ul>
		<b>ENVIRONMENTAL ENGINEERING</b>	<ul style="list-style-type: none"> <li>• Select a source based on quality and quantity and Estimate design population and water demand</li> <li>• Design a water treatment plant for a village/city</li> </ul>

  
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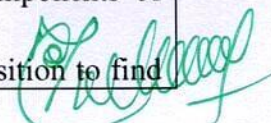


			<ul style="list-style-type: none"> <li>• Design a sewer by estimating DWF and Storm water flow and plumbing system for buildings</li> <li>• Design a Sewage Treatment Plant for a town/city.</li> </ul>
		<b>MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS</b>	<ul style="list-style-type: none"> <li>• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</li> <li>• The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</li> <li>• 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.</li> <li>• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</li> <li>• The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</li> </ul>
		<b>ENVIRONMENTAL ENGINEERING LAB</b>	<ul style="list-style-type: none"> <li>• Estimate some important characteristics of water, wastewater and soil in the laboratory</li> <li>• Draw some conclusion and decide whether the water is suitable for Drinking/Construction / Agriculture/ Industry.</li> <li>• Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture</li> <li>• 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</li> <li>• 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.</li> </ul>

  
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		<b>STRENGTH OF MATERIALS LAB</b>	<ul style="list-style-type: none"> <li>• Able to study the stress-strain curves of different materials used in the field under different loading conditions.</li> <li>• Able to differentiate between properties of materials affect strength under various conditions.</li> <li>• Able to calculate simple tensile and shear stress using the appropriate guidelines and formats.</li> <li>• Able to analyze the bending stress on different types of sections</li> <li>• Able to understand deflection of different sections at different loading conditions.</li> </ul>
		<b>FLUID MECHANICS LAB</b>	<ul style="list-style-type: none"> <li>• Able to understand the behaviour of water current in rivers, canal and drains.</li> <li>• Able to use important practical results in common fluid flows.</li> <li>• Able to determine metacentre of a floating vessel</li> <li>• Able to calibrate various flow measuring devices in pipe and open channel flow.</li> <li>• Able to determine various losses and velocity in pipe flow in field.</li> </ul>
<b>III/IV (R20)</b>	<b>II</b>	<b>DESIGN AND DRAWING OF STEEL STRUCTURES</b>	<ul style="list-style-type: none"> <li>• Work with relevant IS codes</li> <li>• Carryout analysis and design of flexural members and detailing</li> <li>• Design compression members of different types with connection detailing</li> <li>• Design Plate Girder and Gantry Girder with connection detailing</li> <li>• Produce the drawings pertaining to different components of steel structures</li> </ul>
		<b>WATER RESOURCES ENGINEERING</b>	<ul style="list-style-type: none"> <li>• The student can thoroughly understand the theories and principles of the hydrologic processes.</li> <li>• The student will be able to quantify hydrologic components and apply concepts in hydrologic design of water resources projects.</li> <li>• Develop design storms and carryout frequency analysis</li> <li>• Develop flow mass curve and flow duration curve, apply hydrograph analysis in the design of water resources projects.</li> </ul>

			<ul style="list-style-type: none"> <li>• Develop unit hydrograph and synthetic hydrograph</li> </ul>
		<b>GEOTECHNICAL ENGINEERING-II</b>	<ul style="list-style-type: none"> <li>• The Student will be able to know the methods of soil exploration</li> <li>• student will be able to analyse the stability of slope and earth pressure theories</li> <li>• The Student will be able to understand the different types of shallow foundations and decide on their location based on soil characteristics.</li> <li>• The student will be able to compute the magnitude of foundation settlements</li> <li>• The student will be able to apply the principles of bearing capacity of piles and design them accurately</li> </ul>
		<b>TRAFFIC ENGINEERING</b>	<ul style="list-style-type: none"> <li>• To determine various components and characteristics of traffic.</li> <li>• To apply various traffic control devices and principles of highway safety.</li> <li>• To understand the detrimental effects of traffic on environment</li> <li>• To carry out highway capacity and level of service analysis.</li> <li>• To learn about intelligent vehicle highway systems.</li> </ul>
		<b>INTRODUCTION TO AUTOMOBILE ENGINEERING</b>	<ul style="list-style-type: none"> <li>• Explain the basics of an automobile &amp; its components with applications.</li> <li>• Illustrate the concept of Transmission system with different components in an automobile.</li> <li>• Analyze the working of steering system and Categorize the concepts of Suspension in an automobile.</li> <li>• Categorize the concepts of Braking systems &amp; Electrical in an automobile.</li> <li>• Demonstrate the basics of Engine specification &amp; safety systems in automobile under different conditions.</li> </ul>
		<b>ESTIMATION, COSTING AND CONTRACTS LAB</b>	<ul style="list-style-type: none"> <li>• The student should be able to determine the quantities of different components of buildings.</li> <li>• The student should be in a position to find</li> </ul>



			<p>the cost of various building components.</p> <ul style="list-style-type: none"> <li>• The student should be capable of finalizing the value of structures.</li> </ul>
		<b>REMOTE SENSING &amp; GIS LAB</b>	<ul style="list-style-type: none"> <li>• Work comfortably on GIS software</li> <li>• Digitize and create thematic map and extract important features</li> <li>• Develop digital elevation model</li> <li>• Interpretation and Estimation of features from satellite imagery.</li> <li>• Analyze and Modelling using GIS software.</li> </ul>
		<b>CIVIL ENGINEERING PRACTICE LAB</b>	<ul style="list-style-type: none"> <li>• Introducing practical aspects of Civil Engineering profession to the students</li> <li>• Equipping students with the professional knowledge in the design and construction procedures of various Civil Engineering projects</li> <li>• Introducing the important codes and by-laws that will benefit young professionals</li> </ul>
<b>IV/IV R19</b>	<b>II</b>	<b>ESTIMATION SPECIFICATION &amp; CONTRACTS</b>	<ul style="list-style-type: none"> <li>• The student should be able to determine the quantities of different components of buildings.</li> <li>• The student should be in a position to find the cost of various building components.</li> <li>• The student should be capable of finalizing the value of structures.</li> </ul>
	<b>II</b>	<b>GROUND IMPROVEMENT TECHNIQUES</b>	<ul style="list-style-type: none"> <li>• By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations.</li> <li>• The student should be in a position to design a reinforced earth embankment and check its stability.</li> <li>• The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice.</li> <li>• The student should be able to understand the concepts and applications of grouting.</li> </ul>
	<b>II</b>	<b>DESIGN AND DRAWING OF IRRIGATION STRUCTURES</b>	<ul style="list-style-type: none"> <li>• To design Surplusweir</li> <li>• To design Tank sluice with a towerhead</li> <li>• To design Canal drop-Notchtype</li> <li>• To design Canalregulator</li> <li>• To design Undertunnel</li> <li>• To design Syphon aqueduct type III</li> </ul>



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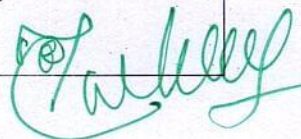
**Electrical and Electronics Engineering**

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

YEAR	SEMESTER	SUBJECT	COS
I/IV (R20)	I	<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials</li> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> <li>• Able to gain knowledge on solving first order differential equations and its applications to various engineering fields.</li> </ul>

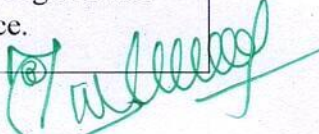
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			<ul style="list-style-type: none"> <li>• Able to solve the higher order differential equations related to various engineering fields.</li> <li>• Able to use functions of several variables in optimization.</li> <li>• Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals.</li> </ul>
		<b>MATHEMATICS-II</b>	<ul style="list-style-type: none"> <li>• Able to solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel</li> <li>• Able to develop the use of matrix algebra techniques that is needed by engineers for practical applications</li> <li>• Able to evaluate approximating the roots of polynomial and transcendental equations by different algorithms.</li> <li>• Able to apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals.</li> <li>• Able to apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations</li> </ul>
		<b>PROGRAMMING FOR PROBLEM SOLVING USING C</b>	<ul style="list-style-type: none"> <li>• Understanding basic building blocks of C-programming language.</li> <li>• Use different operators, data types and write programs that use two-way/ multi way selection &amp; Select the best loop construct for a given problem</li> <li>• Demonstrate the use of different derived data types, Strings, structures and unions</li> <li>• Design and implement programs to analyze the different pointer applications</li> <li>• Explain various file handling mechanisms &amp; Apply File I/O operations.</li> </ul>



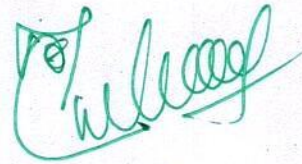
		<b>ENGINEERING DRAWING</b>	<ul style="list-style-type: none"> <li>• Creating to draw the polygons, engineering curves, and scales.</li> <li>• Creating the projections of lines inclined to both the planes and its traces.</li> <li>• Understanding the different plans and draw the projections of the plane inclined to both the planes.</li> <li>• Analyzing the basic solids and draw the projections of the solids inclined to one of the planes.</li> <li>• Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.</li> </ul>
		<b>ELECTRICAL ENGINEERING WORKSHOP</b>	<ul style="list-style-type: none"> <li>• Explain the limitations, tolerances, safety aspects of electrical systems and wiring.</li> <li>• Select wires/cables and other accessories used in different types of wiring.</li> <li>• Make simple lighting and power circuits.</li> <li>• Measure current, voltage and power in a circuit.</li> </ul>
		<b>PROGRAMMING FOR PROBLEM SOLVING USING C LAB</b>	<ul style="list-style-type: none"> <li>• Gains Knowledge on various concepts of a C language.</li> <li>• Draw flowcharts and write algorithms.</li> <li>• Design and development of C problem solving skills.</li> <li>• Design and develop modular programming skills.</li> <li>• Trace and debug a program</li> </ul>
<b>I/IV (R20)</b>	<b>II</b>	<b>MATHEMATICS-III (Vector Calculus, Transforms and PDE)</b>	<ul style="list-style-type: none"> <li>• interpret the physical meaning of different operators such as gradient, curl and divergence (L5)</li> <li>• estimate the work done against a field, circulation and flux using vector calculus (L5)</li> <li>• apply the Laplace transform for solving differential equations (L3)</li> <li>• find or compute the Fourier series of periodic signals (L3)</li> <li>• know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)</li> <li>• identify solution methods for partial differential equations that model</li> </ul>

			physical processes(L3)
		<b>APPLIED PHYSICS</b>	<ul style="list-style-type: none"> <li>• Explain the need of coherent sources and the conditions for sustained interference (L2)</li> <li>• Identify engineering applications of interference (L3)</li> <li>• Analyze the differences between interference and diffraction with applications (L4)</li> <li>• Illustrate the concept of polarization of light and its applications (L2)</li> <li>• Classify ordinary polarized light and extraordinary polarized light (L2)</li> </ul>
		<b>DATA STRUCTURES THROUGH C</b>	<ul style="list-style-type: none"> <li>• data structures concepts with arrays, stacks, queues.</li> <li>• linked lists for stacks, queues and for other applications.</li> <li>• traversal methods in the Trees.</li> <li>• various algorithms available for the graphs.</li> <li>• sorting and searching in the data retrieval applications.</li> </ul>
		<b>ELECTRICAL CIRCUIT ANALYSIS - I</b>	<ul style="list-style-type: none"> <li>• Various electrical networks in presence of active and passive elements.</li> <li>• Electrical networks with network topology concepts.</li> <li>• Any magnetic circuit with various dot conventions.</li> <li>• Any R, L, C network with sinusoidal excitation.</li> <li>• Any R, L, network with variation of any one of the parameters i.e., R, L, C and f.</li> <li>• Electrical networks by using principles of network theorems.</li> </ul>
		<b>BASIC CIVIL AND MECHANICAL ENGINEERING</b>	<ul style="list-style-type: none"> <li>• Apply Shear force diagram &amp; Bending moment diagram principles for Cantilever and Simply supported beams.</li> <li>• Apply concepts of Rosette analysis for strain measurements.</li> <li>• Analyse the characteristics of common building materials.</li> <li>• Compare the working characteristics of Internal Combustion engines.</li> <li>• Compare the differences between boiler mountings and accessories.</li> </ul>
		<b>BASIC CIVIL AND MECHANICAL ENGINEERING LAB</b>	<ul style="list-style-type: none"> <li>• Solve to arrive at finding constant speed and variable speed on IC engines and interpret their performance.</li> </ul>



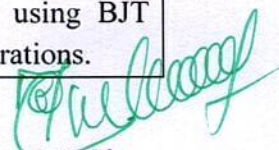


			<ul style="list-style-type: none"> <li>• Estimate energy distribution by conducting heat balance test on IC engines</li> <li>• Explain procedure for standardization of experiments.</li> <li>• Determine flow discharge measuring device used in pipes channels and tanks.</li> <li>• Determine fluid and flow properties.</li> <li>• Solve for drag coefficients.</li> <li>• Test for the performance of pumps and turbines</li> </ul>
		<p><b>DATA STRUCTURES THROUGH C LAB</b></p>	<ul style="list-style-type: none"> <li>• Be able to design and analyze the time and space efficiency of the data structure.</li> <li>• Be capable to identify the appropriate data structure for given problem.</li> <li>• Have practical knowledge on the applications of data structures.</li> </ul>



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YEAR	SEMESTER	SUBJECT	COS
II/IV (R20)	I	MATHEMATICS-IV	<ul style="list-style-type: none"> <li>• Able to apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic</li> <li>• 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</li> <li>• Able to apply discrete and continuous probability distributions</li> <li>• Able to the components of a classical hypothesis test</li> <li>• Able to infer the statistical inferential methods based on small and large sampling tests</li> </ul>
		ELECTRONIC DEVICES AND CIRCUITS	<ul style="list-style-type: none"> <li>• Able to Understand the basic concepts of semiconductor physics.</li> <li>• 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.</li> <li>• Able to know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons</li> <li>• Able to Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.</li> <li>• 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.</li> </ul>



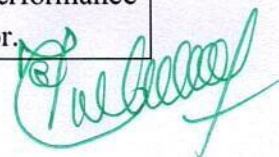
		<b>ELECTRICAL CIRCUIT ANALYSIS – II</b>	<ul style="list-style-type: none"> <li>• Able to understand the concepts of balanced and unbalanced three-phase circuits.</li> <li>• Able to know the transient behaviour of electrical networks with DC excitations.</li> <li>• Able to learn the transient behaviour of electrical networks with AC excitations.</li> <li>• Able to Estimate various parameters of a two port network.</li> <li>• Able to understand the significance of filters in electrical networks.</li> </ul>
		<b>DC MACHINES AND TRANSFORMERS</b>	<ul style="list-style-type: none"> <li>• Assimilate the concepts of electromechanical energy conversion.</li> <li>• Mitigate the ill-effects of armature reaction and improve commutation in dc machines.</li> <li>• Understand the torque production mechanism and control the speed of dc motors, Able to analyze the performance of single phase transformers</li> <li>• Predetermine regulation, losses and efficiency of single phase transformers</li> <li>• Parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.</li> </ul>
		<b>ELECTRO MAGNETIC FIELDS</b>	<ul style="list-style-type: none"> <li>• Able to Compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions.</li> <li>• Able to calculate the capacitance and energy stored in dielectrics.</li> <li>• 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.</li> <li>• Estimate self and mutual inductances</li> </ul>

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			<p>and the energy stored in the magnetic field.</p> <ul style="list-style-type: none"> <li>• Able to Understand the concepts of displacement current and Pointing theorem and Pointing vector</li> </ul>
		<b>ELECTRICAL CIRCUITS LAB</b>	<ul style="list-style-type: none"> <li>• Apply various theorems</li> <li>• Determination of self and mutual inductances</li> <li>• Two port parameters of a given electric circuits</li> <li>• Draw locus diagrams</li> <li>• Draw Waveforms and phasor diagrams for lagging and leading networks</li> </ul>
		<b>DC MACHINES AND TRANSFORMERS LAB</b>	<ul style="list-style-type: none"> <li>• Determine and predetermine the performance of DC machines and Transformers.</li> <li>• Control the speed of DC motor.</li> <li>• Obtain three phase to two phase transformation.</li> </ul>
		<b>ELECTRONIC DEVICES AND CIRCUITS LAB</b>	<ul style="list-style-type: none"> <li>• Analyze the characteristics of diodes, transistors and other devices</li> <li>• Design and implement the rectifier circuits, SCR and UJT in the hardware circuits.</li> <li>• Design the biasing and amplifiers of BJT and FET amplifiers.</li> <li>• Measure electrical quantities using CRO in the experimentation</li> </ul>
		<b>SKILL ORIENTED COURSE (DESIGN OF ELECTRICAL CIRCUITS USING ENGINEERING SOFTWARE TOOLS)</b>	<ul style="list-style-type: none"> <li>• write the MATLAB programs to simulate the electrical circuit problems</li> <li>• simulate various circuits for electrical parameters</li> <li>• simulate various wave form for determination of wave form parameters</li> <li>• simulate RLC series and parallel resonance circuits for resonant parameters</li> <li>• simulate magnetic circuits for determination of self and mutual inductances</li> </ul>
		<b>PROFESSIONAL ETHICS &amp;</b>	<ul style="list-style-type: none"> <li>• Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field.</li> </ul>

		<b>HUMAN VALUES</b>	<ul style="list-style-type: none"> <li>● Identify the multiple ethical interests at stake in a real-world situation or practice</li> <li>● Articulate what makes a particular course of action ethically defensible</li> <li>● Assess their own ethical values and the social context of problems</li> <li>● 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</li> <li>● Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work</li> <li>● Integrate, synthesize, and apply knowledge of ethical dilemmas and solutions in academic settings, including focused and interdisciplinary research.</li> </ul>
<b>II/IV (R20)</b>	<b>II</b>	<b>DIGITAL ELECTRONICS</b>	<ul style="list-style-type: none"> <li>● Classify different number systems and apply to generate various codes.</li> <li>● Use the concept of Boolean algebra in minimization of switching functions</li> <li>● Design different types of combinational logic circuits.</li> <li>● Apply knowledge of flip-flops in designing of Registers and counters</li> <li>● The operation and design methodology for synchronous sequential circuits and algorithmic state machines.</li> </ul>
		<b>POWER SYSTEMS - I</b>	<ul style="list-style-type: none"> <li>● Identify the different components of thermal power plants. Identify the different components of nuclear Power plants.</li> <li>● Identify the different components of air and gas insulated substations.</li> <li>● Identify single core and three core cables with different insulating materials.</li> <li>● Analyse the different economic factors of power generation and tariffs.</li> </ul>
		<b>INDUCTION AND SYNCHRONOUS</b>	<ul style="list-style-type: none"> <li>● Explain the operation and performance of three phase induction motor.</li> </ul>



		<b>MACHINES</b>	<ul style="list-style-type: none"> <li>• Analyze the torque-speed relation, performance of induction motor and induction generator.</li> <li>• Implement the starting of single phase induction motors.</li> <li>• Develop winding design and predetermine the regulation of synchronous generators.</li> <li>• Explain hunting phenomenon, implement methods of starting and correction of power factor with synchronous motor.</li> </ul>
		<b>MANAGERIAL ECONOMICS &amp; FINANCIAL ANALYSIS</b>	<ul style="list-style-type: none"> <li>• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</li> <li>• The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</li> <li>• 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.</li> <li>• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</li> <li>• The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</li> </ul>
		<b>PYTHON PROGRAMMING LAB</b>	<ul style="list-style-type: none"> <li>• Write, Test and Debug Python Programs</li> <li>• Use Conditionals and Loops for Python Programs</li> <li>• Use functions and represent Compound data using Lists, Tuples and</li> <li>• Dictionaries Use various applications using python</li> </ul>
		<b>INDUCTION AND</b>	<ul style="list-style-type: none"> <li>• Assess the performance of single phase and three phase induction motors.</li> <li>• Control the speed of three phase</li> </ul>

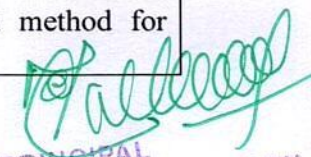
		<b>SYNCHRONOUS MACHINES LAB</b>	<p>induction motor.</p> <ul style="list-style-type: none"> <li>• Predetermine the regulation of three-phase alternator by various methods.</li> <li>• Find the <math>X_d/X_q</math> ratio of alternator and assess the performance of three-phase synchronous motor. Determine the performance of single phase AC series motor.</li> </ul>
		<b>DIGITAL ELECTRONICS LAB</b>	<ul style="list-style-type: none"> <li>• Learn the basics of gates, flip-flops and counters.</li> <li>• Construct basic combinational circuits and verify their functionalities</li> <li>• Apply the design procedures to design basic sequential circuits</li> <li>• To understand the basic digital circuits and to verify their operation</li> <li>• Apply Boolean laws to simplify the digital circuits.</li> </ul>
		<b>SKILL ORIENTED COURSE IOT APPLICATIONS</b>	<ul style="list-style-type: none"> <li>• apply various technologies of Internet of Things to real time applications.</li> <li>• apply various communication technologies used in the Internet of Things.</li> <li>• connect the devices using web and internet in the IoT environment.</li> <li>• implement IoT to study Smart Home, Smart city, etc.</li> </ul>
<b>III/IV (R20)</b>	<b>I</b>	<b>POWER SYSTEMS- II</b>	<ul style="list-style-type: none"> <li>• Calculate parameters of transmission lines for different circuit configurations. Determine the performance of short, medium and long transmission lines.</li> <li>• Analyse the effect of travelling waves on transmission lines.</li> <li>• Analyse the various voltage control methods and effect of corona.</li> <li>• Calculate sag/tension of transmission lines and performance of line insulators.</li> </ul>
		<b>POWER ELECTRONICS</b>	<ul style="list-style-type: none"> <li>• Illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT.</li> <li>• Analyse the operation of phase-controlled rectifiers.</li> <li>• Analyse the operation of three-phase</li> </ul>

			<p>full-wave converters, AC Voltage Controllers and Cycloconverters.</p> <ul style="list-style-type: none"> <li>• Examine the operation and design of different types of DC-DC converters.</li> <li>• Analyse the operation of PWM inverters for voltage control and harmonic mitigation.</li> </ul>
		<b>CONTROL SYSTEMS</b>	<ul style="list-style-type: none"> <li>• Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.</li> <li>• 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.</li> <li>• Analyze the stability of LTI systems using frequency response methods.</li> <li>• Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams.</li> <li>• Represent physical systems as state models and determine the response. Understand the concepts of controllability and observability.</li> </ul>
		<b>RENEWABLE ENERGY SOURCES (OPEN ELECTIVE-I)</b>	<ul style="list-style-type: none"> <li>• Analyze solar radiation data, extra-terrestrial radiation, radiation on earth's surface and solar Energy Storage.</li> <li>• Illustrate the components of wind energy systems.</li> <li>• Illustrate the working of biomass, digesters and Geothermal plants.</li> <li>• Demonstrate the principle of Energy production from OTEC, Tidal and Waves.</li> <li>• Evaluate the concept and working of Fuel cells &amp; MHD power generation</li> </ul>
		<b>CONCEPTS OF OPTIMIZATION</b>	<ul style="list-style-type: none"> <li>• State and formulate the optimization problem without and with constraints,</li> </ul>



		<b>TECHNIQUES (OPEN ELECTIVE-I)</b>	<p>also apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints and arrive at an optimal solution.</p> <ul style="list-style-type: none"> <li>• Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.</li> <li>• Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies.</li> <li>• Solve transportation and assignment problem by using Linear programming Simplex method.</li> <li>• 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.</li> </ul>
		<b>CONCEPTS OF CONTROL SYSTEMS (OPEN ELECTIVE-I)</b>	<ul style="list-style-type: none"> <li>• Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.</li> <li>• Determine time response specifications of second order systems and to determine error constants.</li> <li>• Analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.</li> <li>• Analyze the stability of LTI systems using frequency response methods.</li> <li>• Represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.</li> </ul>
		<b>LINEAR IC APPLICATIONS (PROFESSIONAL</b>	<ul style="list-style-type: none"> <li>• Describe the Op-Amp and internal Circuitry: 555 Timer, PLL</li> <li>• Discuss the Applications of</li> </ul>

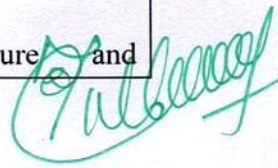
		<b>ELECTIVE – I)</b>	<p>Operational amplifier: 555 Timer, PLL.</p> <ul style="list-style-type: none"> <li>• Design the Active filters using Operational Amplifier</li> <li>• Use the Op-Amp in A to D &amp; D to A Converters</li> </ul>
		<b>UTILIZATION OF ELECTRICAL ENERGY (PROFESSIONAL ELECTIVE – I)</b>	<ul style="list-style-type: none"> <li>• To study the basic principles of illumination and its measurements and to design the different types lighting systems.</li> <li>• To acquaint with the different types of heating and welding techniques.</li> <li>• To understand the operating principles and characteristics of various motors with respect to speed, temperature and loading conditions.</li> <li>• 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.</li> <li>• To Introduce the concepts of various types of energy storage systems.</li> </ul>
		<b>COMPUTER ARCHITECTURE AND ORGANIZATION (PROFESSIONAL ELECTIVE – I)</b>	<ul style="list-style-type: none"> <li>• Explain the instruction cycle of a computer.</li> <li>• Understand various micro operations and register transfer language.</li> <li>• Describe parallel processing and pipelining.</li> <li>• Interface different peripherals with processors.</li> <li>• Know the advantages of cache and virtual memory</li> </ul>
		<b>OPTIMIZATION TECHNIQUES (PROFESSIONAL ELECTIVE – I)</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.</li> </ul>

  
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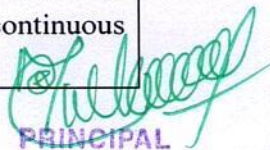
			<ul style="list-style-type: none"> <li>• Formulate a mathematical model and apply non-linear programming techniques for unconstrained and constrained case studies.</li> <li>• Solve transportation and assignment problem by using Linear programming Simplex method.</li> <li>• Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.</li> </ul>
		<p><b>OBJECT ORIENTED PROGRAMMING THROUGH JAVA (PROFESSIONAL ELECTIVE – I)</b></p>	<ul style="list-style-type: none"> <li>• Discuss and understand java programming constructs, Control structures</li> <li>• Illustrate and experiment Object Oriented Concepts like classes, objects</li> <li>• Apply Object Oriented Constructs such as Inheritance, interfaces, and exception handling</li> <li>• Construct applications using multithreading and I/O.</li> <li>• Develop Dynamic User Interfaces using applets and Event Handling in java</li> </ul>
		<p><b>CONTROL SYSTEMS LABORATORY</b></p>	<ul style="list-style-type: none"> <li>• Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros.</li> <li>• Design P,PI,PD and PID controllers</li> <li>• Design lag, lead and lag-lead compensators</li> <li>• Evaluate temperature control of an oven using PID controller</li> <li>• Determine the transfer function of D.C Motor</li> <li>• Analyze the performance of D.C and A.C Servo Motor.</li> <li>• Test the controllability and observability.</li> <li>• Judge the stability in time and frequency domain.</li> <li>• To examine different logic gates and Boolean expressions using PLC.</li> </ul>



		<b>POWER ELECTRONICS LABORATORY</b>	<ul style="list-style-type: none"> <li>Analyse characteristics of various power electronic devices and design firing circuits for SCR.</li> <li>Analyse the performance of single-phase dual, three-phase full-wave bridge converters and dual converter with both resistive and inductive loads.</li> <li>Examine the operation of Single-phase AC voltage regulator and Cycloconverter with resistive and inductive loads.</li> <li>Differentiate the working and control of Buck converter and Boost converter.</li> <li>Differentiate the working &amp; control of Square wave inverter and PWM inverter.</li> </ul>
		<b>SOFT SKILL COURSE EMPLOYABILITY SKILLS</b>	<ul style="list-style-type: none"> <li>Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems</li> <li>Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.</li> <li>Analyze, summarize and present information in quantitative forms including table, graphs and formulas</li> <li>Understand the core competencies to succeed in professional and personal life</li> <li>Learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc.</li> </ul>
<b>III/IV (R20)</b>	<b>II</b>	<b>MICROPROCESSORS AND MICROCONTROLLERS</b>	<ul style="list-style-type: none"> <li>Know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors.</li> <li>Analyse the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors</li> <li>Analyse the Microcontroller and interfacing capability</li> <li>Describe the architecture and</li> </ul>



			<p>interfacing of 8051 controller</p> <ul style="list-style-type: none"> <li>• Know the concepts of PIC micro controller and its programming</li> </ul>
		<b>ELECTRICAL MEASUREMENTS AND INSTRUMENTATION</b>	<ul style="list-style-type: none"> <li>• Know the construction and working of various types of analog instruments.</li> <li>• Describe the construction and working of wattmeter and power factor meters</li> <li>• Know the construction and working various bridges for the measurement resistance - inductance and capacitance</li> <li>• Know the operational concepts of various transducers</li> <li>• Know the construction and operation digital meters.</li> </ul>
		<b>POWER SYSTEM ANALYSIS</b>	<ul style="list-style-type: none"> <li>• Draw impedance diagram for a power system network and calculate per unit quantities.</li> <li>• Apply the load flow solution to a power system using different methods.</li> <li>• Form Zbus for a power system networks and analyse the effect of symmetrical faults.</li> <li>• Find the sequence components for power system Components and analyse its effects of unsymmetrical faults.</li> <li>• Analyse the stability concepts of a power system.</li> </ul>
		<b>SIGNALS AND SYSTEMS (PROFESSIONAL ELECTIVE – II)</b>	<ul style="list-style-type: none"> <li>• Apply the knowledge of various signals and operations.</li> <li>• Analyze the spectral characteristics of periodic signals using Fourier Analysis.</li> <li>• Classify the systems based on their properties and determine the response of LSI system using convolution.</li> <li>• Understand the process of sampling and the effects of under sampling.</li> <li>• Apply Laplace and z-transforms to analyze signals and Systems (continuous &amp; discrete).</li> </ul>

  
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		<p><b>ELECTRIC DRIVES (PROFESSIONAL ELECTIVE – II)</b></p>	<ul style="list-style-type: none"> <li>• Explain the fundamentals of electric drive and different electric braking methods.</li> <li>• Analyze the operation of three-phase converter fed dc motors and four quadrant operations of dc motors using dual converters.</li> <li>• Describe the DC-DC converter fed control of dc motors in various quadrants of operation</li> <li>• 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</li> <li>• Learn the concepts of speed control of synchronous motor with different methods</li> </ul>
		<p><b>ADVANCED CONTROL SYSTEMS (PROFESSIONAL ELECTIVE – II)</b></p>	<ul style="list-style-type: none"> <li>• Analyse different canonical forms - solution of State equation.</li> <li>• Design of control system using the pole placement technique is given after introducing the concept of controllability and observability.</li> <li>• Analyze nonlinear system using describing function technique and phase plane analysis.</li> <li>• Examine the stability analysis using Lyapunov method.</li> <li>• Illustrate the Minimization of functional using calculus of variation - state and quadratic regulator</li> </ul>
		<p><b>ELECTRICAL MEASUREMENTS AND INSRUMENTATION LABORATORY</b></p>	<ul style="list-style-type: none"> <li>• Know about the phantom loading.</li> <li>• Learn the calibration process.</li> <li>• Measure the electrical parameters voltage - current - power - energy and electrical characteristics of resistance - inductance and capacitance.</li> <li>• Gain the skill knowledge of various brides and their applications.</li> <li>• Learn the usage of CT's - PT's for</li> </ul>

			<p>measurement purpose.</p> <ul style="list-style-type: none"> <li>• Know the characteristics of transducers.</li> <li>• Measure the strains - frequency and phase difference. .</li> </ul>
		<p><b>MICRO PROCESSOR AND MICRO CONTROLLERS LAB</b></p>	<ul style="list-style-type: none"> <li>• Write assembly language program using 8086 microprocessor based on arithmetic - logical - number systems and shift operations.</li> <li>• Write assembly language programs for numeric operations and array handling problems.</li> <li>• Write a assembly program on string operations.</li> <li>• Interface 8086 with I/O and other devices.</li> <li>• Do parallel and serial communication using 8051 &amp; PIC 18 micro controllers.</li> <li>• Program microprocessors and microcontrollers for real world applications.</li> </ul>
		<p><b>POWER SYSTEMS AND SIMULATION I</b></p>	<ul style="list-style-type: none"> <li>• Estimate the sequence impedances of 3-phase Transformer and Alternators .</li> <li>• Evaluate the performance of transmission lines</li> <li>• Analyse and simulate power flow methods in power systems</li> <li>• Analyse and simulate the performance of PI controller for load frequency control.</li> <li>• Analyse and simulate stability studies of power systems</li> </ul>
		<p><b>SKILL ADVANCED COURSE</b></p> <p><b>MACHINE LEARNING WITH PYTHON</b></p>	<ul style="list-style-type: none"> <li>• Illustrate and comprehend the basics of Machine Learning with Python</li> <li>• Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions</li> <li>• Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms</li> <li>• Evaluate the concepts of binning, pipeline Interfaces with examples</li> <li>• Apply the sentiment analysis for various case studies</li> </ul>
IV/IV	I	<p><b>SWITCHGEAR AND</b></p>	<ul style="list-style-type: none"> <li>• Understand the principles of arc interruption for application to high</li> </ul>

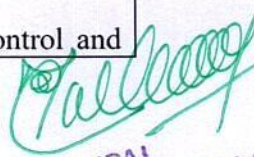
(R19)		<b>PROTECTION</b>	<p>voltage circuit breakers of air, oil, vacuum, SF6 gas type.</p> <ul style="list-style-type: none"> <li>• Understand the working principle and operation of different types of electromagnetic protective relays.</li> <li>• Students acquire knowledge of faults and protective schemes for high power generator and transformers.</li> <li>• Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.</li> <li>• Understand different types of static relays and their applications.</li> <li>• Understand different types of over voltages and protective schemes required for insulation co-ordination.</li> </ul>
		<b>OOPS THROUGH JAVA</b>	<ul style="list-style-type: none"> <li>• Understand Java programming concepts and utilize Java Graphical User Interface in Program writing.</li> <li>• Write, compile, execute and troubleshoot Java programming for networking concepts.</li> <li>• Build Java Application for distributed environment.</li> <li>• Design and Develop multi-tier applications.</li> <li>• identify and Analyze Enterprise applications</li> </ul>
		<b>RENEWABLE ENERGY SYSTEMS</b>	<ul style="list-style-type: none"> <li>• Analyze solar radiation data, extraterrestrial radiation, and radiation on earth's surface.</li> <li>• Design solar thermal collectors, solar thermal plants.</li> <li>• Design solar photo voltaic systems.</li> <li>• develop maximum power point techniques in solar PV and wind energy systems</li> <li>• Explain wind energy conversion systems, wind generators, power generation.</li> <li>• explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems</li> </ul>
		<b>UTILIZATION OF ELECTRICAL</b>	<ul style="list-style-type: none"> <li>• Understand various levels of illuminosity produced by different</li> </ul>

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		<b>ENERGY (ELECTIVE-II)</b>	<p>illuminating sources and able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.</p> <ul style="list-style-type: none"> <li>• Identify most appropriate heating and welding techniques for suitable applications.</li> <li>• identify a suitable motor for electric drives and industrial applications</li> <li>• Determine the speed/time characteristics of different types of traction systems and determination of various traction parameters.</li> <li>• Know the necessity and usage of different energy storage schemes for different applications.</li> </ul>
		<b>DATA BASE MANAGEMENT SYSTEMS (ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Describe a relational database and object-oriented database.</li> <li>• create, maintain and manipulate a relational database using SQL</li> <li>• Describe ER model and normalization for database design.</li> <li>• Examine issues in data storage and query processing and can formulate appropriate solutions.</li> <li>• Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage.</li> <li>• design and build database system for a given real world problem</li> </ul>
		<b>ADVANCED CONTROL SYSTEMS (ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Formulate different state models in canonical forms.</li> <li>• Design of state feedback control using the pole placement technique and state observer design for a given control system.</li> <li>• analyse of nonlinear system using the describing function technique and determine the</li> <li>• Stability of a linear autonomous system using lypnov method.</li> </ul>

			<ul style="list-style-type: none"> <li>• Determine minimization of functionals using calculus of variation studied.</li> <li>• Formulate and solve the LQR problem and riccati equation.</li> </ul>
		<b>ELECTRICAL MACHINE DESIGN (ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Design main dimensions of rotating machines.</li> <li>• Design transformers and determine main dimensions.</li> <li>• Design field circuit of DC machines and Synchronous machines.</li> <li>• Design armature of DC machines and AC machines.</li> </ul>
		<b>HYBRID ELECTRIC VEHICLES (ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Know the concept of electric vehicles and hybrid electric vehicles.</li> <li>• Familiar with different configuration of hybrid electric vehicles.</li> <li>• understand the power converters used in hybrid electric vehicles</li> <li>• Know different batteries and other energy storage systems.</li> </ul>
		<b>LINEAR &amp; DIGITAL IC APPLICATIONS LAB</b>	<ul style="list-style-type: none"> <li>• understand the characteristics of ICs- 741, 555, 565, 566.</li> <li>• apply the concepts of IC 741 for different applications.</li> <li>• analyse the data connection circuits. develop the digital circuits.</li> <li>• model the counters &amp; Registers using IC's.</li> </ul>
		<b>POWER SYSTEMS &amp; SIMULATION LAB</b>	<ul style="list-style-type: none"> <li>• determine the parameters of various power system components which are frequently occur in power system studies and he can execute energy management systems functions at load dispatch center.</li> </ul>
<b>IV/IV (R19)</b>	<b>II</b>	<b>POWER SYSTEM OPERATION AND CONTROL</b>	<ul style="list-style-type: none"> <li>• Compute optimal scheduling of Generators.</li> <li>• Understand hydrothermal scheduling.</li> <li>• Understand the unit commitment problem.</li> <li>• Understand importance of the frequency.</li> <li>• Understand importance of PID controllers in single area and two area systems.</li> <li>• Understand reactive power control and</li> </ul>

  
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			compensation for transmission line.
		<b>MEASUREMENTS AND INSTRUMENTATION (OPEN ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Choose right type of instrument for measurement of ac and dc Electrical quantities.</li> <li>• Choose right type of instrument for measurement of power and power factor.</li> <li>• select right type for measurement of R, L,C.</li> <li>• Understand the effectiveness of Transducer.</li> <li>• Understand Digital Meters.</li> </ul>
		<b>FUNDAMENTALS OF UTILIZATION OF ELECTRICAL ENERGY (OPEN ELECTIVE -II)</b>	<ul style="list-style-type: none"> <li>• Know the various sources of electrical energy and its generation technologies for conventional and non-conventional energy sources.</li> <li>• Know various types of illumination equipment, illumination measurement and illumination techniques.</li> <li>• Learn about various methods used for electrical energy based heating and welding applications.</li> <li>• Know about the mechanisms, equipment and technology used in the electric traction.</li> <li>• Understand the importance of electrical earthing, earthing equipment and electrical earthing measurement methods.</li> </ul>
		<b>CONCEPTS OF POWER SYSTEM ENGINEERING (OPEN ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Gain knowledge on types of power plants.</li> <li>• Learn about transmission and distribution concepts.</li> <li>• Understand protection and grounding methods.</li> <li>• Learn the economic aspects of electrical energy.</li> <li>• Understand the power factor improvement and voltage control.</li> </ul>
		<b>BASICS OF CONTROL SYSTEMS (OPEN ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.</li> <li>• Determine time response specifications of second order systems and to</li> </ul>

			<p>determine error constants.</p> <ul style="list-style-type: none"> <li>Analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.</li> <li>Analyze the stability of LTI systems using frequency response methods.</li> <li>Represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.</li> </ul>
		<b>ENERGY AUDIT (OPEN ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>Explain energy efficiency, conservation and various technologies.</li> <li>Design energy efficient lighting systems.</li> <li>Calculate power factor of systems and propose suitable compensation techniques.</li> <li>Explain energy conservation in HVAC systems.</li> <li>Calculate life cycle costing analysis and return on investment on energy efficient technologies.</li> </ul>
		<b>ELECTRICAL DISTRIBUTION SYSTEMS (ELECTIVE-IV)</b>	<ul style="list-style-type: none"> <li>Understand various factors of distribution system.</li> <li>Design the substation and feeders.</li> <li>determine the voltage drop and power loss</li> <li>Understand the protection and its coordination.</li> <li>Understand the effect of compensation for p.f improvement.</li> <li>Understand the effect of voltage control.</li> </ul>
		<b>HVAC &amp; DC TRANSMISSION (ELECTIVE-IV)</b>	<ul style="list-style-type: none"> <li>Acquaint with HV transmission system with regard to power handling capacity, losses, conductor resistance and electrostatic field associate with HV. Further knowledge is gained in area of bundle conductor system to improve electrical and mechanical performance.</li> <li>Develop ability for determining corona, radio interference, audible noise generation and frequency spectrum for single and three phase transmission lines.</li> </ul>

			<ul style="list-style-type: none"> <li>• Acquire knowledge in transmission of HVDC power with regard to terminal equipments, type of HVDC connectivity and planning of HVDC system.</li> <li>• Develop knowledge with regard to choice of pulse conversion, control characteristic, firing angle control and effect of source impedance.</li> <li>• Develop knowledge of reactive power requirements of conventional control, filters and reactive power compensation in AC. side of HVDC system.</li> <li>• Calculate voltage and current harmonics, and design of filters for six and twelve pulse conversion.</li> </ul>
		<p><b>FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS (ELECTIVE-IV)</b></p>	<ul style="list-style-type: none"> <li>• Understand power flow control in transmission lines using FACTS controllers.</li> <li>• Explain operation and control of voltage source converter.</li> <li>• Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines.</li> <li>• Explain the method of shunt compensation using static VAR compensators.</li> <li>• Understand the methods of compensations using series compensators.</li> <li>• Explain operation of Unified Power Flow Controller (UPFC).</li> </ul>
		<p><b>POWER QUALITY (ELECTIVE-IV)</b></p>	<ul style="list-style-type: none"> <li>• Differentiate between different types of power quality problems.</li> <li>• Explain the sources of voltage sag, voltage swell, interruptions, transients, long duration over voltages and harmonics in a power system.</li> <li>• Analyze power quality terms and power quality standards.</li> <li>• Explain the principle of voltage regulation and power factor improvement methods.</li> <li>• Demonstrate the relationship between distributed generation and power</li> </ul>

			<p>quality.</p> <ul style="list-style-type: none"> <li>• Explain the power quality monitoring concepts and the usage of measuring instruments.</li> </ul>
		<p><b>SMART GRID (ELECTIVE-IV)</b></p>	<ul style="list-style-type: none"> <li>• Understand smart grids and analyse the smart grid policies and developments in smart grids.</li> <li>• Develop concepts of smart grid technologies in hybrid electrical vehicles etc.</li> <li>• Understand smart substations, feeder automation, GIS etc.</li> <li>• Analyse micro grids and distributed generation systems.</li> <li>• Analyse the effect of power quality in smart grid and to understand latest developments in ICT for smart grid.</li> </ul>
		<p><b>SPECIAL ELECTRICAL MACHINES (ELECTIVE - IV)</b></p>	<ul style="list-style-type: none"> <li>• Distinguish between brush dc motor and brush less dc motor.</li> <li>• Explain the performance and control of stepper motors, and their applications.</li> <li>• Explain theory of operation and control of switched reluctance motor.</li> <li>• Explain the theory of travelling magnetic field and applications of linear motors.</li> <li>• Understand the significance of electrical motors for traction drives.</li> </ul>

  
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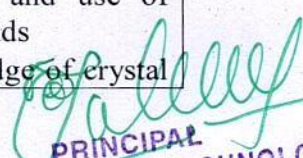


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## MECHANICAL ENGINEERING

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	COURSE OUTCOMES
I/IV (R20)	I	<b>ENGINEERING DRAWING</b>	<ul style="list-style-type: none"> <li>• Creating to draw the polygons, engineering curves, and scales.</li> <li>• Creating the projections of lines inclined to both the planes and its traces.</li> <li>• Understanding the different plans and draw the projections of the plane inclined to both the planes.</li> <li>• Analyzing the basic solids and draw the projections of the solids inclined to one of the planes.</li> <li>• Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.</li> </ul>
		<b>ENGINEERING PHYSICS</b>	<ul style="list-style-type: none"> <li>• Able to know the differences between interference, diffraction and polarization with its Engineering applications.</li> <li>• Able to understand the concepts of LASER and optical fibers. Apply these concepts in various Engineering and medical fields.</li> <li>• Able to apply the concepts of dielectric and magnetic materials in emerging micro devices.</li> <li>• Able to identify acoustic properties of materials in architecture and use of Ultrasonics in different fields</li> <li>• Able to apply the knowledge of crystal</li> </ul>

  
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			<p>diffraction methods to measure the various properties of crystals.</p>
		<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials</li> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> <li>• Able to gain knowledge on solving first order differential equations and its applications to various engineering fields.</li> <li>• Able to solve the higher order differential equations related to various engineering fields.</li> <li>• Able to use functions of several variables in optimization.</li> <li>• Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals</li> </ul>
		<b>PROGRAMMING FOR PROBLEM SOLVING USING C</b>	<ul style="list-style-type: none"> <li>• Understanding basic building blocks of C-programming language.</li> <li>• Use different operators, data types and write programs that use two-way/ multi way selection &amp; Select the best loop construct for a given problem</li> <li>• Demonstrate the use of different derived data types, Strings, structures and unions</li> <li>• Design and implement programs to</li> </ul>

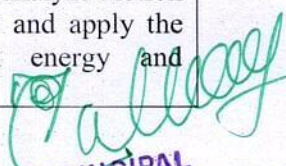


			<p>analyze the different pointer applications</p> <ul style="list-style-type: none"> <li>• Explain various file handling mechanisms &amp; Apply File I/O operations.</li> </ul>
		<b>English Communication Skills Laboratory</b>	<ul style="list-style-type: none"> <li>• Analyze the English speech sounds, Stress, Rhythm and Intonation. Understand the different aspects of the English language proficiency with emphasis on Pronunciation tone and accent neutralization.</li> <li>• Exhibit professionalism in participating in Debates and Group Discussion. Develop and enhance their language skills by participating in oral presentations and public speaking.</li> <li>• Enhance their knowledge through Interview skills</li> </ul>
		<b>Programming for Problem Solving Using C Laboratory</b>	<ul style="list-style-type: none"> <li>• Develop programs using basic data types, variables and conditional.</li> <li>• Develop programs using Arrays, Strings.</li> <li>• Develop programs using functions, pointers, files and dynamic memory allocations.</li> </ul>
		<b>Engineering Physics Lab</b>	<ul style="list-style-type: none"> <li>• Calculation of the physical values like radius of curvature of lens , wavelength of source, thickness of thin object, numerical aperture and Planks constant using principles of optical phenomenon.</li> <li>• Explain the magnetic and electric field effects involved in B-H curve experiment, Stewart Gee's apparatus and dielectric constant experiment.</li> <li>• Demonstrate the phenomena of resonance in stretched strings and verifying the laws of transverse vibrations</li> </ul>



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I(R20)	II	MATHEMATICS-II	<ul style="list-style-type: none"> <li>• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)</li> <li>• Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)</li> <li>• Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)</li> <li>• Apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)</li> <li>• Apply numerical integral techniques to different Engineering problems (L3)</li> <li>• Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)</li> </ul>
		ENGINEERING CHEMISTRY	<ul style="list-style-type: none"> <li>• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.</li> <li>• Synthesize nano materials for modern advances of engineering technology. Summarize the techniques that detect and measure changes of state of reaction. Illustrate the commonly used industrial materials.</li> <li>• Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. Study alternate fuels and analyse flue gases</li> <li>• Analyze the suitable methods for purification and treatment of hard water and brackish water.</li> </ul>
		ENGINEERING MECHANICS	<ul style="list-style-type: none"> <li>• The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters.</li> <li>• He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites.</li> <li>• He should be able to determine area and mass movement of inertia for composite sections He should be able to analyze motion of particles and rigid bodies and apply the principles of motion, work energy and impulse – momentum.</li> </ul>

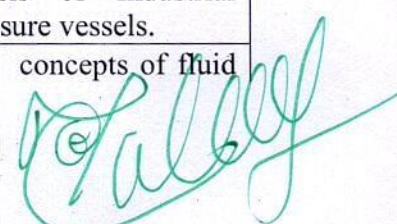
  
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		<b>BASIC ELECTRICAL &amp; ELECTRONICS ENGINEERING</b>	<ul style="list-style-type: none"> <li>Analyse various electrical networks.</li> <li>Understand operation of DC generators, 3-point starter and DC machine testing by Swinburne's Test and Brake test.</li> <li>Analyse performance of single-phase transformer and acquire proper knowledge and working of 3-phase alternator and 3-phase induction motors.</li> <li>Analyse operation of half wave, full wave bridge rectifiers and OP-AMPS.</li> <li>5. Understanding operations of CE amplifier and basic concept of feedback amplifier.</li> </ul>
		<b>THERMODYNAMICS</b>	<ul style="list-style-type: none"> <li>Basic concepts of thermodynamics</li> <li>Laws of thermodynamics</li> <li>Concept of entropy</li> <li>Property evaluation of vapors and their depiction in tables and charts</li> <li>Evaluation of properties of perfect gas mixtures.</li> </ul>
		<b>Workshop Practice Lab</b>	<ul style="list-style-type: none"> <li>Creating components using workshop trades including fitting, carpentry, foundry and welding.</li> <li>Applying the basic electrical engineering knowledge for house wiring practice</li> <li>Build the knowledge of various hardware components of a computer</li> </ul>
		<b>Engineering Chemistry Lab</b>	<ul style="list-style-type: none"> <li>Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus (Understand – L2)</li> <li>Learn and apply basic techniques used in chemistry laboratory for volumetric analysis; red ox titrations with different indicators; EDTA titrations.</li> <li>Explain and demonstrate a few instrumental methods.</li> </ul>
		<b>Basic Electrical &amp; Electronics Engineering Lab</b>	<ul style="list-style-type: none"> <li>Analyse the performance characteristics and to determine efficiency of DC shunt motor &amp; 3-phase induction motor. Estimate the efficiency and regulation for different load conditions and power factors of single phase transformer and alternator with OC and SC test.</li> <li>Understand the electrical behavior of PN junction diode and BJT by analyzing VI Characteristics under given bias condition and validate Op Amp applications using IC 741</li> </ul>

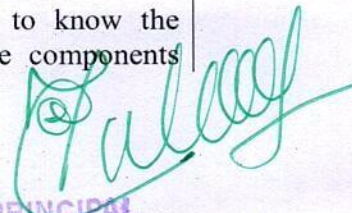
			<ul style="list-style-type: none"><li>Analyze the outputs of different types of Rectifier circuits using diodes and Understand frequency response of Common Emitter (CE) amplifier</li></ul>
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YEAR	SEME STER	SUBJECT	CO's
II	I	Vector Calculus, Fourier Transforms and PDE(M-III)	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Apply the Laplace transform for solving differential equations.</li> <li>• 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.</li> <li>• To identify solution methods for partial differential equations that model physical process.</li> <li>• Identify solution methods for partial differential equations that model physical processes.</li> </ul>
		Mechanics of Solids	<ul style="list-style-type: none"> <li>• Model &amp; Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium.</li> <li>• 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.</li> <li>• 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.</li> <li>• Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior</li> <li>• Design and analysis of Industrial components like pressure vessels.</li> </ul>
		Fluid Mechanics &	<ul style="list-style-type: none"> <li>• Comprehend different concepts of fluid</li> </ul>



		<b>Hydraulic Machines</b>	<p>and its properties, hydrostatic forces acting on different surfaces</p> <ul style="list-style-type: none"> <li>• Understand the topics of basic laws of fluids, flow patterns, viscous flow through ducts and their corresponding problems</li> <li>• Analyze different concepts related to boundary layer theory, velocity profiles and dimensional analysis</li> <li>• Apply the hydrodynamic forces acting on vanes and their performance evaluation</li> <li>• Explain the working Principles and performance evaluation of hydraulic pump and turbines.</li> </ul>
		<b>Production Technology</b>	<ul style="list-style-type: none"> <li>• Design the patterns and core boxes for metal casting processes.</li> <li>• Design the gating system for different metallic components.</li> <li>• Interpret the different types of manufacturing processes.</li> <li>• Identify the forging, extrusion processes.</li> <li>• Comprehend the different types of welding processes used for special fabrication.</li> </ul>
		<b>Kinematics of Machinery</b>	<ul style="list-style-type: none"> <li>• Contrive a mechanism for a given plane motion with single degree of freedom.</li> <li>• 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.</li> <li>• Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.</li> <li>• Select a power transmission system for a given application and analyze motion of different transmission systems</li> <li>• Contrive a mechanism for a given plane motion with single degree of freedom.</li> </ul>
		<b>Computer Aided Engineering Drawing Practice</b>	<ul style="list-style-type: none"> <li>• Student get exposed on working of sheet metal with help of development of surfaces.</li> <li>• Student understands how to know the hidden details of machine components</li> </ul>



			<p>with the help of sections and interpenetrations of solids.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul>
		<b>Fluid Mechanics &amp; Hydraulic Machines Lab</b>	<ul style="list-style-type: none"> <li>• Develop the different types of vanes</li> <li>• Design the different types of hydraulic turbines, pumps.</li> <li>• Develop the hydraulic energy in to mechanical energy using hydraulic turbines.</li> </ul>
		<b>Production Technology Lab</b>	<ul style="list-style-type: none"> <li>• Analyze the advanced welding and casting processes and can relate variables with performance measures</li> <li>• Apply some of the manufactures process directly in the industry for preparation of complicated jobs</li> <li>• Implement similar features in preparation of jobs can be extended to implement in the preparation of complicated jobs</li> </ul>
		<b>Drafting and Modeling Lab</b>	<ul style="list-style-type: none"> <li>• Analyze the basic concept to drawing, edit, dimension, hatching etc. to develop 2&amp;3D Modelling.</li> <li>• Construct 3D modelling, Assembling, modification &amp; manipulation along with detailing.</li> <li>• Construct surface modelling through various exercises.</li> </ul>
<b>III</b>	<b>I</b>	<b>Thermal Engineering-II</b>	<ul style="list-style-type: none"> <li>• Comprehend the concept of Rankine cycle. Interpret working of boilers including water tube, fire tube and high pressure boilers and determine efficiencies.</li> <li>• Analyze the flow of steam through nozzles. Evaluate the performance steam turbines.</li> <li>• Evaluate the performance of reaction turbines and steam condensers.</li> <li>• Discuss the concepts of reciprocating and rotary type of compressors.</li> <li>• Acquire knowledge about the centrifugal and axial flow compressors</li> </ul>
		<b>Design of Machine</b>	<ul style="list-style-type: none"> <li>• Judge about materials and their</li> </ul>

		<b>Members-I</b>	<p>properties along with manufacturing considerations.</p> <ul style="list-style-type: none"> <li>• Gain knowledge about the strength of machine elements.</li> <li>• Apply the knowledge in designing the riveted and welded joints, keys, cotters and knuckle joints.</li> <li>• Apply the knowledge in designing the shafts and shaft couplings.</li> <li>• Apply the knowledge in designing the mechanical springs.</li> </ul>
		<b>Machining, Machine Tools &amp; Metrology</b>	<ul style="list-style-type: none"> <li>• Discuss the concepts of machining processes.</li> </ul>
			<ul style="list-style-type: none"> <li>• Apply the principles of lathe, shaping, slotting and planning machines.</li> <li>• Apply the principles of drilling, milling and boring processes.</li> <li>• Analyze the concepts of finishing processes and the system of limits and fits.</li> <li>• Learn the concepts of surface roughness and optical measuring instruments.</li> </ul>
		<b>Data Structures (OE-I)</b>	<ul style="list-style-type: none"> <li>• Summarize the properties ,interfaces and behaviour of basic abstract data types.</li> <li>• Discuss the computational efficiency of the principal algorithms for sorting &amp; searching</li> <li>• Use arrays, records, linked structures, stacks, trees, and Graphs in writing programs</li> <li>• Demonstrate different methods for traversing trees.</li> <li>• Demonstrate different methods for red-black, splaytrees and priority queues</li> </ul>
		<b>Advanced Materials (PE-I)</b>	<ul style="list-style-type: none"> <li>• Justify the knowledge about metals and alloys and their utility in different environments.</li> <li>• Judge about polymers and ceramics and their applications.</li> <li>• Analyze composite materials along with reinforcements and their applications.</li> <li>• Utilize shape memory alloys and functionally graded materials for different applications.</li> </ul>



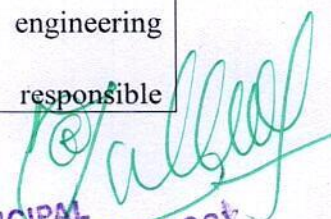


			<ul style="list-style-type: none"> <li>Justify about the nanomaterials and their applications.</li> </ul>
		<b>Machine Tools Lab</b>	<ul style="list-style-type: none"> <li>Demonstrate about general purpose machine tools in the machine shop.</li> <li>Perceive different operations on drilling machine.</li> <li>Experiment with basic operations on shaping machine, slotting machine and milling machine.</li> </ul>
		<b>Thermal Engineering Lab</b>	<ul style="list-style-type: none"> <li>Identify the different types of the principle of various parameters in boilers.</li> <li>Analyze the performance characteristics of an internal combustion engines.</li> <li>Analyze the air compressor characteristics.</li> </ul>
		<b>Advanced Communication Skills Lab</b>	<ul style="list-style-type: none"> <li>Acquire vocabulary and use it contextually.</li> <li>Develop proficiency in academic reading and writing.</li> <li>Increase possibilities of job prospects.</li> </ul>
		<b>Summer Internship</b>	<ul style="list-style-type: none"> <li>Apply science and engineering fundamentals to systematic investigation and interpretation of an engineering problem.</li> </ul>
			<ul style="list-style-type: none"> <li>Demonstrate application of engineering techniques and tools.</li> <li>Demonstrate abilities of a responsible professional and use ethical practices in day to day life.</li> </ul>
<b>IV</b>	<b>I</b>	<b>Industrial Management</b>	<ul style="list-style-type: none"> <li>Design and conduct experiments, analyse, interpret data and synthesize valid conclusions.</li> <li>Design a system, component, or process, and synthesize solutions to achieve desired needs.</li> <li>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.</li> <li>Function effectively within multi-</li> </ul>

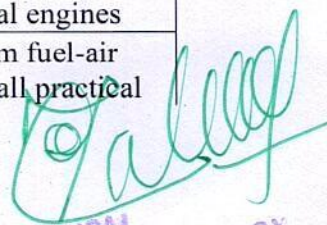


			<p>disciplinary teams and understand the fundamental precepts of effective project management.</p> <ul style="list-style-type: none"> <li>• Understand the management thoughts, its evolution and functions.</li> </ul>
		<b>Finite Element Methods</b>	<ul style="list-style-type: none"> <li>• Analyze the concepts behind variational methods and weighted residual methods in FEM.</li> <li>• Identify the application and characteristics of FEA elements such as trusses, beams, plane and iso-parametric elements, and 3-D element.</li> <li>• Develop element characteristic equation procedure and generation of global stiffness equation will be applied.</li> <li>• Apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.</li> <li>• Identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow.</li> </ul>
		<b>Production Planning &amp; Control</b>	<ul style="list-style-type: none"> <li>• Recognize the objectives, functions, applications of PPC.</li> <li>• Make forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques.</li> <li>• Explain different Inventory control techniques.</li> <li>• Apply the principles and techniques for planning and control of the production and service systems to optimize/make best use of resources.</li> <li>• Understand the importance and function of inventory and to be able to apply selected techniques for its control and management under dependent and independent demand circumstances.</li> </ul>
		<b>Power Plant Engineering</b>	<ul style="list-style-type: none"> <li>• Analyze the working and layout of steam power plants and the different systems comprising the plant and discuss about its economic and safety impacts.</li> <li>• Correlate the concepts of diesel engine &amp; evaluate the working principle of diesel &amp; gas power plant with its layout &amp; safety</li> </ul>

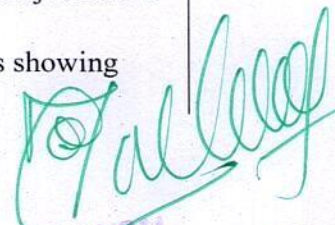
			<p>principles.</p> <ul style="list-style-type: none"> <li>• Demonstrate the conventional methods of hydroelectric power generation &amp; interpret the and basic principles of the nuclear power plant</li> <li>• Combine the working of various power plants &amp; analyze the working of various instruments used for quality check &amp; purification.</li> <li>• Estimate unit power cost under specified conditions &amp; comprehend the impact of power plant on environment.</li> </ul>
		<p><b>Fundamentals of utilization of electrical energy</b></p>	<ul style="list-style-type: none"> <li>• Interpret the concepts of various sources of electrical energy and its generation technologies for conventional and non-conventional energy sources.</li> <li>• Explain the concepts of various types of illumination equipment, illumination measurement and illumination techniques.</li> <li>• Comprehend the phenomena about various methods used for electrical energy based heating and welding applications.</li> <li>• Discuss about the mechanisms, equipment and technology used in the electric traction.</li> <li>• Identify the importance of electrical earthing, earthing equipment and electrical earthing measurement methods.</li> </ul>
		<p><b>Finite Element Simulation Lab</b></p>	<ul style="list-style-type: none"> <li>• Analyze the concepts behind formulation methods in FEM.</li> <li>• Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain, 2D and 3D trusses &amp; beams and Axisymmetric components.</li> <li>• Apply suitable boundary conditions to a global equation for Casting, Forging, Forming and heat transfer problems.</li> </ul>
		<p><b>Project-I</b></p>	<ul style="list-style-type: none"> <li>• Apply science and engineering fundamentals to systematic investigation and interpretation of an engineering problem.</li> <li>• Demonstrate application of engineering techniques and tools.</li> <li>• Demonstrate abilities of a responsible</li> </ul>

  
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			professional and use ethical practices in day to day life.
II	II	<b>Material Science &amp; Metallurgy</b>	<ul style="list-style-type: none"> <li>• Understand the crystalline structure of different metals and study the stability of phases in different alloy systems.</li> <li>• Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains</li> <li>• Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals.</li> <li>• Grasp the methods of making of metal powders and applications of powder metallurgy</li> <li>• Comprehend the properties and applications of ceramic, composites and other advanced methods.</li> </ul>
		<b>Complex Variables &amp; Statistical Methods</b>	<ul style="list-style-type: none"> <li>• Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic</li> <li>• Find the differentiation and integration of complex functions used in engineering problems</li> <li>• Make use of the Cauchy residue theorem to evaluate certain integrals</li> <li>• Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic</li> <li>• Infer the statistical inferential methods based on small and large sampling tests</li> </ul>
		<b>Dynamics of Machinery</b>	<ul style="list-style-type: none"> <li>• To compute the frictional losses and transmission in clutches, brakes and dynamometers</li> <li>• To determine the effect of gyroscopic couple in motor vehicles, ships and aeroplanes</li> <li>• To analyze the forces in four bar and slider crank mechanisms and design a flywheel</li> <li>• To determine the rotary unbalanced mass in reciprocating equipment</li> <li>• To determine the unbalanced forces and couples in reciprocating and radial engines</li> </ul>
		<b>Thermal Engineering-I</b>	<ul style="list-style-type: none"> <li>• Comprehend the actual cycle from fuel-air cycle and air- standard cycle for all practical</li> </ul>

  
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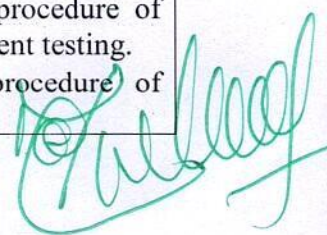
			<p>applications.</p> <ul style="list-style-type: none"> <li>• Discuss the working principle and various components of IC engine</li> <li>• Interpret the combustion phenomenon of SI and CI engines and their impact on engine variables.</li> <li>• Analyze the performance of an IC engine based on the performance parameters.</li> <li>• Identify the cycles and systems of a gas turbine and working principle of rockets and jet propulsion.</li> </ul>
		<b>Industrial Engineering and Management</b>	<ul style="list-style-type: none"> <li>• Design and conduct experiments, analyse, interpret data and synthesize valid conclusions</li> <li>• Design a system, component, or process, and synthesize solutions to achieve desired needs</li> <li>• 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</li> <li>• Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management</li> </ul>
		<b>Mechanics of Solids and Metallurgy Lab</b>	<ul style="list-style-type: none"> <li>• Appraise the students with the use of testing machines and Apply methods to determine Mechanical properties and Elastic Constants by Compiling the data &amp; report the findings and observations in the laboratory.</li> <li>• Characterize the micro structures of different ferrous, nonferrous metals, Treated and Untreated materials &amp; identify the effect of heat treatment and cooling rates on the properties of steels</li> <li>• Evaluate the mechanical properties of material through various destructive and non-destructive testing &amp; compare the hardness values of various material</li> </ul>
		<b>Machine Drawing Practice</b>	<ul style="list-style-type: none"> <li>• Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings.</li> <li>• Draw different types of bearings showing different components.</li> </ul>

  
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			<ul style="list-style-type: none"> <li>• Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials</li> <li>• Select and represent fits and geometrical form of different mating parts in assembly drawings</li> <li>• To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements</li> </ul>
		<b>Theory of Machines Lab</b>	<ul style="list-style-type: none"> <li>• Design the mechanical systems for power transmission such as gears, belts, pulleys.</li> <li>• Design the effect of gyroscopic couple in motor vehicles, ships and aeroplanes</li> <li>• Develop the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.</li> </ul>
		<b>Python Programming Lab</b>	<ul style="list-style-type: none"> <li>• Solve the different methods for linear, non-linear and differential equations</li> <li>• Learn the PYTHON Programming language</li> <li>• Familiar with the strings and matrices in PYTHON</li> <li>• Write the Program scripts and functions in PYTHON to solve the methods</li> </ul>
		<b>Summer Internship</b>	<ul style="list-style-type: none"> <li>• Apply science and engineering fundamentals to systematic investigation and interpretation of an engineering problem.</li> <li>• Demonstrate application of engineering techniques and tools.</li> <li>• Demonstrate abilities of a responsible professional and use ethical practices in day to day life.</li> </ul>
<b>III</b>	<b>II</b>	<b>Heat Transfer</b>	<ul style="list-style-type: none"> <li>• Apply knowledge about mechanism and modes of heat transfer.</li> <li>• Interpret and analyze the concepts of conduction and convective heat transfer.</li> <li>• Interpret and analyze forced and free convection heat transfer.</li> <li>• Analyze the concepts of heat transfer with phase change and condensation along with heat exchangers.</li> <li>• Interpret the knowledge about radiation mode of heat transfer.</li> </ul>
		<b>Design of Machine Members-II</b>	<ul style="list-style-type: none"> <li>• Apply knowledge about the design of bearings.</li> </ul>

			<ul style="list-style-type: none"> <li>• Explain the concepts in designing various engine parts.</li> <li>• Utilize the knowledge to design curved beams and power screws.</li> <li>• Justify power transmission systems and to design pulleys and gear drives.</li> <li>• Apply the concepts in designing various machine tool elements.</li> </ul>
		<p align="center"><b>Introduction to Artificial Intelligence and Machine Learning</b></p>	<ul style="list-style-type: none"> <li>• Discuss basic concepts of artificial intelligence, neural networks and genetic algorithms.</li> <li>• Apply the principles of knowledge representation and reasoning.</li> <li>• Learn about bayesian and computational learning and machine learning.</li> <li>• Utilize various machine learning techniques.</li> <li>• Apply the machine learning analytics and deep learning techniques.</li> </ul>
		<p align="center"><b>Automobile Engineering (PE-II)</b></p>	<ul style="list-style-type: none"> <li>• Discuss various components of four wheeler automobile.</li> <li>• Apply the knowledge of different parts of transmission system.</li> <li>• Judge about steering and suspension systems.</li> <li>• Justify the braking system and electrical system used in automobiles.</li> <li>• Analyze the concepts about engine specifications and service, safety and electronic</li> </ul>
		<p align="center"><b>Disaster Management (OE-II)</b></p>	<ul style="list-style-type: none"> <li>• Affirm the usefulness of integrating management principles in disaster mitigation work.</li> <li>• Distinguish between the different approaches needed to manage pre-during and post-disaster periods.</li> <li>• Explain the process of risk management.</li> <li>• Learn the role of technology in disaster management.</li> <li>• Relate to risk transfer.</li> </ul>
		<p align="center"><b>Heat Transfer Lab</b></p>	<ul style="list-style-type: none"> <li>• Apply the knowledge of heat transfer to perform experiments related to conduction heat transfer .</li> <li>• Evaluate heat transfer coefficient in free and forced convection heat transfer situation.</li> <li>• Apply the knowledge of heat transfer to</li> </ul>

			perform experiments related to radiation heat transfer.
		<b>CAE&amp;CAM Lab</b>	<ul style="list-style-type: none"> <li>• Experiment with trusses and beams to determine stress, deflection, natural frequencies, harmonic analysis, HT analysis and buckling analysis.</li> <li>• Create part programmes using FANUC controller.</li> <li>• Apply G-codes for automated tool path using CAM software.</li> </ul>
		<b>Measurements &amp; Metrology Lab</b>	<ul style="list-style-type: none"> <li>• Demonstrate the calibration experiments with different gauges, transducers, thermocouple and temperature detector.</li> <li>• Demonstrate the calibration experiments with rotameter, seismic apparatus.</li> <li>• Demonstrate the calibration experiments with vernier calipers, micrometer, height and dial gauges.</li> </ul>
		<b>Artificial Intelligence and Machine Learning Lab</b>	<ul style="list-style-type: none"> <li>• Analyze and Implement the machine learning algorithms to solve the real time applications.</li> <li>• Apply the knowledge of artificial intelligence and machine learning models with image classifiers</li> <li>• Implement automatic facial recognition using various software tools.</li> </ul>
<b>IV</b>	<b>II</b>	<b>Additive Manufacturing</b>	<ul style="list-style-type: none"> <li>• Make use of SLA, SGC for manufacturing of complex components</li> <li>• Identify the use of LOM, FDM for manufacturing of complex components.</li> <li>• Apply SLS,3DP for manufacturing of complex components.</li> <li>• Choose the correct Rapid tooling process for prototype development</li> <li>• Utilize Additive manufacturing techniques in various industries and fields like jewelry , coin, architecture etc.</li> </ul>
		<b>Non Destructive Evaluation</b>	<ul style="list-style-type: none"> <li>• Understand the concepts of various NDE techniques and the requirements of radiography techniques and safety aspects.</li> <li>• Interpret the principles and procedure of ultrasonic testing (BL-2).</li> <li>• Understand the principles and procedure of Liquid penetration and eddy current testing.</li> <li>• Illustrate the principles and procedure of Magnetic particle testing.</li> </ul>





			<ul style="list-style-type: none"> <li>• Interpret the principles and procedure of infrared testing and thermal testing.</li> </ul>
		<b>Waste water treatment</b>	<ul style="list-style-type: none"> <li>• Analyze the quality and quantity of water for various industries and Advanced water treatment methods.</li> <li>• Identify the common methods of treatment of wastewaters and Biological treatment methods.</li> <li>• Identify the methods to reduce impacts of disposal of wasters into environment and CETPs.</li> <li>• Identify the methods of treatment of wastewaters from specific industries like steel plants, refineries, and power plants, that imply biological treatment methods.</li> <li>• Identify the methods of treatment of wastewaters from industries like Aqua, dairy, sugar plants, and distilleries that imply biological treatment methods.</li> </ul>
		<b>Image processing</b>	<ul style="list-style-type: none"> <li>• Know and understand the basics and fundamentals of digital image processing, such as digitalization, sampling, quantization, and 2D transforms.</li> <li>• Operate on images using the techniques of smoothing, sharpening and enhancement.</li> <li>• Use the restoration concepts and filtering techniques.</li> <li>• Illustrate the basics of segmentation.</li> <li>• Understand image compression and recognition techniques.</li> </ul>
		<b>Project-II</b>	<ul style="list-style-type: none"> <li>• Assess the Engineering activities with effective presentation.</li> <li>• Perceive in utilizing quality information through various resources</li> <li>• Originate the use of modern presentation techniques.</li> <li>• Happen within the stipulated duration</li> <li>• Justify the presentation content individually to a group</li> </ul>



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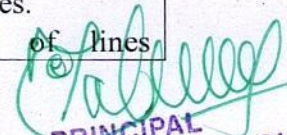


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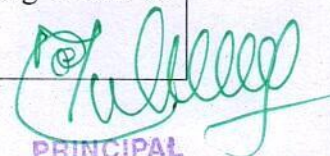
**Electronics and Communication Engineering**

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.

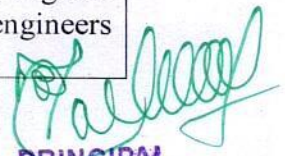
YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I/IV (R20)	I	<b>Applied Chemistry</b>	<ul style="list-style-type: none"> <li>• Able to analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Able to utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.</li> <li>• Able to synthesize nano materials for modern advances of engineering technology and summarize the preparation of semiconductors, analyze the applications of liquid crystals and superconductors.</li> <li>• Able to analyze the principles of different analytical instruments and their applications and design models for energy by different natural sources.</li> <li>• Able to obtain the knowledge of computational chemistry and molecular machines</li> </ul>
		<b>ENGINEERING DRAWING</b>	<ul style="list-style-type: none"> <li>• Creating to draw the polygons, engineering curves, and scales.</li> <li>• Creating the projections of lines</li> </ul>

  
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			<p>inclined to both the planes and its traces.</p> <ul style="list-style-type: none"> <li>• Understanding the different plans and draw the projections of the plane inclined to both the planes.</li> <li>• Analyzing the basic solids and draw the projections of the solids inclined to one of the planes.</li> <li>• Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.</li> </ul>
		<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials</li> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> <li>• Able to gain knowledge on solving first order differential equations and its applications to various engineering fields.</li> <li>• Able to solve the higher order differential equations related to various engineering fields.</li> <li>• Able to use functions of several variables in optimization.</li> <li>• Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals</li> </ul>
		<b>PROGRAMMING FOR PROBLEM SOLVING USING C</b>	<ul style="list-style-type: none"> <li>• Understanding basic building blocks of C-programming language.</li> </ul>

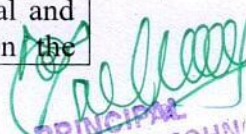
  
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			<ul style="list-style-type: none"> <li>• Use different operators, data types and write programs that use two-way/ multi way selection &amp; Select the best loop construct for a given problem</li> <li>• Demonstrate the use of different derived data types, Strings, structures and unions</li> <li>• Design and implement programs to analyze the different pointer applications</li> <li>• Explain various file handling mechanisms &amp; Apply File I/O operations.</li> </ul>
		<b>English Communication Skills Laboratory</b>	<ul style="list-style-type: none"> <li>• Analyze the English speech sounds, stress, rhythm and intonation.</li> <li>• Understand the different aspects of the English Language proficiency with emphasis on pronunciation tone and accent neutralization</li> <li>• Exhibit professionalism in participating in Debates and Group Discussion.</li> <li>• Develop and enhance their language skills by participating in oral presentations and public speaking.</li> <li>• Enhance their Knowledge through interview skills</li> </ul>
		<b>Programming for Problem Solving Using C Laboratory</b>	<ul style="list-style-type: none"> <li>• Develop programs using basic data types, variables and conditional statements</li> <li>• Develop programs using Arrays, strings</li> <li>• Develop programs using functions, pointers, Files and dynamic memory allocation</li> </ul>
		<b>Applied Chemistry Lab</b>	<ul style="list-style-type: none"> <li>• Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus(Understand-L2)</li> <li>• Learn and apply basic techniques used in chemistry laboratory for volumetric analysis, redox titrations with different indicators; EDTA titration</li> <li>• Explain and demonstrate a few instrumental methods</li> </ul>
<b>I</b>	<b>II</b>	<b>MATHEMATICS-II</b>	<ul style="list-style-type: none"> <li>• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)</li> </ul>



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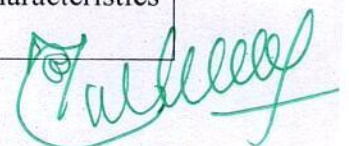
			<ul style="list-style-type: none"> <li>• Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)</li> <li>• Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)</li> <li>• Apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)</li> <li>• Apply numerical integral techniques to different Engineering problems (L3)</li> <li>• Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)</li> </ul>
		<b>APPLIED PHYSICS</b>	<ul style="list-style-type: none"> <li>• Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)</li> <li>• Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).</li> <li>• Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the</li> </ul>

  
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			<p>study of electrical conductivity (L3). Classify the energy bands of solids (L2).</p> <ul style="list-style-type: none"> <li>• Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)</li> <li>• Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory &amp; Josephson effect in superconductors (L2).</li> </ul>
		<b>OBJECT ORIENTED PROGRAMMING THROUGH JAVA</b>	<ul style="list-style-type: none"> <li>• Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate professionally acceptable coding and performance standard</li> <li>• Illustrate the basic principles of the object-oriented programming</li> <li>• Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming</li> </ul>
		<b>NETWORK ANALYSIS</b>	<ul style="list-style-type: none"> <li>• Gain the knowledge on basic network elements.</li> <li>• Will analyze the RLC circuits behaviour in detailed.</li> <li>• Analyze the performance of periodicwaveforms.</li> <li>• Gain the knowledge in characteristics of two port network parameters ( Z,Y,ABCD,h&amp;g).</li> <li>• 5. Analyze the filter design concepts in real world applications.</li> </ul>

*(Signature)*

		<b>BASIC ELECTRICAL ENGINEERING</b>	<ul style="list-style-type: none"> <li>• Able to explain the operation of DC generator and analyze the characteristics of DC generator.</li> <li>• Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the starting and speed control methods of DC motors.</li> <li>• Ability to analyze the performance and speed – torque characteristics of a3-phase induction motor and understand starting methods of 3- phase induction motor.</li> <li>• Able to explain the operation of Synchronous Machines</li> <li>• Capability to understand the operation of various special machines.</li> </ul>
		<b>Electronic Workshop Lab</b>	<ul style="list-style-type: none"> <li>• Identify various Active and Passive electronic components</li> <li>• Operating various Active and Passive electronic components in circuits</li> <li>• Design and implementation of electronic circuits using soldering</li> </ul>
		<b>Basic Electrical Engineering Lab</b>	<ul style="list-style-type: none"> <li>• Determine and predetermine the performance of DC machines and transformers.</li> <li>• Control the DC shunt machines.</li> <li>• Compute the performance of 1- phasetransformer.</li> <li>• Perform tests on 3-phase induction motor and alternator to determine their performance characteristics</li> </ul>
		<b>Applied Physics Lab</b>	<ul style="list-style-type: none"> <li>• Calculation of the physical values like radius of curvature of lens, wavelength of source, thickness of thin object, dispersive power and resolving power using principles of optical phenomenon.</li> <li>• Explain the magnetic and electric field effects involved in B-H curve experiment, Stewart Gee’s apparatus and dielectric constant experiment.</li> <li>• Analyze the electric properties of semiconducting materials by determination of the energy band gap of semiconductor and study characteristics of thermistor.</li> </ul>



YEAR	SEME STER	SUBJECT	CO's
II	I	<b>Electronic Devices and Circuits</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Students will gain on the applications of P-N Junction Diode.</li> <li>• Able to understand the basic principles of electronic device operation with emphasis on bipolar transistors.</li> <li>• Able to understand the basic parameters of electronic devices, their performance, and limiting factors.</li> <li>• Able to Analysis and design of Electronic Circuits.</li> </ul>
		<b>Switching Theory and Logic Design</b>	<ul style="list-style-type: none"> <li>• Classify different number systems apply to generate various codes and minimization of Boolean functions using Boolean algebra.</li> <li>• Understand minimization of switching function using K-Maps to design Combinational logic circuits.</li> <li>• Apply knowledge of logic circuits to design of combinational circuits and PLDs</li> <li>• Understand the knowledge of flip-flops in designing of Registers and counters.</li> <li>• Apply knowledge of state machines diagrams and tables to design sequential circuits.</li> </ul>



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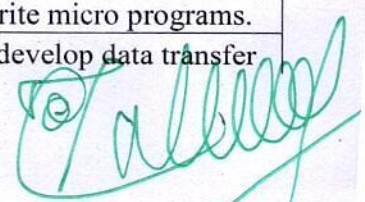
		<b>Signals and Systems</b>	<p>Analyze the characteristics of signals, systems and principles of vector space.</p> <ul style="list-style-type: none"> <li>• Examine the continuous time signals and continuous time systems using Fourier series and Fourier transform.</li> <li>• Apply sampling theorem and evaluate the concept of convolution, correlation energy and power density spectrum and their relationships.</li> <li>• Determine relationship among the various representations of LTI systems.</li> <li>• Apply Laplace transform and Z-transforms to analyze continuous and discrete time signals.</li> </ul>
		<b>Mathematics-III</b>	<ul style="list-style-type: none"> <li>• Interpret the physical meaning of different operators such as gradient, curl and divergence.</li> <li>• Apply the Laplace transform for solving differential equations.</li> <li>• Find or compute the Fourier series of periodic signals.</li> <li>• Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms.</li> <li>• Identify solution methods for partial differential equations that model physical processes.</li> </ul>
		<b>Random Variables and Stochastic Processes</b>	<ul style="list-style-type: none"> <li>• To give an introduction to elementary probability theory and learn basics of random variables and stochastic processes.</li> <li>• Understand and analyze the one random variable with different functions.</li> <li>• Understand and analyze the multiple random variables and their functions.</li> <li>• Introduction to random processes and its classification, functions.</li> <li>• To analyze the LTI systems with stationary random processes as input.</li> </ul>
		<b>OOPS through Java Lab</b>	<ul style="list-style-type: none"> <li>• Identify classes, objects, members of a class and the relationship among them needed for a specific problem.</li> <li>• Implement programs to distinguish different forms of inheritance, packages and file handling.</li> <li>• Develop programs using Exception handling mechanism, multi threading and GUI applications.</li> </ul>
		<b>Electronic Devices and</b>	<ul style="list-style-type: none"> <li>• Understand the electrical behaviour of different semiconductor Devices like Silicon PN junction diode, Zener Diode, BJT, JFET and UJT by</li> </ul>

		<b>Circuits -Lab</b>	<p>analyzing VI Characteristics under given bias condition</p> <ul style="list-style-type: none"> <li>• Verify the outputs of different types of Rectifier circuits and voltage Regulator circuit using diodes</li> <li>• Understand frequency responses of various amplifiers like Common Emitter (CE), Common Collector (CC), and Common Source (CS) amplifiers</li> </ul>
		<b>Switching Theory and Logic Design-Lab</b>	<ul style="list-style-type: none"> <li>• Verification of truth tables ,combinational circuits and sequential circuits with hardware.</li> <li>• Designing of combinational circuits and sequential circuits (counters, flip-flops and SOP's).</li> <li>• Verification of Circuit operation for various functions(Comparator,7-segment displays and counters).</li> </ul>
		<b>Python Programming-Lab/</b>	<ul style="list-style-type: none"> <li>• Understand the basic concepts of scripting and the contributions of scripting language.</li> <li>• Explore and Implement python data structures like Lists, Tuples, Sets and dictionaries.</li> <li>• Create practical applications using Functions, Modules, Exceptional handling and Regular Expressions.</li> </ul>
<b>III</b>	<b>I</b>	<b>Analog ICs and Applications</b>	<ul style="list-style-type: none"> <li>• Analyzing various parameters of differential amplifiers and operational amplifiers.</li> <li>• Implementation of OP-AMP in real time applications.</li> <li>• Application of OP-AMP as a filter.</li> <li>• Evaluating OP-AMP performance in generating various waveforms. Demonstrating PLL and Timer.</li> <li>• Constructing Analog to Digital and Digital to Analog converters using OP-AMP.</li> </ul>



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		<b>Electromagnetic Waves and Transmission Lines</b>	<ul style="list-style-type: none"> <li>• Demonstrate and compute various parameters for transmission lines using either a smith chart or classical theory.</li> <li>• Differentiate matching networks for loaded transmission lines for OC and SC.</li> <li>• Determine E using various laws and applications of electro static fields.</li> <li>• Determine H using various laws and applications of magneto static fields &amp; Derive Maxwell equations in time varying fields.</li> <li>• Demonstrate the reflection and refraction of waves at boundaries &amp; interpret the effects of lossy and low loss dielectrics and conductors upon the propagation of electromagnetic waves, and predict this process in specific applications.</li> </ul>
		<b>Digital Communications</b>	<ul style="list-style-type: none"> <li>• Explain the working of pulse digital modulation systems such as PCM, DPCM and DM.</li> <li>• Classify the various digital pass band techniques such as PSK, FSK,ASK,QPSK, DPSK and M-ary modulation techniques.</li> <li>• Analyze the performance of various digital pass band modulation systems in terms of probability of error and signal to noise ratio.</li> <li>• Familiarize the concepts of information theory and develop the source code with the probabilities given.</li> <li>• 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.</li> </ul>
		<b>Computer Organization and Architecture</b>	<ul style="list-style-type: none"> <li>• Demonstrate and understanding of the different number systems, codes and relate postulates of Boolean algebra and minimize combinational functions.</li> <li>• Evaluate different combinational circuits, sequential circuits and able to design them.</li> <li>• Organize and determine basic structure of components register through language, micro operations and able to write micro programs.</li> </ul>
			<ul style="list-style-type: none"> <li>• Determine and able to develop data transfer</li> </ul>



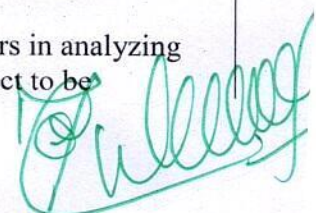
			<p>and manipulation programs and student able to learn micro program control and central processing unit.</p> <ul style="list-style-type: none"> <li>• Able to analyze the internal organization of computers and able to evaluate performance of them.</li> </ul>
		<b>Electronic Measurements and Instrumentation</b>	<ul style="list-style-type: none"> <li>• Analyzing the performance of various measuring systems and metrics.</li> <li>• Recognize various signal generators and acquire knowledge on principle of operation and working of signal analyzers.</li> <li>• Designing of oscilloscopes for different applications.</li> <li>• Compare various measuring bridges and their balancing conditions.</li> <li>• Interpret various measuring techniques for measurement of physical parameters using transducers.</li> </ul>
		<b>Analog ICs and Applications LAB</b>	<ul style="list-style-type: none"> <li>• Implement various linear and nonlinear applications of op-amp.</li> <li>• Design and analyze active filters and oscillator circuits using op-amp.</li> <li>• Understand various applications of IC-555 timer, IC-565 and IC-566.</li> </ul>
		<b>Digital Communications Lab</b>	<ul style="list-style-type: none"> <li>• To be able to differentiate digital modulation techniques.</li> <li>• To understand different pass band modulation techniques.</li> <li>• Implement various source coding &amp; decoding and channel coding &amp; decoding techniques.</li> </ul>
		<b>Data Structures using Java Lab</b>	<ul style="list-style-type: none"> <li>• Define, searching technology and linear data structures like linked list, stack and queue.</li> <li>• Describe nonlinear data structure like tree.</li> <li>• Elaborate nonlinear data structure like graph and sorting techniques.</li> </ul>
		<b>Internship</b>	<ul style="list-style-type: none"> <li>• Recognize the state of engineering research and modern technology.</li> <li>• Gain expertise in technical writing to create a work that complies with technical documents.</li> <li>• Develop effective presentation skills.</li> </ul>
<b>IV</b>	<b>I</b>	<b>Microwave and Optical</b>	<ul style="list-style-type: none"> <li>• Describe the concept of different modes in</li> </ul>

		<b>Communication</b>	<p>Waveguide structures.</p> <ul style="list-style-type: none"> <li>Analyze the S-Matrix for various waveguide components.</li> <li>Describe the different types of optical fiber connectors and analyzing of splitting the microwave energy in a desired direction.</li> <li>Illustrate the Microwave tubes and Solid State Devices and analyzing the efficiency of Devices.</li> <li>Illustrate the various parameters using a Microwave testbench .</li> </ul>
		<b>Data Communications &amp; Computer networks</b>	<ul style="list-style-type: none"> <li>Know the categories and functions of various Data communication Networks</li> <li>Design and analyze various error detection techniques</li> <li>Demonstrate the mechanism of routing the data in network layer</li> <li>Know the significance of various Flow control and congestion control mechanisms</li> <li>Know the functioning of various Application layer Protocols</li> </ul>
		<b>Digital Image and Video Processing</b>	<ul style="list-style-type: none"> <li>Defining the digital image representation applications in image processing and analyze various image transforms</li> <li>Explain how an image can be enhanced by using histogram techniques. Analyze restoration techniques by estimating Image Degradation</li> <li>Detection of point line and edges in images. Differentiate various image compression techniques by the redundancy in images</li> <li>Differentiate analog color TV system and to digital video system and explain filtering operations in Video Processing</li> <li>Analyze the general methodologies for 2D motion estimation</li> </ul>
		<b>Communication Standards and Protocols</b>	<ul style="list-style-type: none"> <li>Acquire knowledge on the basic concepts of how digital data is transferred across computer networks and identify the different types of network topologies</li> <li>Comprehend the concept of layered approach of computer networks organization and familiarize with transmission media , flow</li> </ul>

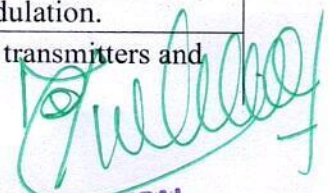
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			<p>control and analyze various error detection and correction techniques</p> <ul style="list-style-type: none"> <li>• Illustrate the fundamental concepts of addressing , reliable transmission and working of wired communication protocols</li> <li>• Interpret the transferring of data using various wireless communication technologies and protocols</li> <li>• Analyze various network routing algorithms , congestion prevention policies and obtain an overview of the internet and network security</li> </ul>
		<b>Embedded Systems</b>	<ul style="list-style-type: none"> <li>• Analyzing the building blocks of typical embedded systems, applications and communication devices</li> <li>• Illustrating about various Communication devices used in the Embedded systems</li> <li>• Describing the concept of firmware design approaches , ISR concept and Interrupt sources</li> <li>• Analyzing of hardware -software tradeoffs and describing the operations systems basics and RTOS</li> <li>• Illustrating the concept of IDE , Hardware debugging, debugging tools and testing tools</li> </ul>
		<b>Internet of Things Lab</b>	<ul style="list-style-type: none"> <li>• Setup and Implement interfacing with Arduino/Raspberry Pi and PSOC4 ble.</li> <li>• Implement interfacing of Bluetooth communication with Arduino.</li> <li>• Implement interfacing of various sensors such as LDR, MQ2, DHT11 and Ultra sonic sensor with Arduino/Raspberry Pi.</li> </ul>
		<b>Microwave and Optical Communication LAB</b>	<ul style="list-style-type: none"> <li>• Verify characteristics of Reflex Klystron and Gunn Diode</li> <li>• Analyze various parameters of Waveguide Components and Able to understand antenna measurements</li> <li>• Demonstrate characteristics of various optical sources and Measure data Rate, Numerical Aperture and Losses in Optical Link.</li> </ul>
		<b>Project - Part I</b>	<ul style="list-style-type: none"> <li>• Understand the advanced technology and research in engineering.</li> <li>• Collaborate with team members in analyzing the requirements of the project to be</li> </ul>

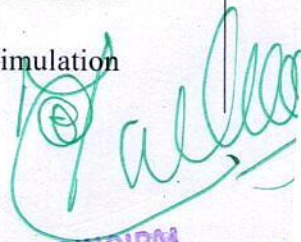


			<ul style="list-style-type: none"> <li>developed</li> <li>Build necessary design specifications and documents for the chosen project(L5)</li> </ul>
			<ul style="list-style-type: none"> <li>Develop apt domain and technical knowledge to implement/code the application(L3)</li> <li>Test and deploy the project after implementation(L4)</li> <li>Demonstrate the project comprehensively with necessary tools(L3)</li> </ul>
II	II	<b>Electronic Circuit Analysis</b>	<ul style="list-style-type: none"> <li>Analyze small signal high frequency transistor amplifier using BJT and FET</li> <li>Analyze multi stage amplifiers and Differential amplifier using BJT</li> <li>Classify different types of the feedback amplifiers using BJT and compare their analysis with performance.</li> <li>Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators</li> <li>Classify different types of the power amplifiers and tuned amplifiers and compare their analysis with performance.</li> </ul>
		<b>Digital IC Design</b>	<ul style="list-style-type: none"> <li>Able to understand the IEEE Standards and able to develop complex digital systems at several levels of abstractions, behavioral and structural using HDL.</li> <li>Student can analyze and design the basic digital circuits with combinatorial logic circuits using VHDL</li> <li>Student can analyze and design the basic digital circuits with sequential logic circuits using VHDL</li> <li>Student can be able to design and implement Combinational logic circuits using MOS logic circuits</li> <li>Student can be able to design and implement Sequential logic circuits using MOS logic circuits</li> </ul>
		<b>Analog Communications</b>	<ul style="list-style-type: none"> <li>Explain the basic elements of communication system, need for modulation and elaborately about amplitude modulation.</li> <li>Describe the time and frequency domain representation, generation and demodulation of DSBSC, SSB and VSB modulation schemes.</li> <li>Discuss the concepts of angle modulation.</li> <li>Explain various issues in radio transmitters and receivers.</li> </ul>



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			<ul style="list-style-type: none"> <li>Describe pulse modulation schemes and estimate the noise in analog modulation schemes</li> </ul>
		<b>Linear control Systems</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Obtaining Transfer Function of a servo motor and the performance metrics to design the Control system in time-domain and frequency domain.</li> <li>Students can be able to analyze stability of Control systems and using Laplace domain.</li> <li>Students can be able to design Control systems for various applications using frequency domain analysis.</li> <li>In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.</li> </ul>
		<b>Management and Organizational Behaviour</b>	<ul style="list-style-type: none"> <li>Course the After completion of the student will acquire the knowledge on management functions, global leadership and organizational structure.</li> <li>Will familiarize with the concepts of functional management that is HRM and Marketing of new product development.</li> <li>The learner is able to think in strategically through contemporary management practices.</li> <li>The learner can develop positive attitude through personality development and can equip with motivational theories.</li> <li>The student can attain the group performance and grievance handling in managing the organizational culture.</li> </ul>
		<b>Electronic Circuit Analysis Lab</b>	<ul style="list-style-type: none"> <li>Understand frequency responses of Single stage, Multistage Transistor amplifier and tuned amplifier behaviour</li> <li>Understand how Different Oscillator Circuits produce sinusoidal signals using BJT</li> <li>Determine the efficiency of Power amplifiers like Class – A Power amplifier</li> </ul>
		<b>Analog Communications Lab</b>	<p>To develop practical knowledge about theories of analog communication</p> <p>To develop practical knowledge about simulation software</p>





			To provide hands-on experience to the students, so that they are able to apply theoretical concepts in practice. Demonstrate various pulse modulation techniques
		<b>Digital IC Design Lab</b>	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.
		<b>Soft Skills</b>	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
<b>III</b>	<b>II</b>	<b>Microprocessor and Microcontrollers</b>	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.
		<b>VLSI Design</b>	<ul style="list-style-type: none"> <li>• Able to apply the design rules and draw layout of given logic circuit.</li> <li>• Able to design MOSFET based logic circuits.</li> <li>• Able to analyze the behavior of amplifier circuits with various loads.</li> <li>• Able to design amplifier circuits, combinational and sequential circuits.</li> <li>• Able to design CMOS logic circuits with various logic styles like static and dynamic CMOS.</li> </ul>
		<b>Digital Signal Processing</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Student can Able to Define and use Discrete Fourier Transforms (DFTs)</li> </ul>

			<ul style="list-style-type: none"> <li>• Student can Able to realize IIR Filters and Use Z - transforms and discrete time Fourier transforms to analyze a digital system</li> <li>• Student can Able to realize FIR Filters and Use Z - transforms and discrete time Fourier transforms to analyze a digital system</li> <li>• Student will be able to understand the Programmable DSP processors and architectures.</li> </ul>
		<b>Mobile and Cellular Communication</b>	<ul style="list-style-type: none"> <li>• Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.</li> <li>• Analyze the concepts of interference with respective to various antennas.</li> <li>• Evaluate the frequency management, channel assignment strategies and antennas in cellular systems.</li> <li>• Explain the concepts of handoff and how dropped calls exist.</li> <li>• Acquire the knowledge of digital cellular networks in different generations.</li> </ul>
		<b>Embedded Systems</b>	<ul style="list-style-type: none"> <li>• Analyzing the building blocks of typical embedded systems, applications and communication devices</li> <li>• Illustrating about various Communication Devices Used in the Embedded Systems</li> <li>• Describing the concept of firmware design approaches, ISR concept and interrupt sources.</li> </ul>
			<ul style="list-style-type: none"> <li>• Analyzing of hardware-software tradeoffs and describing the Operating systems basics and RTOS</li> <li>• Illustrating the concept of IDE, Hardware debugging, debugging tools and testing tools.</li> </ul>
		<b>Python Programming</b>	<ul style="list-style-type: none"> <li>• Analyze small signal high frequency transistor amplifier using BJT and FET</li> <li>• Analyze multi stage amplifiers and Differential amplifier using BJT</li> <li>• Classify different types of the feedback amplifiers using BJT and compare their analysis with performance.</li> <li>• Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators</li> <li>• Classify different types of the power amplifiers and tuned amplifiers and compare their analysis</li> </ul>

			with performance.
		<b>Microprocessor and Microcontrollers - Lab</b>	<ul style="list-style-type: none"> <li>• Apply the usage of TASM software for creating assembly language programs and also apply interfacing concepts using 8086 microprocessor trainer kit.</li> <li>• Develop assembly language programs using 8051 IDE and interfacing various peripherals using 8051 microcontroller trainer kit.</li> <li>• Develop and execute programs for ARM CORTEX M3 processor using KEIL MDK ARM.</li> </ul>
		<b>VLSI Design Lab</b>	<ul style="list-style-type: none"> <li>• Simulate Basic gates with Xilinx VIVADO front and Environment and validate the functionality</li> <li>• Model the sequential circuits using CAD tools in front and environment</li> <li>• Design Simulate and Extract layout of digital IC using EDA tools.</li> </ul>
		<b>Digital Signal Processing Lab</b>	<ul style="list-style-type: none"> <li>• Understand basic operation on signals and Generate the response using MATLAB and code composer studio.</li> <li>• Examine linear, circular convolutions and DFT, IDFT using MATLAB and code composer studio.</li> <li>• Understand the Design of IIR and FIR filters using TIDSP starter kit and Cypress FM4 Starter kit.</li> </ul>
		<b>ARM based/ Aurdino based Programming LAB</b>	<ul style="list-style-type: none"> <li>• Understand the Design of IIR and FIR filters using TIDSP starter kit and Cypress FM4 Starter kit.</li> <li>• Implement interfacing of modules such as led, stepper motor with Arduino using Hyper terminal.</li> <li>• Implement interfacing of various sensors such as LM35, accelerometer with Arduino using Hyper terminal.</li> </ul>
<b>IV</b>	<b>II</b>	<b>Wireless Communication</b>	<ul style="list-style-type: none"> <li>• Know about the Wireless systems and Standards (1G/2G/3Gsystems).</li> <li>• Concept and analysis of CDMA-based wireless networks</li> <li>• Understand the concepts of Multiple-Input Multiple-Output (MIMO).</li> </ul>

			<ul style="list-style-type: none"> <li>• Understand the modern wireless systems using OFDM.</li> <li>• Analysis of Satellite-Based Wireless systems.</li> </ul>
		<b>Cyber Security and Cryptography</b>	<ul style="list-style-type: none"> <li>• Identify security risks, cyber crimes and computer forensic fundamentals</li> <li>• Identify security risks, cyber crimes and computer forensic fundamentals</li> <li>• Investigate cyber crimes and computer forensic systems</li> <li>• Classify computer forensic tools to analyze collected evidences</li> <li>• Illustrate cyber crime legal aspects and compare Indian cyber laws with foreign laws</li> </ul>
		<b>Project - Part II</b>	<ul style="list-style-type: none"> <li>• Understand the advanced technology and research in engineering.</li> <li>• Collaborate with team members in analyzing the requirements of the project to be developed</li> <li>• Build necessary design specifications and documents for the chosen project(L5)</li> <li>• Develop apt domain and technical knowledge to implement/code the application(L3)</li> <li>• Test and deploy the project after implementation(L4)</li> <li>• Demonstrate the project comprehensively with necessary tools(L3)</li> </ul>



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### Computer Science Engineering

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

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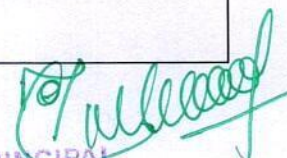
YEAR	SEMESTER	SUBJECT	Course Outcomes
I	I(R20)	Communication English	<ul style="list-style-type: none"> <li>• Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information</li> <li>• Attain Knowledge of ask and answer general questions on familiar topics and introduce oneself/others</li> <li>• Identify suitable strategies for skimming and scanning to get the general idea of a text and locate specific information</li> <li>• Recognize paragraph structure and be able to match beginnings /endings / headings with paragraphs</li> <li>• Organize sentences using proper grammatical structures and correct word forms</li> </ul>
		Mathematics – I	<ul style="list-style-type: none"> <li>• Utilize mean value theorems to real life problems (L3)</li> <li>• Solve the differential equations related to various engineering fields (L3)</li> <li>• Attain Knowledge of functions of several variables which is useful in optimization (L3)</li> <li>• Apply double integration techniques in evaluating areas bounded by region (L3)</li> <li>• Attain the Knowledge of important tools of calculus in higher dimensions.</li> </ul>

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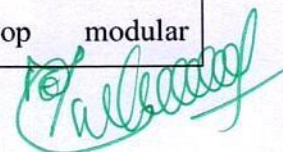
			<p>Students will become familiar with 2-dimensional and 3-dimensional coordinate systems(L5 )</p>
		<p style="text-align: center;"><b>Applied Physics</b></p>	<ul style="list-style-type: none"> <li>• Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3).</li> <li>• Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1)</li> <li>• Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one dimensional infinite potential well (L3).</li> <li>• Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2)</li> <li>• Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall affect (L2).</li> </ul>

  
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		<p style="text-align: center;"><b>Programming for Problem solving using C</b></p>	<ul style="list-style-type: none"> <li>• Write algorithms and to draw flowcharts for solving problems</li> <li>• Use different operators, data types and write programs that use two-way/multi-way selection</li> <li>• Select the best loop construct for a given problem</li> <li>• Design and implement programs to analyze the different pointer applications</li> <li>• Deduce a problem into functions and to develop modular reusable code and apply File I/O operations</li> </ul>
		<p style="text-align: center;"><b>Computer Engineering Workshop</b></p>	<ul style="list-style-type: none"> <li>• Acquire Knowledge of Assemble and disassemble components of a PC</li> <li>• Construct a fully functional virtual machine, Summarize various Linux operating system commands</li> <li>• Recognize characters &amp; extract text from scanned images, Create audio files and podcasts</li> <li>• Explain the internal parts of a computer, peripherals, I/O ports, connecting cables</li> <li>• Demonstrate basic command line interface commands on Linux</li> </ul>
		<p style="text-align: center;"><b>English Communication Skills Laboratory</b></p>	<ul style="list-style-type: none"> <li>• Attain the Knowledge of Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation.</li> </ul>



			<ul style="list-style-type: none"> <li>• Study how to Stress in compound words, rhythm, intonation, accent neutralisation.</li> <li>• Identifying the context and specific pieces of information to answer a series of questions in speaking.</li> </ul>
		<b>Applied Physics Lab</b>	<ul style="list-style-type: none"> <li>• Determination of thickness of thin object by wedge method, radius of curvature of a given plano convex lens by Newton's rings, wavelengths of different spectral lines in mercury spectrum using diffraction</li> <li>• grating in normal incidence configuration, dispersive power of the prism</li> <li>• Determination of numerical aperture and acceptance angle of an optical Fiber, wavelength of Laser light using diffraction grating, resistivity of semiconductor by four probe method</li> <li>• Determination of numerical aperture and acceptance angle of an optical fiber, wavelength of Laser light using diffraction grating, resistivity of semiconductor by four probe method</li> </ul>
		<b>Programming for Problem Solving using C Lab</b>	<ul style="list-style-type: none"> <li>• Attain Knowledge on various concepts of a C language</li> <li>• Design and development of C problem solving skills.</li> <li>• Design and develop modular</li> </ul>



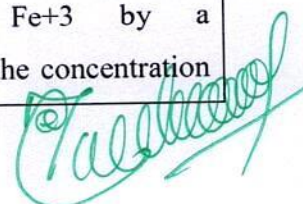
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			programming skills and trace and debug a program
<b>II (R20)</b>	<b>Mathematics – II</b>		<ul style="list-style-type: none"> <li>• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)</li> <li>• Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel(L3)</li> <li>• Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)</li> <li>• Apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)</li> <li>• Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)</li> </ul>
	<b>Applied Chemistry</b>		<ul style="list-style-type: none"> <li>• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion</li> <li>• Summarize the preparation of</li> </ul>

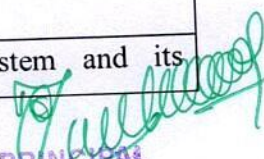
			<p>semiconductors, analyse the applications of liquid crystals and superconductors.</p> <ul style="list-style-type: none"> <li>Analyze the principles of different analytical instruments and their applications. Design models for energy by different natural sources.</li> <li>Attain the knowledge computational chemistry and molecular machines</li> </ul>
		<b>Computer Organization</b>	<ul style="list-style-type: none"> <li>Demonstrate and understanding of the design of the functional units of a digital computer system</li> <li>Recognize and manipulate representations of numbers stored in digital computers</li> <li>Build the logic families and realization of logic gates.</li> <li>Design and analyze combinational and sequential circuits</li> <li>Solve elementary problems by assembly language programming and Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components</li> </ul>
		<b>Python Programming</b>	<ul style="list-style-type: none"> <li>Develop essential programming skills in computer programming concepts like data types, containers</li> <li>Attain Knowledge of general coding techniques and object-oriented</li> </ul>

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			<p>programming</p> <ul style="list-style-type: none"> <li>• Apply the basics of programming in the Python language</li> <li>• Solve coding tasks related conditional execution, loops</li> <li>• Solve coding tasks related to the fundamental notions and techniques used in object oriented programming</li> </ul>
		<b>Data Structures</b>	<ul style="list-style-type: none"> <li>• Summarize the properties, interfaces, and Behaviours of basic abstract data types</li> <li>• Discuss the computational efficiency of the principal algorithms for sorting &amp; searching</li> <li>• Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs</li> <li>• Explain the importance of data structures in developing and implementing efficient algorithms</li> <li>• Demonstrate different methods for traversing trees</li> </ul>
		<b>Applied Chemistry Lab</b>	<ul style="list-style-type: none"> <li>• Determination of HCl using standard Na<sub>2</sub>CO<sub>3</sub> solution, alkalinity of a sample containing Na<sub>2</sub>CO<sub>3</sub> and NaOH, Mn<sup>+2</sup> using standard oxalic acid solution, ferrous iron using standard K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution.</li> <li>• Determination of Fe<sup>+3</sup> by a colorimetric method, the concentration</li> </ul>



			<p>of acetic acid using sodium hydroxide (pH-metry method), iso-electric point of amino acids using pH-metry method/conduct metric method.</p> <ul style="list-style-type: none"> <li>• Determination of strong acid vs strong base (by potentiometric method), Mg<sup>+2</sup> present in an antacid, CaCO<sub>3</sub> present in an egg shell, phosphoric content in soft drinks.</li> </ul>
		<b>Python Programming Lab</b>	<ul style="list-style-type: none"> <li>• Develop essential programming skills in computer programming concepts like data types, containers</li> <li>• Apply the basics of programming in the Python language and Solve coding tasks related conditional execution, loops</li> <li>• Solve coding tasks related to the fundamental notions and techniques used in object oriented programming</li> </ul>
		<b>Data Structures Lab</b>	<ul style="list-style-type: none"> <li>• Use basic data structures such as arrays and linked list.</li> <li>• Demonstrate fundamental algorithmic problems including Tree</li> <li>• Traversals, Graph traversals, and shortest paths.</li> <li>• Use various searching and sorting algorithms.</li> </ul>
		<b>Environment Science</b>	<ul style="list-style-type: none"> <li>• Understand the Ecosystem and its</li> </ul>

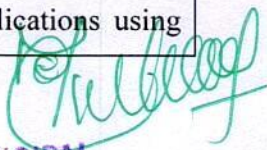
  
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			<p>Diversity</p> <ul style="list-style-type: none"> <li>• Acquire the Knowledge of Natural resources and associated problems.</li> <li>• Acquire the Knowledge of the environmental impact of developmental activities.</li> <li>• Demonstrate Environmental Pollution and Solid Waste Management</li> <li>• Illustrate Social Issues and the Environment and Environmental Management</li> </ul>
II	I(R20)	MATHEMATIC-III	<ul style="list-style-type: none"> <li>• Estimate the work done against a field, circulation and flux using vector calculus</li> <li>• Apply the Laplace transform for solving differential equations</li> <li>• Find or compute the Fourier series of periodic signals</li> <li>• Apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms</li> <li>• Identify solution methods for partial differential equations that model physical processes</li> </ul>
		<p><b>OBJECT ORIENTED PROGRAMMING THROUGH C++</b></p>	<ul style="list-style-type: none"> <li>• Classify object oriented programming and procedural programming</li> <li>• Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O,</li> </ul>

  
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			<p>exception handling</p> <ul style="list-style-type: none"> <li>• Build C++ classes using appropriate encapsulation and design principles</li> <li>• Apply object oriented or non-object oriented techniques to solve bigger computing problems</li> <li>• Categorize inheritance with the understanding of early and late binding, usage of exception handling, generic programming</li> </ul>
		<b>OPEARTING SYSTEMS</b>	<ul style="list-style-type: none"> <li>• Describe various generations of Operating System and functions of Operating System</li> <li>• Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance</li> <li>• Solve Inter Process Communication problems using Mathematical Equations by various methods</li> <li>• Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques</li> <li>• Outline File Systems in Operating System like UNIX/Linux and Windows.</li> </ul>
		<b>SOFTWARE ENGINEERING</b>	<ul style="list-style-type: none"> <li>• Attain Knowledge to transform an Object-Oriented Design into high</li> </ul>

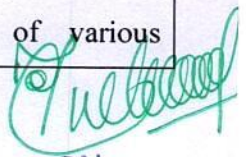
		<p style="text-align: center;"><b>Cryptography and Network Security</b></p>	<ul style="list-style-type: none"> <li>• Explain different security threats and countermeasures and foundation course of cryptography mathematics.</li> <li>• Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography</li> <li>• Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more</li> <li>• Design applications of hash algorithms, digital signatures and key management techniques</li> <li>• Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL, TSL, and IPsec</li> </ul>
		<p style="text-align: center;"><b>Mean stack Development</b></p>	<ul style="list-style-type: none"> <li>• Build static web pages using HTML 5 elements..</li> <li>• Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.</li> <li>• Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.</li> <li>• Develop JavaScript applications using</li> </ul>





			<p>quality, executable code</p> <ul style="list-style-type: none"> <li>• Skills to design, implement, and execute test cases at the Unit and Integration level</li> <li>• Compare conventional and agile software methods</li> <li>• Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.</li> <li>• Acquire Knowledge of testing problems and will be able to develop a simple testing report</li> </ul>
		<p><b>MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE</b></p>	<ul style="list-style-type: none"> <li>• Demonstrate skills in solving mathematical problems</li> <li>• Demonstrate mathematical principles and logic</li> <li>• Demonstrate knowledge of mathematical modelling and proficiency in using mathematical software</li> <li>• Manipulate and analyze data numerically and/or graphically using appropriate Software</li> <li>• Discuss effectively mathematical ideas/results verbally or in writing</li> </ul>
		<p><b>OBJECT ORIENTED PROGRAMMING THROUGH</b></p>	<ul style="list-style-type: none"> <li>• Apply the various OOPs concepts with the help of programs.</li> </ul>

		<b>C++ LAB</b>	<ul style="list-style-type: none"> <li>• Understand dynamic memory management techniques using pointers, constructors, destructors</li> <li>• Implementing the with template and Exception Handling</li> </ul>
		<b>OPEARTING SYSTEMS LAB</b>	<ul style="list-style-type: none"> <li>• Understand various Unix utilities and perform basic shell control of the utilities</li> <li>• Acquire knowledge on the Unix file system and file access control</li> <li>• Use of an operating system to develop software and Linux environment efficiently and Solve problems using bash for shell scripting</li> </ul>
		<b>SOFTWARE ENGINEERING LAB</b>	<ul style="list-style-type: none"> <li>• Attain Knowledge of how to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project</li> <li>• Prepare SRS document, design document, test cases and software configuration management and risk management related document.</li> <li>• Develop function oriented and object oriented software design using tools like rational rose.</li> </ul>
		<b>APPLICATIONS OF PYTHON</b>	<ul style="list-style-type: none"> <li>• Acquire knowledge on how data is collected, managed and stored for processing</li> <li>• Analyze the workings of various</li> </ul>

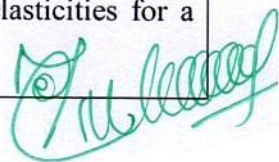


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		<ul style="list-style-type: none"> <li>• Attain the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs</li> <li>• Study the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units</li> <li>• Prepare Financial Statements and the usage of various Accounting tools for Analysis</li> <li>• Evaluate various investment project proposals with the help of capital budgeting techniques for decision making</li> </ul>
	<p style="text-align: center;"><b>DATABASE MANAGEMENT SYSTEM LAB</b></p>	<ul style="list-style-type: none"> <li>• Utilize SQL to execute queries for creating database and performing data manipulation operations</li> <li>• Examine integrity constraints to build efficient databases</li> <li>• Apply Queries using Advanced Concepts of SQL and Build PL/SQL programs including stored procedures, functions, cursors and triggers</li> </ul>
	<p style="text-align: center;"><b>R PROGRAMMING LAB</b></p>	<ul style="list-style-type: none"> <li>• Use online resources for R and import new function packages into the R workspace</li> <li>• Illustrate appropriate statistical tests and create, edit visualizations, with R</li> </ul>

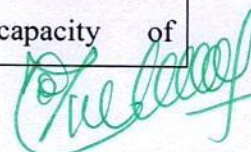
			<p>numerical techniques, different descriptive measures of Statistics, correlation and regression to solve the engineering problems</p> <ul style="list-style-type: none"> <li>• Understand how to apply some linear algebra operations to n-dimensional arrays</li> </ul>
	<b>II(R20)</b>	<b>PROBABILITY AND STATISTICS</b>	<ul style="list-style-type: none"> <li>• Classify the concepts of data science and its importance</li> <li>• Interpret the association of characteristics and through correlation and regression tools</li> <li>• Use of the concepts of probability and their applications</li> <li>• Apply discrete and continuous probability distributions</li> <li>• Design the components of a classical hypothesis test</li> </ul>
		<b>DATABASE MANAGEMENT SYSTEM</b>	<ul style="list-style-type: none"> <li>• Describe a relational database and object-oriented database</li> <li>• Create, maintain and manipulate a relational database using SQL</li> <li>• Describe ER model and normalization for database design</li> <li>• Examine issues in data storage and query processing and can formulate appropriate solutions</li> <li>• Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility,</li> </ul>

			and strategic advantage
		<b>FORMAL LANGUAGES AND AUTOMATA THEROY</b>	<ul style="list-style-type: none"> <li>• Classify machines by their power to recognize languages</li> <li>• Summarize language classes &amp; grammars relationship among them with the help of Chomsky hierarchy</li> <li>• Employ finite state machines to solve problems in computing</li> <li>• Illustrate deterministic and non-deterministic machines</li> <li>• Study the hierarchy of problems arising in the computer science</li> </ul>
		<b>JAVA PROGRAMMING</b>	<ul style="list-style-type: none"> <li>• Study the concept of Object Oriented Programming &amp; Java Programming Constructs</li> <li>• Describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords</li> <li>• Apply the concept of exception handling and Input/ Output operations</li> <li>• Design the applications of Java &amp; Java applet</li> <li>• Analyze &amp; Design the concept of Event Handling and Abstract Window Toolkit</li> </ul>
		<b>MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY</b>	<ul style="list-style-type: none"> <li>• Attain the knowledge of estimating the Demand and demand elasticities for a product</li> </ul>



			<p>and Import, review, manipulate and summarize data-sets in R</p> <ul style="list-style-type: none"> <li>• Study how to create testable hypotheses and identify appropriate statistical tests</li> </ul>
		<b>JAVAPROGRAMMING LAB</b>	<ul style="list-style-type: none"> <li>• Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings</li> <li>• Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism</li> <li>• Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism and Construct Threads, Event Handling, implement packages, developing applets</li> </ul>
		<b>SKILL ORIENTED COURSE – II</b>	<ul style="list-style-type: none"> <li>• Use Pandas to create and manipulate data structures like Series and Data Frames.</li> <li>• Attain Knowledge of arrays, queries, and data frames</li> <li>• Attain Knowledge of Data Frame structures for cleaning and processing and manipulating files</li> </ul>
		<b>Design and Analysis of Algorithm</b>	<ul style="list-style-type: none"> <li>• Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms</li> </ul>

			<p>programming and system control to perform a specific task.</p> <ul style="list-style-type: none"> <li>• Acquire knowledge about devices and buses used in embedded networking</li> <li>• Acquire knowledge about basic concepts of circuit emulators</li> <li>• Develop programming skills in embedded systems for various applications.</li> </ul>
		<b>SOFTWARE PROJECT MANAGEMENT</b>	<ul style="list-style-type: none"> <li>• Apply the process to be followed in the software development life-cycle models.</li> <li>• Apply the concepts of project management &amp; planning.</li> <li>• Implement the project plans through managing people, communications and change</li> <li>• Prepare activities necessary to successfully complete and close the Software projects</li> <li>• Implement communication, modeling, and construction &amp; deployment practices in software development.</li> </ul>
		<b>CLOUD COMPUTING</b>	<ul style="list-style-type: none"> <li>• Interpret the key dimensions of the challenge of Cloud Computing</li> <li>• Examine the economics, financial, and technological implications for selecting cloud computing for own organization</li> <li>• Assessing the financial, technological, and organizational capacity of</li> </ul>



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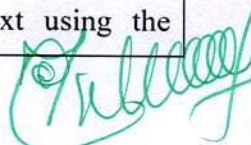
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			SHA-1 algorithm
		<b>Mean Stack Technologies Lab</b>	<ul style="list-style-type: none"> <li>• Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles</li> <li>• Utilize JavaScript for developing interactive HTML web pages and validate form data</li> <li>• Build a basic web server using Node.js and also working with Node Package Manager (NPM) and Build a web server using Express.js</li> </ul>
<b>IV</b>	<b>I(R19)</b>	<b>CRYPTOGRAPHY AND NETWORK SECURITY</b>	<ul style="list-style-type: none"> <li>• Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory</li> <li>• Identify information security goals, classical encryption techniques and acquire fundamental knowledge on the concepts of finite fields and number theory</li> <li>• Apply different digital signature algorithms to achieve authentication and create secure applications</li> <li>• Apply network security basics, analyze different attacks on networks and evaluate the performance of firewalls</li> </ul>

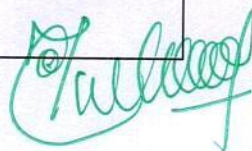
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			<p>typescript and work with document database using Mongo DB</p> <ul style="list-style-type: none"> <li>Utilize Angular JS to design dynamic and responsive web pages.</li> </ul>
		<p><b>Machine Learning using Python Lab</b></p>	<ul style="list-style-type: none"> <li>Implement procedures for the machine learning algorithms</li> <li>Design and Develop Python programs for various Learning algorithms</li> <li>Apply appropriate data sets to the Machine Learning algorithms and Develop Machine Learning algorithms to solve real world problems</li> </ul>
		<p><b>Compiler Design Lab</b></p>	<ul style="list-style-type: none"> <li>Design simple lexical analyzers</li> <li>Determine predictive parsing table for a CFG</li> <li>Apply Lex and Yacc tools and Examine LR parser and generating SLR Parsing table</li> </ul>
		<p><b>Cryptography Network Security Lab</b></p>	<ul style="list-style-type: none"> <li>Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher</li> <li>Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm.</li> <li>Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the</li> </ul>

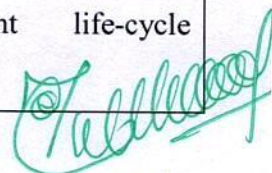


		<p><b>Continuous Integration And Continuous Delivery Using Devops</b></p>	<ul style="list-style-type: none"> <li>• Understand the why, what and how of DevOps adoption</li> <li>• Attain literacy on Devops and Align capabilities required in the team</li> <li>• Create an automated CICD pipeline using a stack of tools</li> </ul>
	II(R20)	<p><b>Machine Learning</b></p>	<ul style="list-style-type: none"> <li>• Explain the fundamental usage of the concept Machine Learning system</li> <li>• Demonstrate on various regression Technique</li> <li>• Analyze the Ensemble Learning Methods</li> <li>• Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning</li> <li>• Discuss the Neural Network Models and Fundamentals concepts of Deep Learning</li> </ul>
		<p><b>Compiler Design</b></p>	<ul style="list-style-type: none"> <li>• Demonstrate phases in the design of compiler</li> <li>• Organize Syntax Analysis, Top Down and LL(1) grammars</li> <li>• Design Bottom Up Parsing and Construction of LR parsers</li> <li>• Analyze synthesized, inherited attributes and syntax directed translation schemes</li> <li>• Determine algorithms to generate code for a target machine</li> </ul>



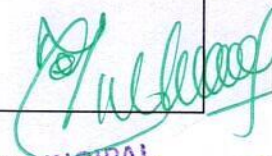
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			<p>itemsets generation.</p> <ul style="list-style-type: none"> <li>Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.</li> </ul>
		<p><b>Optimization In Operations Research</b></p>	<ul style="list-style-type: none"> <li>State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.</li> <li>Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution</li> <li>Apply and Solve transportation and assignment problem by using Linear programming Simplex method</li> <li>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</li> <li>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.</li> </ul>
		<p><b>Software Project Management</b></p>	<ul style="list-style-type: none"> <li>Apply the process to be followed in the software development life-cycle models</li> </ul>



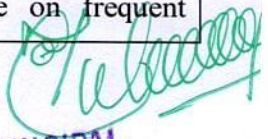
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			<ul style="list-style-type: none"> <li>• Apply the concepts of project management &amp; planning</li> <li>• Implement the project plans through managing people, communications and change</li> <li>• Organize activities necessary to successfully complete and close the Software projects</li> <li>• Implement communication, modeling, and construction &amp; deployment practices in software development</li> </ul>
		<p style="text-align: center;"><b>Data warehousing and Data mining Lab</b></p>	<ul style="list-style-type: none"> <li>• Design a data mart or data warehouse for any organization</li> <li>• Attain knowledge of data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques</li> <li>• Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data</li> </ul>
		<p style="text-align: center;"><b>Computer Networks Lab</b></p>	<ul style="list-style-type: none"> <li>• Attain Knowledge of how reliable data communication is achieved through data link layer.</li> <li>• Identify appropriate routing algorithm for the network.</li> <li>• Acquire Knowledge of how to Provide internet connection to the system and its installation.</li> </ul>



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			<ul style="list-style-type: none"> <li>• List and describe various algorithmic approaches and Solve problems using divide and conquer &amp; greedy Method</li> <li>• Study of efficient algorithms dynamic programming approaches to solve in common engineering design situations.</li> <li>• Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches</li> <li>• Demonstrate NP- Completeness theory ,lower bound theory and String Matching</li> </ul>
		<p style="text-align: center;"><b>Data ware housing and Data mining</b></p>	<ul style="list-style-type: none"> <li>• Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.</li> <li>• 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.</li> <li>• Choose appropriate classification technique to perform classification, model building and evaluation.</li> <li>• Use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent</li> </ul>

  
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			<p>employer's for actively initiating and installing cloud-based applications</p> <ul style="list-style-type: none"> <li>• Evaluate own organizations' needs for capacity building and training in cloud computing related IT areas</li> <li>• Illustrate Virtualization for Data-Center Automation</li> </ul>
		<b>UML LAB</b>	<ul style="list-style-type: none"> <li>• Create use case documents that capture requirements for a software system</li> <li>• Create class diagrams that model both the domain model and design model of a software system and Create interaction diagrams that model the dynamic aspects of a software system</li> <li>• Write code that builds a software system and Develop simple applications</li> </ul>
		<b>PROJECT - I</b>	<ul style="list-style-type: none"> <li>• Demonstrate a sound technical knowledge of their selected project topic.</li> <li>• Problem identification, formulation and solution.</li> <li>• Acquire Knowledge of different software development process models and how to choose an appropriate one for a project</li> <li>• Study about and go through the software development cycle with emphasis on different processes</li> </ul>

			<p>and security protocols like SSL, IPsec, and PGP</p> <ul style="list-style-type: none"> <li>• Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications</li> </ul>
		<b>UML AND DESIGN PATTERNS</b>	<ul style="list-style-type: none"> <li>• Illustrate software design with UML diagrams</li> <li>• Design software applications using OO concepts</li> <li>• Identify various scenarios based on software requirements</li> <li>• Apply UML based software design into pattern based design using design patterns</li> <li>• Illustrate the various testing methodologies for OO software</li> </ul>
		<b>MACHINE LEARNING</b>	<ul style="list-style-type: none"> <li>• Attain knowledge of basic concepts of Machine Learning and Study about different learning algorithms</li> <li>• Identify machine learning techniques suitable for a given problem</li> <li>• Solve the problems using various machine learning techniques</li> <li>• Apply Dimensionality reduction techniques</li> <li>• Design application using machine learning techniques</li> </ul>
		<b>EMBEDDED SYSTEM</b>	<ul style="list-style-type: none"> <li>• Acquire a basic knowledge about fundamentals of microcontrollers</li> <li>• Acquire a basic knowledge about</li> </ul>

			<p>requirements, design, and implementation phases and also learn details about different artifacts produced during software development.</p> <ul style="list-style-type: none"> <li>• Design engineering solutions to complex problems utilising a systems approach.</li> </ul>
	<b>II(R19)</b>	<b>MANAGEMENT AND ORGANISATIONAL BEHAVIOUR</b>	<ul style="list-style-type: none"> <li>• Student will acquire the knowledge on management functions, global leadership and organizational structure</li> <li>• Study the concepts of functional management that is HRM and Marketing of new product developments</li> <li>• Develop positive attitude through personality development and can equip with motivational theories</li> <li>• Acquire Knowledge of contemporary management practices and Strategic Management</li> <li>• Attain the group performance and grievance handling in managing the organizational culture</li> </ul>
		<b>ENTREPRENEURSHIP</b>	<ul style="list-style-type: none"> <li>• Understand the basic concepts in the area of entrepreneurship &amp; its role in economic development.</li> <li>• Study the legal and financial conditions for starting a business venture.</li> <li>• Analyze &amp; evaluate the sources</li> </ul>



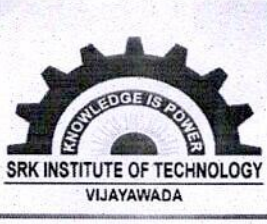


			<p>required for starting up a business.</p> <ul style="list-style-type: none"> <li>• Evaluate the effectiveness of different entrepreneurial strategies.</li> <li>• Explain the importance of marketing and management in small businesses venture.</li> </ul>
		<b>BIG DATA ANALYTICS</b>	<ul style="list-style-type: none"> <li>• Illustrate big data challenges in different domains including social media, transportation, finance and medicine</li> <li>• Use various techniques for mining data stream</li> <li>• Design and develop Hadoop</li> <li>• Identify the characteristics of datasets and compare the trivial data and big data for various applications</li> <li>• Explore the various search methods and visualization techniques</li> </ul>
		<b>PROJECT - II</b>  <b>environment or propose methodology in the field of research.</b>	<ul style="list-style-type: none"> <li>• Understand programming language concepts, particularly Java or C# along with object oriented concepts as well as software engineering principles or go through the research work and gather knowledge over the field and develop an ability to apply them to software design of real life problems in an industry/ commercial environment or propose methodology in the field of research.</li> <li>• Plan, analyze, design a software</li> </ul>

			<p>project and demonstrate the ability to communicate effectively in speech and writing.</p> <ul style="list-style-type: none"><li>• Attain Knowledge of major software engineering topics and position them to lead medium sized software projects in industry or propose any new model over the selected field of research that will be useful for future activities</li><li>• Study about and go through the software development cycle with emphasis on different processes - requirements, design, and implementation phases and also learn details about different artifacts produced during software development.</li><li>• Acquire Knowledge of different software development process models and how to choose an appropriate one for a project</li></ul>
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**(ISO 9001:2015 Certified Institution)**

**Computer Science Engineering- Artificial Intelligence and Machine Learning**

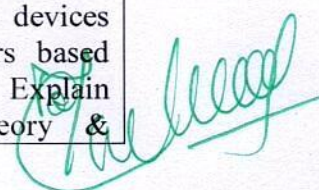
<b>PSO 1</b>	The Department of Computer Science and Engineering considered the Graduate attributes defined by National Board of Accreditation for Framing of Program Specific Outcomes.
<b>PSO 2</b>	The Department academics committee after considering the Program Outcomes and the views of internal stakeholders,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

  
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**Computer Science Engineering- Artificial Intelligence and Machine Learning**

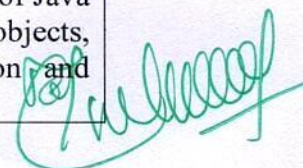
YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I/IV (R20)	I	<b>Applied Chemistry</b>	<ul style="list-style-type: none"> <li>• Able to analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Able to utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.</li> <li>• Able to synthesize nano materials for modern advances of engineering technology and summarize the preparation of semiconductors, analyze the applications of liquid crystals and superconductors.</li> <li>• Able to analyze the principles of different analytical instruments and their applications and design models for energy by different natural sources. Able to obtain the knowledge of computational chemistry and molecular machines</li> </ul>
		<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials</li> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> <li>• Able to gain knowledge on solving first</li> </ul>

			<p>diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)</p> <ul style="list-style-type: none"> <li>• Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).</li> <li>• Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).</li> <li>• Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Clausius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)</li> <li>• Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory &amp;</li> </ul>
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**Computer Science Engineering- Artificial Intelligence and Machine Learning**

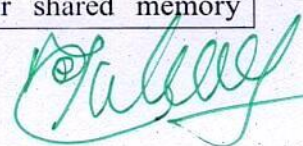
YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
II	I	<b>MATHEMATICS-III</b>	<ul style="list-style-type: none"> <li>• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)</li> <li>• Estimate the work done against a field, circulation and flux using vector calculus (L5)</li> <li>• Apply the Laplace transform for solving differential equations (L3)</li> <li>• Find or compute the Fourier series of periodic signals (L3)</li> <li>• Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)</li> <li>• Identify solution methods for partial differential equations that model physical processes (L3)</li> </ul>
		<b>MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE</b>	<ul style="list-style-type: none"> <li>• Demonstrate skills in solving mathematical problems</li> <li>• Comprehend mathematical principles and logic</li> <li>• Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software</li> <li>• Manipulate and analyze data numerically and/or graphically using appropriate Software</li> <li>• Communicate effectively mathematical ideas/results verbally or in writing</li> </ul>
		<b>INTRODUCTION TO ARTIFICIAL INTELLIGENCE &amp; MACHINE LEARNING</b>	<ul style="list-style-type: none"> <li>• Enumerate the history and foundations of Artificial Intelligence</li> <li>• Apply the basic principles of AI in problem solving</li> <li>• Choose the appropriate representation of Knowledge</li> <li>• Enumerate the Perspectives and Issues in Machine Learning</li> <li>• Identify issues in Decision Tree Learning</li> </ul>
		<b>OOP WITH JAVA</b>	<ul style="list-style-type: none"> <li>• Able to realize the concept of Object Oriented Programming &amp; Java Programming Constructs</li> <li>• Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords</li> </ul>



YEAR	SEMESTER	SUBJECT	Course Outcomes
iii	I(R20)	Compiler Design	<ul style="list-style-type: none"> <li>• Demonstrate phases in the design of compiler</li> <li>• Organize Syntax Analysis, Top Down and LL(1) grammars</li> <li>• Design Bottom Up Parsing and Construction of LR parsers</li> <li>• Analyze synthesized, inherited attributes and syntax directed translation schemes</li> <li>• Determine algorithms to generate code for a target machine</li> </ul>
		Operating Systems	<ul style="list-style-type: none"> <li>• Introduce to the internal operation of modern operating systems</li> <li>• Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems</li> <li>• Understand File Systems in Operating System like UNIX/Linux and Windows</li> <li>• Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism</li> <li>• Analyze Security and Protection Mechanism in Operating System</li> </ul>
		Machine Learning	<ul style="list-style-type: none"> <li>• Explain the fundamental usage of the concept Machine Learning system</li> <li>• Demonstrate on various regression Technique</li> <li>• Analyze the Ensemble Learning Methods</li> <li>• Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.</li> <li>• Discuss the Neural Network Models and Fundamentals concepts of Deep Learning</li> </ul>
		OPTIMIZATION IN OPERATIONS RESEARCH	<ul style="list-style-type: none"> <li>• State and formulate the optimization problem, without and with constraints, by using design variables from an</li> </ul>

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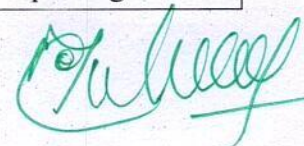
			<p>engineering design problem.</p> <ul style="list-style-type: none"> <li>• Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.</li> <li>• Apply and Solve transportation and assignment problem by using Linear programming Simplex method.</li> <li>• 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</li> <li>• 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.</li> </ul>
		<p><b>Devops (Professional Elective-I)</b></p>	<ul style="list-style-type: none"> <li>• Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility.</li> <li>• Describe DevOps&amp;DevSecOps methodologies and their key concepts</li> <li>• Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models</li> <li>• Set up complete private infrastructure using version control systems and CI/CD tools</li> <li>• Acquire the knowledge of maturity model, Maturity Assessment</li> </ul>
		<p><b>OPERATING SYSTEMS &amp; COMPILER DESIGN LAB</b></p>	<ul style="list-style-type: none"> <li>• Implement various scheduling, page replacement algorithms and algorithms related to deadlocks</li> <li>• Design programs for shared memory</li> </ul>



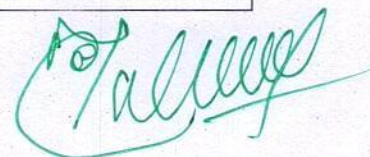
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			<p>management and semaphores</p> <ul style="list-style-type: none"> <li>• Determine predictive parsing table for a CFG</li> <li>• Apply Lex and Yacc tools</li> <li>• Examine LR parser and generating SLR Parsing table</li> </ul>
		<b>MACHINE LEARNING LAB</b>	<ul style="list-style-type: none"> <li>• Implement procedures for the machine learning algorithms</li> <li>• Design and Develop Python programs for various Learning algorithms</li> <li>• Apply appropriate data sets to the Machine Learning algorithms</li> <li>• Develop Machine Learning algorithms to solve real world problems</li> </ul>
		<b>CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING Devops</b>	<ul style="list-style-type: none"> <li>• Understand the why, what and how of DevOps adoption</li> <li>• Attain literacy on Devops</li> <li>• Align capabilities required in the team Create an automated CICD pipeline using a stack of tools</li> </ul>
<b>II (R20)</b>		<b>Computer Networks</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Discuss different transmission media and different switching networks.</li> <li>• Analyze data link layer services, functions and protocols like HDLC and PPP.</li> <li>• Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols</li> <li>• Determine application layer services and client server protocols working with the client server paradigms like</li> </ul>



			<p>WWW, HTTP, FTP, e-mail and SNMP etc.</p>
		<p><b>Deep Learning</b></p>	<ul style="list-style-type: none"> <li>• Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning.□</li> <li>• Discuss the Neural Network training, various random models.</li> <li>• Explain the Techniques of Keras, TensorFlow, Theano and CNTK</li> <li>• Classify the Concepts of CNN and RNN</li> <li>• Implement Interactive Applications of Deep Learning</li> </ul>
		<p><b>Design And Analysis Of Algorithms</b></p>	<ul style="list-style-type: none"> <li>• Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms</li> <li>• List and describe various algorithmic approaches and Solve problems using divide and conquer &amp; greedy Method</li> <li>• Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.</li> <li>• Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches</li> <li>• Demonstrate NP- Completeness theory ,lower bound theory and String Matching</li> </ul>
		<p><b>Software Project Management (Professional Elective-II)</b></p>	<ul style="list-style-type: none"> <li>• Apply the process to be followed in the software development life-cycle models</li> <li>• Apply the concepts of project management &amp; planning</li> <li>• Implement the project plans through managing people, communications and change</li> <li>• Conduct activities necessary to successfully complete and close the</li> </ul>



			<p>Software projects</p> <ul style="list-style-type: none"> <li>• Implement communication, modeling, and construction &amp; deployment practices in software development</li> </ul>
		<p><b>MEAN Stack Development (Job Oriented Course) (Open Elective-II)</b></p>	<ul style="list-style-type: none"> <li>• Build static web pages using HTML 5 elements.</li> <li>• Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.</li> <li>• Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.</li> <li>• Develop JavaScript applications using typescript and work with document database using MongoDB.</li> <li>• Utilize Angular JS to design dynamic and responsive web pages.</li> </ul>
		<p><b>Computer Networks Lab</b></p>	<ul style="list-style-type: none"> <li>• Know how reliable data communication is achieved through data link layer.</li> <li>• Suggest appropriate routing algorithm for the network.</li> <li>• Provide internet connection to the system and its installation.</li> <li>• Work on various network management tools</li> </ul>
		<p><b>Algorithms For Efficient Coding Lab</b></p>	<ul style="list-style-type: none"> <li>• Analyze the program execution time</li> </ul>
		<p><b>Deep Learning With Tensorflow</b></p>	<ul style="list-style-type: none"> <li>• Implement deep neural networks to solve real world problems</li> <li>• Choose appropriate pre-trained model to solve real time problem</li> <li>• Interpret the results of two different deep learning models</li> </ul>
		<p><b>MEAN Stack Technologies Lab</b></p>	<ul style="list-style-type: none"> <li>• 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</li> </ul>

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			<p>Styles.</p> <ul style="list-style-type: none"> <li>• Utilize JavaScript for developing interactive HTML web pages and validate form data.</li> <li>• Build a basic web server using Node.js and also working with Node Package Manager (NPM).</li> <li>• Build a web server using Express.js</li> <li>• Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.</li> </ul>
		<b>Employability Skills-II</b>	<ul style="list-style-type: none"> <li>• Solve various Basic Mathematics problems by following different methods</li> <li>• Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems</li> <li>• Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.</li> <li>• Analyze, summarize and present information in quantitative forms including table, graphs and formulas</li> </ul>



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(ISO 9001:2015 Certified Institution)

**Computer Science Engineering- Data Science**

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

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**Computer Science Engineering- Data Science**

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I/IV (R20)	I	<b>Applied Chemistry</b>	<ul style="list-style-type: none"> <li>• Able to analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Able to utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.</li> <li>• Able to synthesize nano materials for modern advances of engineering technology and summarize the preparation of semiconductors, analyze the applications of liquid crystals and superconductors.</li> <li>• Able to analyze the principles of different analytical instruments and their applications and design models for energy by different natural sources. Able to obtain the knowledge of computational chemistry and molecular machines</li> </ul>
		<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials</li> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> </ul>

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			<p>diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)</p> <ul style="list-style-type: none"> <li>• Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).</li> <li>• Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).</li> <li>• Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)</li> <li>• Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory &amp; Josephson effect in superconductors (L2).</li> </ul>
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			<ul style="list-style-type: none"> <li>circulation and flux using vector calculus (L5)</li> <li>• Apply the Laplace transform for solving differential equations (L3)</li> <li>• x Find or compute the Fourier series of periodic signals (L3)</li> <li>• Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)</li> <li>• Identify solution methods for partial differential equations that model physical processes (L3)</li> </ul>
		<b>MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE</b>	<ul style="list-style-type: none"> <li>• Demonstrate skills in solving mathematical problems</li> <li>• Comprehend mathematical principles and logic</li> <li>• Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software</li> <li>• Manipulate and analyze data numerically and/or graphically using appropriate Software</li> <li>• Communicate effectively mathematical ideas/results verbally or in writing</li> </ul>
		<b>FUNDAMENTALS OF DATA SCIENCE</b>	<ul style="list-style-type: none"> <li>• Apply principles of NumPy and Pandas to the analysis of data.</li> <li>• Make use of various file formats in loading and storage of data.</li> <li>• Identify and apply the need and importance of pre-processing techniques. • Show the results and present them in a pictorial format.</li> </ul>
		<b>OOP WITH JAVA</b>	<ul style="list-style-type: none"> <li>• Able to realize the concept of Object Oriented Programming &amp; Java Programming Constructs</li> <li>• Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords</li> <li>• Apply the concept of exception handling and Input/ Output operations</li> <li>• Able to design the applications of Java &amp; Java applet</li> <li>• Able to Analyze &amp; Design the concept of Event Handling and Abstract Window Toolkit</li> </ul>
		<b>DATABASE MANAGEMENT</b>	<ul style="list-style-type: none"> <li>• Describe a relational database and object-oriented database</li> </ul>






			<p>Similarity, Dissimilarity measures for any given raw data.</p> <ul style="list-style-type: none"> <li>• Construct a decision tree and resolve the problem of model overfitting. Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation.</li> <li>• Apply suitable clustering algorithm for the given data set.</li> </ul>
		<b>VISUAL DESIGN AND COMMUNICATIO N</b>	<ul style="list-style-type: none"> <li>• Students will develop the ability to create visual compositions using basic elements and apply appropriate principles of visual composition to communicate ideas.</li> <li>• Students will begin to understand the visual language and develop the ability to perceive, visualize and communicate using visual narratives.</li> <li>• Students will develop the ability to apply the visual dynamics of visual language in Typography, Photography and Videography.</li> <li>• 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.</li> <li>• Students will be able to execute design solutions using appropriate software programmes.</li> </ul>
		<b>MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY</b>	<ul style="list-style-type: none"> <li>• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</li> <li>• The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</li> <li>• 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.</li> <li>• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</li> <li>• The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</li> </ul>

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			<p>given raw data.</p> <ul style="list-style-type: none"> <li>• Construct a decision tree and resolve the problem of model overfitting.</li> <li>• Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation.</li> <li>• Apply suitable clustering algorithm for the given data set.</li> </ul>
		<b>FORMAL LANGUAGES AND AUTOMATA THEORY</b>	<ul style="list-style-type: none"> <li>• Classify machines by their power to recognize languages.</li> <li>• Summarize language classes &amp; grammars relationship among them with the help of Chomsky hierarchy.</li> <li>• Employ finite state machines to solve problems in computing.</li> <li>• Illustrate deterministic and non-deterministic machines.</li> <li>• Quote the hierarchy of problems arising in the computer science</li> </ul>
		<b>MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY</b>	<ul style="list-style-type: none"> <li>• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.</li> <li>• The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.</li> <li>• 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.</li> <li>• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</li> <li>• The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</li> </ul>

  
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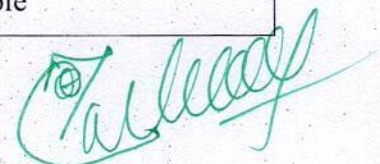
YEAR	SEMESTER	SUBJECT	Course Outcomes
III	I(R20)	<b>COMPILER DESIGN</b>	<ul style="list-style-type: none"> <li>• Demonstrate phases in the design of compiler</li> <li>• Organize Syntax Analysis, Top Down and LL(1) grammars</li> <li>• Design Bottom Up Parsing and Construction of LR parsers</li> <li>• Analyze synthesized, inherited attributes and syntax directed translation schemes</li> <li>• Determine algorithms to generate code for a target machine</li> </ul>
		<b>OPERATING SYSTEMS</b>	<ul style="list-style-type: none"> <li>• Introduce to the internal operation of modern operating systems</li> <li>• Define, explain, processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems</li> <li>• Understand File Systems in Operating System like UNIX/Linux and Windows</li> <li>• Understand Input Output Management and use of Device Driver and Secondary Storage (Disk) Mechanism</li> <li>• Analyze Security and Protection Mechanism in Operating System</li> </ul>
			<ul style="list-style-type: none"> <li>• Explain the fundamental usage of the concept Machine Learning system</li> <li>• Demonstrate on various regression Technique</li> </ul>



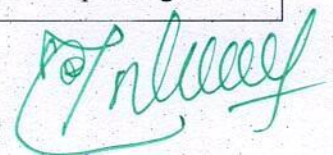
		<b>MACHINE LEARNING</b>	<ul style="list-style-type: none"> <li>• Analyze the Ensemble Learning Methods</li> <li>• Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.</li> <li>• Discuss the Neural Network Models and Fundamentals concepts of Deep Learning</li> </ul>
		<b>OPTIMIZATION IN OPERATIONS RESEARCH</b>	<ul style="list-style-type: none"> <li>• State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.</li> <li>• Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.</li> <li>• Apply and Solve transportation and assignment problem by using Linear programming Simplex method.</li> <li>• 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</li> <li>• Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from</li> </ul>

  
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			the current optimal solution.
		<b>DEVOPS (PROFESSIONAL ELECTIVE-I)</b>	<ul style="list-style-type: none"> <li>• Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility.</li> <li>• Describe DevOps&amp;DevSecOps methodologies and their key concepts</li> <li>• Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models</li> <li>• Set up complete private infrastructure using version control systems and CI/CD tools</li> <li>• Acquire the knowledge of maturity model, Maturity Assessment</li> </ul>
		<b>OPERATING SYSTEMS &amp; COMPILER DESIGN LAB</b>	<ul style="list-style-type: none"> <li>• Implement various scheduling, page replacement algorithms and algorithms related to deadlocks</li> <li>• Design programs for shared memory management and semaphores</li> <li>• Determine predictive parsing table for a CFG</li> <li>• Apply Lex and Yacc tools</li> <li>• Examine LR parser and generating SLR Parsing table</li> </ul>

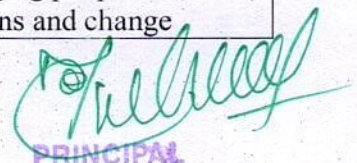


		<b>MACHINE LEARNING LAB</b>	<ul style="list-style-type: none"> <li>• Implement procedures for the machine learning algorithms</li> <li>• Design and Develop Python programs for various Learning algorithms</li> <li>• Apply appropriate data sets to the Machine Learning algorithms</li> <li>• Develop Machine Learning algorithms to solve real world problems</li> </ul>
		<b>CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING DEVOPS</b>	<ul style="list-style-type: none"> <li>• Understand the why, what and how of DevOps adoption</li> <li>• Attain literacy on Devops</li> <li>• Align capabilities required in the team Create an automated CICD pipeline using a stack of tools</li> </ul>
	<b>II (R20)</b>	<b>COMPUTER NETWORKS</b>	<ul style="list-style-type: none"> <li>• Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and getknowledge about various communication techniques, methods and protocol standards.</li> <li>• Discuss different transmission media and different switching networks.</li> <li>• Analyze data link layer services, functions and protocols like HDLC and PPP.</li> <li>• Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols</li> <li>• Determine application layer services and client server protocols working with the client server paradigms like</li> </ul>



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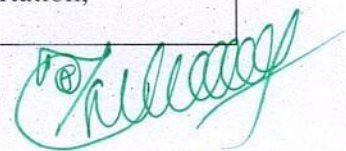
			<p>WWW, HTTP, FTP, e-mail and SNMP etc.</p>
		<p><b>BIG DATA ANALYTICS</b></p>	<ul style="list-style-type: none"> <li>• Illustrate big data challenges in different domains including social media, transportation, finance and medicine</li> <li>• Use various techniques for mining data stream</li> <li>• Design and develop Hadoop</li> <li>• Identify the characteristics of datasets and compare the trivial data and big data for various applications Explore the various search methods and visualization techniques</li> </ul>
		<p><b>DESIGN AND ANALYSIS OF ALGORITHMS</b></p>	<ul style="list-style-type: none"> <li>• Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms</li> <li>• List and describe various algorithmic approaches and Solve problems using divide and conquer &amp; greedy Method</li> <li>• Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.</li> <li>• Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches</li> <li>• Demonstrate NP- Completeness theory ,lower bound theory and String Matching</li> </ul>
		<p><b>SOFTWARE PROJECT MANAGEMENT</b></p>	<ul style="list-style-type: none"> <li>• Apply the process to be followed in the software development life-cycle models</li> <li>• Apply the concepts of project management &amp; planning</li> <li>• Implement the project plans through managing people, communications and change</li> </ul>



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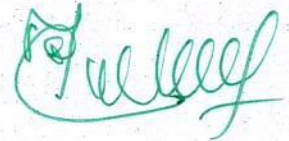
		<b>(PROFESSIONAL ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Conduct activities necessary to successfully complete and close the Software projects</li> <li>• Implement communication, modeling, and construction &amp; deployment practices in software development</li> </ul>
		<b>MEAN STACK DEVELOPMENT (JOB ORIENTED COURSE) (OPEN ELECTIVE-II)</b>	<ul style="list-style-type: none"> <li>• Build static web pages using HTML 5 elements.</li> <li>• Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.</li> <li>• Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.</li> <li>• Develop JavaScript applications using typescript and work with document database using MongoDB.</li> <li>• Utilize Angular JS to design dynamic and responsive web pages.</li> </ul>
		<b>COMPUTER NETWORKS LAB</b>	<ul style="list-style-type: none"> <li>• Know how reliable data communication is achieved through data link layer.</li> <li>• Suggest appropriate routing algorithm for the network.</li> <li>• Provide internet connection to the system and its installation.</li> <li>• Work on various network management tools</li> </ul>
			<ul style="list-style-type: none"> <li>• Illustrate big data challenges in different domains including social media, transportation, finance and medicine</li> </ul>





		<b>BIG DATA ANALYTICS LAB</b>	<ul style="list-style-type: none"> <li>• Use various techniques for mining data stream</li> <li>• Design and develop Hadoop</li> <li>• Identify the characteristics of datasets and compare the trivial data and big data for various applications Explore the various search methods and visualization techniques</li> </ul>
		<b>DEEP LEARNING WITH TENSORFLOW</b>	<ul style="list-style-type: none"> <li>• Implement deep neural networks to solve real world problems</li> <li>• Choose appropriate pre-trained model to solve real time problem</li> <li>• Interpret the results of two different deep learning models</li> </ul>
		<b>MEAN STACK TECHNOLOGIES LAB</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Utilize JavaScript for developing interactive HTML web pages and validate form data.</li> <li>• Build a basic web server using Node.js and also working with Node Package Manager (NPM).</li> <li>• Build a web server using Express.js</li> <li>• Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.</li> </ul>
			<ul style="list-style-type: none"> <li>• Solve various Basic Mathematics problems by following different methods</li> <li>• Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems</li> <li>• Confidently solve any mathematical problems and utilize these</li> </ul>

		<b>EMPLOYABILITY SKILLS-II</b>	mathematical skills both in their professional as well as personal life. <ul style="list-style-type: none"><li>• Analyze, summarize and present information in quantitative forms including table, graphs and formulas</li></ul>
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**Information Technology**

<b>PSO1</b>	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.
<b>PSO2</b>	Develop Application-Oriented IT services with Advanced and efficient software tools.

YEAR	SEMESTER	SUBJECT	COS
I/IV (R20)	I	<b>APPLIED PHYSICS</b>	<ul style="list-style-type: none"> <li>• Able to know the differences between interference, diffraction and polarization with its Engineering applications.</li> <li>• Able to understand the concepts of LASER and optical fiber. Apply these concepts in various Engineering and medical fields.</li> <li>• Able to identify the role of Quantum mechanics and Free electron theory to resolve various problems in microscopic level of matter.</li> <li>• Able to apply the concepts of dielectric and magnetic materials in emerging micro devices. Able to apply the knowledge of semiconductors and superconductors in electronic and electromagnetic devices.</li> </ul>
		<b>COMMUNICATIVE ENGLISH</b>	<ul style="list-style-type: none"> <li>• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers</li> <li>• Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials.</li> </ul>

  
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			<ul style="list-style-type: none"> <li>• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations</li> <li>• Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information</li> <li>• Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing</li> </ul>
		<b>MATHEMATICS-I</b>	<ul style="list-style-type: none"> <li>• Able to apply mean value theorems to engineering problems.</li> <li>• Able to gain knowledge on solving first order differential equations and its applications to various engineering fields.</li> <li>• Able to solve the higher order differential equations related to various engineering fields.</li> <li>• Able to use functions of several variables in optimization.</li> <li>• Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals</li> </ul>
		<b>PROGRAMMING FOR PROBLEM SOLVING USING C</b>	<ul style="list-style-type: none"> <li>• Understanding basic building blocks of C-programming language.</li> <li>• Use different operators, data types and write programs that use two-way/ multi way selection &amp; Select the best loop construct for a given problem</li> <li>• Demonstrate the use of different derived data types, Strings, structures and unions</li> <li>• Design and implement programs to analyze the different pointer applications</li> <li>• Explain various file handling mechanisms &amp; Apply File I/O operations.</li> </ul>
		<b>English Communication Skills</b>	<ul style="list-style-type: none"> <li>• Analyze the English speech sounds, stress, rhythm and intonation.</li> </ul>

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		<b>Laboratory</b>	<p>Understand the different aspects of the English Language proficiency with emphasis on pronunciation tone and accent neutralization</p> <ul style="list-style-type: none"> <li>• Exhibit professionalism in participating in Debates and Group Discussion. Develop and enhance their language skills by participating in oral presentations and public speaking.</li> <li>• Enhance their Knowledge through interview skills</li> </ul>
		<b>Applied Physics Lab</b>	<ul style="list-style-type: none"> <li>• Calculation of the physical values like radius of curvature of lens, wavelength of source, thickness of thin object, dispersive power and resolving power using principles of optical phenomenon.</li> <li>• Explain the magnetic and electric field effects involved in B-H curve experiment, Stewart Gee's apparatus and dielectric constant experiment.</li> <li>• Analyze the electric properties of semiconducting materials by determination of the energy band gap of semiconductor and study characteristics of thermostat.</li> </ul>
		<b>Computer Engineering Workshop</b>	<ul style="list-style-type: none"> <li>• Understand the internal parts of a computer, peripherals, I/O ports, connecting cables and Demonstrate basic command line interface commands on Linux.</li> <li>• Demonstrate the usage of Internet for productivity and self-placed lifelong learning.</li> <li>• Describe about Compression, Multimedia and Antivirus tools, Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools.</li> </ul>
		<b>Programming For Problem Solving Using C Lab</b>	<ul style="list-style-type: none"> <li>• Develop programs using basic data types, variables and conditional statements</li> <li>• Develop programs using Arrays, strings</li> <li>• Develop programs using functions, pointers, Files and dynamic memory allocation</li> </ul>
<b>I/IV (R20)</b>	<b>II</b>	<b>MATHEMATICS-II</b>	<ul style="list-style-type: none"> <li>• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)</li> <li>• Solve system of linear algebraic</li> </ul>

			<p>equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)</p> <ul style="list-style-type: none"> <li>• Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)</li> <li>• Apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)</li> <li>• Apply numerical integral techniques to different Engineering problems (L3)</li> <li>• Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)</li> </ul>
		<b>APPLIED CHEMISTRY</b>	<ul style="list-style-type: none"> <li>• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</li> <li>• Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.</li> <li>• Synthesize nanomaterials for modern advances of engineering technology.</li> <li>• Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.</li> <li>• Analyze the principles of different analytical instruments and their applications.</li> <li>• Design models for energy by different natural sources</li> <li>• Obtain the knowledge of computational chemistry and molecular machines</li> </ul>
		<b>COMPUTER ORGANIZATION</b>	<ul style="list-style-type: none"> <li>• Demonstrate an understanding of the design of the functional units of a digital computer system.</li> <li>• Relate Postulates of Boolean algebra and minimize combinational functions</li> <li>• Recognize and manipulate representations of numbers stored in digital computers</li> <li>• Build the logic families and realization of logic gates.</li> <li>• Design and analyze combinational and sequential circuits</li> </ul>

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			<ul style="list-style-type: none"> <li>Identify, compare and assess issues related to ISA, memory, control and I/O functions.</li> <li>Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components</li> <li>Solve elementary problems by assembly language programming</li> </ul>
		<b>PYTHON PROGRAMMING</b>	<ul style="list-style-type: none"> <li>Develop essential programming skills in computer programming concepts like data types, containers</li> <li>Apply the basics of programming in the Python language</li> <li>Solve coding tasks related conditional execution, loops</li> <li>Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming</li> </ul>
		<b>DATA STRUCTURES</b>	<ul style="list-style-type: none"> <li>Summarize the properties, interfaces, and behaviors of basic abstract data types</li> <li>Discuss the computational efficiency of the principal algorithms for sorting &amp; searching</li> <li>Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs</li> <li>Demonstrate different methods for traversing trees</li> </ul>
		<b>PYTHON PROGRAMMING LAB</b>	<ul style="list-style-type: none"> <li>Develop programs using basic data types, variables and conditional statements and strings.</li> <li>Develop programs using Lists and functions.</li> <li>Develop programs using Files, classes, exceptions.</li> </ul>
		<b>DATA STRUCTURES LAB</b>	<ul style="list-style-type: none"> <li>Use basic data structures such as arrays and linked list.</li> <li>Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.</li> <li>Use various searching and sorting algorithms.</li> </ul>
		<b>APPLIED CHEMISTRY LAB</b>	<ul style="list-style-type: none"> <li>Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus (Understand-L2)</li> </ul>

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			<ul style="list-style-type: none"><li>• Learn and apply basic techniques used in chemistry laboratory for volumetric analysis, redox titrations with different indicators; EDTA titration</li><li>• Explain and demonstrate a few instrumental methods</li></ul>
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II	I	<p align="center"><b>Mathematics - III</b></p>	<ul style="list-style-type: none"> <li>• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)</li> <li>• Estimate the work done against a field, circulation and flux using vector calculus (L5)</li> <li>• Apply the Laplace transform for solving differential equations (L3)</li> <li>• Find or compute the Fourier series of periodic signals (L3)</li> <li>• Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)</li> <li>• Identify solution methods for partial differential equations that model physical processes (L3)</li> </ul>
		<p align="center"><b>Object Oriented Programming through C++</b></p>	<ul style="list-style-type: none"> <li>• Classify object oriented programming and procedural programming</li> <li>• Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling</li> <li>• Build C++ classes using appropriate encapsulation and design principles</li> <li>• Apply object oriented or non-object oriented techniques to solve bigger computing problems</li> </ul>
		<p align="center"><b>Operating Systems</b></p>	<ul style="list-style-type: none"> <li>• Describe various generations of Operating System and functions of Operating System</li> <li>• Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance</li> <li>• Solve Inter Process Communication problems using Mathematical Equations by various methods</li> <li>• Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques</li> <li>• Outline File Systems in Operating System like UNIX/Linux and Windows</li> </ul>
		<p align="center"><b>Database Management Systems</b></p>	<ul style="list-style-type: none"> <li>• Describe a relational database and object-oriented database</li> <li>• Create, maintain and manipulate a</li> </ul>

			<ul style="list-style-type: none"> <li>relational database using SQL</li> <li>Describe ER model and normalization for database design</li> <li>Examine issues in data storage and query processing and can formulate appropriate solutions</li> <li>Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage</li> </ul>
		<b>Discrete Mathematics and Graph Theory</b>	<ul style="list-style-type: none"> <li>Demonstrate skills in solving mathematical problems</li> <li>Comprehend mathematical principles and logic</li> <li>Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software</li> <li>Manipulate and analyze data numerically and/or graphically using appropriate Software</li> </ul>
		<b>Object Oriented Programming Through C++ Lab</b>	<ul style="list-style-type: none"> <li>Apply the various OOPs concepts with the help of programs.</li> <li>Use various searching and sorting algorithms using arrays and linked list.</li> <li>programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.</li> </ul>
		<b>Operating System Lab</b>	<ul style="list-style-type: none"> <li>To use Unix utilities and perform basic shell control of the utilities</li> <li>To use the Unix file system and file access control</li> <li>To use of an operating system to develop software</li> <li>Students will be able to use Linux environment efficiently</li> <li>Solve problems using bash for shell scripting</li> </ul>
		<b>Database Management Systems Lab</b>	<ul style="list-style-type: none"> <li>Utilize SQL to execute queries for creating database and performing data manipulation operations</li> <li>Examine integrity constraints to build efficient databases</li> <li>Apply Queries using Advanced Concepts of SQL</li> <li>Build PL/SQL programs including stored procedures, functions, cursors</li> </ul>

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		<b>Distributed Technologies-Sqlite</b>	<ul style="list-style-type: none"> <li>• Learn about SQ Lite which is a relational database that is present in android and helps the users by storing important information.</li> <li>• Perform various operations on server less database SQ Lite</li> <li>• Implement a small, fast, self-contained, high-reliability, full-featured using SQL database engine.</li> </ul>
<b>II/IV (R20)</b>	<b>II</b>	<b>STATISTICS WITH R COURSE</b>	<ul style="list-style-type: none"> <li>• List motivation for learning R programming language</li> <li>• Access online resources for R and import new function packages into the R workspace and manipulating data.</li> <li>• Import, review, manipulate and summarize data-sets in R</li> <li>• Explore data-sets to create testable hypotheses and identify appropriate statistical tests</li> <li>• Perform appropriate statistical tests using R , Create and edit visualizations with R.</li> </ul>
		<b>PRINCIPLES OF SOFTWARE ENGINEERING COURSE</b>	<ul style="list-style-type: none"> <li>• Students able to understand and gain software engineering skills</li> <li>• Transform an Object-Oriented Design into high quality, executable code</li> <li>• Skills to design, implement, and execute test cases at the Unit and Integration level</li> <li>• Compare conventional and agile software methods</li> </ul>
		<b>AUTOMATA THEORY AND COMPILER DESIGN COURSE</b>	<ul style="list-style-type: none"> <li>• Ability to design, develop, and implement a compiler for any language</li> <li>• Able to use LEX and YACC tools for developing a scanner and a parser</li> <li>• Able to design and implement LL and LR parsers</li> <li>• Able to design algorithms to perform code optimization in order to improve</li> <li>• the performance of a program in terms of space and time complexity</li> <li>• Ability to design algorithms to generate machine code</li> </ul>
		<b>JAVA PROGRAMMING COURSE</b>	<ul style="list-style-type: none"> <li>• Discuss and understand java programming constructs, Control structures</li> <li>• Illustrate and experiment Object Oriented Concepts like classes, objects</li> <li>• Apply Object Oriented Constructs such as Inheritance, interfaces, and Exception handling</li> </ul>

			<ul style="list-style-type: none"> <li>• Construct applications using multithreading and I/O</li> </ul>
		<p align="center"><b>MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY</b></p>	<ul style="list-style-type: none"> <li>• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product</li> <li>• The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs</li> <li>• 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</li> <li>• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis</li> <li>• The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making</li> </ul>
<b>II</b>	<b>ii</b>	<p align="center"><b>Unified Modeling Language (Uml) Lab</b></p>	<ul style="list-style-type: none"> <li>• Know the syntax of different UML diagrams</li> <li>• Create use case documents that capture requirements for a software system</li> <li>• Create class diagrams that model both the domain model and design model of a software system</li> </ul>
		<p align="center"><b>Foss Lab</b></p>	<ul style="list-style-type: none"> <li>• Demonstrate UNIX commands for file handling and process control</li> <li>• Construct regular expressions for pattern matching and apply them to various filters for a specific task.</li> <li>• Analyze a given problem and apply requisite facets of shell programming in order to devise a shell script to solve the problem</li> </ul>
		<p align="center"><b>Java Programming Lab</b></p>	<ul style="list-style-type: none"> <li>• Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings</li> <li>• Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism</li> <li>• Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism</li> </ul>

			<ul style="list-style-type: none"> <li>• Construct Threads, Event Handling, implement packages, developing applets</li> </ul>
		<b>Distributed Technologies- Mongodb</b>	<ul style="list-style-type: none"> <li>• Install, configure and setup the drivers to use Mongo DB with your programming language of choice</li> <li>• Gain an in-depth understanding of main features of Mongo DB and their use cases</li> <li>• Retrieve data in the database using advanced querying</li> </ul>
<b>III</b>	<b>I</b>	Computer Networks	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Discuss different transmission media and different switching networks.</li> <li>• Analyze data link layer services, functions and protocols like HDLC and PPP.</li> <li>• Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols</li> <li>• Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.</li> </ul>
		Design And Analysis Of Algorithms	<ul style="list-style-type: none"> <li>• Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms</li> <li>• List and describe various algorithmic approaches and Solve problems using divide and conquer &amp; greedy Method</li> <li>• Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations</li> <li>• Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches</li> </ul>

			<ul style="list-style-type: none"> <li>• Demonstrate NP- Completeness theory ,lower bound theory and String Matching</li> </ul>
		Data Mining Techniques	<ul style="list-style-type: none"> <li>• Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.</li> <li>• 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.</li> <li>• Choose appropriate classification technique to perform classification, model building and evaluation.</li> <li>• Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent item sets generation.</li> <li>• Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result</li> </ul>
		Advanced Unix Programming	<ul style="list-style-type: none"> <li>• Gain good knowledge on Unix commands and awareness of</li> <li>• shell programming</li> <li>• Know about different system calls for files and directories</li> <li>• Ability to know the working of processes and signals</li> <li>• Application of client server program for IPC</li> <li>• Knowledge about socket programming</li> </ul>
		Sustainable Energy Technologies	<ul style="list-style-type: none"> <li>• Categorize the importance of solar energy collection and storage .</li> <li>• Apply the principles of wind energy and biomass energy.</li> <li>• Analyze knowledge on geothermal and ocean energy.</li> <li>• Justify the knowledge about energy efficient systems.</li> <li>• Discuss the concepts of green manufacturing systems.</li> </ul>

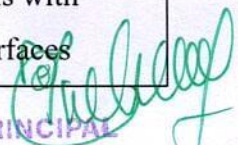
		<b>Computer Networks Lab</b>	<ul style="list-style-type: none"> <li>• Know how reliable data communication is achieved through data link layer.</li> <li>• Suggest appropriate routing algorithm for the network.</li> <li>• Provide internet connection to the system and its installation</li> <li>• Work on various network management tools</li> </ul>
		<b>Data Mining Techniques With R Lab</b>	<ul style="list-style-type: none"> <li>• Extend the functionality of R by using add-on packages</li> <li>• Extract data from files and other sources and perform various data manipulation tasks on them</li> <li>• Code statistical functions in R</li> <li>• Use R Graphics and Tables to visualize results of various statistical operations on data</li> <li>• Apply the knowledge of R gained to data Analytics for real life applications</li> </ul>
		<b>Continuous Integration And Continuous Delivery Using Dev Ops</b>	<ul style="list-style-type: none"> <li>• Understand the why, what and how of Dev Ops adoption</li> <li>• Attain literacy on Dev ops</li> <li>• Align capabilities required in the team</li> <li>• Create an automated CICD pipeline using a stack of tools</li> </ul>
<b>III</b>	<b>II</b>	<b>Machine Learning</b>	<ul style="list-style-type: none"> <li>• Explain the fundamental usage of the concept Machine Learning system</li> <li>• Demonstrate on various regression Technique</li> <li>• Analyze the Ensemble Learning Methods</li> <li>• Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.</li> <li>• Discuss the Neural Network Models and Fundamentals concepts of Deep Learning</li> </ul>
			<ul style="list-style-type: none"> <li>• Illustrate big data challenges in</li> </ul>

		<b>Big Data Analytics</b>	<p>different domains including social media, transportation, finance and medicine</p> <ul style="list-style-type: none"> <li>• Use various techniques for mining data stream</li> <li>• Design and develop Hadoop</li> <li>• Identify the characteristics of datasets and compare the trivial data and big data for various applications</li> <li>• Explore the various search methods and visualization techniques</li> </ul>
		<b>Cryptography And Network Security</b>	<ul style="list-style-type: none"> <li>• Explain different security threats and countermeasures and foundation course of cryptography mathematics.</li> <li>• Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography</li> <li>• Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more</li> <li>• Design applications of hash algorithms, digital signatures and key management techniques</li> <li>• Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL.TSL, and IP sec .</li> </ul>
		<b>Design Patterns</b>	<ul style="list-style-type: none"> <li>• Construct a design consisting of a collection of modules</li> <li>• Examine well-known design patterns (such as Iterator, Observer, Factory and Visitor)</li> <li>• Distinguish between different categories of design patterns</li> <li>• Ability to understand and apply common design patterns to incremental /iterative development</li> <li>• Identify appropriate patterns for design of given problem</li> </ul>
		<b>Disaster Management</b>	<ul style="list-style-type: none"> <li>• Affirm the usefulness of integrating</li> </ul>



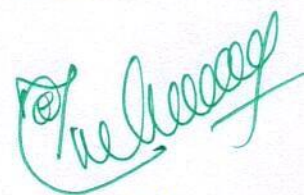
			<p>management principles in disaster mitigation work</p> <ul style="list-style-type: none"> <li>• Distinguish between the different approaches needed to manage</li> <li>• pre-during and post- disaster periods</li> <li>• Explain the process of risk management</li> <li>• The student will be able to learn the role of technology in disaster management</li> <li>• The student will be able to relate to risk transfer</li> </ul>
		<b>Big Data Analytics Lab</b>	<ul style="list-style-type: none"> <li>• Demonstrate the knowledge of big data analytics and implement different file management task in Hadoop.</li> <li>• Understand Map Reduce Paradigm and develop data applications using variety of systems</li> <li>• Analyze and perform different operations on data using Pig Latin scripts</li> </ul>
		<b>Machine Learning Using Python Lab</b>	<ul style="list-style-type: none"> <li>• Implement procedures for the machine learning algorithms</li> <li>• Design and Develop Python programs for various Learning algorithms</li> <li>• Apply appropriate data sets to the Machine Learning algorithms</li> <li>• Develop Machine Learning algorithms to solve real world problems</li> </ul>
		<b>Cryptography And Network Security Lab</b>	<ul style="list-style-type: none"> <li>• Apply the knowledge of symmetric cryptography to implement encryption and decryption using Caesar Cipher, Substitution Cipher, Hill Cipher</li> <li>• Demonstrate the different algorithms like DES, Blow Fish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm.</li> <li>• Analyze and implement public key</li> </ul>

			algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
		<b>Data Science: Natural Language Processing</b>	<ul style="list-style-type: none"> <li>• Explore natural language processing (NLP) libraries in Python</li> <li>• Learn various techniques for implementing NLP including parsing &amp; text processing</li> <li>• Understand how to use NLP for text feature engineering</li> </ul>
IV	I	<b>Cryptography And Network Security</b>	<ul style="list-style-type: none"> <li>• Classify Security attacks, threats and its measures.</li> <li>• Evaluate security mechanisms with Symmetric Key cryptography.</li> <li>• Evaluate Number theory and security mechanisms with Asymmetric Key cryptography</li> <li>• Analyze Data Integrity, Digital Signature Schemes &amp; Key Management</li> <li>• Analyze network security models for ensuring security at</li> <li>• Application I Layer and Transport layer.</li> </ul>
		<b>Machine Learning</b>	<ul style="list-style-type: none"> <li>• Identify machine learning techniques suitable for a given</li> <li>• problem</li> <li>• Solve the problems using various machine learning techniques</li> <li>• Apply Dimensionality reduction techniques</li> <li>• Design application using machine learning techniques</li> <li>• Explore the various artificial neural networks techniques</li> </ul>
			<ul style="list-style-type: none"> <li>• Illustrate reference models with layers, protocols and interfaces</li> </ul>



		<b>Advanced Computer Networks</b>	<ul style="list-style-type: none"> <li>• Describe the routing algorithms, Sub netting and Addressing nIPV6</li> <li>• Describe and Analysis of basic protocols of computer networks, hand they can be used to assist in network design and</li> <li>• implementation</li> <li>• Describe the concepts Wireless LANS, WIMAX, IEEE 802.11,</li> <li>• Cellular telephony and Satellite networks</li> <li>• Analyze the performance of various file implementations</li> </ul>
		<b>Design Patterns</b>	<ul style="list-style-type: none"> <li>• Construct a design consisting of a collection of modules</li> <li>• Examine well-known design patterns</li> <li>• Ability to understand and apply common design patterns to</li> <li>• incremental/iterative development</li> <li>• I Identify appropriate patterns for design of given problem</li> <li>• Design the software using Pattern Oriented Architectures</li> </ul>
		<b>MEMS</b>	<ul style="list-style-type: none"> <li>• Get awareness of different techniques used in micro and nano manufacturing</li> <li>• Get in-depth idea of thin films and nano composites</li> <li>• Get awareness on characterization techniques</li> <li>• Find different materials for micro and nano mechanical systems and their applications in mechanical</li> </ul>

			<p>engineering</p> <ul style="list-style-type: none"> <li>• Explain different MEMS &amp; nano fabrication techniques</li> </ul>
		<b>Internet Of Things</b>	<ul style="list-style-type: none"> <li>• Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things</li> <li>• Conceptually identify vulnerabilities, including recent attacks involving the Internet of Things</li> <li>• Develop simple application</li> <li>• Compare and contrast the threat environment based on industry and/or device type</li> <li>• Develop critical thinking skills</li> </ul>
		<b>Unified Modeling Language (Uml) Lab</b>	<ul style="list-style-type: none"> <li>• Create use case documents that capture requirements for a software system</li> <li>• Construct different type of UML diagrams</li> <li>• Develop simple applications</li> </ul>
		<b>Project –I</b>	<ul style="list-style-type: none"> <li>• Discover potential research area in the field of computer Science and IT</li> <li>• Conduct a survey of several literature in the required field of study</li> <li>• Compare and contrast the several existing methodology and solution for further research</li> </ul>



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IV (R19)	II	<b>Management And Organizational Behavior</b>	<ul style="list-style-type: none"> <li>• After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure</li> <li>• Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments</li> <li>• The learner is able to think in strategically through</li> <li>• contemporary management practices</li> <li>• The learner can develop positive attitude through personality development and can equip with motivational theories</li> <li>• The student can attain the group performance and grievance handling in managing the organizational culture</li> </ul>
		<b>Disaster Management</b>	<ul style="list-style-type: none"> <li>• The student will be able to Affirm the usefulness of integrating management principles in disaster mitigation work.</li> <li>• The student will be able Distinguish between the different a Approaches needed to manage pre - during and post- disaster p Period</li> <li>• The student will be able to explain the process of risk management</li> <li>• The student will be able to learn the role of technology in disaster management</li> <li>• The student will be able to relate to risk transfer</li> </ul>
			<ul style="list-style-type: none"> <li>• Explain the fundamental concepts of block chain Technology</li> <li>• Summarize the classification of</li> </ul>

*[Handwritten Signature]*

		<b>Block Chain Technologies</b>	<p>consensus algorithms</p> <ul style="list-style-type: none"> <li>• Explain the concepts of first decentralized crypto-currency Bit coin</li> <li>• Explain the use of smart contracts and its use cases</li> <li>• Develop simple applications using Solidity language on Ethereum platform</li> </ul>
		<b>Project –II</b>	<ul style="list-style-type: none"> <li>• Demonstrate an ability to work in teams and manage to conduct the research study</li> <li>• Formulate and purpose a plan for creating a solution for the identified</li> <li>• To report and present the finding of the study conducted in the preferred domain</li> </ul>

  
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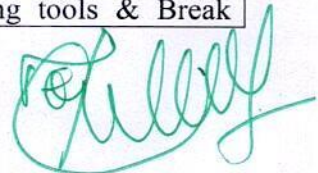
### MASTER OF BUSINESS ADMINISTRATION

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

  
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**MASTER OF BUSINESS ADMINISTRATION**

YEAR	SEMESTER	SUBJECT	COS
I/I (R20)	I	<b>Management and Organizational Behaviour</b>	<ul style="list-style-type: none"> <li>• Student has learned about Evolution of Management thought Scientific management, administrative management, Hawthorne experiments systems approach Levels of Management Managerial Skills</li> <li>• 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</li> <li>• 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</li> <li>• 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</li> <li>• student has learned about Organizational conflict-causes and consequences-conflict and Negotiation Team Building, Conflict Resolution in Groups and problem solving Techniques</li> </ul>
		<b>Managerial Economics</b>	<ul style="list-style-type: none"> <li>• know the economy and its principles.</li> <li>• understand the relationship between the demand supply</li> <li>• learn the types of production and its factors.</li> <li>• To understand the cost concepts, relationship between cost, volume and profit</li> <li>• To know the market structure and pricing theories</li> </ul>
		<b>Accounting for Managers</b>	<ul style="list-style-type: none"> <li>• Acquaint the knowledge about accounting process</li> <li>• focus on analysis of Financial Statements</li> <li>• gain knowledge about Inventory issue methods</li> <li>• obtain knowledge about Management accounting applications</li> <li>• Focus on standard costing tools &amp; Break</li> </ul>





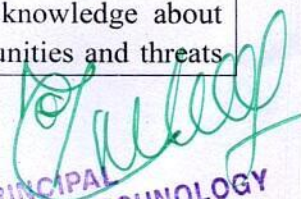
			Even Analysis
		<b>Quantitative Techniques for Business Decisions</b>	<ul style="list-style-type: none"> <li>the concepts of basic mathematical and statistical techniques are learned which are used in business studies</li> <li>equipped with statistical decision theory applied in business studies</li> <li>knowledge on analysing linear programming problems are learned</li> <li>understand the concepts of assignment &amp; transportation models</li> <li>the techniques of networking models are learned</li> </ul>
		<b>Legal and Business environment</b>	<ul style="list-style-type: none"> <li>Determine the meaning of Business Environment and its significance</li> <li>Acquaint the knowledge of Political &amp; Economic Environment</li> <li>Gain knowledge on Legal Environment specially to Indian Context</li> <li>Obtain the knowledge of Indian Partnership Act 1962</li> <li>Focus on miscellaneous acts of Indian Context</li> </ul>
		<b>Business Communication and Soft Skills</b>	<ul style="list-style-type: none"> <li>obtained knowledge of objectives of communication</li> <li>Acquaint the knowledge interpersonal and intrapersonal communication theories certain integrals</li> <li>Obtain the knowledge etiquettes of interview</li> <li>equipped with business correspondence letters</li> <li>obtained knowledge of interview techniques for group discussion</li> </ul>
		<b>Cross Cultural Management</b>	<ul style="list-style-type: none"> <li>understand the concepts of cross culture dimensions</li> <li>obtain knowledge about communication strategy for Indian MNC/foreign MNC</li> <li>acquaint knowledge of negotiation overview with two illustrations from multicultural contexts</li> </ul>

  
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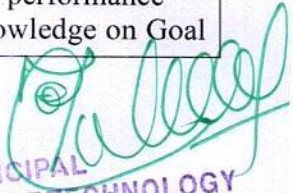
			<ul style="list-style-type: none"> <li>• acquaint knowledge of staffing and training for global operations ,expatriates</li> <li>• understand the concepts of designing the strategy for a culture change building</li> </ul>
I/II	II	<b>Financial Management</b>	<ul style="list-style-type: none"> <li>• gain knowledge about concepts of financial management</li> <li>• obtain knowledge about Capital structure theories</li> <li>• understand the Investment decision process &amp; its tools</li> <li>• understand the theories of Dividend</li> <li>• acquaint knowledge of Working Capital Cycle.</li> </ul>
		<b>Human Resource Management</b>	<ul style="list-style-type: none"> <li>• understand the base concept of HRM and its significance in the organisation</li> <li>• understand the investment perspectives of HRM(Training and Development)</li> <li>• understand the concepts of Performance Appraisal: Importance – Methods – Traditional and Modern methods –</li> <li>• Latest trends in performance appraisal</li> <li>• Enhanced knowledge and skills to Wage Structure- Wage and Salary Policies</li> </ul>
		<b>Marketing Management</b>	<ul style="list-style-type: none"> <li>• understand the concepts of marketing.</li> <li>• Gain the knowledge on market segmentation.</li> <li>• Understand the concepts of pricing and price changes</li> <li>• Gain the knowledge on promotion activities.</li> <li>• Evolution of marketing department.</li> </ul>
		<b>Operations management</b>	<ul style="list-style-type: none"> <li>• Gain knowledge on Operations Management &amp; its scope</li> <li>• acquaint knowledge on Product Process &amp; Design</li> <li>• gain the knowledge on Forecasting &amp; Capacity Planning</li> <li>• Understand the Productivity &amp; influencing factors</li> <li>• Gain the knowledge on Quality management</li> </ul>

  
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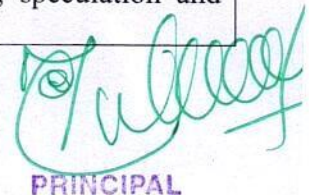
		<b>Business Research Methods</b>	<ul style="list-style-type: none"> <li>• enhanced knowledge and skills to carry out research for business</li> <li>• better awareness on data collection techniques, measurement and scaling</li> <li>• gained knowledge in preparation and presentation of research report</li> <li>• equipped student with statistical techniques</li> <li>• students were in a position to use multivariate techniques</li> </ul>
		<b>Technology management</b>	<ul style="list-style-type: none"> <li>• 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</li> <li>• Student has gained knowledge on Technology Assessment- Technology Choice Technological Leadership and Followership Technology Acquisition Technological Forecasting- Exploratory, Intuitive, Extrapolation, Growth Curves, Technology Monitoring</li> <li>• obtained knowledge on Diffusion of Technology Rate of Diffusion; Innovation Time and Innovation Cost Speed of Diffusion Technology Indicators Various Indicators- Organizational Implications of Technology</li> <li>• 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</li> <li>• learner has got knowlede on Human Aspects in Technology Management- Integration of People and Technology Organizational and Psychological Factors</li> </ul>
<b>II/I</b>	<b>III</b>	<b>Strategic Management</b>	<ul style="list-style-type: none"> <li>• Gain knowledge about Vision, Mission and Objectives of the Organisation.</li> <li>• Acquaint the student with knowledge about strengths, weakness, opportunities and threats</li> </ul>

  
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			<p>of the organization.</p> <ul style="list-style-type: none"> <li>• Understand about framing of Strategy at various levels.</li> <li>• Acquaint the student with knowledge about structures of organization and its impact on Strategy.</li> <li>• Obtain knowledge of Evaluation of strategy and its control</li> </ul>
		<b>Operations Research</b>	<ul style="list-style-type: none"> <li>• To acquaint the students with basic knowledge of the overview of Operations Research</li> <li>• To gain knowledge about Transportation Models and assignment Models</li> <li>• To know and Understand about various applications of dynamic programming &amp; replacement models.</li> <li>• To understand the concept of Game Theory and simulations Models</li> <li>• To understand the nature and scope of Networking Models.</li> </ul>
		<b>Leadership and Change Management</b>	<ul style="list-style-type: none"> <li>• To acquired the student with basic knowledge the concept of New millennium organization, leadership skills.</li> <li>• To acquainted the student with basic knowledge of the concept of organizational development. And the concept of challenges in motivating employees.</li> <li>• To Gained knowledge about characteristics, principles and significance of continuous learning. And leadership attitude</li> <li>• To acquired the student with basic knowledge the concept of change management programmes and value based change</li> <li>• To Gained knowledge about OD interventions and total project management model.</li> </ul>
		<b>Performance Evaluation and Compensation Management</b>	<ul style="list-style-type: none"> <li>• Knowledge on performance measurement, its background, influencing factors and consequences of in organization. They can processes for managing performance – critical appraisal-... Knowledge on Goal</li> </ul>

  
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			<p>Setting-Linkages to Strategic Planning- Competency mapping- Career Development- Monitoring Performance Planning is imparted.</p> <ul style="list-style-type: none"> <li>• 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 Appraising- Merit Rating</li> <li>• Gained in depth knowledge on the compensation program and employee attitude.</li> <li>• The concept on the pay structures and tax planning in Indian context are understood.</li> </ul>
		<p><b>Human Capital Management</b></p> <p><b>ELECTIVE – I)</b></p>	<ul style="list-style-type: none"> <li>• To know the Basic Economic Theories in Human Capital</li> <li>• To gain knowledge related to different Accounting aspects of Human Capital</li> <li>• To understand an assess existing theories and practices in the field of Human capital management</li> <li>• To understand the concept of Quality of workers work life in Human Capital Management</li> <li>• To learn about Industrial Accidents and Safety precautions in Industries.</li> </ul>
		<p><b>Manpower Planning, Recruitment &amp; Selection</b></p>	<ul style="list-style-type: none"> <li>• To know the meaning of Human Resource Planning, various factors and techniques affects demand and supply of HRP.</li> <li>• To understand the various human resource distribution mapping and usage of downsizing strategies</li> <li>• To learn the nature and process of job analysis and job design.</li> <li>• To learn the nature and process of job analysis and job design.</li> <li>• To know the importance, methods of recruitment and selection and barriers to effective selection.</li> <li>• To focus on steps involved in training and development and Requisites of Effective Training programs.</li> </ul>
		<p><b>Investment Analysis and Portfolio Management</b></p>	<ul style="list-style-type: none"> <li>• To acquaint the student with basic knowledge of Investment, speculation and Investment Process</li> </ul>



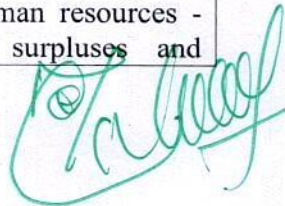
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			<ul style="list-style-type: none"> <li>• Gain knowledge about Risk, Return and Shares</li> <li>• To understand tools and techniques of Fundamental and Technical Analysis.</li> <li>• To understand about the elements of Portfolio Management and evaluation of securities</li> <li>• To acquaint knowledge on evaluation of securities through Sharpe and Markowitz Models.</li> </ul>
		<b>Managing Banks and Financial Institutions</b>	<ul style="list-style-type: none"> <li>• Acquaint the knowledge on Banking &amp; Indian Financial System</li> <li>• Focus on uses of bank funds &amp; Non-Performing Assets</li> <li>• Acquaint concepts of Banking Innovations</li> <li>• Equipped the knowledge on Insurance in India</li> <li>• Gain knowledge on Life &amp; General Insurance in India</li> </ul>
		<b>Financial Markets &amp; Services</b>	<ul style="list-style-type: none"> <li>• To Create the awareness on RBI and SEBI</li> <li>• To understand various financial services in India</li> <li>• Able to learn Venture Capital Financing</li> <li>• To understand rating of the customers</li> <li>• To know the need of Micro Finance.</li> </ul>
		<b>Taxation</b>	<ul style="list-style-type: none"> <li>• Able to know the basics of Tax, Tax on agricultural income &amp; Income Tax Act.</li> <li>• Understand all about the Central Value Added Tax (CENVAT)</li> <li>• Able to know Tax Plannings and its Principles</li> <li>• Learner understand the Elements of Tax considerations, tax management and tax decisions</li> <li>• Understand about the International Taxation system and legal aspects.</li> </ul>
		<b>Hospital Organization &amp; Management</b>	<ul style="list-style-type: none"> <li>• To know the Role of a professional manager in a Hospital</li> <li>• To understand the Managerial functions in a hospital</li> <li>• Able to understand the Behavioural concepts and theories</li> <li>• Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems.</li> </ul>

			<ul style="list-style-type: none"> <li>• Able to correlate the relationship Descriptive, Analytical and Experimental Epidemiology</li> </ul>
		<b>Health Care Policies and Delivery systems</b>	<ul style="list-style-type: none"> <li>• Gain Knowledge about concepts Internal and External Environment and Environmental Scanning</li> <li>• Understand the Conceptual Approach to the Health Care Systems</li> <li>• Gain the sound knowledge on Overview of Health care sector in India</li> <li>• Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems.</li> <li>• Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems.</li> <li>• Able to correlate the relationship Descriptive, Analytical and Experimental Epidemiology</li> </ul>
<b>II/II</b>	<b>IV</b>	<b>Supply Chain Management &amp; Analytics</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on basics of SCM and its drivers</li> <li>• Learner is able to understand tools of supply chain analysis and MRP</li> <li>• Understand the Management of different algorithms relevant to Supply chain</li> <li>• Equip with various concepts of value adding in Supply chain</li> <li>• Gain knowledge on implementation of Supply chain in various industries in practical manner.</li> </ul>
		<b>Innovation &amp; Entrepreneurship</b>	<ul style="list-style-type: none"> <li>• Able to understand meaning, scope and importance of entrepreneurship development.</li> <li>• Students obtained the knowledge of creativity &amp; Entrepreneurial plan</li> <li>• Students are able to plan &amp; execute the operation problems</li> <li>• Able to understand Family &amp; non-family entrepreneurs</li> <li>• Able to understand the Innovation &amp; Management</li> </ul>
		<b>Labour Welfare &amp; Employment Laws</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on Labour welfare.</li> <li>• Learner is able to understand Statutory &amp; Non-statutory labour welfare programmes.</li> <li>• Understand the Labour Legislation.</li> </ul>

  
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			<ul style="list-style-type: none"> <li>• Equip with Industrial Relations Legislation</li> <li>• Gain knowledge on various acts pertaining to Social Security Legislations.</li> </ul>
		<b>International HRM</b>	<ul style="list-style-type: none"> <li>• 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</li> <li>• To attained The concepts of Strategies - International assignments for Women Problems.</li> <li>• To gained knowledge in Cross Culture Communication and Negotiation, Cross Culture Teams.</li> <li>• To understood The concepts of Compensation Management: Importance, Concepts- Trends, Issues, Methods, Factors of Consideration-Models</li> <li>• To gained knowledge on Analysis of Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working Life and Productivity</li> </ul>
		<b>Human Resource Development</b>	<ul style="list-style-type: none"> <li>• To know the meaning, need, scope of Human Resource Development, various functions and techniques affects HRD.</li> <li>• To understand the various human resource development strategies, designing training and development and methods of implementation.</li> <li>• To understand the various human resource development strategies, designing training and development and methods of implementation.</li> <li>• To learn the methods for reducing employee stress and providing wellness and health promotions and career planning.</li> <li>• Focus on steps involved in HRD for innovation, Ethical problems with HRD roles for various workers.</li> </ul>
		<b>Strategic HRM</b>	<ul style="list-style-type: none"> <li>• To Gained the Concepts of Importance of Human Resources to Strategy- Human Resources contribution to strategy</li> <li>• Understood The concepts of Strategies - Efficient utilization of Human resources - Dealing with employee surpluses and</li> </ul>





			<p>shortages</p> <ul style="list-style-type: none"> <li>• The gained knowledge in Oriented performance measurement systems - Strategically oriented compensation system</li> <li>• The attained The concepts of Building core competencies through Human Resource Development - Competency mapping approaches</li> </ul> <p>Understood the Analysis of Strategic Frame Work of Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas and emerging areas</p>
		<b>Financial Derivatives</b>	<ul style="list-style-type: none"> <li>• Student has learned about the basics of risk management and different types of risks.</li> <li>• The students has gained knowledge on Value of Risk, Cash flow risk, Asset liability Management</li> <li>• Student has learned about Derivatives and its types.</li> <li>• Learner has understood about Swaps &amp; its types</li> <li>• Student has learned about the Options, Binomial Option Pricing Model.</li> </ul>
		<b>Global Financial Management</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on Globalization &amp; MNC's</li> <li>• Learner is able to understand Exchange &amp; Interest rate exposures</li> <li>• Understand the Management of Global Business Operations</li> <li>• Equip with International Investment Decisions</li> <li>• Gain knowledge on Global Indebtedness</li> </ul>
		<b>Financial Risk Management</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on Risk Management framework</li> <li>• Learner is able to understand tools of measuring Risk</li> <li>• Understand the Management of risk in corporate</li> <li>• Equip with regulatory bodies for various markets</li> <li>• Gain knowledge on various models of Risk management</li> </ul>
		<b>Strategic Financial Management</b>	<ul style="list-style-type: none"> <li>• To know the theories of share holders value creation.</li> <li>• To learn Corporate Financial strategies</li> </ul>

			<ul style="list-style-type: none"><li>• To understand the techniques of Investment Strategies</li><li>• To know the Corporate Financial Engineering</li><li>• To understand Corporate Restructuring.</li></ul>
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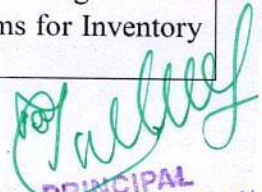


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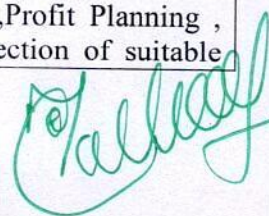
## INTEGRATED MASTER OF BUSINESS ADMINISTRATION

YEAR	SEMESTER	SUBJECT	COS
I/I (R19)	I	<b>Business Mathematics and statistics</b>	<ul style="list-style-type: none"> <li>• To make the students understand humour and the contributions of Mokshagundam to build modern India, The students also develop their LSRW skills</li> <li>• To make the students aware of Polymer currency and inspire them with the unique journey of Helen Keller.</li> <li>• 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</li> <li>• 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.</li> <li>• Students learn about the importance of sports and how they can improve their health and also the motivating speech from technocrat Narayanamurthy of Infosys.</li> </ul>
		<b>Business Mathematics and statistics</b>	<ul style="list-style-type: none"> <li>• to equip students the knowledge of basic mathematical techniques</li> <li>• to understand the concepts of matrices in business studies</li> <li>• To recollect the knowledge of statistics</li> <li>• to provide better knowledge on probability theory</li> <li>• to enhance the understanding of bi variate statistical techniques</li> </ul>
		<b>Fundamentals Of Business organisation</b>	<ul style="list-style-type: none"> <li>• To understand the concepts of business</li> <li>• To know the responsibilities , source of finance for an entrepreneur</li> <li>• To understand various types of business</li> <li>• To find out the difference between public and private companies</li> <li>• To know how to commence the business.</li> </ul>
		<b>Financial Accounting -1</b>	<ul style="list-style-type: none"> <li>• students has understood about basics of accounting</li> <li>• students has got awareness on basics of the journal and the trail balance</li> <li>• Able to know about basic of ledger posting</li> <li>• students has understood about the final</li> </ul>

			<ul style="list-style-type: none"> <li>accounts and income statement</li> <li>Students have got awareness on basis of ratio analysis and different types of ratios.</li> </ul>
		<b>Fundamentals Of Computers</b>	<ul style="list-style-type: none"> <li>Able to understand the basics of computers &amp; devices</li> <li>Learnder able to know the different types of operating system</li> <li>focus on various application softwares used in day to day manner</li> <li>Understand the concept of E-Business</li> <li>Equip with computer networks</li> </ul>
<b>I/II</b>	<b>II</b>	<b>English laguage -II</b>	<ul style="list-style-type: none"> <li>The students learn about the definition, types and benefits of Communication</li> <li>They gain awareness about Time Management and Business Etiquettes</li> <li>They gain Knowledge of decision making and leadership skills</li> <li>They understand thinking about logical, lateral and positive thinking a skills.</li> <li>Honesty, Positive attitude, Courtesy and other soft skills are learnt by the students.</li> </ul>
		<b>Business Environment</b>	<ul style="list-style-type: none"> <li>To know the factors influncing the business environment</li> <li>To understand economic systems and economic reforms</li> <li>To learn fiscal policy and balance of payments.</li> <li>To know the challenges and mechanisms of india trade policy</li> <li>To understand the legal frame work of indian economic system.</li> </ul>
		<b>Managerial Economics</b>	<ul style="list-style-type: none"> <li>To know the economy and its principles.</li> <li>To understand the relationship between the demand supply</li> <li>To learn the types of production and its factors.</li> <li>To understand the cost concepts, relationship between cost, volume and profit</li> <li>To know the market atructure and pricing practices.</li> </ul>
		<b>Financial Aaccounting -2</b>	<ul style="list-style-type: none"> <li>To understand basics of accounting</li> <li>To know the accounting forms for Inventory management</li> </ul>

  
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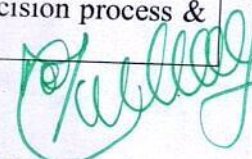
			<ul style="list-style-type: none"> <li>• Able to know the basic awareness on cashflow and funds flow statements</li> <li>• able to get basic awareness on accounting standards</li> <li>• Able to know the various aspects of financial reporting</li> </ul>
		<b>Organisational Communication</b>	<ul style="list-style-type: none"> <li>• To understand basics of Objective of Communication – The Process of Human</li> <li>• To understand basics of techniques of presentation – types of presentation –</li> <li>• To understand the basic– Models for Inter Personal Communication – Exchange Theory</li> <li>• students able to know about the – Barriers of Communication</li> <li>• Gateways to Effective Interpersonal Communication.</li> </ul>
<b>II/I</b>	<b>III</b>	<b>Principles of Management</b>	<ul style="list-style-type: none"> <li>• Interpret basic concept and theories of management</li> <li>• Outline plan and different organizational structures</li> <li>• Classify different leadership style in cross culture environment</li> <li>• Develop rationale decision making and problem solving abilities</li> <li>• Cite contemporary issues and approaches to management</li> </ul>
		<b>Cost Accounting</b>	<ul style="list-style-type: none"> <li>• 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</li> <li>• students able to know about the Direct and Indirect expenses, allocation and apportionment of</li> <li>• overheads, calculation of machine hour rate and labour hour rate</li> <li>• students has got awareness on Application of Marginal costing in terms of cost control, Income determinants under marginal cost-Absorption Cost Vs Marginal Cost. Key or Limiting Factor.</li> <li>• students understood about concept of cost , volume-profit relationship , Profit Planning , make or buy decision- Selection of suitable</li> </ul>



			<p>product mix, desired level of Profits , Determination of Breakeven point, Break-even-graph and assumptions of BEP, importance.</p> <ul style="list-style-type: none"> <li>• 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,</li> </ul>
		<b>Banking theory and Practices</b>	<ul style="list-style-type: none"> <li>• understand the functions of commercial banks and credit creation limitations</li> <li>• Determine the functions and components of indian money markets</li> <li>• knowledge of Banking Regulations act 1949 causes of Non Performing Assets</li> <li>• focus on innovative banking and Hi.Tech banking</li> <li>correlate the relationship between banker and customer</li> </ul>
		<b>Business Law</b>	<ul style="list-style-type: none"> <li>• Describe three different relationships that could be created the law of agency</li> <li>• Explain about sale of goods act</li> <li>• Distinguish forms of business organisations</li> <li>• compare consumer protection act 1986 and contract of agency</li> <li>• research negotiable instruments act 1881</li> </ul>
		<b>Entrepreneurship Development</b>	<ul style="list-style-type: none"> <li>• Able to understand meaning, scope and importance of entrepreneurship development</li> <li>• students obtained the knowledge of training, progress and feed back system of ED</li> <li>• Students are able to plan and excecute the small projects wth all teh properties of ED</li> <li>• Able to undertand Importance of MSME's</li> <li>• Able to understand the Industrial support to MSME and other Entrepreneurs</li> </ul>
<b>II/II</b>	<b>IV</b>	<b>Organisational Behaviour</b>	<ul style="list-style-type: none"> <li>• To understand the basic approach of organisation behaviour</li> <li>• To understand the ways of personality development</li> <li>• To understand the decision making system and importance in organisation</li> <li>• To understand the interpersonal communication system with in the organisation</li> <li>• To understand the organisation</li> </ul>

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			development(goals, objectives and process)
		<b>Management Accounting</b>	<ul style="list-style-type: none"> <li>• Prepare independently different accounting statements</li> <li>• prepare and analyse financial statement and reports independentl</li> <li>• analyze cost accounting concepts</li> <li>• Interpret cost behaviour and decision methods</li> <li>• understand the management audit system.</li> </ul>
		<b>Company Law</b>	<ul style="list-style-type: none"> <li>• Gain knowledge of the environment about in and around of company act</li> <li>• Able to understand the procedure of incorporation of a company</li> <li>• will understand concepts, rules or procedures of Company Prospects</li> <li>• The learner will understand the procedure or rules of directors appointments ,qualifications,and other aspects</li> <li>• the learner can interpret the procedure in winding up of a company</li> </ul>
		<b>GST(Goods and Services Taxes)</b>	<ul style="list-style-type: none"> <li>• Describe the meaning and concepts of Direct and Indirect Taxes.</li> <li>• Explain about issues in Tax management.</li> <li>• Distinguish between various factors affecting CENVAT and other Tax management Issues</li> <li>• Compare Tax Planning in Indian context with other countries.</li> <li>• Research on Multinational Taxation.</li> </ul>
		<b>Management of Information system</b>	<ul style="list-style-type: none"> <li>• Able to get information about MIS and its applications in digital firm</li> <li>• Able to know various types of Information System</li> <li>• Able to gain knowledge about various IS models</li> <li>• Able to understand the steps involved in the process of IS planning</li> <li>• Able to know about security of systems</li> </ul>
<b>III/I</b>	<b>V</b>	<b>Financial Management</b>	<ul style="list-style-type: none"> <li>• gain knowledge about concepts of financial management</li> <li>• obtain knowledge about Capital structure theories</li> <li>• understand the Investment decision process &amp; its tools</li> </ul>

  
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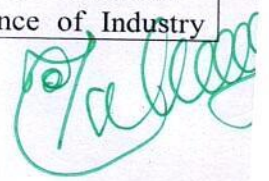
			<ul style="list-style-type: none"> <li>• understand the theories of Dividend</li> <li>• acquaint knowledge of Working Capital Cycle.</li> </ul>
		<b>Marketing Management</b>	<ul style="list-style-type: none"> <li>• Determine the Concept of Market and Marketing and Marketing Mix</li> <li>• Outline the essentials of Market Segmentation and Targeting and positioning</li> <li>• Correlate the drivers of pricing strategy</li> <li>• Determine the communication process and communication mix elements</li> <li>• Focus on Marketing Organization and different Control strategies</li> </ul>
		<b>Human Resource Management</b>	<ul style="list-style-type: none"> <li>• understand the base concept of HRM and its significance in the organisation</li> <li>• understand the investment perspectives of HRM(Training and Development)</li> <li>• understand the concepts of Performance Appraisal: Importance – Methods – Traditional and Modern methods</li> <li>• –Latest trends in performance appraisal</li> <li>• Enhanced knowledge and skills to Wage Structure- Wage and Salary Policies</li> <li>• Gain the knowledge on Employee Participation Schemes, Grievances and disputes resolution mechanism</li> </ul>
		<b>Operations Management</b>	<ul style="list-style-type: none"> <li>• The Learner able to know the basics of Production &amp; Operations Management</li> <li>• Gain the knowledge on Production Planning &amp; Control</li> <li>• Better understand of the Work Environment</li> <li>• Equip with Quality aspects of Production</li> <li>• Acquaint with Store Management of Production</li> </ul>
		<b>Business Research Methodology</b>	<ul style="list-style-type: none"> <li>• Enhanced knowledge and skills to carry out research in business</li> <li>• Better awareness on data collection techniques, measurement and scaling</li> <li>• To gain knowledge in preparation and presentation of research report</li> <li>• Equipped students with statistical techniques</li> <li>• To gain knowledge in multivariate statistical techniques</li> </ul>

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III/II	VI	Operations Research	<ul style="list-style-type: none"> <li>• to understand the basic concepts of linear programming</li> <li>• to provide the knowledge of integer programming problem</li> <li>• to gain knowledge of assignment and transportation models</li> <li>• to equip students with the knowledge network analysis</li> <li>• to provide the knowledge of game theory</li> </ul>
		International Business	<ul style="list-style-type: none"> <li>• obtained knowledge about free trade &amp; trade strategies</li> <li>• Gained knowledge of balance of payments</li> <li>• understand the basic concept of foreign exchange markets</li> <li>• obtained knowledge about GDR's &amp; SEZ</li> <li>• provide the knowledge of international liquidity</li> </ul>
		Strategic Management	<ul style="list-style-type: none"> <li>• Gained knowledge about Vission, Mission and Objectives of the Organisation</li> <li>• Obtained knowledge of strengths, weakness, opportunities and threats of the Organisation</li> <li>• Gained knowledge about framing of Strategy at Various levels</li> <li>• Obtained knowlege about Stuctures of organisation and its impact on Strategy</li> <li>• Obtained knowledge of Evaluation of strategy and its control</li> </ul>
		Decision Support Systems	<ul style="list-style-type: none"> <li>• able to understand the difference between MIS and DSS</li> <li>• able to gain knowledge about deterministic models and it will be helpful to deal with uncertainty</li> <li>• able to know DSS can be used in the various functional areas</li> <li>• able to get knowledge about simulation techniques and its applications</li> <li>• able to identify the adcantages and limitations of DSS</li> </ul>
IV/I	VII	Knowledge management	<ul style="list-style-type: none"> <li>• Describe the major roles and responsibilities in knowledge management implementations</li> <li>• Describe how valuable individual, group and organizational knowledge is managed throughout the knowledge management cycle</li> <li>• Understand and apply various success factors of knowledge management implementations</li> </ul>

			<ul style="list-style-type: none"> <li>• Apply appropriate systems and tools for Knowledge Mapping Techniques</li> <li>• Understand and apply various concepts like information technology , E- Commerce, TQM, &amp; Benchmarking in knowledge</li> </ul>
		<b>Strategic Cost Management</b>	<ul style="list-style-type: none"> <li>• Understand the Cost management and International Issues in Cost Management</li> <li>• Describe the Process of Strategic Cost Audit</li> <li>• Equip the Strategic Cost Management &amp; its framework</li> <li>• The Learner will outlines the Balanced Score Card, Strategic based responsibility accounting</li> <li>• Able to get knowledge on Quality aspects of Cost Management</li> </ul>
		<b>Human Resource Planning</b>	<ul style="list-style-type: none"> <li>• The learner will outline the History of HRM and HR Policies and Strategies.</li> <li>• The learners can list and define the Human Resource Planning role and responsibilities of HR</li> <li>• able to understand the HRP Process outline and Productive</li> <li>• The learner can able to gain the knowledge on Recruitment Selection and Induction</li> <li>• can able to focus on Training and Performance Appraisal</li> </ul>
		<b>Security Analysis</b>	<ul style="list-style-type: none"> <li>• Able to understand about Investment Vs Speculation, Investment alternatives - Investment Process - Sources of Investment Information and basics of secondary markets.</li> <li>• students has understood about Preference Shares and Equity Shares Earning valuation- Cashflow valuation, Asset Valuation , Dividend, discount model; Valuation of Bonds , Bond Returns and Risks -Bond Pricing Theorems convexity.</li> <li>• 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.</li> <li>• students has understood about Risk and Returns Security Analysis, Economic Analysis , Security Analysis and Investment</li> <li>• Able to understnad Importance of Industry</li> </ul>



			<p>Analysis ,Classification of Industries , Key</p> <ul style="list-style-type: none"> <li>• Indicators in Analysis , Analytical Frame Works</li> </ul>
		<b>Leadership Management</b>	<ul style="list-style-type: none"> <li>• Determine the meaning of leadership and its importance</li> <li>• Outline motivational theories and cultural dimensions</li> <li>• Correlate leadership with learning and attitude</li> <li>• Determine the factors necessary developing leadership</li> <li>• Focus on leadership styles in other countries</li> </ul>
		<b>Banking and insurance Management</b>	<ul style="list-style-type: none"> <li>• Understand indian financial system</li> <li>• Focus on indian banking practices</li> <li>• understand innovative banking systems in india</li> <li>• Outline the indian life insurance practice</li> <li>• understand the concepts of LIC and GIC</li> </ul>
		<b>Compensation and Reward management</b>	<ul style="list-style-type: none"> <li>• able to understand the outline of compensation</li> <li>• able to get awareness about compensation structure</li> <li>• able to get the clear view about wage and salary administration</li> <li>• able to know about types of workers and wage analysis</li> <li>• to gain the knowledge about pay structure and importance tax planning in compensation structure</li> </ul>
		<b>Advanced Management Accounting</b>	<ul style="list-style-type: none"> <li>• Gain Knowledge on International Accounting Standards</li> <li>• Obtained knowledge on Analysis of Financial statements</li> <li>• Gain knowledge on preparation of functional budgets</li> <li>• Equipped with applications of marginal costing</li> <li>• understand applications of break even analysis</li> </ul>
<b>IV/II</b>	<b>VIII</b>	<b>Total Quality management</b>	<ul style="list-style-type: none"> <li>• able to gain the knowledge about the need ofor ISO 9000-2000 Quality system</li> <li>• to identify the needs of customer and satisfy their needs</li> <li>• apply appropriate tools and strategies of quality in TQM</li> <li>• to provide information and understand the</li> </ul>

			<p>deployment of quality circles and performance measures</p> <ul style="list-style-type: none"> <li>• able to gain the knowledge about the need of ISO 9000-2000 Quality system</li> </ul>
		<b>Project management</b>	<ul style="list-style-type: none"> <li>• The learner will understand the basics of Project characteristics, Screening of the Projects</li> <li>• Able to understand the different Tax Incentives &amp; Tax Planning</li> <li>• Gain the sound knowledge on Project Appraisal techniques and Social cost benefit analysis</li> <li>• understands the Cost estimate for the Projects &amp; Risk Analysis</li> <li>• The learner able to know the Project Evaluation and Auditing of the Projects</li> </ul>
		<b>Performance Management</b>	<ul style="list-style-type: none"> <li>• The learner will outline the Over view of performance management</li> <li>• The learners can define the Performance Management Planning</li> <li>• able to understand the Management System: objectives – Functions- Phases of Performance Management System</li> <li>• The learner will able to gain the knowledge on Performance Monitoring and Counseling</li> <li>• The learner will able to focus on Performance management skills</li> </ul>
		<b>Strategic Financial Management</b>	<ul style="list-style-type: none"> <li>• Describe the meaning and concept of strategic financial management and corporate policy</li> <li>• Explain the concept of corporate financial strategies</li> <li>• Distinguish between net present value and rate of return.</li> <li>• Compare and contrast corporate financial engineering concepts</li> <li>• Research on corporate restructuring.</li> </ul>
		<b>Strategic Human Resource management</b>	<ul style="list-style-type: none"> <li>• The learner will outline the Importance of Human Resources to Strategy- Human Resources contribution to strategy</li> <li>• The learner will able to gain the knowledge on Efficient utilization of Human resources</li> <li>• To gain the knowledge about Reward and Development Systems Strategically oriented performance</li> <li>• Able to understand theThe learner will able</li> </ul>

  
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			<p>to gain the knowledge on Organizing and structuring of Human Resource Development in an organization Building core competencies through Human Resource Development</p> <ul style="list-style-type: none"> <li>• The learners can define the Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas</li> </ul>
		<b>Portfolio management</b>	<ul style="list-style-type: none"> <li>• student has understood about Elements of Portfolio Management, Portfolio Models , Markowitz Model, Efficient Frontier and Selection of Optimal Portfolio.</li> <li>• student has got awairness on Performance Evaluation of Portfolios; Sharpe Model Jensen's Model for PF Evaluation, Evaluation of Mutual Fund</li> <li>• obtained knowledge on Neural Networks ,Artificial Neural Networks , Fuzzylogic , Behavioral Models , .Portfolio Management.</li> <li>• student has got awairness on The Indian Connection with Commodity Market Commodity and</li> <li>• Currency Derivatives Legal Frame Work Policy Liberization</li> </ul>
		<b>Organisational development and Change management</b>	<ul style="list-style-type: none"> <li>• gain the knowledge on importance of change management</li> <li>• obtain the knowledge on mapping change</li> <li>• able to learn about OD interventions</li> <li>• provide awareness about negotiated change</li> <li>• understand the importance of team building</li> </ul>
		<b>Financial Markets and Services</b>	<ul style="list-style-type: none"> <li>• Gain knowledge on Indian Capital Market &amp; Money Market issues</li> <li>• Able to understand the Regulatory framework of Financial Services</li> <li>• Understand the concept of Venture Capital and its growth in India</li> <li>• Acquaint knowledge on Credit Rating Agencies in India</li> <li>• The learner able to understand the classification &amp; evaluation of Mutual Funds.</li> </ul>
<b>VI (R16)</b>	<b>IX</b>	<b>Corporate Governance</b>	<ul style="list-style-type: none"> <li>• Able to understand meaning, scope and importance of Corporate Governance</li> <li>• Students obtained the knowledge of Board of Directors, Duties &amp; responsibilities of auditors.</li> <li>• Students are able to plan and execute the</li> </ul>

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			<p>models of governance, obligations towards stake holders.</p> <ul style="list-style-type: none"> <li>• Able to understand Importance of Corporate Governance &amp; Stake holders</li> <li>• Able to understand the capabilities &amp; responsibilities of directors, corporate social responsibility.</li> </ul>
		<b>Intellectual Property Rights</b>	<ul style="list-style-type: none"> <li>• Acquainted knowledge of Laws Relating to IPR and the Agencies Responsible to IPR Registration</li> <li>• Gain the sound knowledge on Copyrights and Neighbouring Right sand Law Relating to Copyrights</li> <li>• Acquaint knowledge on Laws Relating to Patents in India, New developments in Patents.</li> <li>• Understood the Concep of Trademarks Claims and Infringement, Remedies</li> <li>• Acquainted knowledge on Cyber Law and Cyber Crime, Liability of Network Providers.</li> </ul>
		<b>Risk Management</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on Risk Management framework</li> <li>• Learner is able to understand tools of measuring Risk</li> <li>• Understand the Management of risk in corporate</li> <li>• Equip with regulatory bodies for various markets</li> <li>• Gain knowledge on various models of Risk management</li> </ul>
		<b>Global Financial Management</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on Globalization &amp; MNC's</li> <li>• Learner is able to understand Exchange &amp; Interest rate exposures</li> <li>• Understand the Management of Global Business Operations</li> <li>• Equip with International Investment Decisions</li> <li>• Gain knowledge on Global Indebtedness</li> </ul>
		<b>Tax Management</b>	<ul style="list-style-type: none"> <li>• Able to know the basics of Tax, Tax on agricultural income &amp; Income Tax Act.</li> <li>• Understand all about the Central Value Added Tax (CENVAT)</li> <li>• Able to know Tax Plannings and its Principles</li> <li>• Learner understand the Elements of Tax considerations, tax management and tax</li> </ul>

			<p>decisions</p> <ul style="list-style-type: none"> <li>• Understand about the International Taxation system and legal aspects.</li> </ul>
		<b>Global HRM</b>	<ul style="list-style-type: none"> <li>• 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</li> <li>• To attained The concepts of Strategies - International assignments for Women Problems.</li> <li>• To gained knowledge in Cross Culture Communication and Negotiation, Cross Culture Teams</li> <li>• To understood The concepts of Compensation Management: Importance, Concepts- Trends, Issues, Methods, Factorsof Consideration- Models</li> <li>• To gained knowledge on Analysis of Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working Life and Productivity</li> </ul>
		<b>Management of Industrial Relations</b>	<ul style="list-style-type: none"> <li>• To Understand the basics of Industrial Relations</li> <li>• Able to know the Trade Unions Act, 1926.</li> <li>• To acquaint the knowledge on Quality of Work Life.</li> <li>• To know the concepts of Social Security Measures in India</li> <li>• To understand the Employee Grievances and Settlement of Industrial disputes.</li> </ul>
		<b>Labour Welfare Legislation</b>	<ul style="list-style-type: none"> <li>• Obtain knowledge on Labour welfare.</li> <li>• Learner is able to understand Statutory &amp; Non-statutory labour welfare programmes.</li> <li>• Understand the Labour Legislation.</li> <li>• Equip with Industrial Relations Legislation</li> <li>• Gain knowledge on various acts pertaining to Social Security Legislations.</li> </ul>

  
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**Enikepadu, Vijayawada 521108**  
 Approved by AICTE, Affiliated to JNTUK, Kakinada  
 (ISO 9001:2015 Certified Institution)

**Master of Computer Application**

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

YEAR	SEMESTER	SUBJECT	Course Outcomes
<b>I</b>	<b>I(R20)</b>	<b>Mathematical And Statistical Foundations</b>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters.</li> <li>• Learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests.</li> <li>• Design various ciphers using number theory.</li> <li>• Apply graph theory for real time problems like network routing problem.</li> </ul>
		<b>Computer Organization &amp; Operating Systems</b>	<ul style="list-style-type: none"> <li>• Understand the basic organization of computer and different instruction formats and addressing modes</li> <li>• Analyze the concept of pipelining, segment registers and pin diagram of CPU.</li> <li>• Understand and analyze various issues related to memory hierarchy.</li> <li>• Evaluate various modes of data transfer between CPU and I/O devices.</li> <li>• Examine various inter connection structures of multi processors</li> </ul>
		<b>Data Structures</b>	<ul style="list-style-type: none"> <li>• Implement basic programs by using C concepts.</li> </ul>

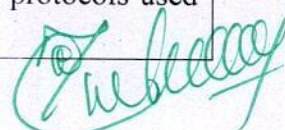
  
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			<ul style="list-style-type: none"> <li>• Select the data structures that efficiently model the information in a problem.</li> <li>• Assess efficiency trade-offs among different data structure implementations or combinations</li> <li>• Implement and know the application of algorithms for sorting and pattern matching</li> </ul>
		<p align="center"><b>Object Oriented Programming With Java</b></p>	<ul style="list-style-type: none"> <li>• Describe the uses OOP concepts.</li> <li>• Apply OOP concepts to solve real world problems.</li> <li>• Distinguish the concept of packages and interfaces.</li> <li>• Demonstrate the exception handling, multithread applications with synchronization</li> <li>• Design the GUI based applications using AWT and Swings</li> <li>• Discuss the Collection Framework</li> </ul>
I	II(R20)	<p align="center"><b>Database Management Systems</b></p>	<ul style="list-style-type: none"> <li>• Illustrate the concept of databases, database management systems, database languages, database structures and their work</li> <li>• Apply ER modeling and Relational modeling for designing simple databases.</li> <li>• Summarize the concepts related to relational model and SQL and Write database queries using relational algebra and structured query language.</li> <li>• Design and develop databases from the real world by applying the concepts of Normalization.</li> <li>• Outline the issues associated with Transaction Management and Recovery, Tree Structured and Hash-Based Indexing</li> </ul>
		<p align="center"><b>Computer Networks</b></p>	<ul style="list-style-type: none"> <li>• Explain the network architecture, TCP/IP and OSI reference models.</li> <li>• Identify and understand various techniques and modes of transmission.</li> <li>• Demonstrate the data link protocols, multi-channel access protocols and IEEE 802 standards for LAN.</li> <li>• Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme.</li> <li>• Discuss the elements and protocols of</li> </ul>

			<p>transport layer.</p> <ul style="list-style-type: none"> <li>• Develop network security and define various protocols such as FTP, HTTP, Telnet, DNS</li> </ul>
		<p><b>Software Engineering And Design Patterns</b></p>	<ul style="list-style-type: none"> <li>• Define various software application domains and remember different process model used in software development.</li> <li>• Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques.</li> <li>• Convert the requirements model into the design model and demonstrate use of software and user interface design principles.</li> <li>• Illustrate the appropriate design patterns to solve object-oriented design problems.</li> <li>• Apply structural patterns to solve design problems.</li> <li>• Evaluate the design solutions by using behavioral patterns.</li> </ul>
		<p><b>Data Warehousing And Mining</b></p>	<ul style="list-style-type: none"> <li>• Understand the basics of types of data, quality of data, suitable techniques required for preprocessing and measures required to perform data analysis.</li> <li>• Describe the need of classification, identify suitable technique(s) to perform classification, model building and evaluation.</li> <li>• Identify the requirements and usage of association rule mining on categorical and continuous data.</li> <li>• Compare and Identify suitable clustering algorithm(s) (apply with open source tools), interpret, evaluate and report the result.</li> <li>• Describe the requirements and the need of web mining</li> </ul>
		<p><b>Nosql DATABASES</b></p>	<ul style="list-style-type: none"> <li>• Identify what type of NoSQL database to implement based on business requirements (key-value, document, full text, graph, etc.)</li> <li>• Apply NoSQL data modeling from application specific queries.</li> <li>• Use Atomic Aggregates and denormalization as data modelling techniques to optimize query processing</li> </ul>
		<p><b>Computer</b></p>	<ul style="list-style-type: none"> <li>• Implement various CPU scheduling</li> </ul>

		<b>Organization &amp; Operating Systems Lab</b>	<p>algorithms and compare results</p> <ul style="list-style-type: none"> <li>• Implement various disk scheduling algorithms and compare results</li> <li>• Implement page replace algorithms</li> <li>• Implement various memory management techniques.</li> <li>• Execute basic Linux commands</li> </ul>
		<b>Object Oriented Programming With Java Lab</b>	<ul style="list-style-type: none"> <li>• Apply OOP concepts to solve real world problems</li> <li>• Implement different forms of inheritance</li> <li>• Create packages and to reuse them.</li> <li>• Implement multi threaded programs using synchronization concepts</li> <li>• Create user defined exceptions</li> <li>• Design GUI applications using AWT and SWINGS.</li> </ul>
		<b>Data Structures Lab</b>	<ul style="list-style-type: none"> <li>• Implement various basic data structures and its operations.</li> <li>• Apply sorting and searching algorithms to given numbers</li> <li>• Implement various tree operations.</li> <li>• Implement various graphs algorithms.</li> <li>• Develop applications using various data structures.</li> </ul>
<b>II</b>	<b>I(R20)</b>	<b>Machine Learning With Python</b>	<ul style="list-style-type: none"> <li>• Illustrate and comprehend the basics of Machine Learning with Python.</li> <li>• Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions</li> <li>• Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms.</li> <li>• Evaluate the concepts of binning, pipeline Interfaces with examples.</li> <li>• Apply the sentiment analysis for various case studies</li> </ul>
		<b>Internet Of Things</b>	<ul style="list-style-type: none"> <li>• Explain the definition and usage of the term 'the internet of things' in different contexts.</li> <li>• Discover the various network protocols used in IoT</li> </ul>



			<ul style="list-style-type: none"> <li>• Define the role of big data, cloud computing and data analytics in a typical IoT system.</li> <li>• Compare and contrast the threat environment based on industry and/or device type.</li> <li>• Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software</li> </ul>
		<b>Web Technologies</b>	<ul style="list-style-type: none"> <li>• Analyze a web page and identify its elements and attributes.</li> <li>• To acquire knowledge of xml fundamentals and usage of xml technology in electronic data interchange.</li> <li>• Build dynamic web pages using JavaScript (client side programming).</li> <li>• To design and develop web based enterprise systems for the enterprises using technologies like jsp, servlet.</li> <li>• Build web applications using PHP</li> </ul>
		<b>Cryptography And Network Security</b>	<ul style="list-style-type: none"> <li>• Explain Basic Principles, different security threats, countermeasures, foundation course of cryptography mathematics and Symmetric Encryption.</li> <li>• Classify the basic principles of Asymmetric key algorithms and operations of asymmetric key cryptography.</li> <li>• Design Cryptographic Hash Functions as SHA-3 and Digital Signatures as Elgamal.</li> <li>• Explain the concept of Key Management and Distribution and User Authentication.</li> <li>• Determine the knowledge of Network and Internet Security Protocols such as S/MIME</li> </ul>
		<b>Software Project Management</b>	<ul style="list-style-type: none"> <li>• Apply the process to be followed in the software development life-cycle models.</li> <li>• Apply the concepts of project management &amp; planning.</li> <li>• Implement the project plans through managing people, communications and change.</li> <li>• Conduct activities necessary to successfully complete and close the Software projects.</li> <li>• Implement communication, modeling, and</li> </ul>

			<p>construction &amp; deployment practices in software development</p>
		<p><b>Database Management Systems Lab</b></p>	<ul style="list-style-type: none"> <li>• Utilize SQL to execute queries for creating database and performing data manipulation operations</li> <li>• Examine integrity constraints to build efficient databases</li> <li>• Apply Queries using Advanced Concepts of SQL</li> <li>• Build PL/SQL programs including stored procedures, functions, cursors and triggers</li> </ul>
		<p><b>Computer Networks Lab</b></p>	<ul style="list-style-type: none"> <li>• To understand the working principle of various communication protocols.</li> <li>• To analyze the various routing algorithms.</li> <li>• To know the concept of data transfer between nodes.</li> <li>• Understand network layers, structure/format and role of each network layer.</li> <li>• Able to design and implement various network application such as data transmission between client and server, file transfer, real-time multimedia transmission.</li> <li>• Understand the various Routing Protocols/Algorithms and Internetworking</li> </ul>
		<p><b>Software Engineering And Design Patterns Lab</b></p>	<ul style="list-style-type: none"> <li>• Understand the architecture, creating it and moving from one to any, different structural patterns.</li> <li>• Analyze the architecture and build the system from the components.</li> <li>• Design creational and structural patterns.</li> <li>• Learn about behavioral patterns.</li> <li>• Do a case study in utilizing architectural structures.</li> </ul>
II	II(R20)	<p><b>Machine Learning With Python Lab</b></p>	<ul style="list-style-type: none"> <li>• Understand the implementation procedures for the machine learning algorithms</li> <li>• Design Java/Python programs for various Learning algorithms.</li> <li>• Apply appropriate data sets to the Machine Learning algorithms</li> <li>• Identify and apply Machine Learning</li> </ul>

			algorithms to solve real world problems
		<b>Internet Of Things Lab</b>	<ul style="list-style-type: none"> <li>• Interpret the impact and challenges posed by IoT networks leading to new architectural models.</li> <li>• Compare and contrast the deployment of smart objects and the technologies to connect them to network.</li> <li>• Appraise the role of IoT protocols for efficient network communication.</li> <li>• Elaborate the need for Data Analytics and Security in IoT.</li> <li>• Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.</li> </ul>
		<b>Web Technologies Lab</b>	<ul style="list-style-type: none"> <li>• Create dynamic and interactive web pages using HTML, CSS &amp; JavaScript</li> <li>• Experiment with Learn and implement XML concepts</li> <li>• Develop web applications using PHP</li> <li>• Show the Install Tomcat Server and execute client-server programs</li> </ul>

  
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