Program Outcomes (POs)

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

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

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

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

Modern tool usage : Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society : Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

Ethics : Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
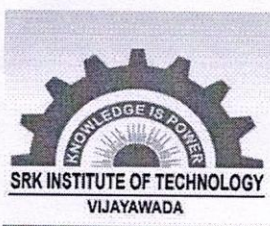
Individual and team work : Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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

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

Life - long learning : Recognize the need for, and have the preparation and ability to engage in independent and life - long learning in the broadest context of technological change.

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Civil Engineering

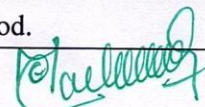| YEAR	SEMESTER	SUBJECT	COS
I	I	MATHEMATICS-I	• utilize mean value theorems to real life problems • solve the differential equations related to various engineering fields • familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region • students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
I	I	PROGRAMMING FOR PROBLEM SOLVING USING C	• 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	I	MATHEMATICS - II	• develop the use of matrix algebra techniques that is needed by engineers for practical applications • solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel • evaluate approximating the roots of polynomial and transcendental equations by different algorithms • apply Newton's forward & backward interpolation and Lagrange's formulae for equal

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			and unequal intervals
			• apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
I	I	**ENGINEERING PHYSICS**	1.a) Identify forces and moments in mechanical systems using scalar and vector techniques b)Extend Newton's second law for inertial and non-inertial frame of reference c)Explain simple harmonic motion and damped harmonic motions 2. a) Explain how sound is propagated in buildings b) Analyze acoustic properties of typically used materials in buildings c)Recognize sound level disruptors and their use in architectural acoustics d)Use of ultrasonic in flaw detection using NDT technique 3. a) Understand the elasticity and plasticity concepts b) Study different types of moduli and their relation c) Analyze the concepts of shearing force and moment of inertia 4. a) Understand the basic concepts of LASER light Sources b)Study Different types of laser systems c)Identify different types of sensors and their working principles 5) a) Explain the concept of dielectric constant and polarization in dielectric materials. b) Summarize various types of polarization of dielectrics . c) Interpret Lorentz field and Claussius_Mosotti relation in dielectrics. d)Classify the magnetic materials based on susceptibility and their temperature dependence. e) Explain the applications of dielectric and magnetic materials . f)Apply the concept of magnetism to magnetic devices.
I	I	**ENGINEERING**	• The students are to be exposed to the concepts of force and friction ,

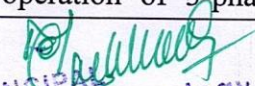|		MECHANICS	• The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces. • The students are to be exposed to concepts of centre of gravity • The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications. • The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion. • The students are to be exposed to concepts of work, energy and particle motion
I	I	ENGINEERING DRAWING	• The student will learn how to visualize 2D & 3D objects.
I	I	ENGINEERING EXPLORATION PROJECT	• Project Stream 1: Electronics, Robotics, IOT and Sensors • Project Stream 2: Computer Science and IT Applications • Project Stream 3: Mechanical and Electrical tools • Project Stream4: Eco-friendly solutions for waste management, infrastructure, safety, alternative energy sources, Agriculture, Environmental science and other fields of engineering.
I	II	ENGLISH I	• understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information • ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text andlocate specific information • recognize paragraph structure and be able to match beginnings/endings/headings

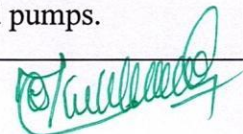|				
			withparagraphs • form sentences using proper grammatical structures and correct word forms	
I	II	**MATHEMATICS - III**	• interpret the physical meaning of different operators such as gradient, curl and divergence • estimate the work done against a field, circulation and flux using vector calculus • apply the Laplace transform for solving differential equations • find or compute the Fourier series of periodic signals • know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms • identify solution methods for partial differential equations that model physical processes	
I	II	**ENGINEERING CHEMISTRY**	• Outline the properties of polymers and various additives added and different methods of forming plastic materials. • Explain the preparation, properties and applications of some plastic materials. • Interpret the mechanism of conduction in conducting polymers . • Discuss natural and synthetic rubbers and their applications. • Explain the theory of construction of battery and fuel cells. • Categorize the reasons for corrosion and study some methods of corrosion control. • Outline the awareness of materials like nanomaterials and fullerenes and their uses. • Explain 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. • Analyse flue gases. • Explain the impurities present in raw water, problems associated with them and how to avoid them are understood.	

I	II	PROGRAMMING FOR PROBLEM SOLVING USING C	• 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	COMPUTER AIDED ENGINEERING DRAWING	• Student get exposed on working of sheet metal with help of development of surfaces. • Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids. • Student shall exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
II	I	PROBABILITY AND STATISTICS	• Examine, analyze, and compare various Probability distributions for both discrete and continuous random variables. • Describe and compute confidence intervals for the mean of a population. • Describe and compute confidence intervals for the proportion and the variance of a population and test the hypothesis concerning mean, proportion and variance and perform ANOVA test. • Fit a curve to the numerical data.
		BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	• Able to analyse the various electrical networks. • Able to understand the operation of DC generators,3-point starter and conduct the Swinburne's Test. • Able to analyse the performance of transformer. • Able to explain the operation of 3-phase

			alternator and 3-phase induction motors. • Able to analyse the operation of half wave, full wave rectifiers and OP-AMPs. • Able to explain the single stage CE amplifier and concept of feedback amplifier.
		STRENGTH OF MATERIALS-I	• The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions • The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces • The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions • The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.
		BUILDING MATERIALS AND CONSTRUCTION	• 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.
		SURVEYING	• To demonstrate the basic surveying skills • To use various surveying instruments. • To perform different methods of surveying • To compute various data required for various methods of surveying. • To integrate the knowledge and produce topographical map
		FLUID MECHANICS	Upon successful completion of this course the students will be able to: • Understand the various properties of fluids

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			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. • Identify and 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. • Draw simple hydraulic and energy gradient lines. • Measure the quantities of fluid flowing in pipes, tanks and channels.
		BUILDING PLANNING AND DRAWING	• Student should be able to plan various buildings as per the building by-laws. • The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings. • The student is expected to learn the skills of drawing building elements and plan the buildings as per requirements.
		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.

			CONCRETE TECHNOLOGY	• understand the basic concepts of concrete. • realize the importance of quality of concrete. • familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field. • test the fresh concrete properties and the hardened concrete properties. • evaluate the ingredients of concrete through lab test results. design the concrete mix by BIS method. • familiarize the basic concepts of special concrete and their production and applications. understand the behaviour of concrete in various environments.
			STRUCTURAL ANALYSIS – I	• Distinguish between the determinate and indeterminate structures. • Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure. • Estimate the bending moment and shear forces in beams for different fixity conditions. • Analyze the continuous beams using various methods -, three moment method, slope deflection method, energy theorems. • Draw the influence line diagrams for various types of moving loads on beams/bridges. • Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.
			TRANSPORTATION 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 • Construct and maintain highways
III	I		MANAGEMENT SCIENCE	1. After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior. 2. *Will familiarize with the concepts of functional management project

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				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	II	**DESIGN AND DRAWING OF**	• Work with relevant IS codes • Carryout analysis and design of flexural members and detailing

		STEEL STRUCTURES	• 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

		REMOTE SENSING AND GIS APPLICATIONS	based on the principles of bearing capacity.
			• 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.
		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.

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Electrical and Electronics Engineering

YEAR	SEMESTER	SUBJECT	COS
I	I	ENGLISH	• understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information • ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information • recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs • form sentences using proper grammatical structures and correct word forms
I	I	MATHEMATICS-I	• utilize mean value theorems to real life problems • solve the differential equations related to various engineering fields • familiarize with functions of several variables which is useful in optimization (L3) • Apply double integration techniques in evaluating areas bounded by region • students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3- dimensional coordinate systems
I	I	APPLIED CHEMISTRY	• Outline the properties of polymers and various additives added and different methods of forming plastic materials. • Explain the preparation, properties and applications of some plastic materials. • Interpret the mechanism of conduction in conducting polymers . • Discuss natural and synthetic rubbers and their applications • Explain the theory of construction of battery and fuel cells. • Understand the importance of materials like nanomaterials and fullerenes and their uses.

				• Understand liquid crystals and superconductors.
				• Understand the preparation of semiconductors
				• Obtain the knowledge of computational chemistry
				• Understand importance molecular machines
				• Learning Outcomes: At the end of this unit, the students will be able to
				• understand the principles of different analytical instruments.
				• explain the different applications of analytical instruments.
				• design sources of energy by different natural sources
I	I	PROGRAMMING FOR PROBLEM SOLVING USING C		• 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	I	PROGRAMMING FOR PROBLEM SOLVING USING C LAB		• Gains Knowledge on various concepts of a C language.
				• Able to draw flowcharts and write algorithms.
				• Able design and development of C problem solving skills.
				• Able to design and develop modular programming skills.
				• Able to trace and debug a program
I	II	MATHEMATICS - II (BS1202)		• develop the use of matrix algebra techniques that is needed by engineers for practical applications
				• solve system of linear algebraic equations

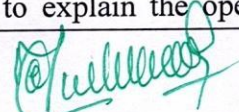|			
			using Gauss elimination, Gauss Jordan, Gauss Seidel • evaluate approximating the roots of polynomial and transcendental equations by different algorithms • apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals • apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
I	II	MATHEMATICS - III	• interpret the physical meaning of different operators such as gradient, curl and divergence • estimate the work done against a field, circulation and flux using vector calculus • apply the Laplace transform for solving differential equations • find or compute the Fourier series of periodic signals (L3) • know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms • identify solution methods for partial differential equations that model physical processes
I	II	APPLIED PHYSICS	• explain the need of coherent sources and the conditions for sustained interference. • analyze the differences between interference and diffraction with applications. • illustrate the resolving power of various optical instruments. • explain the fundamental concepts of quantum mechanics. • analyze the physical significance of wave function. • apply Schrödinger's wave equation for energy values of a free particle . • explain the various electron theories.

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				• calculate the Fermi energy.
				• analyze the physical significance of wave function .
				• interpret the effects of temperature on Fermi Dirac distribution function.
				• summarise various types of solids based on band theory.
				• classify the energy bands of semiconductors.
				• outline the properties of n-type and p-type semiconductors.
				• identify the type of semiconductor using Hall effect.
				• explain the concept of polarization in dielectric materials.
				• summarize various types of polarization of dielectrics .
				• Interpret Lorentz field and Claussius-Mosotti relation in dielectrics.
				• classify the magnetic materials based on susceptibility and their temperature dependence.
				• explain the applications of dielectric and magnetic materials .
				• Apply the concept of magnetism to magnetic devices.
I	II	FUNDAMENTALS OF COMPUTER SCIENCE (ES1212)		• Explain the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming.
				• Recognize the Computer networks, types of networks and topologies.
				• Summarize the concepts of Operating Systems and Databases.
				• Recite the Advanced Computer Technologies like Distributed Computing & Wireless Networks.
I	II	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.
II	**I**	**Electrical Circuit Analysis-II**	• Students are able to solve three- phase circuits under balanced and unbalanced condition
			• Students are able find the transient response of electrical networks for different types of excitations.
			• Students are able to find parameters for different types of network.
			• Students are able to realize electrical equivalent network for a given network transfer function.
			• Students are able to extract different harmonics components from the response of a electrical network.
		Electrical Machines – I	• Able to assimilate the concepts of electromechanical energy conversion.
			• Able to mitigate the ill-effects of armature reaction and improve commutation in dc machines.
			• Able to understand the torque production mechanism and control the speed of dc motors.
			• Able to analyze the performance of single phase transformers.
			• Able to predetermine regulation, losses and efficiency of single phase transformers.
			• Able to parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.
		Basic Electronics And Devices	• Students are able to understand the basic concepts of semiconductor physics, which are useful to understand the operation of diodes and transistors.
			• Students are able to explain the operation

			and characteristics of PN junction diode and special diodes. • Ability to understand operation and design aspects of rectifiers and regulators. • Students are able to understand the characteristics of various transistor configurations. They become familiar with different biasing, stabilization and compensation techniques used in transistor circuits. • Students are able to understand the operation and characteristics of FET, Thyristors, Power IGBTs and Power MOSFETs. • Students are able to understand the merits and demerits of positive and negative feedback and the role of feedback in oscillators and amplifiers.
		Electromagnetic Fields	• To determine electric fields and potentialsusing guass's lawor solving Laplace's or Possion's equations, for various electric charge distributions. • To Calculate and design capacitance, energy stored in dielectrics. • To Calculate the magnetic field intensity due to current, the application of ampere's law and the Maxwell's second and third equations. • To determine the magnetic forces and torque produced by currents in magnetic field • To determine self and mutual inductances and the energy stored in the magnetic field. • To calculate induced e.m.f., understand the concepts of displacement current and Poynting vector.
		Thermal And Hydro Prime Movers	• The student shall be able to calculate the performance of different types of internal combustion engines. • To train the student to calculate the performance of steam turbines using velocity diagrams. • To impart the knowledge of gas turbine

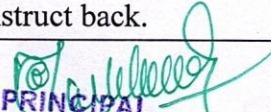|			
			fundamentals, the governing cycles and the methods to improve the efficiency of gas turbines.
			• To impart the knowledge of various types of pumps, their constructional features, working and performance.
			• Further, the student shall be able to calculate the performance of hydraulic turbines.
			• To train the student in the areas of types of hydro electric power plants, estimation and calculation of different loads by considering various factors.
		Managerial Economics And Financial Analysis	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
			• The Student able to get 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
			• Understanding the knowledge of different Business Units.
			• The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and
			• Able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
		Electrical Measurements	• Able to choose right type of instrument for measurement of voltage and current for ac and dc.
			• Able to choose right type of instrument for measurement of power and energy – able to calibrate energy meter by suitable method
			• Able to calibrate ammeter and potentiometer.
			• Able to select suitable bridge for measurement of electrical parameters
			• Able to use the ballistic galvanometer and

			flux meter for magnetic measuring instruments • Able to measure frequency and phase difference between signals using CRO. Able to use digital instruments in electrical measurements.
		Electrical Machines – II	• Able to explain the operation and performance of three phase induction motor. • Able to analyze the torque-speed relation, performance of induction motor and induction generator. • Able to explain design procedure for transformers and three phase induction motors. • Implement the starting of single phase induction motors. • To 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.
		Switching Theory And Logic Design	• To study number system and codes in digital logic design. Study of basic logic gates • To study Boolean theorems K-Maps, tabulation method for minimization of Boolean functions • To study different types of combinational logic circuits like adders subtractors Multiplexer's, demultiplexers, encoders and decoders. • To study different types of combinational logic circuits like PLA,PAL and PROM • To study different types of sequential logic circuits like counters shift registers • To study different types of Finite State Machines like mealy and moore machines.
		Control Systems	• Ability to derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.

			• Capability to determine time response specifications of second order systems and to determine error constants.
			• Acquires the skill to analyze absolute and relative stability of LTI systems using Routh's stability criterion and the root locus method.
			• Capable to analyze the stability of LTI systems using frequency response methods.
			• Able to design Lag, Lead, Lag-Lead compensators to improve system performance from Bode diagrams.
			• Ability to represent physical systems as state models and determine the response. Understanding the concepts of controllability and observability.
		Power Systems-I	• Students are able to identify the different components of thermal power plants.
			• Students are able to identify the different components of nuclear Power plants.
			• Students are able to distinguish between AC/DC distribution systems and also estimate voltage drops of distribution systems.
			• Students are able to identify the different components of air and gas insulated substations.
			• Students are able to identify single core and multi core cables with different insulating materials.
			• Students are able to analyze the different economic factors of power generation and tariffs.
		Management Science	• Able to understand the concept and nature of management evolution of management theories, motivation and leadership styles.
			• Able to equip with the concepts of operations project management and inventory control.
			• Able to understand the different functional areas in an organization and their responsibilities product life cycle and channels of distribution.

				• Able to equip with the concept and practical issues relating to strategic management. • Able to understand the need and imp of business ethics and communication skills in contemporary situations. • Able to equip the contemporary management practices i.e., MIS, MRP, JIT and ERP etc.
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 aYbusand 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 Through C++	• Distinguish between procedures and object oriented programming. • 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 potentialbenefits 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.

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				• 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).
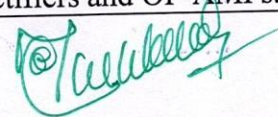
Mechanical Engineering

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I	I	MATHEMATICS-I	• utilize mean value theorems to real life problems • solve the differential equations related to various engineering fields • familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region • students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems
I	I	PROGRAMMING FOR PROBLEM SOLVING USING C	• 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	I	MATHEMATICS - II	• develop the use of matrix algebra techniques that is needed by engineers for practical applications • solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel • evaluate approximating the roots of polynomial and transcendental equations by different algorithms • apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals • apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
I	I	ENGINEERING PHYSICS	1.a) Identify forces and moments in mechanical systems using scalar and vector

			techniques
			b)Extend Newton's second law for inertial and non-inertial frame of reference
			c)Explain simple harmonic motion and damped harmonic motions
			2. a) Explain how sound is propagated in buildings
			b) Analyze acoustic properties of typically used materials in buildings
			c)Recognize sound level disruptors and their use in architectural acoustics
			d)Use of ultrasonic in flaw detection using NDT technique
			3. a) Understand the elasticity and plasticity concepts
			b) Study different types of moduli and their relation
			c) Analyze the concepts of shearing force and moment of inertia
			4. a) Understand the basic concepts of LASER light Sources
			b)Study Different types of laser systems
			c)Identify different types of sensors and their working principles
			5) a) Explain the concept of dielectric constant and polarization in dielectric materials.
			b) Summarize various types of polarization of dielectrics .
			c) Interpret Lorentz field and Claussius_Mosotti relation in dielectrics.
			d)Classify the magnetic materials based on susceptibility and their temperature dependence.
			e) Explain the applications of dielectric and magnetic materials .
			f)Apply the concept of magnetism to magnetic devices.
I	I	ENGINEERING DRAWING	• The student will learn how to visualize 2D & 3D objects.
I	II	ENGLISH I	• understand social or transactional dialogues spoken by native speakers of English andidentify the context, topic, and pieces of specific information
			• ask and answer general questions on familiar topics and introduce oneself/others
			• employ suitable strategies for skimming and scanning to get the general idea of a text andlocate specific information

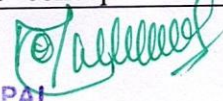|				
			• recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs • form sentences using proper grammatical structures and correct word forms	
I	II	**ENGINEERING CHEMISTRY**	• Outline the properties of polymers and various additives added and different methods of forming plastic materials. • Explain the preparation, properties and applications of some plastic materials. • Interpret the mechanism of conduction in conducting polymers . • Discuss natural and synthetic rubbers and their applications. • Explain the theory of construction of battery and fuel cells. • Categorize the reasons for corrosion and study some methods of corrosion control. • Outline the awareness of materials like nanomaterials and fullerenes and their uses. • Explain 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. • Analyse flue gases. • Explain the impurities present in raw water, problems associated with them and how to avoid them are understood.	
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.	

			• Understanding operations of CE amplifier and basic concept of feedback amplifier.
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	**COMPUTER AIDED ENGINEERING DRAWING**	• Student get exposed on working of sheet metal with help of development of surfaces. • Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids. • Student shall exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
II	I	**Metallurgy& Materials Science**	• To know the basic concepts of bonds in metals and alloys. To understand the basic requirements for the formation of solid solutions and other compounds. • To understand the regions of stability of the phases that can occur in an alloy system in order to solve the problems in practical metallurgy. • Able to understand the basic differences between cast irons and steels, their properties and practical applications. • Able to find the affect of various alloying elements on iron-iron carbide system. To understand the various heat treatment and strengthening processes

				used in practical applications.
				• Able to understand the properties and applications of widely used non-ferrous metals and alloys so as to use the suitable material for practical applications.
				• 6. Able to know the properties and applications of ceramic, composite and other advanced materials so as to use the suitable material for practical applications.
			Mechanics of Solids	• It gives the ability to find stress, strain poissons ratio etc and stresses in bars of varying cross sections, composite bars, thermal stress in members, stresses on inclined planes with analytical approach and graphical approach, strain energy under different loadings and also problem solving techniques.
				• Able to perform to construction of shear force diagrams and bending moment diagrams to the different loads for the different support arrangements and also problem solving techniques
				• Able to perform the bending and shear stress induced in the beams which are made with different cross sections like rectangular, circular, triangular, I, T angle sections and also problem solving techniques.
				• Able to finding slope and deflection for different support arrangements by Double integration method, Macaulay's method and Moment-Area and also problem solving techniques.
				• Able to know how a cylinder fails, what kind of stresses induced in cylinders subjected to internal, external pressures and also problem solving techniques.
				• Able to perform shear stresses induced in circular shafts, discussing columns in stability point of view and columns with different end conditions.
			Thermodynamics	• Basic concepts of thermodynamic systems and related fundamental

			definitions. concept of point function and path function with respect to energy, work. heat
			• First of law of thermodynamics and apply to different thermodynamic systems. application of steady flow energy equation to different mechanical systems
			• Second law of thermodynamics apply to heat engines, concepts of carnot cycle. entropy, availability and irreversibility and Maxwell.s relations and thermodynamic functions
			• Steam formation and its representation on property diagram and calculate the quality of steam with help of standard steam tables
			• psychometric chart and calculate various psychometric properties of air
			• air standard cycles calculate the efficiency and performance parameter of the cycles
		Managerial Economics & 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.
		Fluid Mechanics & Hydraulic Machines	• Comprehend different concepts of fluid and its properties, hydrostatic forces acting on different surfaces.
			• Understand the topics of basic laws of fluids, flow patterns, viscous flow through ducts and their corresponding problems.
			• Analyze different concepts related to

			boundary layer theory, velocity profiles and dimensional analysis • Apply the hydrodynamic forces acting on vanes and their performance evaluation. • Explain the importance, function and performance of hydro-machinery
		Computer Aided Engineering Drawing Practice	• To enhance the student's knowledge and skills in engineering drawing and to introduce drafting packages and commands for computer aided drawing and modelling.
II	II	**Kinematics of Machinery**	• Able to Identify basic kinematic pairs. • Able to Design Steering gear mechanism. • Able to Design Velocity and acceleration Digrams. • Able to Design circular cam with straight, concave and convex flanks. • Able to Design and analyze friction wheels and toothed gears. • Able to Selection of gear box-Differential gear for an automobile.
		Thermal Engineering -I	• 1.Actual cycles and the effect of various losses occurs in the actual cycles • 2.various engine systems along with their function and necessity • combustion phenomenon and knocking in S.I and C.I engines and the several operating parameters and their effect the smooth engine operation • 4.perform testing on S.I and C.I Engines for the calculations of performance and emission parameters • 5.Different types of compressors and to calculate power and efficiency of reciprocating compressors • 6.Mechanical details and to calculate power and efficiency of rotary compressors
		Production Technology	• Design patterns, Gating, runner and riser systems • Select a suitable casting process based on the component • Learn various arc and solid state welding processes and select a suitable process based on the application and requirements • Understand various bulk deformation

				processes • Understand various sheet metal forming and processing of plastics
			Design of Machine Members -I	• Able to Apply the design procedure to engineering problems, and to Calculate different stresses in the machine components subjected to various static loads, failures and suitability of a material for an engineering application. • Able to select the suitable materials and significance of tolerances and fits in critical design applications and also to Calculate dynamic stresses in the machine components subjected to variable loads. • Able to Design riveted, welded, bolted joints subjected to static loads and their failure modes. • Able to Design 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.
			Machine drawing	• Able to understand product symbols, weld symbols, pipe joints. • Understand orthographic projections of machine elements. • Able to isometric projections of machine elements. • Understand detailed assembly drawings of different machine components parts and applications in Industrial operations.
			Industrial engineering and management	• Able to understand fundamental knowledge and skill sets required in the Industrial Management and Engineering profession, which include the ability to apply basic knowledge of mathematics, probability and statistics, and the domain knowledge of Industrial management and Engineering. • To extract graduates with the ability to adopt a system approach to design, develop, implement and innovate

			integrated systems that include people, materials, information, equipment and energy. • Able to understand the interactions between engineering, business, technological and environmental spheres in the modern society. • To understand their role as engineers and their impact to society at the national global context.
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 Members–II	• The student will able to select the 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. • 4. 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 • 6. Apply LMTD and NTU methods to design heat exchangers.
IV	I		**Mechatronics**	• After completion of this course, the student shall be able to use the various mechatronics systems devices and components in the design of electro mechanical systems. • 1.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.
		CAD/CAM Lab	• The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.
			• Use of these tools for any engineering and real time applications
			• Acquire knowledge on utilizing these tools for a better project in their

			curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment
		Mechatronics Lab	• Measure load, displacement and temperature using analogue and digital sensors. • Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts. • Simulate and analyse PID controllers for a physical system using MATLAB. • Develop pneumatic and hydraulic circuits using Automaton studio.
IV	II	Production Planning and Control	• 1.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..

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		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.

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Electronics and Communication Engineering

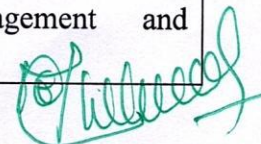| YEAR	SEMESTER	SUBJECT	COS
II/IV B.Tech	I	**Electronic Devices and Circuits**	• Understand the basic concepts of semiconductor physics. • Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation. • Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons. • Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations. • Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions. • 6. Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.
		Switching Theory and Logic Design	• Able to understand number systems and codes in Digital Logic Design. • Able to understand Boolean theorems K-MAPS, tabulation method for minimization of BOOLEAN functions. • Able to understand different types of combinational logic circuits like ADDERS, Subtractors, Multiplexers, De-Multiplexers and Encoders and Decoders. • Able to understand different types of Combination Logic circuits like PLA, PAL and PROM. • Able to study different types of sequential logic circuits like counters and shift registers • 6. Able to understand different types of finite state machines like MEALEY and MOORE machines.
		Signals and Systems	• Characterize the signals and systems and principles of vector spaces, Concept of orthogonality. • 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. 6. Apply z-transform to analyze discrete-time signals and systems.
		Network Analysis	- Gain the knowledge on basic network elements. - Will analyze the RLC circuits behavior in detailed. - Analyze the performance of periodic waveforms. - Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g). - Analyze the filter design concepts - Applications of filter designs are understood.
		Random Variables and Stochastic Process	- Mathematically model the random phenomena and solve simple probabilistic problems. - Identify different types of random variables and compute statistical averages of these random variables. - Characterize the random processes in the time and frequency domains. - Analyze the LTI systems with random inputs. - Apply these techniques to analyze the systems in the presence of different types of noise.
		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 are understood. - One is also ready to understand the nature of different markets - Price Output determination under various market conditions and also to have the knowledge of different Business Units are analyzed. - The Learner is able to prepare Financial Statements and the usage of various

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			Accounting tools for Analysis • To evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
II/IV B. Tech	**II**	**Electronic Circuit Analysis**	• Small signal high frequency BJT transistor amplifier Hybrid-π equivalent circuit and the expressions for conductances and capacitances are derived. • Cascading of single stage amplifiers is discussed. Expressions for overall voltage gain are derived. • The concept of feedback is introduced. Effect of negative feedback on amplifier characteristics is explained and necessary equations are derived. • Basic principle of oscillator circuits is explained and different oscillator circuits are given with their analysis. • Power amplifiers Class A, Class B, Class C, Class AB and other types of amplifiers are analyzed. • Different types of tuned amplifier circuits are analyzed.
		Control Systems	• The concepts of open loop and closed loop systems, mathematical models of mechanical and electrical systems, and concepts of feedback are learnt • The characteristics of the given system in terms of the transfer function and introducing various approaches to reduce the overall system for necessary analysis are made. • The acquaintance in analyzing the system response in time-domain and frequency domain in terms of various performance indices. • Analysis of the system in terms of absolute stability and relative stability by different approaches • Design different control systems for different applications as per given specifications are learnt. • The concepts of state variable analysis, design and also the concepts of controllability and • Observability are understood.
		Electromagnetic Waves and Transmission	• Determine E and H using various laws and applications of electric & magnetic fields

		Lines	- Apply the Maxwell equations to analyze the time varying behavior of EM waves - Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various - Media - Calculate Brewster angle, critical angle and total internal reflection - Derive the expressions for input impedance of transmission lines - Calculate reflection coefficient, VSWR etc. Using smith chart
		Analog Communications	- Students get familiarize with the fundamentals of analog communication systems - Students get familiarize with various techniques for analog modulation and demodulation of signals - Students can distinguish the figure of merits of various analog modulation methods - Students can develop the ability to classify and understand various functional blocks of radio transmitters and receivers - Students are able to learn different types of noise in communication systems. - Students get familiarize with basic techniques for generating and demodulating various pulse - Modulated signals
		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. 6. Students will be able to learn design of different Logic families and Sampling gates.
		Management Science	- Able to understand the concept and nature of management evolution of management theories, motivation and leadership styles. - Able to equip with the concepts of operations project management and inventory control.

			• Able to understand the different functional areas in an organization and their responsibilities product life cycle and channels of distribution. • Able to equip with the concept and practical issues relating to strategic management. • Able to understand the need and imp of business ethics and communication skills in contemporary situations. • Able to equip the contemporary management practices i.e., MIS, MRP, JIT and ERP etc.
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

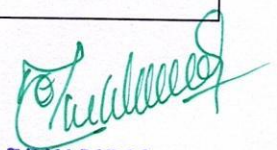|			
		Digital Communications	- Determine the performance of different waveform coding techniques for the generation and digital representation of the signals. - Determine the probability of error for various digital modulation schemes - Analyze different source coding techniques - Compute and analyze 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 Engineering (Open Elective)	- Understand the origin of bio-potential 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

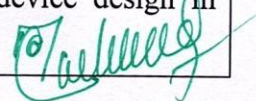|			
			in cellular systems. • Understand the concepts of handoff and architectures of various cellular systems.
		Electronic Measurements And Instrumentation	• Select the instrument to be used based on the requirements. • Understand and analyze different signal generators and analyzers. • Understand 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.

I/II M.Tech ECE	I	Detection & Estimation Theory	• Acquire basics of statistical decision theory used for signal detection and estimation. • Examine the detection of deterministic and random signals using statistical models. • Analyze signal estimation in discrete-time domain using filters. • Examine the performance of signal parameters using optimal estimators. • Comprehend the parameters of random processes from data using different functions.
		Digital Data Communications	• Able to identify the properties of Digital Modulation Schemes. • Able to Understand Overview of various Data Communication devices. • Able to Understand Overview of various errors Control methods and data link protocols. • Able to understand the basic principles of multiplexing and different networks. • Able to understand the basic principles of various multiple access techniques
		VLSI Design	• Understand the various IC design processing national and sequential design techniques. • Understand the various fabrication steps of IC and concepts and techniques of modern integrated circuit design and testing. • The various basic electrical properties of MOS transistors and applying technology specific layout design rules in the placement and routing of transistors. • Understand the design static CMOS combinational and sequential logic at the transistor level including mask layout. • Understand place and root methods with OFF chip connections and architecture testing.
		Advanced Digital Signal Processing	• Understand the concepts of multi rate signal processing. • Understand the applications of multi rate signal processing. • Gain knowledge on non-parametric methods of power spectral estimation. • Gain knowledge on parametric methods of power spectral estimation.

			• To understand the implementation of digital filters. • Gain knowledge on parametric methods of power spectral estimation.
		Statistical Signal Processing	• Ability to generalize the statistical models. • Able to analyze the various non parametric methods for power spectral density estimation. • Able to understand the review of stochastic signals and systems fundamentals random process, white noise, auto and cross correlation functions, spectral and cross spectral densities, properties of linear time-invariant systems excited by white noise and to learn basic estimation methods like MLE, MAP. • Able to differentiate the prominence of various spectral estimation techniques. • Able to design and development of optimum filters using classical and adaptive algorithms.
		Digital System Design	• Able to study minimization of switching functions using tabulation of k-maps CAMP algorithms and cube based operations. • Able to study different kinds of PLDs like PROM, PLA, PAL and minimization techniques of PLAs. • Able to study ASM charts and design of large scale circuits using FPGAs. • Able to study different kinds of fault classes in combination circuits. • Able to study different kinds of fault classes in sequential circuits using machine identification techniques.
I/II M. Tech ECE	II	**Coding Theory & Applications**	• Analyze the number of bits in the given information, detect and correct the error using linear block codes. • Analyze the number of errors detected and corrected using cyclic codes. • Analyze the number of errors detected and corrected using Convolution codes. • Analyze the number of errors corrected using Burst Error Correcting codes. • Analyze the number of errors corrected using BCH codes.

			Embedded & Real Time Systems	- Students can be able to understand the introduction to an embedded system and their current technologies. - Students can be able to understand the embedded hardware building blocks and various memory types. - Students can be able to understand the device drivers for interrupt handling and various embedded OS. - Students can be able to create ES architecture and various debugging tools. - Students can be able to understand the considerations while designing an ES.
			Image & Video Processing	- Describe basic fundamentals of digital image processing, image transform used in digital image processing. - Explain various image enhancement and restoration techniques and examine various types of images, intensity transformations and spatial filtering. - Evaluate the methodologies for segmentation and compression process and describe wavelet based compression schemes. - Explain about analog and digital video and common video system design problems and describe sampling and filtering concepts. - Analyze the concepts of motion estimation algorithms and their applications in video coding.
			Wireless Communications & Networks	- Get acquainted with the basic cellular system concepts and system design fundamentals. - Understand the radio propagation mechanisms and various large scale fading models. - Analyze the concept of small scale fading and study various fading models. - Obtain the knowledge of various equalization and diversity techniques. - Study various wireless networks such as WLAN, WPAN, HYPE and WLL.
			CMOS Analog & Digital IC Applications	Students can be able to understand the MOS device modeling and MOS device design in real time applications.

			- Students can be able to understand the combinational MOS logic circuits and sequential MOS logic circuits. - Students can be able to understand the dynamic logic circuits and their working with applications and semi conductor memories. - Students can be able to create some basic analog CMOS sub circuits and design the current sources and current sinks for the design of analog circuits. - Students can be able to understand the design of CMOS amplifiers and CMOS operations amplifiers for various analog and digital applications.
		Digital Signal Processors & Architectures	- Understand the concepts of Digital signal processing. - Understand the concepts of Architectures for programmable DSP devices. - Gain knowledge on Programmable digital signal processors. - To understand the principles of Analog devices family of DSP devices. - Gain knowledge on various interfacing memory and I/O peripherals to programmable DSP devices.
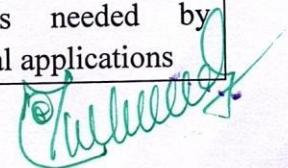
Computer Science Engineering

YEAR	SEMESTER	SUBJECT	COS
I	I	ENGLISH	• understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information • ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information • recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs • form sentences using proper grammatical structures and correct word forms
I	I	MATHEMATICS-I	• utilize mean value theorems to real life problems • solve the differential equations related to various engineering fields • familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region • students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3- dimensional coordinate systems
I	I	APPLIED CHEMISTRY	• Outline the properties of polymers and various additives added and different methods of forming plastic materials. • Explain the preparation, properties and applications of some plastic

			materials.
			• Interpret the mechanism of conduction in conducting polymers.
			• Discuss natural and synthetic rubbers and their applications
			• Explain the theory of construction of battery and fuel cells.
			• Categorize the reasons for corrosion and study some methods of corrosion control.
			• Understand the importance of materials like nanomaterials and fullerenes and their uses.
			• Understand liquid crystals and superconductors.
			• Understand the preparation of semiconductors
			• Obtain the knowledge of computational chemistry
			• Understand importance molecular machines
			• understand the principles of different analytical instruments.
			• explain the different applications of analytical instruments.
			• design sources of energy by different natural sources
I	I	FUNDAMENTALS OF COMPUTER SCIENCE	• Explain the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming.
			• Recognize the Computer networks, types of networks and topologies.
			• Summarize the concepts of Operating Systems and Databases.
			• Recite the Advanced Computer Technologies like Distributed Computing & Wireless Networks.
I	II	MATHEMATICS - II	• develop the use of matrix algebra techniques that is needed by engineers for practical applications

			• solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel • evaluate approximating the roots of polynomial and transcendental equations by different algorithms • apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals • apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
I	II	MATHEMATICS - III	• interpret the physical meaning of different operators such as gradient, curl and divergence • estimate the work done against a field, circulation and flux using vector calculus apply the Laplace transform for solving differential equations • find or compute the Fourier series of periodic signals • know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms • identify solution methods for partial differential equations that model physical processes
I	II	APPLIED PHYSICS	• explain the need of coherent sources and the conditions for sustained interference. • analyze the differences between interference and diffraction with applications. • illustrate the resolving power of various optical instruments. • explain the fundamental concepts of quantum mechanics. • analyze the physical significance of wave function.

			- apply Schrödinger's wave equation for energy values of a free particle . - Explain the various electron theories. - Calculate the Fermi energy. - analyze the physical significance of wave function . - interpret the effects of temperature on Fermi Dirac distribution function. - summarise various types of solids based on band theory. - classify the energy bands of semiconductors. - outline the properties of n-type and p-type semiconductors. - identify the type of semiconductor using Hall effect. - explain the concept of polarization in dielectric materials. - summarize various types of polarization of dielectrics - Interpret Lorentz field and Claussius-Mosotti relation in dielectrics. - Classify the magnetic materials based on susceptibility and their temperature dependence. - Explain the applications of dielectric and magnetic materials . - Apply the concept of magnetism to magnetic devices.
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		PROGRAMMING FOR PROBLEM SOLVING USING C	• 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
II	I		STATISTICS WITH R PROGRAMMING	• List motivation for learning a programming language • Access online resources for R and import new function packages into the R workspace • Import, review, manipulate and summarize data-sets in R • Explore data-sets to create testable hypotheses and identify appropriate statistical tests • Perform appropriate statistical tests using R Create and edit visualizations with
			MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE	• Student will be able to demonstrate skills in solving mathematical problems • Student will be able to comprehend mathematical principles and logic

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				• Student will be able to demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Student will be able to manipulate and analyze data numerically and/or graphically using appropriate Software • Student will be able to communicate effectively mathematical ideas/results verbally or in writing
			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. • An ability to define the other minimization methods for any number of variables Variable Entered Mapping (VEM) and Quine-MeCluskey (QM) Techniques and perform an algorithmic reduction of logic functions
			JAVA PROGRAMMING	• Understand Java programming concepts and utilize Java Graphical User Interface in Program writing. • Write, compile, execute and troubleshoot Java programming for networking concepts. • Build Java Application for distributed environment. • Design and Develop multi-tier applications. • Identify and Analyze Enterprise applications.
			DATASTRUCTURES	• Illustrate Object Oriented
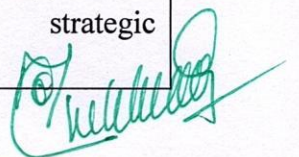
			THROUGH C++	Programming concepts using C++.
				• Interpret the Basic Concepts in Data Structures, Stacks, Queues and Templates
				• Construct various advanced data structures like Binary Trees, tree traversals and Heap
				• Construct various graphs and operations and shortest path algorithm.
				• Distinguish various sorting techniques
				• Prepare programs on pointers, Singly Linked Lists, Double Linked List and Circular Linked List
			COMPUTER GRAPHICS	• Acquire the basics of computer graphics, different graphics systems and applications of computer graphics with various algorithms for line, circle and ellipse drawing objects for 2D transformations
				• Explain projections and visible surface detection techniques for display of 3D scene on 2D screen
				• Develop scene with basic graphic primitive algorithms using OPENGL programming.
				• Know and be able to Explain selected among models for lighting/shading: Color, ambient light; distant and light with sources; Phong reflection model; and shading (flat, smooth, Gourand, Phong).
				• Illustrate able to create the general software architecture of programs that use 3D object sets with computer graphics.
				• Discuss Adding texture surface with transparency Boolean operations
		II	SOFTWARE ENGINEERING	• ☐Define and develop a software project from requirement gathering to
				• implementation.
				• ☐Obtain knowledge about principles

			and practices of software engineering. • □Focus on the fundamentals of modeling a software project. • □Obtain knowledge about estimation and maintenance of software systems
		PYTHON PROGRAMMING	• Understand and comprehend the basics of python programming. • Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology. • Explain the use of the built-in data structures list, sets, tuples and dictionary. • Make use of functions and its applications. • Identify real-world applications using oops, files and exception handling provided by python. • Formulate and implement a program to solve a real-world problem using GUI and Turtle graphics.
		ADVANCED DATA STRUCTURES	• Be able to understand and apply amortised analysis on data structures, including binary • search trees, mergable heaps, and disjoint sets. • Understand the implementation and complexity analysis of fundamental algorithms suchas RSA, primality testing, max flow, discrete Fourier transform. • Have an idea of applications of algorithms in a variety of areas, including linear • programming and duality, string matching, game-theory
		COMPUTER 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.
		FORMAL LANGUAGE AND AUTOMATA THEORY	• Classify machines by their power to recognize languages, • Employ finite state machines to solve problems in computing, • Explain deterministic and non-deterministic machines, • Comprehend the hierarchy of problems arising in the computer science
		PRINCIPLES OF PROGRAMMING LANGUAGES	• Describe syntax and semantics of programming languages • Explain data, data types, and basic statements of programming languages • Design and implement subprogram constructs, Apply object - oriented, • concurrency, and event handling programming constructs • Develop programs in Scheme, ML, and Prolog • Understand and adopt new programming languages
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
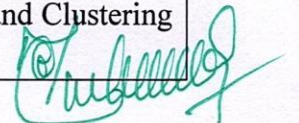
				LALR parse table.
				• Syntax directed translation, synthesized and inherited attributes.
				• Techniques for code optimization.
			UNIX PROGRAMMING	• Documentation will demonstrate good organization and readability.
				• File processing projects will require data organization, problem solving and 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

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		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 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 (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,

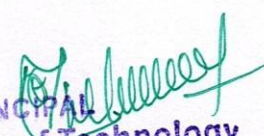|			
			as a planning problem, as a Markov decision process, etc). • Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming). • Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation 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 PROPERTY RIGHTS AND PATENTS	• IPR Laws and patents pave the way for 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

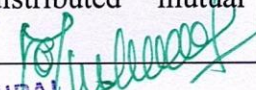|				
				analytics
				• Building a complete business data analytic solution
			WEB TECHNOLOGIES	• Outline the history of web and technologies that makes the web pages. Design web pages using the concepts of Html, CSS and JavaScript. • Acquire the concepts of XML, DTD and XML schemas • Learn AJAX and 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.

YEAR	SEMESTER	SUBJECT	COS
I/II M.Tech CSE	I	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	• To apply the basic rules and theorems of probability theory such as Baye's Theorem, to 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. • To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests. • Design various ciphers using number theory. • Apply graph theory for real time problems like network routing problem.
	I	ADVANCED DATA STRUCTURE AND ALGORITHM ANALYSIS	• Ability to write and analyze algorithms for algorithm correctness and efficiency • Master a variety of advanced abstract data type (ADT) and data structures and their Implementation • Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life • Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees • Ability to compare various search trees and find solutions for IT related problems
		ADVANCED OPERATING SYSTEMS	• Illustrate on the fundamental concepts of distributed operating systems, its architecture and distributed mutual exclusion.

				• Analyze on deadlock detection algorithms and agreement protocols. • Make use of algorithms for implementing DSM and its scheduling. • Apply protection and security in distributed operating systems. • Elaborate on concurrency control mechanisms in distributed database systems.
			INTERNET OF THINGS	• Summarize on the term 'internet of things' in different contexts. • Analyze various protocols for IoT. • Design a PoC of an IoT system using Rasperry Pi/Arduino • Apply data analytics and use cloud offerings related to IoT. • Analyze applications of IoT in real time scenario
			LAB 1(ADVANCED DATA STRUCTURES AND ALGORITHMS LAB)	• Identify classes, objects, members of a class and relationships among them needed for a specific problem. • Examine algorithms performance using Prior analysis and asymptotic notations. • Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.) • Apply and analyze functions of Dictionary
		II	**MACHINE LEARNING**	• Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications. • Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration. • Ability to solve problems associated with batch learning and online learning, and the big data characteristics such as high

			dimensionality, dynamically growing data and in particular scalability issues.
			• Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies.
			• Ability to recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
			• Ability to integrate machine learning libraries and mathematical and statistical tools with modern technologies like hadoop and mapreduce.
		MEAN STACK TECHNOLOGIES	• Build a mean stack application • Build and route a basic SPA's • Build RESTful API • Develop Module • Secure your app • Model-driven forms
		ADVANCED DATABASES AND MINING	• Perform data modeling • Apply OLAP techniques for mulit-dimensional data analysis • Apply data cubing techniques • Develop general skill of data warehousing project management • Obtain the general knowledge on the design and implementation of data warehouses • Be able to apply data mining techniques for knowledge discovery • Develop in-depth understanding of fundamental data mining algorithms • Perform data mining in data warehouses.

		CLOUD COMPUTING	- Define Cloud Computing and memorize the different Cloud service and deployment models - Describe importance of virtualization along with their technologies. - Use and Examine different cloud computing services - Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing - Describe the key components of Amazon web Service - Design & develop backup strategies for cloud data based on features.

Information Technology

YEAR	SEMESTER	SUBJECT	COS
I	I	ENGLISH	• understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information • ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text andlocate specific information • recognize paragraph structure and be able to match beginnings/endings/headings withparagraphs • form sentences using proper grammatical structures and correct word forms
I	I	MATHEMATICS-I	• utilize mean value theorems to real life problems • solve the differential equations related to various engineering fields • familiarize with functions of several variables which is useful in optimization • Apply double integration techniques in evaluating areas bounded by region • students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
I	I	APPLIED CHEMISTRY	• Outline the properties of polymers and various additives added and different methods of forming plastic materials. • Explain the preparation, properties and applications of some plastic materials. • Interpret the mechanism of conduction in conducting polymers. • Discuss natural and synthetic rubbers and their applications • Explain the theory of construction of battery and fuel cells. • Categorize the reasons for corrosion and study some methods of corrosion control.

			- Understand the importance of materials like nanomaterials and fullerenes and their uses. - Understand liquid crystals and superconductors. - Understand the preparation of semiconductors - Obtain the knowledge of computational chemistry - Understand importance molecular machines - understand the principles of different analytical instruments. - explain the different applications of analytical instruments. - design sources of energy by different natural sources
I	I	**FUNDAMENTALS OF COMPUTER SCIENCE**	- Explain the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming. - Recognize the Computer networks, types of networks and topologies. - Summarize the concepts of Operating Systems and Databases. - Recite the Advanced Computer Technologies like Distributed Computing & Wireless Networks.
I	II	**MATHEMATICS - II**	- develop the use of matrix algebra techniques that is needed by engineers for practical applications - solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel - evaluate approximating the roots of polynomial and transcendental equations by different algorithms - apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals - apply different algorithms for approximating the solutions of ordinary

I	II	MATHEMATICS - III	differential equations to its analytical computations
I	II	MATHEMATICS - III	• interpret the physical meaning of different operators such as gradient, curl and divergence • estimate the work done against a field, circulation and flux using vector calculus apply the Laplace transform for solving differential equations • find or compute the Fourier series of periodic signals • know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms • identify solution methods for partial differential equations that model physical processes
I	II	APPLIED PHYSICS	• explain the need of coherent sources and the conditions for sustained interference. • analyze the differences between interference and diffraction with applications. • illustrate the resolving power of various optical instruments. • explain the fundamental concepts of quantum mechanics. • analyze the physical significance of wave function. • apply Schrödinger's wave equation for energy values of a free particle . • Explain the various electron theories. • Calculate the Fermi energy. • analyze the physical significance of wave function . • interpret the effects of temperature on Fermi Dirac distribution function. • summarise various types of solids based on band theory. • classify the energy bands of semiconductors. • outline the properties of n-type and p-

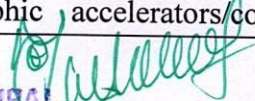|			
			type semiconductors.
			• identify the type of semiconductor using Hall effect.
			• explain the concept of polarization in dielectric materials.
			• summarize various types of polarization of dielectrics
			• Interpret Lorentz field and Claussius-Mosotti relation in dielectrics.
			• Classify the magnetic materials based on susceptibility and their temperature dependence.
			• Explain the applications of dielectric and magnetic materials .
			• Apply the concept of magnetism to magnetic devices.
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	**PROGRAMMING FOR PROBLEM SOLVING USING C**	• 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

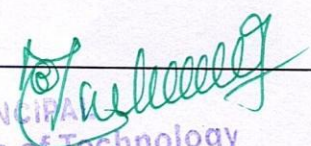|				• To design and implement programs to analyze the different pointer applications • To decompose a problem into functions and to develop modular reusable code • To apply File I/O operations
II	I	**STATISTICS WITH R PROGRAMMING**		• List motivation for learning a programming language • Access online resources for R and import new function packages into the R workspace • Import, review, manipulate and summarize data-sets in R • Explore data-sets to create testable hypotheses and identify appropriate statistical tests • Perform appropriate statistical tests using R Create and edit visualizations with
		MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE		• Student will be able to demonstrate skills in solving mathematical problems • Student will be able to comprehend mathematical principles and logic • Student will be able to demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Student will be able to manipulate and analyze data numerically and/or graphically using appropriate Software • Student will be able to communicate effectively mathematical ideas/results verbally or in writing
		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. • An ability to define the other minimization methods for any number of variables

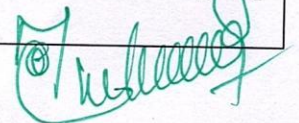|			Subject	Course Outcomes
				• Variable Entered Mapping (VEM) and Quine-MeCluskey (QM) Techniques and perform an algorithmic reduction of logic functions.
			PYTHON PROGRAMMING	• Making Software easily right out of the box. • Experience with an interpreted Language. • To build software for real needs. • Prior Introduction to testing software
			DATA STRUCTURES THROUGH C++	• Distinguish between procedures and object oriented programming. • 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
			SOFTWARE ENGINEERING	• Define and develop a software project from requirement gathering to implementation. • Obtain knowledge about principles and practices of software engineering. • Focus on the fundamentals of modeling a software project. • Obtain knowledge about estimation and maintenance of software systems
II	II		**COMPUTER GRAPHICS**	• Know and be able to describe the general software architecture of programs that use 3D computer graphics. • Know and be able to discuss hardware system architecture for computer graphics. This Includes, but is not limited to: graphics pipeline, frame buffers, and graphic accelerators/co-

			processors. • Know and be able to select among models for lighting/shading: Color, ambient light;distant and light with sources; Phong reflection model; and shading (flat, smooth, Gourand, Phong).
		JAVA PROGRAMMING	• Understand Java programming concepts and utilize Java Graphical User Interface in Program writing. • Write, compile, execute and troubleshoot Java programming for networking concepts. • Build Java Application for distributed environment. • Design and Develop multi-tier applications. • Identify and Analyze Enterprise applications.
		E-COMMERCE	• Identify, interpret and analyze stakeholder needs • Identify and apply relevant problem solving methodologies • Design components, systems and/or processes to meet required specifications • Design components, systems and/or processes to meet required specifications • Demonstrate research skills
		COMPUTER 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

			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
			PRINCIPLES OF PROGRAMMING LANGUAGES	• Describe syntax and semantics of programming languages • Explain data, data types, and basic statements of programming languages • Design and implement subprogram constructs, Apply object - oriented, • concurrency, and event handling programming constructs • Develop programs in Scheme, ML, and Prolog • Understand and adopt new programming languages
III	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.

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		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	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,

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			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

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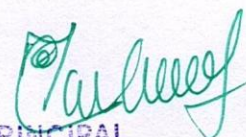SRK Institute of Technology
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				• Compliance level with the new model of theoretical teaching
			CYBER SECURITY	• Cyber Security architecture principles • Identifying System and application security threats and vulnerabilities • Identifying different 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	• Describe different approaches to testing

		QUALITY ASSURANCE	software applications • Analyze specifications and identify appropriate test generation strategies • Develop an appropriate test design for a given test object

Masters of Business Administration

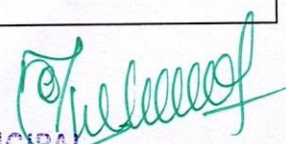| YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES:
I	I	**Management and Organizational Behaviour**	• student has learned about Evolution of Management thought Scientific management, administrative, management, Hawthrone experiments systems approach Levels of Management Managerial Skills • student has gained knowledge 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
I	I	**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

I	I	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
I	I	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 - Focus on miscelleanious acts of Indian Context
I	I	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.

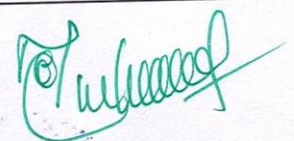| I	II	Human Resource Management	- undestand the base concept of HRM and its significance in the organisation - undestand the investment perspectives of HRM(Training and Development) - understand the concepts of Performance Appraisal: Importance – Methods – Traditional and Modern methods – Latest trends 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
I	II	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.
I	II	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
I	II	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 - presentation of research report - equipped student with statistical techniques - students were in a position to use multivariate techniques

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I	II	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	- 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
II	I	Legal Aspects of Business	- Obtained knowledge on contract and its essentials - understand consumer rights and grivances - gain knowledge about negotiable instruments - Obtained knowledge on partnership firms - understand the company formation and

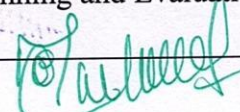|			winding up
II	I	**Business Ethics and Corporate Governance**	• Obtained Knowledge of Nature of Ethics, Business Ethics and its theories • Obtained knowledge of Different Ethical attitudes • Gained Knowledge of Ethics in HRM, Marketing, Finance etc • Obtained knowlege of Corporate Governance • Gained Knowledge of Ethics and Social Responsibilities
II	I	**Leadership Management**	• Able to understand the Leadership: Situational Leadership Behaviour: Meaning, Fiedler Contingency Model, Path Goal and Normative Models • Acquaint concepts of Motivation Theories for Leadership: Maslow's, Herzberg, X, Y and Z theories of Motivation - Similarities and Distinctions of Need Hierarchy and Two Factors theories. ERG – McClelland - Expectancy - Porter and Lawler Theories. • The learner will able to gain the knowledge on Vision and Goals for organisation: significance of goals for leaders – Charting vision and goals of Indian leaders and abroad • Obtain knowledge on Leadership Assertiveness: Circle of influence and circle of concern • Able to understand the – Global perspectives of leadership – Leadership in USA – Leadership in Japan – European leadership – Leadership in Arab countries –
II	I	**Security Analysis and Portfolio Management**	• To know about investment, speculations and basics of primary and secondary markets • Will get to know about the types of shares and bonds, valuation of bonds, shares and bonds pricing theory • To know about the technichal analysis and fundamental analysis, market research • Will get awareness on elements, composition of portifolio and management of portifilio • Obtained the knowledge on evaluation of perfomance of portifolio

II	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
II	I	Banking and insurance Management	• Gain knowledge on Banking & Indian Financial System • Obtain knowledge on uses of bank funds & Non- Performing Assets • Acquaint concepts of Banking Innovations • Equipped the knolwedge on Insurance in India • Gain knowledge on Life & General Insurance in India
II	I	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
II	I	Advanced Management Accoumting	• Gain Knowledge on International Accounting Standards • Obtained knowledge on Analysis of Financial statements • Gain knowledge on preparation of functional budgets • Equipped with applications of marginal costing • understand applications of break even analysis

II	I	strategic Human Resource Management	• Gain Knowledge on Human Resource Manager and Strategic planning. • The learner will outline the Efficient utilization of Human resources • able to know about Reward and Development Systems Strategically oriented performance measurement system • able to gain knowledge on Monitoring- Monitoring Process- Periodic reviews • to understand about the Building and leading High performing teams
II	I	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.
II	II	Logistics and Supply Chain Management	• Acquaint concepts of - Models in Logistics Management - Logistics to Supply Chain Management • Obtained knowledge on Impact of Logistics on shareholder value - customer profitability analysis – • Obtained knowledge on Benchmarking the logistics process and SCM operations –Mapping the supply chain processe • Acquaint concepts of sourcing decisions and transportation in supply chain – infrastructure suppliers of transport services • Acquaint concepts of Global strategy –Global purchasing – Global logistics
II	II	Entrepreneurship development	• Obtined the knowledge of Entrepreneurship • Able to learn about Training for Entrepreneurs • Gained knowledge of Planning and Evaluation of Projects

			• Provide awareness of Corporate • Obtained the knowledge of Institutional support to Entrepreneurs and MSME's
II	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
II	II	**Fianacial Markets and Servicies**	• provide awareness of RBI and SEBI. • understand various financial services in india. • able to learn venture capital. • understand the rating of the customers • Know the need of micro finance
II	II	**Global Human Resource Management**	• Able to understand the -Challenges of Globalization - Implications of Managing People and Leveraging Human ResourceInternational Labour relations • Able to learn about Selection methods - Positioning Expatriate – Repatriate • provide awareness about Concepts and issues – theories- considerations - Problems – Skill building methods • students got to know about the Compensation Management: Importance – Concepts- Trends - Issues – Methods – Factors of Consideration – Models – incentive methods • understand the importance of Globalization and Quality of Working Life and Productivity – Challenges in Creation of New Jobs through Globalization
II	II	**Labour Welfare and legislation**	• understand the welfare legislation of labour • gain knowledge on Industrial relations legislation • equip with wage & social security legislation • learner know about the Labour Welfare in India • Understand the various labour welfare Programmes in India

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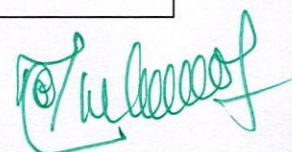| II	II	Risk Management	- Obtain knowledge on Risk Management framework - Learner is able to understand tools of measuring Risk - Understand the Management of risk in corporates - Equip with regulatory bodies for various markets - Gain knowledge on various models of Risk management
II	II	Managenent of Industrial relations	- The learner will Gain Knowledge on Industrial Relations Management - The learner able to Obtain the knowledge on Trade Unions in India-trade Unions Act , 1926 and Legal framework - The learner will Gain knowledge on Quality of Work Life and Wage and Salary administration - Understand the Social Security in Indiaand types of welafre measures provided in india - Acquaint the knowledge on Employee Grievances and Prevention and Settlement of industrial disputes in India.
II	II	Tax Management	- Able to know about the basics of tax, tax on agriculture income, about theincome tax act - Understand all about the Central Value Adde Tax(CENVAT) - Able to know about the tax planning and legal principles of tax planning - learner understand the elements of tax considerations, tax mangement , tax decissions - Understand about the international txation system and legal aspects in international taxation.

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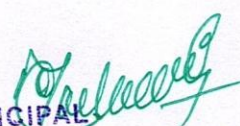## Integrated Masters in Business Administration

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	Fundamentals 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 Accounting -1	• students has understood about basics of accounting • students has got awairness on basics of the journal and the trail balance • Able to know about basic of ledger posting • students has understood about the final accounts and income statement • students has got awairness on basis of ratio analysis and different types of ratios

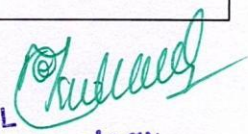| I	I	Fundamentals Of Computers	- Able to understand the basics of computers & devices - Learnder able to know the different types of operating system - focus on various application softwares used in day to day manner - Understand the concept of E-Business - Equip with computer networks
I	II	English language -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.

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I	II	Financial Accounting -2	• To understand basics of accounting • To know the accounting forms for Inventory management • Able to know the basic awareness on cash flow and funds flow statements • able to get basic awareness on accounting standards • Able to know the various aspects of financial reporting
I	II	Organisational Communication	• 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

II	I	Cost Accounting	• Learner has got awareness 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 Breakeven point, Break-even-graph and assumptions of BEP, importance,
			• students has got awareness 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 execute the small projects with all teh properties of ED • Able to understand Importance of MSME's • Able to understand the Industrial support to MSME and other Entrepreneurs
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 accounting statements • prepare and analyse financial statement and reports independently • analyze cost accounting concepts • Interpret cost behaviour 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

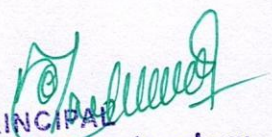|			
II	II	**Elements Of Direct and Indirect taxes**	• Able to Know about the basics of tax system and have awareness on Income Tax Act 1961 • Students have awareness on assessment of tax of income from salaried, income from individuals and income from HP • Can analyise the tax on income from business and profession problems arising from aggregation of income and set off and carry forward loss. • obtained the knowledge on Indirect tax laws, administration and relevant procedure, the central exercise including central value added tax and central sales tax • Able to know about Tax administration appeals, revisions, review, rectification and application to control board of direct taxes. Acquisition proceedings principals of valuation movable and immovable property.
II	II	**Management of Information system**	• Able to get information about MIS and its applications 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	**Production and operations Management**	• The Learner able 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	**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 frameining of Strategy at Various levels • Obtained knowledge about Structures 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 uncertainty • 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 advantages 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 responsibilities 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 awareness 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 understand Importance of Industry Analysis ,Classification of Industries , Key Indicators in Analysis , Analytical Frame

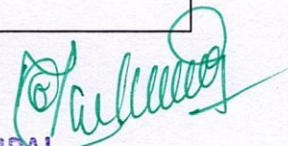|			Works
IV	I	**Leadership Management**	• Determine the meaning of leadership and its importance • Outline motivational theories and cultural dimensions • Correlate leadership with learning and attitude • Determine the factors necessary developing leadership • Focus on leadership styles in other countries
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 • Equipped with applications of marginal costing • understand applications of break even analysis
IV	II	**Total Quality management**	• able to gain the knowledge about the need of or ISO 9000-2000 Quality system • to identify the needs of customer and satisfy their needs • apply appropriate tools and strategies of quality in TQM • to provide information and understand the deployment of quality circles and performance

			measures
			• able to gain the knowledge about the need ofor ISO 9000-2000 Quality system
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

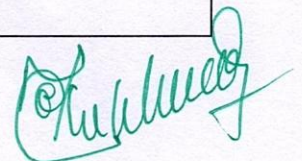| IV	II	Financial Markets and Services	• Gain knowledge on Indian Capital Market & Money Market issues • Able to understand the Regulatory framework of Financial Services • Understand the concept of Venture Capital and its growth in India • Acquaint knowledge on Credit Rating Agencies in India • The learner able to understand the classification & evaluation of Mutual Funds.
V	I	Industrial Safety and Security	• students has understand basic insights on Industrial acts • learner have awairness on Factories legislations • students has got awairness on industrial safety legislations • students has got awairness on wage and compensation regulations • students got to know about the latest ammendaments in industrial legislations
V	I	Leadership Management	• Understand the Leadership: Situational Leadership Behaviour: Meaning, Fiedler Contingency Model, Path Goal and Normative Models • Acquaint concepts of Motivation Theories for Leadership: Maslow's, Herzberg, X, Y and Z theories of Motivation - Similarities and Distinctions of Need Hierarchy and Two Factors theories. ERG – McClelland - Expectancy - Porter and Lawler Theories. • The learner will able to gain the knowledge on Vision and Goals for organisation: significance of goals for leaders • Obtain knowledge on Leadership Assertiveness: Circle of influence and circle of concern • Able to understand the – Global perspectives of leadership – Leadership in USA – Leadership in Japan – European leadership – Leadership in Arab countries –

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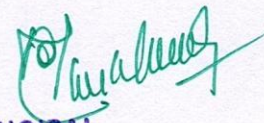SRK Institute of Technology
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V	I	Knowledge management	• Understand the Knowledge Management techniques & its implementation • Able to know the Essentials of Knowledge Management • Acquaint the knolwedge on Dirivers of KM • Familiar with KM Techqniues & implementation and acquisition tools • Gain the knowledge on various technologies used in KM
V	I	International Financial Management	• Able to understand the global financial management and its scope in organisations • Able to understand management of exchange and interest rate exposure • Able to understand management of global operations and practices • Able to understand the International investment decision with respect to contemporary issues • Students obtained the knowledge of Global indebtedness
V	I	Management Of Change	• 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
V	I	Financial Risk Management and Derivatives	• Student has learned about the basics of risk management, different types of risks, comprehensive view of risk in financial institutions • Student has gained knowledge on Value of Risk, Cash flow risk , asset liability management • student has learned about dervatives basics, types of derivatives , different players in stock market • lerner has understood about SWAPS meaning , types, pricing rates of swaps • student has learned aboout the Options , binomial option pricing model

V	I	Global Human Resource Management	• Able to understand the -Challenges of Globalization -Implications of Managing People and Leveraging Human ResourceInternational Labour relations
			• Able to learn about Selection methods - Positioning Expatriate – Repatriate
			• provide awareness about Concepts and issues – theories- considerations -Problems – Skill building methods
			• students got to know about the Compensation Management: Importance – Concepts- Trends - Issues – Methods – Factors of Consideration – Models – incentive methods
			• understand the importance of Globalization and Quality of Working Life and Productivity – Challenges in Creation of New Jobs through Globalization

Master of Computer Applications

YEAR	SEMESTER	SUBJECT	COS
I	I	**Problem Solving with C**	• Understand the basic concepts used in computer programming • Write, compile and debug programs in C language • Design programs involving decision structures, loops and functions. • Understand about the application and implementation of 2-dimentional array, structures and strings. • Understand the dynamics of memory by the use of pointers. • Develop solutions to problems using derived data types and files.
		Computer Organization	• Understand the basic organization of computer and different instruction formats and addressing modes. • Analyse the concept of pipelining, segment registers and pin diagram of CPU. • Understand and analyse 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
		Discrete Mathematical Structures	• Perform operations on various discrete structures such as sets, functions, relations, and sequences. • Ability to solve problems using Counting techniques, Permutation and Combination, Recursion and generating functions. • Apply algorithms and use of graphs and

			trees as tools to visualize and simplify Problems. • Use of K-Maps and Truth Tables to construct and verify correctness of a Boolean expression. • Create the various properties of algebraic systems like Rings, Monoids and Groups	
			Probability and Statistics	• Demonstrate the basic knowledge on fundamental probability concepts, including random variable, probability of an event, additive rules and conditional probability. • Derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions • Demonstrate the basic statistical concepts and measures • Discuss several well-known distributions, including Binomial, Geometrical, Negative Binomial, Normal and Exponential Distribution • Prove hypotheses testing.
			Accounting and Financial Management	• Understand the balance sheet preparation and perform analysis. • Understand the budget preparation and control of a company. • Decide about the state of affairs of a particular firm / company. • Ensure the preparation of fiscal policies of the organization. • Ensure the factors to be considered in investment policies
I	II(R19)	**Data Structures**	• Select appropriate data structures as applied

				to specified problem definition.
				• Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
				• Compare Linear and Non-Linear data structures.
				• Apply appropriate sorting/searching technique for given problem.
				• Design advance data structure using Non-Linear data structure.
				• Determine and analyse the complexity of given Algorithms.
			Operating Systems	• Understand the basics of operating systems like kernel, shell, types and views of operating systems.
				• Understands CPU scheduling algorithms and compare the results using Gantt chart.
				• Explain various memory management techniques and concept of thrashing
				• Apply disk scheduling algorithms for better utilization of external memory.
				• Understand the architecture of Unix operating system.
				• Write and execute shell programs.
			Software Engineering	• 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

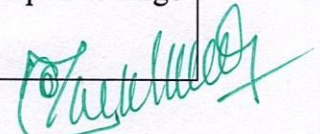|				
			software and user interface design principles.	
			• Distinguish among SCM and SQA and can classify different testing strategies and tactics and compare them.	
			• Justify role of SDLC in Software Project Development.	
		OOP Through Java	• Understand the use OOP concepts.	
			• Apply OOP concepts to solve real world problems.	
			• Understand the concepts of packages and interfaces.	
			• Understand the concepts of exception handing, multithread applications with synchronization.	
			• Design the GUI based applications using AWT and Swings.	
			• Understand the concept of Collection Framework.	
		Optimization Techniques	• Describe clearly a problem, identify its parts and analyse the individual functions.	
			• Feasibility study for solving an optimization problem.	
			• Becoming a mathematical translation of the verbal formulation of an optimization problem.	
			• To design algorithms, the repetitive use of which will lead reliably to finding an approximate solution.	
			• Discovery, study and solve optimization problems.	
			• Investigate, study, develop, organize and promote innovative solutions for various	

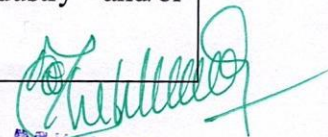|				applications.
II	I	DATABASE MANAGEMENT		• Understand, appreciate and effectively explain the underlying concepts of database technologies
				• Design and implement a database schema for a given problem-domain
				• Normalize a database
				• Populate and query a database using sql DML/DDL commands
				• Declare and enforce integrity constraints on a database using state –of-the-art RDBMS
				• Programming PL/SQL including stored procedures, stored functions, cursors, packages.
				• Design and build a GUI application using 4GL
		COMPUTER NETWORKS		• To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
				• To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
				• To be familiar with wireless networking concepts
				• To be familiar with contemporary issues in networking technologies.
				• To be familiar with network tools and network programming.
		UNIX PROGRAMMING		• Work confidently in Unix/Linux environment
				• Write shell scripts to automate various tasks

				• Master the basics of Linux administration • To know in detail concepts of operating system
			MANAGEMENT INFORMATION SYSTEM	• Understand basic concepts and technologies used in the field of management information systems • Have the knowledge of the different types of management information system • Understand the process of developing and implementing information systems • Be aware of the ethical,social and security issues and information systems • Learn about the importance of managing organizational change associated with information system implementation
			DESIGN AND ANALYSIS ALGORITHMS	• Analyze algorithm performance using complexity measurement. • Master major algorithm design techniques such as Divide and conquer, Greedy and Dynamic Programming • Apply above approaches to solve variety of practical problems such as sorting and selection ,graph problems and other optimization problems such as branch and bound.
II	II		OBJECT ORIENTED ANALYSIS AND DESIGN	• 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
			ADVANCED JAVA & WEB	• Write a valid HTML document involving a

			TECHNOLOGIES	variety of element types, including hyperlinks, images, lists, tables and forms • Choose the best technologies of solving client/server problems • Use a variety of strategies and tools to create websites • Install a web server application • Develop a sophisticated web application that employs the MVC architecture
			DATA WAREHOUSING AND MINING	• Design a data mart or data warehouse for any organization • Develop skills to write queries using DMQL • Extract knowledge using data mining techniques • Adapt to new data mining tools • Explore recent trends in data mining such as web mining, spatial_temporal mining
			HUMAN COMPUTER INTERACTION	• Implement Interaction design basics • Use HCI in the software process • Apply Design rules
			SOFTWARE PROJECT MANAGEMENT	• Define roles and responsibilities by PM process group • Articulate the purpose and benefits of project management • Written reports and oral presentations • Work in groups to analyze a project and implement a solution • Apply Key PM concepts.
III	I		BIG DATA ANALYTICS	• Preparing for data summarization, query, and analysis. • Applying data modeling techniques to large data sets

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				• Creating applications for Big Data analytics • Building a complete business data analytic solution
			NETWORK PROGRAMMING	• Understand the key protocols that support the Internet • Apply several common programming interfaces to network communication • Understand the use of TCP/UDP Sockets • Apply advanced programming techniques such as Broadcasting, Multicasting.
			PYTHON PROGRAMMING	• Making Software easily right out of the box. • Experience with an interpreted Language. • To build software for real needs. • Prior Introduction to testing software
			E-COMMERCE	• Study of electronic data inter change and just in time approach • Study about the electronic commerce and electronic transactions and impact of electronic commerce on organizations and society • Study of various security issues while doing electronic transactions
			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