		SRK INSTITUTE OF TECHNOLOGY	
		Enikepadu, Vijayawada 521108	
		Approved by AICTE, Affiliated to JNTUK, Kakinada	
		(ISO 9001:2015 Certified Institution)	

Civil Engineering

YEAR	SEMESTER	SUBJECT	COS
I/IV (R20)	I	**Engineering Drawing**	• Creating to draw the polygons, engineering curves, and scales. • Creating the projections of lines inclined to both the planes and its traces. • Understanding the different plans and draw the projections of the plane inclined to both the planes. • Analyzing the basic solids and draw the projections of the solids inclined to one of the planes. • Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.
		Engineering Physics	• Able to know the differences between interference, diffraction and polarization with its Engineering applications. • Able to understand the concepts of LASER and optical fibers. Apply these concepts in various Engineering and medical fields. • Able to apply the concepts of dielectric and magnetic materials in emerging micro devices. • Able to identify acoustic properties of materials in architecture and use of Ultrasonics in different fields • Able to apply the knowledge of crystal diffraction methods to measure the various properties of crystals.
		Engineering Geology	• Able to identify and classify the geological minerals • Able to measure the rock strengths of various rocks • Able to classify, monitor and measure the Landslides and earthquake prone areas to practice the hazard zonation • Able to analyses the ground conditions

			through geophysical surveys.
			• 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.
		Communicative English	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials • Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		Mathematics-I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
I/IV	**II**	**Mathematics-II**	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of

			polynomial and transcendental equations by different algorithms (L5) • Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
I	II	**Engineering Chemistry**	• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • 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. • 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. • Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. Study alternate fuels and analyse flue gases • Analyze the suitable methods for purification and treatment of hard water and brackish water.
I	II	**Enigineering Mechanics**	• 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. • He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites. • 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.
I	II	**Programming For**	• Upon the completion of the course the

		Problem Solving Using C	student will learn
			• To write algorithms and to draw flowcharts for solving problems
			• To convert flowcharts/algorithms to C Programs, compile and debug programs
			• To use different operators, data types and write programs that use two-way/ multi-way selection
			• To select the best loop construct for a given problem
			• To design and implement programs to analyze the different pointer applications
			• To decompose a problem into functions and to develop modular reusable code
			• To apply File I/O operations
I	II	**Building Materials And Concrete Technology**	• Know various engineering properties of building construction materials and suggest their suitability
			• Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design
			• Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete
II	I	**Complex Variables and Statistical Methods**	• apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)
			• find the differentiation and integration of complex functions used in engineering problems (L5)
			• make use of the Cauchy residue theorem to evaluate certain integrals (L3)
			• apply discrete and continuous probability distributions (L3)
			• design the components of a classical hypothesis test (L6)
			• infer the statistical inferential methods based on small and large sampling tests (L4)

		STRENGTH OF MATERIALS - I	- The student will be able to understand the basic materials behavior underthe influence of different external loading conditions and the supportconditions - The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shearforces - 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 loadingconditions - The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame'sequation.
		FLUID MECHANICS	- Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics. - Calculate the forces that act on submerged planes and curves. - Ability to analyse various types of fluid flows. - Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces. - Able Measure the quantities of fluid

			flowing in pipes, tanks and channels.
		SURVEYING AND GEOMETRICS	- Apply the knowledge to calculate angles, distances and levels - Identify data collection methods and prepare field notes - Understand the working principles of survey instruments, measurement errors and corrective measures - Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies
		BUILDING METERIALS, CONSTRUCTION AND PLANNING	- The student should be able to identify different building materials and their importance in building construction. - The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions. - The student should have learnt the importance of building components and finishings. - The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.
		TRANPORTATION ENGINEERING – I	- Plan highway network for a given area. - Determine Highway alignment and design highway geometrics. - Design Intersections and prepare traffic management plans - Judge suitability of pavement materials and design flexible and rigid pavements

II/IV (R19)	II	STRENGTH OF MATERIALS- II	• The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections. • The student can asses stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions • • The student will be able to assess forces in different types of trusses used in construction.
		HYDRAULICS AND HYDRAULIC MACHINERY	• Solve uniform and non uniform open channel flow problems. • Apply the principals of dimensional analysis and similitude in hydraulic model testing. • Understand the working principles of various hydraulic machineries and pumps.
		ENGINEERING GEOLOGY	• Identify and classify the geological minerals • Measure the rock strengths of various rocks • Classify and measure the earthquake prone areas to practice the hazard zonation • Classify, monitor and measure the Landslides and subsidence • Prepares, analyses and interpret the Engineering Geologic maps • Analyses the ground conditions through geophysical surveys. • Test the geological material and ground to

			check the suitability of civil engineering project construction. • Investigate the project site for mega/mini civil engineering projects.Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc
		TRANPORTATION ENGINEERING – II	• Design geometrics in a railway track. • Plan track layouts and control movement of trains • Design airport geometrics and airfield pavements. • Plan, construct and maintain Docks and Harbours.
		ENVIRONMENTAL ENGINEERING- I	• Estimation of design population and water demand • Identify the water source and select proper intake structure • Characterization of water for drinking, industry and construction • Design of water treatment plant for a village/city • Selection and design of an ideal distribution system
III/IV R16	**I**	**MANAGEMENT SCIENCE**	After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior. Will familiarize with the concepts of functional management project management and strategic management.
		ENGINEERING GEOLOGY	• Identify and classify the geological minerals • Measure the rock strengths of various rocks • Classify and measure the earthquake prone

			areas to practice the hazard zonation
			• Classify, monitor and measure the Landslides and subsidence
			• Prepares, analyses and interpret the Engineering Geologic maps
			• Analyses the ground conditions through geophysical surveys.
			• Test the geological material and ground to check the suitability of civil engineering project construction.
			• Investigate the project site for mega/mini civil engineering projects.Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc
		STRUCTURAL ANALYSIS – II	• Differentiate Determinate and Indeterminate Structures
			• Carryout lateral Load analysis of structures
			• Analyze Cable and Suspension Bridge structures
			• Analyze structures using Moment Distribution, Kani's Method and Matrix methods
		DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES	• Work on different types of design philosophies
			• Carryout analysis and design of flexural members and detailing
			• Design structures subjected to shear, bond and torsion
			• Design different type of compression members and footings
		TRANSPORTATION ENGINEERING – II	• Design geometrics in a railway track.
			• Design airport geometrics and airfield pavements.

			• Plan, construct and maintain Docks and Harbours.
III/IV R16	II	DESIGN AND DRAWING OF STEEL STRUCTURES	• Work with relevant IS codes • Carryout analysis and design of flexural members and detailing • Design compression members of different types with connection detailing • Design Plate Girder and Gantry Girder with connection detailing • Produce the drawings pertaining to different components of steel structures
		GEOTECHNICAL ENGINEERING – I	• The student must know the definition of the various parameters related to soil mechanics and establish their inter-relationships. • The student should be able to know the methods of determination of the various index properties of the soils and classify the soils. • The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory. • The student should be able to apply the above concepts in day-to-day civil engineering practice.
		ENVIRONMENTAL ENGINEERING – I	• Plan and design the water and distribution networks and sewerage systems • Identify the water source and select proper intake structure • Characterisation of water • Select the appropriate appurtenances in the water supply • Selection of suitable treatment flow for raw

			water treatments
		WATER RESOURCES ENGINEERING–I	• have a thorough understanding of the theories and principles governing the hydrologic processes, • be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects • develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures. • be able to develop design storms and carry out frequency analysis • be able to determine storage capacity and life of reservoirs. • develop unit hydrograph and synthetic hydrograph • be able to estimate flood magnitude and carry out flood routing. • be able to determine aquifer parameters and yield of wells. • be able to model hydrologic processes
		WASTE WATER MANAGEMENT	Suggest treatment method for any industrial waste water Learn the manufacturing process various industries Student will be in position to decide the need of common effluent treatment plant for industrial area in their vicinity
IV	**I**	**ENVIRONMENTAL ENGINEERING -II**	• Plan and design the sewerage systems • Select the appropriate appurtenances in the sewerage systems • Analyze sewage and suggest and design

			suitable treatment system for sewage treatment
			• Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river
			• Suggest a suitable disposal method with respect to effluent standards.
		WATER RESOURCES ENGINEERING–II	• estimate irrigation water requirements • design irrigation canals and canal network • plan an irrigation system • design irrigation canal structures • plan and design diversion head works • analyse stability of gravity and earth dams • design ogee spillways and energy dissipation works
		GEOTECHNICAL ENGINEERING – II	• The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics. • The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation. • The student must be able to use the field test data and arrive at the bearing capacity. • The student must be able to design Piles based on the principles of bearing capacity.
		REMOTE SENSING AND GIS APPLICATIONS	• be familiar with ground, air and satellite based sensor platforms. • interpret the aerial photographs and satellite imageries • create and input spatial data for GIS application • apply RS and GIS concepts in water

			resources engineering • applications of various satellite data
		GROUND IMPROVEMENT TECHNIQUES	• 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. • The student should be in a position to design a reinforced earth embankment and check its stability. • The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice. • The student should be able to understand the concepts and applications of grouting.
		GROUND WATER DEVELOPMENT	• estimate aquifer parameters and yield of wells • analyse radial flow towards wells in confined and unconfined aquifers. • design wells and understand the construction practices. • interpret geophysical exploration data for scientific source finding of aquifers. • determine the process of artificial recharge for increasing groundwater potential. • take effective measures for controlling saline water intrusion. • apply appropriate measures for groundwater management.
IV/IV	**II**	**ESTIMATION SPECIFICATION & CONTRACTS**	• The student should be able to determine the quantities of different components of buildings. • The student should be in a position to find the cost of various building components.

			• The student should be capable of finalizing the value of structures.
		CONSTRUCTION TECHNOLOGY AND MANAGEMENT	• appreciate the importance of construction planning • understand the functioning of various earth moving equipment • know the methods of production of aggregate products and concreting and usage of machinery required for the works. • apply the gained knowledge to project management and construction techniques
		PRESTRESSED CONCRETE	• Understand the different methods of prestressing • Estimate effective prestress including the short and long term losses • Analyze and design prestressed concrete beams under flexure and shear • Understand the relevant IS Codal provisions for prestressed concrete
		SOLID AND HAZARDOUS WASTE MANAGEMENT	• Design the collection systems of solid waste of a town • Design treatment of municipal solid waste and landfill • Know the criteria for selection of landfill • Characterise the solid waste and design a composting facility • Know the Method of treatment and disposal of Hazardous wastes.

Electrical and Electronics Engineering

YEAR	SEMESTER	SUBJECT	COS
I/IV **(R20)**	**I**	**ENGINEERING DRAWING**	• Creating to draw the polygons, engineering curves, and scales. • Creating the projections of lines inclined to both the planes and its traces. • Understanding the different plans and draw the projections of the plane inclined to both the planes. • Analyzing the basic solids and draw the projections of the solids inclined to one of the planes. • Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.
		COMMUNICATIVE ENGLISH	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials • Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS -I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using

			multiple integrals.
		MATHEMATICS -II	• Able to solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel • Able to develop the use of matrix algebra techniques that is needed by engineers for practical applications • Able to evaluate approximating the roots of polynomial and transcendental equations by different algorithms. • Able to apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals. • Able to apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
		PROGRAMMIN G FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O operations.
I	II	**MATHEMATICS -III(Vector Calculus, Transforms and PDE)**	• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • Estimate the work done against a field, circulation and flux using vector calculus (L5) • Apply the Laplace transform for solving differential equations (L3) • Find or compute the Fourier series of periodic signals (L3) • Know and be able to apply integral expressions for the forwards and

			inverse Fourier transform to a range of non-periodic waveforms (L3) • Identify solution methods for partial differential equations that model physical processes (L3)
		APPLIED PHYSICS	• 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) • 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). • 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). • 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)
			• 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 & Josephson effect in superconductors (L2).
		DATA STRUCTURES THROUGH C	• Data structures concepts with arrays, stacks, queues. • Linked lists for stacks, queues and for other applications. • Traversal methods in the Trees. • Various algorithms available for the graphs. • Sorting and searching in the data retrieval applications.
		ELECTRICAL CIRCUIT ANALYSIS -I	• Various electrical networks in presence of active and passive elements. • Electrical networks with network topology concepts. • Any magnetic circuit with various dot conventions. • Any R, L, C network with sinusoidal excitation. • Any R, L, network with variation of any one of the parameters i.e R, L, C and f. • Electrical networks by using principles of network theorems

		BASIC CIVIL AND MECHANICAL ENGINEERING	• Apply Shear force diagram & Bending moment diagram principles for Cantilever and Simply supported beams. • Apply concepts of Rosette analysis for strain measurements. • Analyse the characteristics of common building materials. • Compare the working characteristics of Internal Combustion engines. • Compare the differences between boiler mountings and accessories.
II	**I**	**ELECTRICAL CIRCUIT ANALYSIS-II**	• solve three- phase circuits under balanced and unbalanced condition. • find the transient response of electrical networks for different types of excitations. • find parameters for different types of network. • realize electrical equivalent network for a given network transfer function. • extract different harmonics components from the response of an electrical network.
		ELECTRICAL MACHINES – I	• Assimilate the concepts of electro mechanical energy conversion. • mitigate the ill-effects of armature reaction and improve commutation in dc machines. • understand the torque production mechanism and control the speed of dc motors. • Analyze the performance of single phase transformers. • predetermine regulation, losses and efficiency of single phase transformer • parallel transformers, control voltages with tap changing methods and achieve three phase to two-phase transformation.
		ELECTRONIC DEVCIES AND	• understand the concepts of Semiconductor Technology. • appraise the construction & operation of

		CIRCUITS	electronic devices.
			• develop the biasing circuits using the electronic devices.
			• model the amplifier circuits.
			• Analyse the characteristics of the devices.
		ELECTROMAG NETIC FIELDS	• determine electric fields and potentials using Guass's law or solving Laplace's or Possion's equations, for various electric charge distributions.
			• calculate and design capacitance, energy stored in dielectrics.
			• calculate the magnetic field intensity due to current, the application of Ampere's law and the MAXWELL's second and third equations.
			• determine the magnetic forces and torque produced by currents in magnetic field.
			• determine self and mutual inductances and the energy stored in the magnetic field.
			• calculate induced EMF, understand the concepts of displacement current and Poynting vector.
		THERMAL AND HYDRO PRIME MOVERS	• CO1: HYDRAULIC TURBINES: Classifications of turbines; Working principle, Efficiency calculation and Design principles for Pelton Wheel, Francis and for Kaplan turbines; Governing of turbines; Performance and characteristic curves.
			• CO2: HYDRO POWER: Components of Hydro electric power plant; pumped storage systems, Estimation of water power potential ; Estimation of water power potential ; Estimation of load on turbines load curve, load factor, capacity factor, utilization factor, diversity factor, load- duration curve, firm power, secondary power, prediction of load.
		MANAGERIAL ECONOMICS	• The learner is equipped with the knowledge of estimating the Demand

		AND FINANCIAL ANALYSIS	and demand elasticities for a product • the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis. • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.	
		ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	• choose right type of instrument for measurement of ac and dc Electrical quantities. • choose right type of instrument for measurement of power and power factor. • select right type for measurement of R, L,C. • understand the effectiveness of Transducer • able to understand Digital Meters.	
		ELECTRICAL MACHINES – II	• explain the operation and performance of three phase induction motor. • analyze the torque-speed relation, performance of induction motor and induction generator. • explain design procedure for transformers and three phase induction motors. • implement the starting of single phase induction motors. • perform winding design and predetermine the regulation of synchronous generators. • avoid hunting phenomenon, implement methods of staring and correction of	

			power factor with synchronous motor.
		DIGITAL ELECTRONICS	- classify different number systems and apply to generate various codes. - use the concept of Boolean algebra in minimization of switching functions - design different types of combinational logic circuits. - apply knowledge of flip-flops in designing of Registers and counters - the operation and design methodology for synchronous sequential circuits and algorithmic state machines - produce innovative designs by modifying the traditional design techniques.
		CONTROL SYSTEMS	- derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs. - determine time response specifications of second order systems and to determine error constants. - analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method. - analyze the stability of LTI systems using frequency response methods. - design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams - represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.
		POWER SYSTEMS-I	- identify the different components of thermal power plants. - identify the different components of nuclear Power plants. - identify the different components of air and gas insulated substations. - identify single core and three core cables with different insulating materials.

			• analyse the different economic factors of power generation and tariffs.
		SIGNALS AND SYSTEMS	• characterize the signals and systems and principles of vector spaces, Concept of orthgonality. • analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform. • apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back. • understand the relationships among the various representations of LTI systems • understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships • apply z-transform to analyze discrete-time signals and systems.
III	I	**Power Systems–II**	• Able to understand parameters of various types of transmission lines during different operating conditions. • Able to understand the performance of short and medium transmission lines. • Student will be able to understand travelling waves on transmission lines. • Will be able to understand various factors related to charged transmission lines. • Will be able to understand sag/tension of transmission lines and performance of line insulators.
		Renewable Energy Sources	• Analyze solar radiation data, extraterrestrial radiation, and radiation on earth's surface. • Design solar thermal collectors, solar thermal plants. • Design solar photo voltaic systems. • Develop maximum power point techniques in solar PV and wind energy systems. • Explain wind energy conversion systems, wind generators, power generation. • Explain basic principle and working of hydro, tidal, biomass, fuel cell and

			geothermal systems.
		Signals & Systems	- Characterize the signals and systems and principles of vector spaces, Concept of orthgonality. - Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform. - Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back. - Understand the relationships among the various representations of LTI systems - Understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships. - Apply z-transform to analyze discrete-time signals and systems.
		Pulse And Digital Circuits	- Design linear and non-linear wave shaping circuits. - Apply the fundamental concepts of wave shaping for various switching and signal generating circuits. - Design different mono-stable multivibrators - Design different time base generators. - Utilize the non sinusoidal signals in many experimental research areas. - Students will be able to learn design of different Logic families and Sampling gates.
		Power Electronics	- Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's. - Design firing circuits for SCR. - Explain the operation of single phase full–wave converters and analyze harmonics in the input current. - Explain the operation of three phase full–wave converters. - Analyze the operation of different types of DC-DC converters. - Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation. - Analyze the operation of AC-AC regulators.

III	II	Power Electronic Controllers & Drives	- Explain the fundamentals of electric drive and different electric braking methods. - Analyze the operation of three phase converter fed dc motors and four quadrant operations of dc motors using dual converters. - Describe the converter control of dc motors in various quadrants of operation - Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters. - Differentiate the stator side control and rotor side control of three phase induction motor. - Explain the speed control mechanism of synchronous motors
		Power System Analysis	- Able to draw impedance diagram for a power system network and to understand per unit quantities. - Able to form a Ybusand Zbusfor a power system networks. - Able to understand the load flow solution of a power system using different methods. - Able to find the fault currents for all types faults to provide data for the design of protective devices. - Able to findthe sequence components of currents for unbalanced power system network. - Able to analyze the steady state, transient and dynamic stability concepts of a power system.
		Microprocessors And Microcontrollers	- To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors. - To be able to understand the addressing modes of microprocessors - To be able to understand the micro controller capability - To be able to program mp and mc - To be able to interface mp and mc with other electronic devices - To be able to develop cyber physical systems
		Data Structures	Distinguish between procedures and object oriented programming.

		Through C++	• Apply advanced data structure strategies for exploring complex data structures. • Compare and contrast various data structures and design techniques in the area of Performance. • Implement data structure algorithms through C++. • Incorporate data structures into the applications such as binary search trees, AVL and B Trees • Implement all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs
		OOPs through Java	• Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches. • • Apply an object-oriented approach to developing applications of varying complexities
IV	I	**Energy Audit, Conservation & Management (Open Elective)**	• Explain energy efficiency, conservation and various technologies. • Design energy efficient lighting systems. • Calculate power factor of systems and propose suitable compensation techniques. • Explain energy conservation in HVAC systems. • Calculate life cycle costing analysis and return on investment on energy efficient technologies.
		Utilization Of Electrical Energy	• Able to identify a suitable motor for electric drives and industrial applications • Able to identify most appropriate heating or welding techniques for suitable applications. • Able to understand various level of illuminosity produced by different illuminating sources. • 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. • Able to determine the speed/time characteristics of different types of

			traction motors.
			• Able to estimate energy consumption levels at various modes of operation.
		Linear IC Applications	• Design circuits using operational amplifiers for various applications. Analyze and design amplifiers and active filters using Op-amp.
			• Diagnose and trouble-shoot linear electronic circuits.
			• Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
			• Understand thoroughly the operational amplifiers with linear integrated circuits.
			• Loop and its applications.
			• Understand D/a and A/D conversions **by using IC's.**
		Power System Operation And Control	• Able to compute optimal scheduling of Generators.
			• Able to understand hydrothermal scheduling.
			• Understand the unit commitment problem.
			• Able to understand importance of the frequency.
			• Understand importance of PID controllers in single area and two area systems.
			• Will understand reactive power control and compensation for transmission line.
		Switchgear And Protection	• Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6 gas type.
			• Ability to understand the working principle and operation of different types of electromagnetic protective relays.
			• Students acquire knowledge of faults and protective schemes for high power generator and transformers.
			• Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.
			• Able to understand different types of static relays and their applications.
			• Able to understand different types of over voltages and protective schemes required for insulation co–ordination.

		Electrical Machine Modeling & Analysis (Elective-I)	- Develop modeling of dc machine - Apply mathematical modeling concepts to 3-phase Induction machines - Design control strategies based on dynamic modeling of 3-ph Induction machines and 3-phase synchronous machine. - Analyze BLDC Machine and switched reluctance machine based on mathematical modeling of BLDCM and SRM.
		Advanced Control Systems	- State space representation of control system and formulation of different state models are reviewed. - Able to design of control system using the pole placement technique is given after introducing the concept of controllability and observability. - Able to analyse of nonlinear system using the describing function technique and phase plane analysis. - Able to analysethe stability analysis using lypnov method. - Minimization of functionals using calculus of variation studied. - Able to formulate andsolve the LQR problem and riccatti equation.
		Progammable Logic Controllers & Applications	- Understand the PLCs and their I/O modules. - Develop control algorithms to PLC using ladder logic. - Manage PLC registers for effective utilization in different applications. - Design PID controller with PLC.
		Instrumentation (Elective – I)	- Able to represent various types of signals - Acquire proper knowledge to use various types of Transducers. - Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc. - Acquire proper knowledge and working principle of various types of digital voltmeters. - Able to measure various parameter like phase and frequency of a signal with the help of CRO. - Acquire proper knowledge and able to handle various types of signal analyzers.

		Electric Power Quality	• Differentiate between different types of power quality problems. • Explain the sources of voltage sag, voltage swell, interruptions, transients, long duration over voltages and harmonics in a power system. • Analyze power quality terms and power quality standards. • Explain the principle of voltage regulation and power factor improvement methods. • Demonstrate the relationship between distributed generation and power quality. • Explain the power quality monitoring concepts and the usage of measuring instruments.
IV/IV B.Tech EEE (R16)	**II**	**Digital Control Systems**	• The students learn the advantages of discrete time control systems and the "know how" of various associated accessories. • The learner understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems). • The stability criterion for digital systems and methods adopted for testing the same are explained. • Finally, the conventional and state space methods of design are also introduced
		High Voltage DC Transmission	• Learn different types of HVDC levels and basic concepts • Know the operation of converters • Acquire control concept of reactive power control and AC/DC load flow. • Understand converter faults, protection and harmonic effects • Design low pass and high pass filters
		Electrical DistibutionSystems	• Able to understand various factors of distribution system. • Able to design the substation and feeders. • Able to determine the voltage drop and power loss • Able to understand the protection and its coordination. • Able to understand the effect of compensation forp.f improvement. • Able to understand the effect of voltage

			control.
		Flexible Alternating Current Transmission Systems	• Understand power flow control in transmission lines using FACTS controllers. • Explain operation and control of voltage source converter. • Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines. • Explain the method of shunt compensation using static VAR compensators. • Understand the methods of compensations using series compensators. • Explain operation of Unified Power Flow Controller (UPFC).

MECHANICAL ENGINEERING

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I/IV (R20)	**I**	**ENGINEERING DRAWING**	• Creating to draw the polygons, engineering curves, and scales. • Creating the projections of lines inclined to both the planes and its traces. • Understanding the different plans and draw the projections of the plane inclined to both the planes. • Analyzing the basic solids and draw the projections of the solids inclined to one of the planes. • Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.
		ENGINEERING PHYSICS	• Able to know the differences between interference, diffraction and polarization with its Engineering applications. • Able to understand the concepts of LASER and optical fibers. Apply these concepts in various Engineering and medical fields. • Able to apply the concepts of dielectric and magnetic materials in emerging micro devices. • Able to identify acoustic properties of materials in architecture and use of Ultrasonics in different fields • Able to apply the knowledge of crystal diffraction methods to measure the various properties of crystals.
		COMMUNICATIVE ENGLISH	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials • Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same

			in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS-I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
		PROGRAMMING FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O operations.
I	II	**MATHEMATICS-II**	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)

			• Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
I	II	**ENGINEERING CHEMISTRY**	• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • 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. • 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. • Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. Study alternate fuels and analyse flue gases • Analyze the suitable methods for purification and treatment of hard water and brackish water.
I	II	**ENIGINEERING MECHANICS**	• 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. • He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites. • 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 ofmotion, work energy and impulse – momentum.
I	II	**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**	• Analyse various electrical networks. • Understand operation of DC generators,3-point starter and DC machine testing by Swinburne'sTest and Brake test. • Analyse performance of single-phase transformer and acquire proper knowledge and working of3-phase alternator and 3-phase induction motors. • Analyse operation of half wave, full wave

			bridge rectifiers and OP-AMPs.
			• 5. Understanding operations of CE amplifier and basic concept of feedback amplifier.
I	II	**THERMODYNAMICS**	• Basic concepts of thermodynamics • Laws of thermodynamics • Concept of entropy • Property evaluation of vapors and their depiction in tables and charts • 5. Evaluation of properties of perfect gas mixtures.
II	I	**Vector Calculus & Fourier Transforms**	• Student will be able to Interpret the physical meaning of different operators such as gradient, curl and divergence • Student will be able to estimate the work done against a field, circulation and flux using vector calculus • Student will be able to apply the Laplace transform for solving differential equations • Student will be able to find or compute the Fourier series of periodic signals • Student will be able to know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms • Student will be able to identify solution methods for partial differential equations that model physical processes
		Mechanics of Solids	• Student will model & analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium. • Able to understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment. • Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to

			solve deflection problems in preparation for the design of such structural components. Students are able to analyse beams and draw correct and complete shear and bending moment diagrams for beams.
			• Students attain a deeper understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior.
			• Student can design and analysis of Industrial components like pressure vessels.
		Material Science & Metallurgy	• Understand the crystalline structure of different metals and study the stability of phases in different alloy systems. • Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains • Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals. • Grasp the methods of making of metal powders and applications of powder metallurgy • Comprehend the properties and applications of ceramic, composites and other advanced methods.
		Production Technology	• At the end the of course student will be able to design the patterns and core boxes for metal casting processes • At the end of the course student will be able to design the gating system for different metallic components. • At the end of the course student will Know the different types of manufacturing processes • At the end of the course student will learn about the different types of

			welding processes used for special fabrication. • At the end of the course student will be learn about forging, extrusion and powder metallurgy.
		Thermodynamics	• At the end the of course student will be able to know basic concepts of thermodynamics • At the end the of course student will be able to learn Laws of thermodynamics • At the end of the course student will learn about the Concept of entropy • At the end of the course student will learn about the Property evaluation of vapors and their depiction in tables and charts • At the end of the course student will learn about the Evaluation of properties of perfect gas mixtures.
		Machine Drawing	• Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings. • Draw different types of bearings showing different components. • Assemble components of a machine part and draw the sectional assembly drawing showing the • dimensions of all the components of the assembly as per bill of materials • Select and represent fits and geometrical form of different mating parts in assembly drawings. • To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements.
II	II	**Complex Variables & Statistical Methods**	• At the end of the course students will be able to apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic • At the end of the course students will be able to find the differentiation and

			integration of complex functions used in engineering problems
			• At the end of the course students will be able to make use of the Cauchy residue theorem to evaluate certain integrals
			• At the end of the course students will be able to apply discrete and continuous probability distributions
			• At the end of the course students will be able to design the components of a classical hypothesis test
			• At the end of the course students will be able to infer the statistical inferential methods based on small and large sampling tests
		Kinematics Of Machinery	• The student should be able to Contrive a mechanism for a given plane motion with single degree of freedom.
			• The student should be able to Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.
			• The student should be able to Analyze the motion (velocity and acceleration) of a plane mechanism.
			• The student should be able to Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.
			• The student should be able to Select a power transmission system for a given application and analyze motion of different transmission systems
		Applied Thermodynamics	• Expected to learn the working of steam power cycles and also should be able to analyze and evaluate the performance of individual components
			• Student is able to learn the principles of combustion , stochiometry and flue gas analysis
			• Students will be able to design the components and calculate the losses and efficiency of the boilers, nozzles and

			impulse turbines**.**
			• Students will be able to design the components and calculate the losses and efficiency of reactions turbines and condensers.
			• Student is able to learn various types of compressors, principles of working and their performance evaluation.
		Fluid Mechanics & Hydraulic Machines	• Student will be able to learn The basic concepts of fluid properties.
			• Student will be able to learn The mechanics of fluids in static and dynamic conditions.
			• Student will be able to learn Boundary layer theory, flow separation and dimensional analysis.
			• Student will be able to learn Hydrodynamic forces of jet on vanes in different positions.
			• Student will be to learn Working Principles and performance evaluation of hydraulic pump and turbines.
		Metal Cutting & Machine Tools	• Students will be able to understand the fundamental knowledge and principals in material removal processes.
			• Students will acquire the knowledge on operations on conventional, automatic, capstan and turret lathes.
			• Students are capable of understanding the working principles and operation of shaping, slotting, planning, drilling and boring machines.
			• Students will be able to make gear and keyway in milling machines and understanding the indexing mechanisms.
			• Students will be able to understand the different types of unconventional machining methods and principles of finishing processes. .
		Design Of Machine	• Able to Calculate different stresses in the

		Members-I	machine components subjected to various static loads, failures and suitability of a material for an engineering application.
			• Able to Calculate dynamic stresses in the machine components subjected to variable loads.
			• Able to Design riveted, welded, bolted joints, keys, cotters and knuckle joints subjected to static loads and their failure modes
			• Able to Design the machine shafts and suggest suitable coupling for a given application.
			• Able to calculate stresses in different types of springs subjected to static loads and dynamic loads.
III	**I**	**Dynamics of Machinery**	• Able to identify stabilization of sea vehicles, aircrafts and automobile vehicles.
			• Able to identify frictional losses, torque transmission of mechanical systems.
			• Able to design dynamic force analysis of slider crank mechanism and design of flywheel.
			• Able to design of governor its working in different condition.
			• Able to design balancing of reciprocating and rotary masses.
			• Able to the identify frequencies of continuous systems starting from the general equation of displacement.
		Metal Cutting & Machine Tools	• Able to apply cutting mechanics to metal machining based on cutting force and power consumption.
			• Able to Operate lathe, milling machines, drill press, grinding machines, etc.
			• Able to Select cutting tool materials and tool geometries for different metals.
			• Able to Select appropriate machining processes and conditions for different metals.
			• Able to Learn machining economics.
		Design of Machine	• The student will able to select the

		Members–II	suitable bearing based on the application of the loads and predict the life of the bearing. • Able to design the IC Engines parts. • Able to design the curved beams, calculation of stresses in curved beams and expression for radius of neutral axis for curved beams with different cross-sections. • Able to design power transmission elements such as gears, belts, chains, pulleys, ropes, levers and power screws. • Able to design the spur & helical gear for different engineering applications. • Able to design the Levers and brackets: design of levers and Wire Ropes: Construction, Designation, Stresses in wire ropes.
		Operations Research	• Formulate a real time situation into a mathematical model. • Assign a right job to a right person using job sequencing. • Make right decisions in operations management using game theory, queuing theory and replacement analysis. • Solve non-linear problems using non-linear programming techniques. • Perform optimum problem solving using dynamic programming and simulation techniques.
		Thermal Engineering -II	• Understand the concept of Rankine cycle. • Understand working of boilers including water tube, fire tube and high pressure boilers and determine efficiencies. • Analyze the flow of steam through nozzles • Evaluate the performance of condensers and steam turbines • Evaluate the performance of gas turbines • 6. Understand working of jet propulsions and rockets and related problems.
III	**II**	**Metrology**	• Students will be able to design tolerances and fits for selected product quality. • They can choose appropriate method and

			instruments for inspection of various gear elements and thread elements. • They can understand the standards of length, angles, they can understand the evaluation of surface finish and measure the parts with various comparators. • The quality of the machine tool with alignment test can also be evaluated by them.
		Instrumentation & Control Systems	• After undergoing the course the student can select appropriate device for the measurement of parameters like temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
		Refrigeration & Air-conditioning	• After undergoing the course the student should be in a position to analyze various refrigerating cycles and evaluate their performance. The student also should be able to perform cooling load calculations and select the appropriate process and equipment for the required comfort and industrial air-conditioning
		Heat Transfer	• Understand basic modes of heat transfer and compute temperature distribution in steady state and unsteady state heat conduction • Analyze heat transfer through extended surfaces • Interpret and analyze free & forced convection heat transfer • Comprehend the phenomena and flow regimes of boiling and condensation • Understand the principles of radiation heat transfer • Apply LMTD and NTU methods to design heat exchangers.
IV	I	**Mechatronics**	• Elements & levels of mechatronics system, measurement systems, Sensors and transducers • PN junction diode, BJT, FET, DIAC, TRIAC and LEDs. Analog signal • conditioning, operational amplifiers, noise reduction, filtering. • Fluid systems, Hydraulic systems, Mechanical actuating systems and electrical actuating systems. • digital logic control, micro processors

			and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control. • Data Acquisition Systems, Analog to Digital and Digital to Analog conversions; Digital Signal Processing – data flow in DSPs, block diagrams, typical layouts, Interfacing motor • System response. Process Controllers – Digital Controllers, Programmable Logic Controllers, Design of mechatronics systems & future trends
		CAD/CAM	• Describe the mathematical basis in the technique of representation of geometric entities including points, lines, and parametric curves, surfaces and solid, and the technique of transformation of geometric entities using transformation matrix • Describe the use of GT and CAPP for the product development • Identify the various elements and their activities in the Computer Integrated Manufacturing Systems.
		Finite Element Methods	• Understand the concepts behind variational methods and weighted residual methods in FEM • Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements, and 3-D element . • Develop element characteristic equation procedure and generation of global stiffness equation will be applied. • Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form. • Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow. • The objective of the course is to teach the fundamentals of finite element method with emphasize on the underlying theory, assumption, and modeling issues as well as providing hands on experience using finite element

			software to model, analyze and design systems of mechanical and aerospace engineers.
		Power Plant Engineering	• Able to study resources & development of power in India. Steam power plant layout, working of different circuits, combustion properties of coal-overfeed & underfeed fuel beds CO: To understand the working principles of diesel & Gas power plant layouts. • Able to understand the working principles of hydro electric power plant & different hydro-electric plant layouts+. • Able to understand the working principles of nuclear power plant & types of reactors • Able to understand the concepts of combined operations of different power plants, power plant instrumentation & control, importance of instrumentation & measurement • Able to understand the concepts of power plant economics & environmental considerations
		Elective. Additive Manufacturing	• Able to understand prototyping fundamentals & advantages & limitations of RP, Classifications & also able to identify the use of SLA,SGC for manufacturing of complex components. • Able to identify the use of LOM,FDM for manufacturing of complex components. • Able to identify the use of SLS,3DP for manufacturing of complex components. • Able to understand various indirect & direct tooling techniques • Able to understand RP Data formats, features of RP Software's & To identify the STL file problems & their repair • Able to understand the applications of RP in various industries & fields.
		Elective II Advanced Materials	• Students who successfully complete this course will demonstrate the following • Properties of constituents, classification of composites and their suitability for the structural applications. • Smart materials and their applications. • Nano materials in comparison with bulk

			materials.
			• Manufacturing processes.
IV	II	**Production Planning and Control**	• Understanding of the concepts of production and service systems • Application of principles and techniques in the design, planning and control of these systems to optimise/make best use of resources in achieving. • Finding different strategies employed in manufacturing and service industries • Calculate effectiveness, identify likely areas for improvement, development • Implementation and improved planning and control methods for different production systems.
		Unconventional Machining Processes	• Able to identify the classification of unconventional machining process • Able to gain knowledge on electro chemical machining process • Able To gain knowledge on thermal metal removal process like ED,EDG & wire EDM • Able to gain knowledge on thermal metal removal process like EBM & LDM • Able to gain knowledge on Plasma machining & other application of plasma in industries • Able to gain knowledge on AJM,WJM & AWJM etc..
		Automobile Engineering	• To understand the basic components of automobile, engine lubrication, cooling & engine service • To understand different types of transmission systems in an automobile. • To understand different types of steering systems, & geometry • To understand the suspension system & their types, Braking systems & their types • To understand the Electrical systems used in automobiles • To understand the Engine specifications, safety systems, engine emission & control & engine servicing
		Elective III Non Destructive Evaluation	• Able to understand the principle of radiographic technique, sources of radiographic rays, equipment & different techniques of radiography

			- Able to understand the ultra sonic test, ultra sonic transducers & their characteristics, interpretation of defects, effectiveness & limitations of testing. - Able to understand the concept of liquid penetrate test & eddy current test, test procedure & its applications - Able to understand the concept of Magnetic particle test, test procedure & to interpret the various surface & sub-surface flaws - Able to understand the fundamentals to infrared & thermal testing, contact & non-contact thermal inspection methods, infrared detectors - Able to select the appropriate NDE method based on the application.

Electronics and Communication Engineering

YEAR	SEMESTER	SUBJECT	COS
I/IV (R20)	I	**Applied Chemistry**	• Able to analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • 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. • 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. • 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
		ENGINEERING DRAWING	• Creating to draw the polygons, engineering curves, and scales. • Creating the projections of lines inclined to both the planes and its traces. • Understanding the different plans and draw the projections of the plane inclined to both the planes. • Analyzing the basic solids and draw the projections of the solids inclined to one of the planes. • Creating to represent and convert the isometric view to orthographic view and orthographic view to isometric view.
		COMMUNICATIVE ENGLISH	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials

			• Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS-I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
		PROGRAMMING FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O

			operations.
I	**II**	**MATHEMATICS-II**	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
		APPLIED PHYSICS	• 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) • 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). • 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).
			• 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)
			• 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 & Josephson effect in superconductors (L2).
		OBJECT ORIENTED PROGRAMMING THROUGH JAVA	• 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 • Illustrate the basic principles of the object-oriented programming • Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming
		NETWORK ANALYSIS	• Gain the knowledge on basic network elements. • Will analyze the RLC circuits behaviour in detailed. • Analyze the performance of periodicwaveforms.

				• Gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g). • 5. Analyze the filter design concepts in real world applications.
			BASIC ELECTRICAL ENGINEERING	• Able to explain the operation of DC generator and analyze the characteristics of DC generator. • 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. • Ability to analyze the performance and speed – torque characteristics of a3-phase induction motor and understand starting methods of 3- phase induction motor. • Able to explain the operation of Synchronous Machines • Capability to understand the operation of various special machines.
II/IV (R19) B. Tech		**I**	**SWITCHING THEORY AND LOGIC DESIGN**	• An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. • An ability to understand the different switching algebra theorems and apply them for logic functions. • An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions. • Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays. • Students will be able to design various sequential circuits starting from flip-flop to registers and counters.
			Managerial Economics & Financial Analysis	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product. • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • Able to be aware of Types of Business Organizations and Phases of Business

			Cycle.
			• The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and to have the knowledge of different Business Units.
			• The Learner can prepare Financial Statements and the usage of various accounting tools for Analysis.
			• The Learner can be able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
		Electronic Device and Circuits	• Able to identify the properties of semiconductor material .Able to identify the properties of various semiconductor devices. To observe the V-I Characteristics of devices.
			• Students will gain on the applications of P-N Junction Diode.
			• Able to understand the basic principles of electronic device operation with emphasis on bipolar transistors.
			• Able to understand the basic parameters of electronic devices, their performance, and limiting factors
			• Able to Analysis and design of Electronic Circuits
		Object Oriented Programming through Java	• Illustrate the basic concepts of Java Programming
			• Illustrate the principles of Object Oriented Programming
			• Demonstrate an introductory understanding of Graphical User Interfaces(GUI)
			• Demonstrate an introductory understanding of IO programming
			• Demonstrate an introductory understanding of Multi Threading and Exception Handling
		Random Variables & Stochastic Processes	• Able to know the most important distributions and their characteristics.
			• Able to understand, analyze, and solve typical problems in operations on one random variable.
			• Able to know the distribution and density functions of multiple random variables and operations on multiple

			random variables. • An ability to characterize stochastic processes with an emphasis of stationary random processes. • An ability to characterize stochastic processes with an emphasis on stationary random processes. Able to know the response of linear system for random inputs.
		SIGNALS and SYSTEMS	• Differentiate the various classifications of signals and systems • Analyze the frequency domain representation of signals using Fourier concepts • Classify the systems based on their properties and determine the response of LTI • Systems. Know the sampling process and various types of sampling techniques • Apply Laplace and z-transforms to analyze signals and Systems (continuous &discrete).
		Electronic Circuit Analysis	• Student can able to design and analysis of small signal high frequency transistor amplifier using BJT and FET • Student can able to design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT • Student learn the effect of negative feedback on amplifier characteristics and design various feedback amplifier circuits • Student can able to derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept • Students understand the classification of

			the power and tuned amplifiers and their analysis with performance comparison
		COMPUTER ARCHITECTURE AND ORGANIZATION	- Student can understand the architecture of modern computers and able o analyze the performance of a computer using performance equation. - Students can evaluate the effective address of an operand by addressing modes and they can understand different instruction types. - Student can understand the concepts of input and output organization. - Ability to understand memory management system of computer. - Ability to understand the design of different control unit.
		LINEAR CONTROL SYSTEMS	- Understanding the concept of control systems, Representing Mechanical and Electrical Systems using Differential Equations and introduces the concepts of feedback and its advantages to various control systems.. - Obtaining Transfer Function of a servo motor and the performance metrics to design the control system in time-domain - Obtaining the location of roots of linear differential equations having real coefficients and commenting on stability. Locating roots in S-Domain and finding critical value of open-loop gain K for stability of system. - Students are able to comment on stability of a system from the given characteristic equation. They can locate roots in S-Domain and find critical value of open-loop gain K for stability of system using root locus. Analyzing the stability of the system in frequency domain and obtaining frequency domain specifications. - Compensating system performance using Lag, Lead and Lag-lead controllers and Analyzing the effect of proportionality controllers. Representing a control system using state equations.

		EM WAVES AND TRANSMISSION LINES	- Demonstrate and compute various parameters for transmission lines using either a smith chart or classical theory. - Design matching networks for loaded transmission lines. - An in depth analysis of electro static fields with help of Coulomb's Law &Gauss Law. - An in depth analysis of magneto static fields with help of Biot-Savart's Law and Ampere's Circuital Law & To Derive Maxwell Equations in Time Varying Fields. - Interpret the effects of lossy and low loss dielectrics and conductors upon the propagation of electromagnetic waves, and predict this process in specific applications & Able to demonstrate the reflection and refraction of waves at boundaries.
		Analog Communications	- Explain the basic elements of communication system, need for modulation and elaborately about amplitude modulation. - Describe the time and frequency domain representation, generation and demodulation of DSBSC, SSB and VSB modulation schemes. - Discuss the concepts of angle modulation. - Explain various issues in radio transmitters and receivers. - Describe pulse modulation schemes and estimate the noise in analog modulation schemes.
		COMPUTER ARCHITECTURE AND ORGANIZATION	- Student can understand the architecture of modern computers and able o analyze the performance of a computer using performance equation. - Students can evaluate the effective address of an operand by addressing modes and they can understand different instruction types. - Student can understand the concepts of input and output organization. - Ability to understand memory management system of computer. - Ability to understand the design of different control unit.

		Management and Organizational Behaviour	• After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure. • Students will familiarize with the concepts of functional management that is HRM and Marketing of new product developments. • The learner is able to think in strategically through contemporary management practices. • The learner can develop positive attitude through personality development and can equip with motivational theories. • The student can attain the group performance and grievance handling in managing the organizational culture.
III/IV B. Tech	**I**	**Computer Architecture and Organization**	• Students can understand the architecture of modern computer. • They can analyze the Performance of a computer using performance equation • Understanding of different instruction types. • Students can calculate the effective address of an operand by addressing modes • They can understand how computer stores positive and negative numbers. • Understanding of how a computer performs arithmetic operation of positive and negative numbers.
		Linear IC Applications	• Design circuits using operational amplifiers for various applications. • Analyze and design amplifiers and active filters using Op-amp. • Diagnose and trouble-shoot linear electronic circuits. • Understand the gain-bandwidth concept and frequency response of the amplifier configurations. • Understand thoroughly the operational amplifiers with linear integrated circuits.
		Digital IC Applications	• Understand the structure of commercially available digital integrated circuit families. • Learn the IEEE Standard 1076 Hardware Description Language

			(VHDL).
			• Model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping.
			• Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL
		Digital Communications	• Determine the performance of different waveform coding techniques for the generation and digital representation of the signals.
			• Determine the probability of error for various digital modulation schemes
			• Analyze different source coding techniques
			• Compute and analyze different error control coding schemes for the reliable transmission of digital information over the channel.
		Antenna And Wave Propagation	• Identify basic antenna parameters.
			• Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and microstrip antennas
			• Quantify the fields radiated by various types of antennas
			• Design and analyze antenna arrays
			• Analyze antenna measurements to assess antenna's performance
			• Identify the characteristics of radio wave propagation
		Professional Ethics and Human Values	• It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
			• It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.
III/IV B.Tech ECE	**II**	**Microprocessors And Microcontrollers**	• Student can understand basic microprocessors like 8086,its architecture, pins, in depth knowledge on 8086.
			• Student can understand programming the 8086, its addressing modes.
			• Student can understand the interconnections and interfacing of 8086

			with different systems
			• Ability to student can understand the advanced microprocessors like 80386 and 80486.
			• Student can understand 8051 architecture, pins, programming, interfacing devices and memory.
			• Ability to understand the operation of modern controllers like PIC
		MICROWAVE ENGINEERING	• Design different modes in waveguide structures
			• Calculate S-matrix for various waveguide components and splitting the microwave energy in a desired
			• direction
			• Distinguish between Microwave tubes and Solid State Devices, calculation of efficiency of devices.
			• Measure various microwave parameters using a Microwave test bench
		VLSI Design	• Understand the properties of MOS active devices and simple circuits configured when using them and the
			• reason for such encumbrances as ratio rules by which circuits can be interconnected in silicon.
			• Know three sets of design rules with which nMOS and CMOS designs may be fabricated.
			• Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.
		Digital Signal Processing	• Apply the difference equations concept in the anayziation of Discrete time systems
			• Use the FFT algorithm for solving the DFT of a given signal
			• Design a Digital filter (FIR&IIR) from the given specifications
			• Realize the FIR and IIR structures from the designed digital filter.
			• Use the Multirate Processing concepts in various applications (eg: Design of phase shifters, Interfacing of digital systems…)
			• Apply the signal processing concepts on DSP Processor.
		Bio-Medical	• Understand the origin of bio-potential

			Engineering (Open Elective)	and how to measure various physiological parameters from Human body. • Understand the principles involved in Electrodes and Transducers used to acquire different bio-potentials • Learn about the positioning and functioning of the cardiovascular system, measurement of parameters related to cardiology and Understand the basic knowledge about measurements of parameters related to Respiratory system • Gain knowledge about fundamental issues and elements of patient care in ICU and Organization of hospitals with quality care and Ability to understand diagnosis and therapy related equipments • Learn Ultrasound imaging techniques and its usefulness in diagnosis and different types of radio diagnostic techniques • 6. Understand the importance of patient safety against electrical hazard and functioning of Amplifiers, display devices and signal recorders
IV/IV B.Tech ECE (R16)	I	Radar Systems		• Derive the radar range equation and to solve some analytical problems. • Understand the different types of radars and its applications. • Understand the concept of tracking and different tracking techniques. • Understand the various components of radar receiver and its performance
		Digital Image Processing		• Perform image manipulations and different digital image processing techniques • Perform basic operations like – Enhancement, segmentation, compression, Image transforms and restoration techniques on image. • Analyze pseudo and full color image processing techniques. • Apply various morphological operators on images
		Computer Networks		• Understand OSI and TCP/IP models • Analyze MAC layer protocols and LAN technologies

			• Design applications using internet protocols • Understand routing and congestion control algorithms • Understand how internet works
		Optical Communications	• Choose necessary components required in modern optical communications systems. • Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers. • Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems. • Choose the optical cables for better communication with minimum losses Design, build, and demonstrate optical fiber experiments in the laboratory
		Electronic Switching Systems (Elective- I)	• Evaluate the time and space parameters of a switched signal • Establish the digital signal path in time and space, between two terminals • Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions. • Investigate the traffic capacity of the system. • Evaluate methods of collecting traffic data. • Evaluate the method of interconnecting two separate digital switches
		Embedded Systems (Elective – II)	• Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function. • The hardware components required for an embedded system and the design approach of an embedded hardware. • The various embedded firmware design approaches on embedded environment. • Understand how to integrate hardware and firmware of an embedded system using real time operating system.
		Network Security And Cryptography (Elective – II)	• To be familiarity with information security awareness and a clear understanding of

			- its importance. - To master fundamentals of secret and public cryptography - To master protocols for security services - To be familiar with network security threats and countermeasures - To be familiar with network security designs using available secure solutions (such as PGP, 5.SSL, IPSec, etc)
IV/IV B.Tech ECE (R16)	**II**	**Cellular And Mobile Communications**	- Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems. - Understand the frequency management, channel assignment strategies and antennas in cellular systems. - Understand the concepts of handoff and architectures of various cellular systems.
		Cellular And Mobile Communications	- Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems. - Understand the frequency management, channel assignment strategies and antennas in cellular systems. - Understand the concepts of handoff and architectures of various cellular systems.
		Electronic Measurements And Instrumentation	- Select the instrument to be used based on the requirements. - Understand and analyze different signal generators and analyzers. - Understand the design of oscilloscopes for different applications. - Design different transducers for measurement of different parameters.
		Satellite Communications	- Understand the concepts, applications and subsystems of Satellite communications. - Derive the expression for G/T ratio and to solve some analytical problems on satellite link design. - Understand the various types of multiple access techniques and architecture of earth station design. - Understand the concepts of GPS and its architecture.
		Wireless Sensors And Networks (Elective-III)	Importance of Wireless Sensor Networks and the challenges faced in designing Sensor nodes and Wireless

			Sensor Networks was understood
			• Topologies of PANs, MANETs and WANETs was understood.
			• Understood the issues in designing MAC protocols and different MAC protocols used in WSN.
			• Understood the issues in designing routing protocol for WSN and different routing protocols used in WSN.
			• Understood the issues in designing transport layer protocols for WSN.
			• Understood types of security attacks in WSN and also protocol providing security in wireless sensor networks. Understood sensor network platforms and tools and it's applications in our daily life.

Computer Science Engineering

YEAR	SEMESTER	SUBJECT	COS
I/IV (R20)	**I**	**APPLIED PHYSICS**	• Able to know the differences between interference, diffraction and polarization with its Engineering applications. • Able to understand the concepts of LASER and optical fiber. Apply these concepts in various Engineering and medical fields. • Able to identify the role of Quantum mechanics and Free electron theory to resolve various problems in microscopic level of matter. • 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.
		COMMUNICATIV E ENGLISH	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials • Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS-I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables

			in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
		PROGRAMMING FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O operations.
I	**II**	**MATHEMATICS-II**	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
		APPLIED CHEMISTRY	• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • 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.
			• (i) Synthesize nanomaterials for modern advances of engineering technology.
			• (ii) Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
			• (i) Analyze the principles of different analytical instruments and their applications.
			• (ii)Design models for energy by different natural sources
			• Obtain the knowledge of computational chemistry and molecular machines
		COMPUTER ORGANIZATION	• Demonstrate an understanding of the design of the functional units of a digital computer system.
			• Relate Postulates of Boolean algebra and minimize combinational functions
			• Recognize and manipulate representations of numbers stored in digital computers
			• Build the logic families and realization of logic gates.
			• Design and analyze combinational and sequential circuits
			• Identify, compare and assess issues related to ISA, memory, control and I/O functions.
			• Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components
			• Solve elementary problems by assembly language programming
		PYTHON PROGRAMMING	• Develop essential programming skills in computer programming concepts like data types, containers
			• Apply the basics of programming in the Python language
			• Solve coding tasks related conditional execution, loops
			• Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
		DATA STRUCTURES	• Summarize the properties, interfaces, and behaviors of basic abstract data types
			• Discuss the computational efficiency of the principal algorithms for sorting & searching

			• Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees
II/II (R19)	**I**	**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**	• Demonstrate skills in solving mathematical problems • Comprehend mathematical principles and logic • Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Manipulate and analyze data numerically and/or graphically using appropriate Software • Communicate effectively mathematical ideas/results verbally or in writing
		SOFTWARE ENGINEERING	• Ability to transform an Object-Oriented Design into high quality, executable code • Skills to design, implement, and execute test cases at the Unit and Integration level • Compare conventional and agile software methods
		PYTHON PROGRAMMING	• Develop essential programming skills in computer programming concepts like data types, containers • Apply the basics of programming in the Python language • Solve coding tasks related conditional execution, loops • Solve coding tasks related to the fundamental notions and techniques used in objectoriented programming
		DATA STRUCTURES	• Summarize the properties, interfaces, and behaviors of basic abstract data types • Discuss the computational efficiency of the principal algorithms for sorting & searching • Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees
		OOPS WITH C ++	• Classify object oriented programming and procedural programming • Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling • Build C++ classes using appropriate

			encapsulation and design principles • Apply object oriented or non-object oriented techniques to solve bigger computing problems
		COMPUTER ORGANISATION	• Develop a detailed understanding of computer systems • Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations • Develop a detailed understanding of architecture and functionality of central processing unit • Exemplify in a better way the I/O and memory organization • Illustrate concepts of parallel processing, pipelining and inter processor communication
II	**II**	**PROBABILITY AND STATISTICS**	● Classify the concepts of data science and its importance (L4) or (L2) ● Interpret the association of characteristics and through correlation and regression tools (L4) ● Make use of the concepts of probability and their applications (L3) ● Apply discrete and continuous probability distributions (L3) ● Design the components of a classical hypothesis test (L6) ● Infer the statistical inferential methods based on small and large sampling tests (L4)
		JAVA PROGRAMMING	• Able to realize the concept of Object Oriented Programming & Java Programming Constructs • Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords • Apply the concept of exception handling and Input/ Output operations • Able to design the applications of Java & Java applet • Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
		OPERATING SYSTEMS	• Describe various generations of Operating System and functions of Operating System • Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance • Solve Inter Process Communication problems using Mathematical Equations by

			various methods • Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques • Outline File Systems in Operating System like UNIX/Linux and Windows
		DATABASE MANAGEMENT SYSTEMS	• Describe a relational database and object-oriented database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
		FORMAL LANGUAGES AND AUTOMATA THEORY	• Classify machines by their power to recognize languages. • Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy • Employ finite state machines to solve problems in computing • Illustrate deterministic and non-deterministic machines • Quote the hierarchy of problems arising in the computer science
III	**I**	**COMPILER DESIGN**	• Acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer, and also able to use the Compiler tools like LEX, YACC, etc. • Parser and its types i.e. Top-down and Bottom-up parsers. • Construction of LL, SLR, CLR and LALR parse table. • Syntax directed translation, synthesized and inherited attributes. • Techniques for code optimization.
		UNIX PROGRAMMING	• Documentation will demonstrate good organization and readability. • File processing projects will require data organization, problem solving and research.

			• Scripts and programs will demonstrate simple effective user interfaces. • Scripts and programs will demonstrate effective use of structured programming. • Scripts and programs will be accompanied by printed output demonstrating completion of a test plan. • Testing will demonstrate both black and glass box testing strategies. • Project work will involve group participation.
		OBJECT ORIENTED ANALYSIS & DESIGN USING UML	• Ability to find solutions to the complex problems using object oriented approach • Represent classes, responsibilities and states using UML notation • Identify classes and responsibilities of the problem domain
		DATA BASE MANAGEMENT SYSTEMS	• Describe a relational database and object-oriented database. • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design. • Examine issues in data storage and query processing and can formulate appropriate solutions. • Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage. • Design and build database system for a given real world problem
		OPERATING SYSTEMS	• Design various Scheduling algorithms. • Apply the principles of concurrency. • Design deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Design and Implement a prototype file systems. • Perform administrative tasks on Linux Servers • Introduction to Android Operating System

			Internals
		PROFESSIONAL ETHICSAND HUMAN VALUES	• t gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties. • It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.
III	**II**	**COMPUTER NETWORKS**	• Understand OSI and TCP/IP models • ☐ nalyze MAC layer protocols and LAN technologies • Design applications using internet protocols • Understand routing and congestion control algorithms • Understand how internet works
		DATA WARE HOUSING AND DATA MINING	• Understand stages in building a Data Warehouse • Understand the need and importance of preprocessing techniques • Understand the need and importance of Similarity and dissimilarity techniques • Analyze and evaluate performance of algorithms for Association Rules. • Analyze Classification and Clustering algorithms
		DESIGN AND ANALYSIS OF ALGORITHMS	• Argue the correctness of algorithms using inductive proofs and invariants. • Analyze worst-case running times of algorithms using asymptotic analysis. • Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-andconquer algorithms. Derive and solve recurrences describing the performance of divideand- conquer algorithms. • Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm.

			Synthesize dynamicprogramming algorithms, and analyze them.
			• Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
		SOFTWARE TESTING METHODOLOGIE S	• Understand the basic testing procedures.
			• Able to support in generating test cases and test suites.
			• Able to test the applications manually by applying different testing methods and automation tools.
			• Apply tools to resolve the problems in Real time environment
		ARTIFICIAL INTELLIGENCE (Elective 1)	• Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
			• Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc).
			• Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).
			• Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports
		INTERNET OF THINGS (Elective 2)	• Demonstrate knowledge and understanding of the security and ethical issues of the Internet of Things
			• Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things
			• Develop critical thinking skills
			• Compare and contrast the threat environment based on industry and/or device type
		INTELLECTUAL	• IPR Laws and patents pave the way for

		PROPERTY RIGHTS AND PATENTS	innovative ideas which are instrumental for
			• inventions to seek Patents.
			• Student get an insight on Copyrights, Patents and Software patents which are
			• instrumental for further advancements.
IV	I	CRYPTOGRAPHY AND NETWORK SECURITY	• Be able to individually reason about software security problems and protection techniques on both an abstract and a more technically advanced level.
			• Be able to individually explain how software exploitation techniques, used by adversaries, function and how to protect against them.
		BIG DATA ANALYTICS	• Preparing for data summarization, query, and analysis.
			• Applying data modeling techniques to large data sets
			• Creating applications for Big Data analytics
			• Building a complete business data analytic solution
		WEB TECHNOLOGIES	• Outline the history of web and technologies that makes the web pages. Design web pages using the concepts of Html, CSS and JavaScript.
			• Acquire the concepts of XML, DTD and XML schemas
			• Learn AJAX and write simple client side scripts using AJAX
			• Build web applications using PHP by integrating PHP to databases.
			• Learn and create dynamic and interactive web pages using PERL.
			• Design dynamic websites with latest technical advancements in RUBY
		SOFTWARE ARCHITECTURE AND DESIGN PATTERNS (elective 1)	• To understand interrelationships, principles and guidelines governing architecture and evolution over time.
			• To understand various architectural styles of software systems.
			• To understand design patterns and their underlying object oriented concepts.

			• To understand implementation of design patterns and providing solutions to real world software design problems. • • To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.
		MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	• Equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand. • Ability to understand the Cost Concepts for decision making and to estimate the least Cost combination of inputs. • Acquire the knowledge of the nature of different markets and Price Output determination under various market conditions. • To evaluate various investment project proposals with the help of capital budgeting techniques for decision making. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
IV/IV	**II**	**DISTRIBUTED SYSTEMS**	• Demonstrate on the distributed systems basic concepts, challenges and system models • Explain interprocess communication mechanism, sockets, TCP & UDP Communication and representing multicast mechanism • Make them to analyze on distributed objects, remote method invocation and its implementation • Identify the operating system support and analyze processes & threads • Identify the operating system support and analyze processes & threads • Elaborate on transactions, concurrency control, distributed deadlocks, and replications
		MANAGEMENT SCIENCE	• Demonstrate various approaches to management • *Learn the principles and practices of

			operations management
			• Describe the dynamics of individual and interpersonal behavior in organizational setting through human resource management
			• Describe the dynamics of individual and interpersonal behavior in organizational setting through human resource management
			• Creating a better strategic management for organizational effectiveness
			• Gain the knowledge of contemporary management practices
		MACHINE LEARNING	• Relate the characteristics of machine learning algorithms and their applications to real world problems
			• Distinguish linear and logistic regressions
			• construct and evaluate hypothesis
			• Acquire the concepts of artificial neural networks
			• Apply kernel methods to solve real world problems.
			• Analyze Learn eager and lazy learners
		SOFTWARE PROJECT MANAGEMENT	• Demonstrate the Information System of Problem Solving and Critical Thinking
			• Elaborate Communication and Interpersonal Skills (C&IS), Ethical and Professional Responsibilities 3. Analyze Critical Thinking and Problem Solving, Communication, Values and Ethics.
			• Acquire a basics of the important theoretical concepts and practical skills related to modern deep learning techniques
		OPERATION RESEARCH (Elective - 3)	• Methodology of Operations Research. • Linear programming: solving methods, duality, and sensitivity analysis. • Integer Programming. • Network flows. • Multi-criteria decision techniques. • Decision making under uncertainty and risk. • Game theory. Dynamic programming.

Computer Science Engineering- Data Science

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I/IV (R20)	I	**Applied Chemistry**	• Able to analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • 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. • 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. • 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
		COMMUNICATIVE ENGLISH	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials • Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS-I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first

			order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
		PROGRAMMING FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O operations.
I	**II**	**MATHEMATICS-II**	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
		APPLIED PHYSICS	• 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)

- 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)
- 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).
- 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).
- 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)
- 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 & Josephson effect in superconductors (L2).

		DIGITAL LOGIC DESIGN	• A student who successfully fulfils the course requirements will have demonstrated: • An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. • An ability to understand the different switching algebra theorems and apply them for logic functions. • An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions. • Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays. • Students will be able to design various sequential circuits starting from flip-flop to registers and counters.
		PYTHON PROGRAMMING	• Develop essential programming skills in computer programming concepts like data types, containers • Apply the basics of programming in the Python language • Solve coding tasks related conditional execution, loops • Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
		DATA STRUCTURES	• Summarize the properties, interfaces, and behaviors of basic abstract data types • Discuss the computational efficiency of the principal algorithms for sorting & searching • Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees

Computer Science Engineering- Artificial Intelligence and Machine Learning

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I/IV (R20)	I	**Applied Chemistry**	• Able to analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • 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. • 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. • 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
		COMMUNICATIVE ENGLISH	• Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers • Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials • Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations • Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information • Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS-I	• Able to apply mean value theorems to engineering problems. • Able to gain knowledge on solving first

			order differential equations and its applications to various engineering fields. • Able to solve the higher order differential equations related to various engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
		PROGRAMMING FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O operations.
I	II	**MATHEMATICS-II**	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • 6. Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
I	II	**APPLIED PHYSICS**	• 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)

- 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).

- 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).

- 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)

- 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 &

			Josephson effect in superconductors (L2).
I	**II**	**DIGITAL LOGIC DESIGN**	• An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. • An ability to understand the different switching algebra theorems and apply them for logic functions. • An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions. • Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays. • Students will be able to design various sequential circuits starting from flip-flop to registers and counters.
I	**II**	**PYTHON PROGRAMMING**	• Develop essential programming skills in computer programming concepts like data types, containers • 2.Apply the basics of programming in the Python language • Solve coding tasks related conditional execution, loops • Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
I	**II**	**DATA STRUCTURES**	• Summarize the properties, interfaces, and behaviors of basic abstract data types • Discuss the computational efficiency of the principal algorithms for sorting & searching • Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees

Information Technology

YEAR	SEMESTER	SUBJECT	COS
I/IV (R20)	**I**	**APPLIED PHYSICS**	- Able to know the differences between interference, diffraction and polarization with its Engineering applications. - Able to understand the concepts of LASER and optical fiber. Apply these concepts in various Engineering and medical fields. - Able to identify the role of Quantum mechanics and Free electron theory to resolve various problems in microscopic level of matter. - 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.
		COMMUNICATIVE ENGLISH	- Able to facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers - Able to focus on appropriate reading strategies for comprehension of various academic texts and authentic materials - Able to help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations - Able to impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information - Able to provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
		MATHEMATICS-I	- Able to apply mean value theorems to engineering problems. - Able to gain knowledge on solving first order differential equations and its applications to various engineering fields. - Able to solve the higher order differential equations related to various

			engineering fields. • Able to use functions of several variables in optimization. • Able to apply the tools of calculus for calculating the areas and volumes using multiple integrals
		PROGRAMMING FOR PROBLEM SOLVING USING C	• Understanding basic building blocks of C-programming language. • Use different operators, data types and write programs that use two-way/ multi way selection & Select the best loop construct for a given problem • Demonstrate the use of different derived data types, Strings, structures and unions • Design and implement programs to analyze the different pointer applications • Explain various file handling mechanisms & Apply File I/O operations.
		MATHEMATICS-II	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • Evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • Apply numerical integral techniques to different Engineering problems (L3) • Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
		APPLIED CHEMISTRY	• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.

			- 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. - Synthesize nanomaterials for modern advances of engineering technology. - Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors. - Analyze the principles of different analytical instruments and their applications. - Design models for energy by different natural sources - Obtain the knowledge of computational chemistry and molecular machines
		COMPUTER ORGANIZATION	- Demonstrate an understanding of the design of the functional units of a digital computer system. - Relate Postulates of Boolean algebra and minimize combinational functions - Recognize and manipulate representations of numbers stored in digital computers - Build the logic families and realization of logic gates. - Design and analyze combinational and sequential circuits - Identify, compare and assess issues related to ISA, memory, control and I/O functions. - Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components - Solve elementary problems by assembly language programming
		PYTHON PROGRAMMING	- Develop essential programming skills in computer programming concepts like data types, containers - Apply the basics of programming in the Python language - Solve coding tasks related conditional execution, loops - Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

		DATA STRUCTURES	• Summarize the properties, interfaces, and behaviors of basic abstract data types • Discuss the computational efficiency of the principal algorithms for sorting & searching • Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees
III/IV (R16)	**I**	**HUMAN COMPUTER INTERACTION**	• Students are assessed on their ability to communicate and apply UCD methods in the capstone project course. Assessment includes examination of team reports and how HCI students can discuss challenges and solutions for adapting UCD methods to fit the practical needs of an actual project
		UNIX AND SHELL PROGRAMMING	• Documentation will demonstrate good organization and readability. • File processing projects will require data organization, problem solving and research. • Scripts and programs will demonstrate simple effective user interfaces. • Scripts and programs will demonstrate effective use of structured programming. • Scripts and programs will be accompanied by printed output demonstrating completion of a test plan. • Testing will demonstrate both black and glass box testing strategies. • Project work will involve group participation.
		ADVANCED JAVA PROGRAMMING	• Construct a Web Application using Servlets • Construct a Web application using Java Server Pages • Construct an enterprise application using Session Beans • Construct an enterprise application using Entity Beans linked with Database • Construct an asynchronous enterprise

			application using Message-Driven Beans
		DATA BASE MANAGEMENT SYSTEMS	• Describe a relational database and object-oriented database. • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization f or database design. • Examine issues in data storage and query processing and can formulate appropriate solutions. • Understand the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage. • Design and build database system for a given real world problem
		OPERATING SYSTEMS	• Design various Scheduling algorithms. • Apply the principles of concurrency. • Design deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Design and Implement a prototype file systems. • Perform administrative tasks on Linux Servers • Introduction to Android Operating System Internals
III/IV (R16	**II**	**COMPUTER NETWORKS**	• Understand OSI and TCP/IP models • Analyze MAC layer protocols and LAN technologies • Design applications using internet protocols • Understand routing and congestion control algorithms • Understand how internet works
		DATA MINING	• Understand stages in building a Data Warehouse • Understand the need and importance of preprocessing techniques • Understand the need and importance of Similarity and dissimilarity techniques

			• Analyze and evaluate performance of algorithms for Association Rules. • Analyze Classification and Clustering algorithms
		WEB TECHNOLOGIES	• Analyze a web page and identify its elements and attributes. • Create web pages using XHTML and Cascading Styles sheets. • Build dynamic web pages. • Build web applications using PHP. • Programming through PERL and Ruby • Write simple client-side scripts using AJAX
		SOFTWARE TESTING METHODOLOGIES	• Understand the basic testing procedures. • Able to support in generating test cases and test suites. • Able to test the applications manually by applying different testing methods and automation tools. • Apply tools to resolve the problems in Real time environment.
		ARTIFICIAL INTELLIGENCE (Open Elective)	• Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem. • Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, as a Markov decision process, etc). • Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming). • Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.
		SOCIAL NETWORKS AND SEMANTIC WEB (Open Elective)	• Able to represent data from a chosen problem in XML with appropriate semantic • Tags obtained or derived from the

			ontology Able to understand the semantic
			• relationships among these data elements using
			• Resource Description Framework (RDF) Able to design and implement a web services
			• application that "discovers" the
			• Data and/or other web services via the semantic web Able to discover the capabilities and limitations of semantic web technology for social networks
		DIGITAL SIGNAL PROCESSING (Open Elective)	• an ability to apply knowledge of Mathematics, science, and engineering
			• an ability to design and conduct experiments and interpret data
			• an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
			• an ability to function as part of a multi-disciplinary team
		EMBEDDED SYSTEMS (Open Elective)	• Program an embedded system
			• Design, implement and test an embedded system.
			• Identify the unique characteristics of real-time systems
			• Explain the general structure of a real-time system
			• Define the unique design problems and challenges of real-time systems
		ROBOTICS (Open Elective)	• The Student must be able to design automatic manufacturing cells with robotic control Using
			• The principle behind robotic drive system, end effectors, sensor, machine vision robot Kinematics and programming.
		OPERATION RESEARCH (Open Elective)	• Methodology of Operations Research.
			• Linear programming: solving methods,

			duality, and sensitivity analysis.
			• Integer Programming. • Network flows. • Multi-criteria decision techniques. • Decision making under uncertainty and risk. • Game theory. Dynamic programming.
IV	I	**CRYPTOGRAPHY AND NETWORK SECURITY**	• To be familiarity with information security awareness and a clear understanding of Its importance. • To master fundamentals of secret and public cryptography • To master protocols for security services • To be familiar with network security threats and countermeasures • To be familiar with network security designs using available secure solutions (such asPGP, SSL, IPSec, etc)
		MOBILE COMPUTING	• Able to think and develop new mobile application. • Able to take any new technical issue related to this new paradigm and come up with a solution(s). • Able to develop new ad hoc network applications and/or algorithms/protocols. • Able to understand & develop any existing or new protocol related to mobile environment
		DATA WAREHOUSING AND BUSINESS INTELLIGENCE	• Describe the scope and application of business intelligence and decision support; • Design systems for sourcing and structuring data to provide an integrated, non-volatile collection of data for decision support using data warehouses; • Design multidimensional data models and implement them using star schemas and relational databases; • Communicate and foster realistic expectations of the role of OLAP technology and business intelligence systems in management and decision

			• support;
			• Explain the need for evolutionary development approaches to developing business intelligence and data warehouse systems;
			• Develop a simple business intelligence system using an OLAP tool;
			• Apply theories and principles of data visualization to encourage high quality analysis of business information to inform decision making;
			• Design governance mechanisms for the development and management of business intelligence and data warehouse systems in an organization.
		MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities
			• for a product and the knowledge of understanding of the Input-Output-Cost relationships and
			• estimation of the least cost combination of inputs.
			• One is also ready to understand the nature of different markets and Price Output determination
			• under various market conditions and also to have the knowledge of different Business Units.
			• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
		BIG DATA ANALYTICS (Elective - 1)	• Preparing for data summarization, query, and analysis.
			• Applying data modeling techniques to large data sets
			• Creating applications for Big Data analytics
			• Building a complete business data

			analytic solution
		INFORMATION RETRIEVAL SYSTEMS	• dentify basic theories in information retrieval systems • dentify the analysis tools as they apply to information retrieval systems • Understands the problems solved in current IR systems • Describes the advantages of current IR systems • Understand the difficulty of representing and retrieving documents. • Understand the latest technologies for linking, describing and searching the web.
		INTERNET OF THINGS	• Demonstrate knowledge and understanding of the security and ethical issues of the • Internet of Things • Conceptually identify vulnerabilities, including recent attacks, involving the Internet of Things • Develop critical thinking skills • Compare and contrast the threat environment based on industry and/or device type
		MULTIMEDIA PROGRAMMING	• Ability to design a short films and teaching material for better understanding. • Ability to apply different multimedia development tools to produce web based and stand-alone user interfaces.
		CLOUD COMPUTING (Elective-II)	• Understanding the key dimensions of the challenge of Cloud Computing • Assessment of the economics , financial, and technological implications for selecting cloud computing for own organization • Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications. • Assessment of own organizations' needs for capacity building and training in

			cloud
			• computing-related IT areas
		SOFTWARE PROJECT MANAGEMENT	• To match organizational needs to the most effective software development model
			• To understand the basic concepts and issues of software project management
			• To effectively Planning the software projects
			• To implement the project plans through managing people, communications and change
			• To select and employ mechanisms for tracking the software projects
			• To conduct activities necessary to successfully complete and close the Software projects
			• To develop the skills for tracking and controlling software deliverables
			• To create project plans that address real-world management challenges
		MACHINE LEARNING	• Recognize the characteristics of machine learning that make it useful to real-world problems
			• Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
			• Have heard of a few machine learning toolboxes.
			• Be able to use support vector machines.
			• Be able to use regularized regression algorithms.
			• Understand the concept behind neural networks for learning non-linear functions.
		DECISION SUPPORT SYSTEMS	• Recognize the relationship between business information needs and decision making
			• Appraise the general nature and range of decision support systems
			• Appraise issues related to the development of DSS

			• Select appropriate modelling techniques
IV	II	**DISTRIBUTED SYSTEMS**	• Develop a familiarity with distributed file systems. • Describe important characteristics of distributed systems and the salient architectural features of such systems. • Describe the features and applications of important standard protocols which are used in distributed systems. • Gaining practical experience of inter-process communication in a distributed environment
		MANAGEMENT SCIENCE	• *After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior. • *Will familiarize with the concepts of functional management project management and strategic management.
		MANAGEMENT INFORMATION SYSTEMS	• MIS brings to the notice of the management strength (i.e., strong points) of the organization, to take advantage of the opportunities available. • MIS reports on production statistics regarding rejection, defective and spoilage and their effect on costs and quality of the products.
		CONCURRENT AND PARALLEL PROGRAMMING (Elective - III)	• Understanding improvement of CPP concepts presented • The number of reinforcement–exercises assigned • The time required for the resolution of exercises • Compliance level with the new model of theoretical teaching
		CYBER SECURITY	• Cyber Security architecture principles • Identifying System and application security threats and vulnerabilities • Identifying different classes of attacks • Cyber Security incidents to apply appropriate response • Describing risk management processes

			and practices
			• Evaluation of decision making outcomes of Cyber Security scenarios
		ARTIFICIAL NEURAL NETWORKS	• This course has been designed to offer as a graduate-level/ final year undergraduate level elective subject to the students of any branch of engineering/ science, having basic foundations of matrix algebra, calculus and preferably (not essential) with a basic knowledge of optimization.
			• Students and researchers desirous of working on pattern recognition and classification, regression and interpolation from sparse observations; control and optimization are expected to find this course useful. The course covers theories and usage of artificial neural networks (ANN) for problems pertaining to classification (supervised/ unsupervised) and regression.
			• The course starts with some mathematical foundations and the structures of artificial neurons, which mimics biological neurons in a grossly scaled down version. It offers mathematical basis of learning mechanisms through ANN. The course introduces perceptrons, discusses its capabilities and limitations as a pattern classifier and later develops concepts of multilayer perceptrons with back propagation learning.
		SOFTWARE QUALITY ASSURANCE	• Describe different approaches to testing software applications
			• Analyze specifications and identify appropriate test generation strategies
			• Develop an appropriate test design for a given test object

Masters of Business Administration

YEAR	SEMESTER	SUBJECT	Course Outcomes
I	**I**	**Management and Organizational Behaviour**	• student has learned about Evolution of Management thought Scientific management, administrative management, Haw throne experiments systems approach Levels of Management Managerial Skills • student has gained knowledge on Principles of organizing ,Organization Structure and Design ,Types of power , Delegation of Authority and factors affecting delegation , Span of control , Decentralization , Line and staff structure conflicts • obtained knowledge on Organizational behavior: Nature and scope , Linkages with other social sciences , Individual roles and organizational goals , perspectives of human behavior , Perception, perceptual process • student has learned about Content and process Theories of Motivation , Leadership - Styles , Approaches ,Challenges of leaders in globalized era , Groups ,stages formation of groups , Group Dynamics • student has learned about Organizational conflict-causes and consequences-conflict and Negotiation Team Building, Conflict Resolution in Groups and problem solving Techniques
		Managerial Economics	• know the economy and its principles. • understand the relationship between the demand supply • learn the types of production and its factors. • To understand the cost concepts, relationship between cost, volume and profit • To know the market atructure and pricing theories.
		Accounting for Managers	• Acquaint the knowledge about accounting process • focus on analysis of Financial Statements • gain knowledge about Inventory issue methods • obtain knowledge about Management

			• accounting applications • Focus on standard costing tools & Break Even Analysis
		Quantitative Techniques for Business Decisions	• the concepts of basic mathematical and statistical techniques are learned which are used in business studies • equipped with statistical decision theory applied in business studies • knowledge on analyising linear programming problems are learned • understand the concepts of assingnment & transportment models • the techniques of networking models are learned
		Legal and Business environment	• Determine the meaning of Business Environment and its significance • Acquaint the knowledge of Political & Economic Environment • Gain knowledge on Legal Environment specially to Indian Context • Obtain the knowledge of Indian Partnership Act 1962 • Focus on miscelleanious acts of Indian Context
		Business Communication and Soft Skills	• uptained knowledge of objectives of communication • Acquaint the knowledgeinterpersonal and intrapersonal communication theories • Obtain the knowledge etiquettes of interview • equipped with business correspondence letters • uptained knowledge of interview techniques for group discussion
		Cross Cultural Management	• understand the concepts of cross culture dimensions • obtain knowledge about communication strategy fot indian MNC/foregin MNC • acquaint knowledge of negotiation overview with two illustations from multicultural contexts • acquaint knowledge of staffing and training for global operations ,expatriates • understand the concepts of desining the stretegy for a culture change building

I	II	Financial Management	• gain knowledge about concepts of financial management • obtain knowledge about Capital structure theories • understand the Investment decision process & its tools • understand the theories of Dividend • acquaint knowledge of Working Capital Cycle.
		Human Resource Management	• undestand the base concept of HRM and its significance in the organisation • undestand the investment perspectives of HRM(Training and Development) • understand the concepts of Performance Appraisal: Importance – Methods – Traditional and Modern methods – Latest trends in performance appraisal • Enhanced knowledge and skills to Wage Structure- Wage and Salary Policies • Gain the knowledge on Employee Participation Schemes, Grievances and disputes resolution mechanism
		Marketing Management	• understand the concepts of marketing. • Gain the knowledge on market segmentation. • Understand the concepts of pricing and price changes • Gain the knowledge on promotion activities. • Evoluation of marketing department.
		Operations management	• Gain knowledge on Operations Management & its scope • acquaint knowledge on Product Process & Design • gain the knowledge on Forecasting & Capacity Planning • Understand the Productivity & influencing factors • Gain the knowledge on Quality management
		Business Research Methods	• enhanced knowledge and skills to carry out research for business • better awarness on data collection techniques, measurement and scaling • gained knowledge in preparation and presentation of research report • equipped student with statistical

			techniques
			• students were in a position to use multivariate techniques
		Technology management	• Student has learned about Evolution of Technology-Effects of New Technology- Technology Innovation, Invention,Innovation, Diffusion, Revolutionary and Evolutionary Innovation- Product and Process Innovation , Strategic Implications of Technology • Student has gained knowledge on Technology Assessment- Technology Choice Technological Leadership and Followership Technology Acquisition Technological Forecasting- Exploratory, Intuitive, Extrapolation, Growth Curves, Technology Monitoring • obtaibned knowledge on Diffusion of Technology Rate of Diffusion; Innovation Time and Innovation Cost Speed of Diffusion Technology Indicators Various Indicators- Organizational Implications of Technology • Student has learned abFinancial Aspects in Technology Management- Improving Traditional Cost Management System Barriers to the Evaluation of New Technology Social Issues in Technology Management • learner has got knowlede on Human Aspects in Technology Management- Integration of People and Technology Organizational and Psychological Factors
II	I	**Strategic Management**	• Gain knowledge about Vision, Mission and Objectives of the Organisation. • Acquaint the student with knowledge about strengths, weakness, opportunities and threats of the organization. • Understand about framing of Strategy at various levels. • Acquaint the student with knowledge about structures of organization and its impact on Strategy. • Obtain knowledge of Evaluation of strategy and its control.
		Operations Research	• To acquaint the students with basic knowledge of the overview of Operations Research

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

			planning in Indian context are understood.
		Human Capital Management	• To know the Basic Economic Theories in Human Capital • To gain knowledge related to different Accounting aspects of Human Capital • To understand an assess existing theories and practices in the field of Human capital management • To understand the concept of Quality of workers work life in Human Capital Management • To learn about Industrial Accidents and Safety precautions in Industries.
		Manapower Planning, Recruitment & Selection	• To know the meaning of Human Resource Planning, various factors and techniques affects demand and supply of HRP. • To understand the various human resource distribution mapping and usage of downsizing strategies • To learn the nature and process of job analysis and job design. • To know the importance, methods of recruitment and selection and barriers to effective selection. • To focus on steps involved in training and development and Requisites of Effective Training programs.
		Investment Analysis and Portfolio Management	• To acquaint the student with basic knowledge of Investment, speculation and Investment Process • Gain knowledge about Risk, Return and Shares • To understand tools and techniques of Fundamental and Technical Analysis. • To understand about the elements of Portfolio Management and evaluation of securities • To acquaint knowledge on evaluation of securities through Sharpe and Markowitz Models.
		Managing Banks and Financial Institutions	• Acquaint the knowledge on Banking & Indian Financial System • Focus on uses of bank funds & Non-Performing Assets • Acquaint concepts of Banking Innovations • Equipped the knowledge on Insurance in India

			• Gain knowledge on Life & General Insurance in India
		Financial Markets & Services	• To Create the awareness on RBI and SEBI • To understand various financial services in India • Able to learn Venture Capital Financing • To understand rating of the customers • To know the need of Micro Finance.
		Taxation	• Able to know the basics of Tax, Tax on agricultural income & Income Tax Act. • Understand all about the Central Value Added Tax (CENVAT) • Able to know Tax Plannings and its Principles • Learner understand the Elements of Tax considerations, tax management and tax decisions • Understand about the International Taxation system and legal aspects.
		Hospital Organization & Management	• To know the Role of a professional manager in a Hospital • To understand the Managerial functions in a hospital • Able to understand the Behavioural concepts and theories • Understands the concept of Organization structure and planning process • To learn Organizational climate and social responsibility
		Health Care Policies and Delivery systems	• Gain Knowledge about concepts Internal and External Environment and Environmental Scanning • Understand the Conceptual Approach to the Health Care Systems • Gain the sound knowledge on Overview of Health care sector in India • Acquaint knowledge of Health Care Regulations and other Health care Delivery Systems. • Able to correlate the relationship Descriptive, Analytical and Experimental Epidemiology
		Hospital Functions and Support Services	• Knowledge on various services providing by the hospitals are gained • Understood about different departments involved in maintenance of civil assets and facilities providing by the hospitals.

			• Known about the CSS department, importance of energy conservation and its methods. • In depth knowledge on ambulance, mortuary and security services are gained. • Equipped knowledge on supportive services and disaster management.
		Revenue Cycle Management	• To know the Meaning and scope of patient care services, Role and functions of Administrator in hospitals and classification of Hospital. • To understand the various front office services for in-patient, out-patient and accident and emergency services. • To learn the various types of Lab services are Radiology and Imaging services, Rehabilitation services and blood bank services. • To know the importance of Operation theatre, types of Operation theatre and ICU service provided by hospitals. • Focus on quality patient care services and hospital accreditation.
		Supply Chain Management & Analytics	• Obtain knowledge on basics of SCM and its drivers • Learner is able to understand tools of supply chain analysis and MRP • Understand the Management of different algorithms relevant to Supply chain • Equip with various concepts of value adding in Supply chain • Gain knowledge on implementation of Supply chain in various industries in practical manner.
II	**II**	**Innovation & Entrepreneurship**	• Able to understand meaning, scope and importance of entrepreneurship development. • Students obtained the knowledge of creativity & Entrepreneurial plan • Students are able to plan & execute the operation problems • Able to understand Family & non-family entrepreneurs • Able to understand the Innovation & Management
		Labour Welfare & Employment Laws	• Obtain knowledge on Labour welfare. • Learner is able to understand Statutory & Non-statutory labour welfare programmes.

			• Understand the Labour Legislation. • Equip with Industrial Relations Legislation • Gain knowledge on various acts pertaining to Social Security Legislations.
		International HRM	• To gained knowledge on the Concepts of a Global HR Perspective in New Economy- Challenges of Globalization - Implications of Managing People and Leveraging Human Resource • To attained The concepts of Strategies - International assignments forWomenProblems. • To gained knowledge in Cross Culture Communication and Negotiation, CrossCultureTeams. • To understood The concepts of Compensation Management:Importance, Concepts- Trends, Issues, Methods, FactorsofConsideration–Models • To gained knowledge on Analysis of Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working LifeandProductivity
		Human Resource Development	• To know the meaning, need, scope of Human Resource Development, various functions and techniques affects HRD. • To understand the various human resource development strategies, designing training and development and methods of implementation. • To understand the various human resource development strategies, designing training and development and methods of implementation. • To learn the methods for reducing employee stress and providing wellness and health promotions and career planning. • Focus on steps involved in HRD for innovation, Ethical problems with HRD roles for various workers.
		Strategic HRM	• To Gained the Concepts of Importance of Human Resources to Strategy- Human Resources contribution to strategy • Understood The concepts of Strategies - Efficient utilization of Human resources -

			• Dealing with employee surpluses and shortages • The gained knowledge in Oriented performance measurement systems - Strategically oriented compensation system • The attained The concepts of Building core competencies through Human Resource Development - Competency mapping approaches • Understood the Analysis of Strategic Frame Work of Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas and emerging areas
		Financial Derivatives	• Student has learned about the basics of risk management and different types of risks. • The students has gained knolwedge on Value of Risk, Cash flow risk, Asset liability Management • Student has learned about Derivatives and its types. • Learner has understood about Swaps & its types • Student has learned about the Options, Binomial Option Pricing Model.
		Global Financial Management	• Obtain knowledge on Globalization & MNC's • Learner is able to understand Exchange & Interest rate exposures • Understand the Management of Global Business Operations • Equip with International Investment Decisions • Gain knowledge on Global Indebtedness
		Financial Risk Management	• Obtain knowledge on Risk Management framework • Learner is able to understand tools of measuring Risk • Understand the Management of risk in corporate • Equip with regulatory bodies for various markets • Gain knowledge on various models of Risk management
		Strategic Financial Management	• To know the theories of share holders value creation. • To learn Corporate Financial strategies

			• To understand the techniques of Investment Strategies • To know the Corporate Financial Engineering • To understand Corporate Restructuring.
		Patent Care & Service Management	• To know the Meaning and scope of patient care services, Role and functions of department managers in enhancing care and risk management. • To understand the various Systems approach towards quality improvement for various patients. • To know the various types of patients and innovative methods for classifying patients. • To learn the important ethical principles of patient and hospital negligence in the form of Patient appeals, Autopsy, Tort liability, vicarious liability and different types of patient protection laws. • To understand basic Policies & procedures for maintaining medical records and general procedure for patient safety.
		Managed Health Care & Insurance	• To know the concepts of Life and Health Insurance • To understand the concept of Health Insurance Policies in India • Able to know the Adminsitration of Health Insurance Policies • Acquainted with Taxation of Health Insurance • Understood the Regulations of Health Insurance Policies in India.
		Health laws, Ethics & Regulations	• Acquainted knowledge of Laws relating to Hospital formation, Promotion • Gain the sound knowledge on Laws relating Purchases and funding, Laws pertaining to Health. • Acquaint knowledge of Laws pertaining to Hospitals Medical Negligence,Medico Legal Case • Understood the Concep of Medical Terminology,Glossary of medical terms • Equippped with applications of Maintaining Medical Records, Medical Registers, Statutory records.
		Hospital Management,	• The impact of overflow of information

		Information System	on people and future of health care technology is understood. • The knowledge on health records, various advanced technologies using to store health records and its usefulness is attained. • The concept of securing information, different phases of system Development Life Cycle, and projects are understood. • The information about the key devices, technologies to communicate the information and to access the information are known. • Got aware of telehealth, advanced technologies available to protect public health.

Integrated Masters in Business Administration

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I	I	**English language-1**	• To make the students understand humour and the contributions of Mokshagundam to build modern india, The students also develop their LSRW skills. • To make the students aware of Polymer currency and inspire them with the unique journey of Helen Keller. • To make the students aware of Man-made disasters and how to prevent and prepare for them. They learn about the South Indian small town life through R.K. Narayan's work • The students gain awareness about human values and ethics which contain the core values of our education policy and also experience the pathos in the story The Last Leaf. • Students learn about the importance of sports and how they can improve their health and also the motivating speech from technocrat Narayanamurthy of Infosys.
I	I	**Business Mathematics and statistics**	• to equip students the knowledge of basic mathematical techniques • to understand the concepts of matrices in business studies • to recollect the knowledge of statistics • to provide better knowledge on probability theory • to enhance the understanding of bi variate statistical techniques
I	I	**Fundamentls Of Business organisation**	• To understand the concepts of business • To know the responsibilities , source of finance for an entreprenuier • To understand various types of business • To find out the difference between public and private companies. • To know how to commence the business.

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

I	II	**Financial Acconting -2**	• To understand basics of accounting • To know the accounting forms for Inventory management • Able to know the basic awairness on cashflow and funds flow statements • able to get basic awairness on accounting standards • Able to know the various aspects of financial reporting
I	II	**Organisational Comminication**	• To understand basics of Objective of Communication – The Process of Human Communication • To understand basics of techniques of presentation – types of presentation – • To understand the basic– Models for Inter Personal Communication - ExchangeTheory • students able to know about the – Barriers of Communication – Gateways to Effective Interpersonal Communication. • students able to know about the Essentials of Effective Business Correspondence, Business Letter and Forms, Meeting, Telephone Communication –
II	I	**Principles of Management**	• Interpret basic concept and theories of management • Outline plan and different organizational structures • Classify different leadership style in cross culture environment • Develop rationale decision making and problem solving abilities. • Cite contemporary isssues and approaches to management
I	I	**Cost Accounting**	• Learner has got awairness on Management accounting vs Cost accounting role of accounting information in planning and control, cost concepts and managerial use of classification of costs • students able to know about the Direct and Indirect expenses, allocation and apportionment of overheads, calculation of machine hour rate and labour hour rate

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

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

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

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

			limitations of DSS
IV	I	**Knowledge management**	• Describe the major roles and responsibilities in knowledge management implementations • Describe how valuable individual, group and organizational knowledge is managed throughout the knowledge management cycle • Understand and apply various success factors of knowledge management implementations • Apply appropriate systems and tools for Knowledge Mapping Techniques • Understand and apply various concepts like information technology , E-Commerce, TQM, & Benchmarking in knowledge
IV	I	**Strategic Cost Management**	• Understand the Cost management and International Issues in Cost Management • Describe the Process of Strategic Cost Audit • Equip the Strategic Cost Management & its framework • The Learner will outlines the Balanced Score Card, Strategic based responsibility accounting • Able to get knowledge on Quality aspects of Cost Management
IV	I	**Human Resource Planning**	• The learner will outline the History of HRM and HR Policies and Strategies. • The learners can list and define the Human Resource Planning role and responibilities of HR • able to understand the HRP Process outline and Productive Statistics in Micro Level HRP. • The learner can able to gain the knowledge on Recruitment Selection and Induction • can able to focus on Training and Performance Appraisal

IV	I	**Security Analysis**	• Able to understand about Investment Vs Speculation, Investment alternatives - Investment Process - Sources of Investment Information and basics of secondary markets • students has understood about Preference Shares and Equity Shares Earning valuation-Cash flow valuation,Asset Valuation , Dividend,discount model; Valuation of Bonds , Bond Returns and Risks -Bond Pricing Theorems convexity • student has got awairness on Fundamental Analysis , Economy, Industry and Company Analysis, Technical Analysis , Dow Theory, Elliot Wave Theory , Trends and Trend Reversals , Efficient Market Theory • students has understood about Risk and Returns Security Analysis, Economic Analysis , Security Analysis and Investment • Able to understnad Importance of Industry Analysis ,Classification of Industries , Key Indicators in Analysis , Analytical Frame Works
IV	I	**Leadership Management**	• Determine the meaning of leadership and its importance • Outline motivational theories and cultural dimensions • Correlate leadership with learning and attitude • Determine the factors necessary developing leadership • Focus on leadership styles in other countries
IV	I	**Banking and insurance Management**	• Understand indian financial system • Focus on indian banking practices • understand innovative banking systems in india. • Outline the indian life insurance practice • understand the concepts of LIC and GIC

IV	I	Compensation and Reward management	• able to understand the outline of compensation • able to get awareness about compensation structure • able to get the clear view about wage and salary administration • able to know about types of workers and wage analysis • to gain the knowledge about pay structure and importance tax planning in compensation structure
IV	I	Advanced Management Accounting	• Gain Knowledge on International Accounting Standards • Obtained knowledge on Analysis of Financial statements • Gain knowledge on preparation of functional budgets • Equippped with applications of marginal costing • understand applications of break even analysis
IV	II	Total Quality management	• able to gain the knowledge about the need ofor ISO 9000-2000 Quality system • to identify the needs of customer and satisfy their needs • apply appropriate tools and strategies of quality in TQM • to provide information and understand the deployment of quality circles and performance measures • able to gain the knowledge about the need of or ISO 9000-2000 Quality system
IV	II	Project management	• The learner will understands the basics of Project characteristics, Screening of the Projects • Able to understand the different Tax Incentives & Tax Planning • Gain the sound knowledge on Project Appraisal techniques and Social cost benefit analysis • understands the Cost estimate for the Projects & Risk Analysis • The learner able to know the Project Evaluation and Auditing of the Projects.

IV	II	**Performance Management**	• The learner will outline the Over view of performance management • The learners can define the Performance Management Planning • able to understand the Management System: objectives – Functions- Phases of Performance Management System • The learner will able to gain the knowledge on Performance Monitoring and Counseling • The learner will able to focus on Performance management skills
IV	II	**Strategic Financial Management**	• Decribe the meaning and concept of strategic financial management and corporate policy • Explain the concept of corporate financial strategies • Distinguish between net present value and rate of return. • Compare and contrast corporate financial engineering concepts • Research on corporate restructuring.
IV	II	**Strategic Human Resource management**	• The learner will outline the Importance of Human Resources to Strategy- Human Resources contribution to strategy • The learner will able to gain the knowledge on Efficient utilization of Human resources • To gain the knowledge about Reward and Development Systems Strategically oriented performanceT • Able to understand theThe learner will able to gain the knowledge on Organizing and structuring of Human Resource Development in an organization Building core competencies through Human Resource Development • The learners can define the Approaches to evaluation, Evaluation Strategic contributions of Traditional Areas
IV	II	**Portfolio management**	• student has understood about Elements of Portfolio Management, Portfolio Models , Markowitz Model, Efficient Frontier and Selection of Optimal Portfolio. • student has got awairness on Performance Evaluation of Portfolios; Sharpe Model , Jensen's Model for PF Evaluation, Evaluation of Mutual Fund • obtained knowledge on Neural Networks

			,Artificial Neural Networks , Fuzzylogic , Behavioral Models , .Portfolio Management • student has understood about Characteristics of Derivatives Derivatives Trading Hedging Portfolio Rebalancing Introduction of Futures • student has got awairness on The Indian Connection with Commodity Market Commodity and Currency Derivatives Legal Frame Work Policy Liberization
IV	II	**Organisational development and Change management**	• gain the knowledge on importance of change management • obtain the knowledge on mapping change • able to learn about OD interventions • provide awareness about negoitated change • understand the importance of team building
IV	II	**Financial Markets and Servicies**	• Gain knowedge on Indian Capital Market & Money Market issues • Able to understand the Regulatory framework of Financial Services • Understand the concept of Venture Capital and its growth in India • Acquaint knolwedge on Credit Rating Agencies in India • The learner able to understand the classfication & evaluation of Mutual Funds.
V	I	**Corporate Governance**	• Able to understand meaning, scope and importance of Corporate Governance • students obtained the knowledge of Board of Directors, Duties & responsibilities of auditors. • Students are able to plan and execute the models of governance, obligations towards stake holders. • Able to understand Importance of Corporate Governance & Stake holders • Able to understand the capabilities& responsibilities of directors, corporate social responsibility.

V	I	**Intellectual Property Rights**	• Acquainted knowledge of Laws Relating to IPR and the Agencies Responsible to IPR Registration • Gain the sound knowledge on Copyrights and Neighboring Rightsand Law Relating to Copyrights • Acquaint knowledge on Laws Relating to Patents in India,New developments in Patents. • Understood the Concep of Trademarks Claims and Infringement,Remedies. • Acquainted knowledge on Cyber Law and Cyber Crime, Liability of Network Providers.
V	I	**Risk Management**	• Obtain knowledge on Risk Management framework • Learner is able to understand tools of measuring Risk • Understand the Management of risk in corporate • Equip with regulatory bodies for various markets • Gain knowledge on various models of Risk management
V	I	**Global Financial Management**	• Obtain knowledge on Globalization & MNC's • Learner is able to understand Exchange & Interest rate exposures • Understand the Management of Global Business Operations • Equip with International Investment Decisions • Gain knowledge on Global Indebtedness
V	I	**Tax Management**	• Able to know the basics of Tax, Tax on agricultural income & Income Tax Act. • Understand all about the Central Value Added Tax (CENVAT) • Able to know Tax Plannings and its Principles • Learner understand the Elements of Tax considerations, tax management and tax decisions • Understand about the International Taxation system and legal aspects.
V	I	**Global HRM**	• To gained knowledge on the Concepts of a Global HR Perspective in New Economy-Challenges of Globalization - Implications of Managing People and Leveraging Human Resource

			• To attained The concepts of Strategies - International assignments forWomen Problems. • To gained knowledge in Cross Culture Communication and Negotiation, Cross CultureTeams • To understood The concepts of Compensation Management:Importance, Concepts- Trends, Issues, Methods, Factors of Consideration–Models • To gained knowledge on Analysis of Strategic Frame Work of HRD and Challenges - Globalization and Quality of Working Life and Productivity
V	I	**Management of Industrial Relations**	• To Understand the basics of Industrial Relations • Able to know the Trade Unions Act, 1926. • To acquaint the knowledge on Quality of Work Life. • To know the concepts of Social Security Measures in India • To understand the Employee Grievances and Seettlement of Industrial disputes.
V	I	**Labour Welfare Legislation**	• Obtain knowledge on Labour welfare. • Learner is able to understand Statutory & Non-statutory labour welfare programmes. • Understand the Labour Legislation. • Equip with Industrial Relations Legislation • Gain knowledge on various acts pertaining to Social Security Legislations.

Master of Computer Application

YEAR	SEMESTER	SUBJECT	Course Outcomes
I	I(R20)	**Mathematical And Statistical Foundations**	Apply the basic rules and theorems of probability theory such as Baye's Theorem, determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution. • Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters. • Learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests. • Design various ciphers using number theory. • Apply graph theory for real time problems like network routing problem.
		Computer Organization & Operating Systems	• Understand the basic organization of computer and different instruction formats and addressing modes • Analyze the concept of pipelining, segment registers and pin diagram of CPU. • Understand and analyze various issues related to memory hierarchy. • Evaluate various modes of data transfer between CPU and I/O devices. • Examine various inter connection structures of multi processors
		Data Structures	Implement basic programs by using C concepts.

			• Select the data structures that efficiently model the information in a problem. • Assess efficiency trade-offs among different data structure implementations or combinations • Implement and know the application of algorithms for sorting and pattern matching
		Object Oriented Programming With Java	• Describe the uses OOP concepts. • Apply OOP concepts to solve real world problems. • Distinguish the concept of packages and interfaces. • Demonstrate the exception handing, multithread applications with synchronization • Design the GUI based applications using AWT and Swings • Discuss the Collection Framework
		Business Communication	• Effective business writing • Effective business communications • Research approaches and information collection • Developing and delivering effective presentations • Effective interpersonal communications • Skills that maximise team effectiveness • Good time management • Effective problem solving
I	II(R20)	**Database Management Systems**	Illustrate the concept of databases, database management systems, database languages, database structures and their work • Apply ER modeling and Relational modeling for designing simple databases. • Summarize the concepts related to relational model and SQL and Write database queries using relational algebra and structured query language. • Design and develop databases from

			the real world by applying the concepts of Normalization. • Outline the issues associated with Transaction Management and Recovery, Tree Structured and Hash-Based Indexing
		Computer Networks	Explain the network architecture, TCP/IP and OSI reference models. • Identify and understand various techniques and modes of transmission. • Demonstrate the data link protocols, multi-channel access protocols and IEEE 802 standards for LAN. • Describe routing and congestion in network layer with routing algorithms and classify IPV4 addressing scheme. • Discuss the elements and protocols of transport layer. • Develop network security and define various protocols such as FTP, HTTP, Telnet, DNS
		Software Engineering And Design Patterns	Define various software application domains and remember different process model used in software development. • Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques. • Convert the requirements model into the design model and demonstrate use of software and user interface design principles. • Illustrate the appropriate design patterns to solve object-oriented design problems. • Apply structural patterns to solve design problems. • Evaluate the design solutions by using behavioral patterns.

		Data Warehousing And Mining	Understand the basics of types of data, quality of data, suitable techniques required for preprocessing and measures required to perform data analysis. • Describe the need of classification, identify suitable technique(s) to perform classification, model building and evaluation. • Identify the requirements and usage of association rule mining on categorical and continuous data. • Compare and Identify suitable clustering algorithm(s) (apply with open source tools), interpret, evaluate and report the result. • Describe the requirements and the need of web mining
		Nosql DATABASES	Identify what type of NoSQL database to implement based on business requirements (key-value, document, full text, graph, etc.) • Apply NoSQL data modeling from application specific queries. • Use Atomic Aggregates and denormalization as data modelling techniques to optimize query processing