SRK INSTITUTE OF TECHNOLOGY

Enikepadu, Vijayawada 521108

Approved by AICTE, Affiliated to JNTUK, Kakinada

(ISO 9001:2015 Certified Institution)

Civil Engineering

YEAR	SEMESTER	SUBJECT	COS
I	I	**ENGLISH - I**	• The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly. • The lesson motivates the public to adopt road safety measures • The lesson creates an awareness in the readers that mass production is ultimately detrimental to biological survival. • The lesson helps to choose a source of energy suitable for rural India. • The lesson creates an awareness in the reader as to the usefulness of animals for the human society. • The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace
I	I	**MATHEMATICS-I (Common to all Branch's for I Year B. Tech)**	• Solve linear differential equations of first, second and higher order. • Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE. • Calculate total derivative, Jocobian and minima of functions of two variables.
I	I	**ENGINEERING CHEMISTRY**	• The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood. The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is

			also explained. Conductance phenomenon is better understood. The students are exposed to some of the alternative fuels and their advantages and limitations.
I	I	**COMPUTER PROGRAMMING**	• Write, compile and debug programs in C language. • Use different data types in a computer program. • Design programs involving decision structures, loops and functions. • Explain the difference between call by value and call by reference • Understand the dynamics of memory by the use of pointers • Use different data structures and create/update basic data files.
I	I	**ENVIRONMENTAL STUDIES**	• The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources • The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web • The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity • Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices • Social issues both rural and urban environment and the possible means to combat the challenges • The environmental legislations of India and the first global initiatives towards sustainable development • . • About environmental assessment and the stages involved in EIA and the environmental audit. • • Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, Parking Curriculum.
I	II	**ENGLISH -II**	• The lesson underscores that the ultimate aim of Education is to enhance wisdom. • The lesson enables the students to promote peaceful co-existence and

			universal harmony among people and society. • The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists. • The lesson imparts the students to manage different cultural shocks due to globalization. • The lesson highlights insightful commentary on cultural traditions. • The lesson offers several inputs to protect environment for the sustainability of the future generations.
I	II	**MATHEMATICS – II (MATHEMATICAL METHODS)**	• Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data. • Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of partial differential equations.
I	II	**MATHEMATICS-III**	• Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations. • Solve simultaneous linear equations numerically using various matrix methods. • Determine double integral over a region and triple integral over a volume. • Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.
I	II	**ENGINEERING PHYSICS**	• Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study Acoustics, crystallography magnetic and dielectric materials enhances the utility aspects of materials
I	II	**ELEMENTS OF MECHANICAL ENGINEERING**	• The stress/strain of a mechanical component subjected to loading. • The performance of components like Boiler, I.C. Engine, Compressor, Steam/Hydraulic turbine, Belt, Rope and

			Gear. • The type of mechanical component suitable for the required power transmission.
II/IV R16	**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.
II	**I**	**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.
II	**I**	**STRENGTH OF MATERIALS-I**	• The student will be able to understand the basic materials behaviour under the influence of different external loading conditions and the support conditions • The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces • The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions • The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the

			internal pressure using Lame's equation.
II	**I**	**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.
II	**I**	**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
II	**I**	**FLUID MECHANICS**	Upon successful completion of this course the students will be able to: • Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics. • Calculate the forces that act on submerged planes and curves. • 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.
II/IV R16	**II**	**BUILDING PLANNING AND**	• Student should be able to plan various buildings as per the building by-laws. • The student should be able to distinguish the

		DRAWING	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.
II	**II**	**STRENGTH OF MATERIALS- II**	• The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections. • The student can asses stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions • The student will be able to assess forces in different types of trusses used in construction.
II	**II**	**HYDRAULICS AND HYDRAULIC MACHINERY**	• Solve uniform and non uniform open channel flow problems. • Apply the principals of dimensional analysis and similitude in hydraulic model testing. • Understand the working principles of various hydraulic machineries and pumps.
II	**II**	**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.
II	**II**	**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.
II	**II**	**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/IV	**I**	**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
III	**I**	**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.
III	**I**	**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
III	**I**	**GEOTECHNICAL ENGINEERING – I**	• The student must know the definition of the various quantities 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.
III	**I**	**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**	**INTELLECTUAL PROPERTY RIGHTS AND PATENTS**	• Able to know about the basics of IPR, types of IPR, emerging trends in IPR • Able to know about copy rights, subject matter of copy rights, laws relating to copy rights • Able to know about the patents, types of patents, patents registration process, patent

			co-operation treaty • Able to know about trademarks, types of trademarks, trade marks registration process • Able to know about the IT-Act- • 2000 provisions cyber crime, cyber security measures, e-commerce ,data security ,digital signature
III	**II**	**DESIGN AND DRAWING OF STEEL STRUCTURES**	• Work with relevant IS codes. • Carryout analysis and design of flexural members and detailing. • Design compression members of different types with connection detailing. • Design Plate Girder and Gantry Girder with connection detailing • Produce the drawings pertaining to different components of steel structures.
III	**II**	**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 and decide on the size of the foundation accordingly. • The student must be able to use the field test data and arrive at the bearing capacity. • The student must be able to apply the principles of bearing capacity of piles and design them accordingly.
III	**II**	**TRANSPORTATION ENGINEERING – II**	• Design geometrics in a railway track. • Provide good transportation network • Design airport geometrics and airfield pavements. • Plan, construct and maintain Docks and Harbours.
III	**II**	**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.
III	**II**	**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.
III	**II**	**ENVIRONMENTAL POLLUTION AND CONTROL**	• Identify the air pollutant control devices • Have knowledge on the NAAQ standards and air emission standards • Differentiate the treatment techniques used for sewage and industrial wastewater treatment methods. • Understand the fundamentals of solid waste management, practices adopted in his town/village and its importance in keeping the health of the city. • Appreciate the methods of environmental sanitation and the management of community facilities without spread of epidemics. • Appreciate the importance of sustainable development while planning a project or executing an activity.

IV/IV R13	**I**	**ENVIRONMENTAL ENGINEERING – II**	• Plan and design the sewerage systems • Characterisation of Sewage • Select the appropriate appurtenances in the sewerage systems • Selection of suitable treatment flow for sewage treatment • Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river
IV	**I**	**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
IV	**I**	**CONSTRUCTION TECHNOLOGY AND MANAGEMENT**	• Appreciate the importance of construction planning. • Understand the functioning of various earth moving equipment. • Know the methods of production of aggregate products and concreting. • Apply the gained knowledge to project management and construction techniques.
IV	**I**	**PRESTRESSED CONCRETE**	• Understand the different methods of prestressing. • Estimate the 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
IV	**I**	**REMOTE SENSING AND GIS APPLICATIONS**	• Be familiar with ground, air and satellite based sensor platforms. • Interpret the aerial photographs and satellite imageries • Create and input spatial data for GIS

			application • Apply RS and GIS concepts in water resources engineering
IV	**I**	**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.
IV/IV R13	**II**	**ESTIMATING, SPECIFICATIONS & 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.
IV	**II**	**GROUND WATER DEVELOPMENT AND MANAGEMENT**	• At the end of the course the student will be able to Estimate aquifer parameters and yield of wells. • Analyse radial flow towards wells in confined and unconfined aquifers. • Design wells and understand the construction practices. • Interpret geophysical exploration data for scientific source finding of aquifers. • Determine the process of artificial recharge for increasing groundwater potential. • Take effective measures for controlling saline water intrusion. • Apply appropriate measures for groundwater management.

IV	**II**	**WATERSHED MANAGEMENT**	• calculate watershed parameters and analyse watershed • characteristics to take appropriate management action. • quantify soil erosion and design control measures. • apply land grading techniques for proper land management . • suggest suitable harvesting techniques for better watershed management. • apply appropriate models for watershed management.
IV	**II**	**REPAIR AND REHABILITATION OF STRUCTURES**	• Explain deterioration of concrete in structures • Carryout analysis using NDT and evaluate structures • Assess failures and causes of failures in structures • Carryout Physical evaluation and submit report on condition of the structure.

Electrical and Electronics Engineering

YEAR	SEMESTER	SUBJECT	COS
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I	**I**	**MATHEMATICS-I (Common to all Branch's for I Year B. Tech)**	• Solve linear differential equations of first, second and higher order. • Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE. • Calculate total derivative, Jocobian and minima of functions of two variables.
I	**I**	**APPLIED CHEMISTRY**	• The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood. The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained. Conductance phenomenon is better understood. The students are exposed to some of the alternative fuels and their advantages and limitations.
		COMPUTER PROGRAMMING	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. • Use different data types in a computer

			program. • Design programs involving decision structures, loops and functions. • Explain the difference between call by value and call by reference • Understand the dynamics of memory by the use of pointers • Use different data structures and create/update basic data files.
I	**I**	**ENVIRONMENTAL STUDIES**	• The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources • The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web • The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity • Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices • Social issues both rural and urban environment and the possible means to combat the challenges • The environmental legislations of India and the first global initiatives towards sustainable development • About environmental assessment and the stages involved in EIA and the environmental audit. • Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, Parking Curriculum.
I	**II**	**ENGLISH -II**	• The lesson underscores that the ultimate aim of Education is to enhance wisdom. • The lesson enables the students to promote peaceful co-existence and universal harmony among people and society. • The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists. • The lesson imparts the students to manage different cultural shocks due to globalization. • The lesson highlights insightful commentary on cultural traditions.

			• The lesson offers several inputs to protect environment for the sustainability of the future generations.
I	**II**	**MATHEMATICS – II (MATHEMATICAL METHODS)**	• Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data. • Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of partial differential equations.
I	**II**	**MATHEMATICS-III**	• Course Outcomes: At the end of the Course, Student will be able to: • Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations. • Solve simultaneous linear equations numerically using various matrix methods. • Determine double integral over a region and triple integral over a volume. • Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.
I	**II**	**APPLIED PHYSICS**	• Outcome: Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study Acoustics, crystallography magnetic and dielectric materials enhances the utility aspects of materials
I	**II**	**ENGINEERING DRAWING**	• To introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them. • To introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other. • To make the students draw the projections of the lines inclined to both the planes. • To make the students draw the projections of the plane inclined to both the planes.

			• To make the students draw the projections of the various types of solids in different positions inclined to one of the planes. • To represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
II/IV R16	**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.
II	**I**	**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.
II	**I**	**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.
II	**I**	**Electromagnetic Fields**	• To determine electric fields and potentials using guass's law or 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.
II	**I**	**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.
II	**I**	**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.
II/IV R16	**II**	**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.
II	**II**	**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.
II	**II**	**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.
II	**II**	**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.
II	**II**	**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.
II	**II**	**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 R13	**I**	**Managerial Economics And Financial Analysis**	• The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand • One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs • One has to understand the nature of different markets and Price Output determination under various market conditions) • One should equipped with the knowledge of different Business Units • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis • The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
III	**I**	**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.
III	**I**	**Power Systems–II**	• Able to understand parameters of various types of transmission lines for using calculation and behavior during different operating conditions. • Able to understand the insight into specific transmission lines short and medium type which would have application in medium

			and high voltage power transmission systems. • Student will be able to understand the surge propagation, reflection and refraction in transmission lines. such output will be useful in protecting transmission line insulators and designing level of insulation coordination at various high voltages. • Will be able to utilize it for understanding the surge behaivour of transmission line for protection of connects equipments,viz.power transformer and system connected shunt reactors. • Will be able to understand various phenomenon related to charged line transmitting different level of power. • Will be able to understand physical and geometrical parameters of transmission line for safe and efficient performance during operating condition of voltage and power.
III	**I**	**Electrical Machines – III**	• Analyze the performance of single phase induction and ac series motors. • Explain the structure of synchronous machines and design the windings. • Develop solutions for regulation of both non salient pole and salient pole synchronous generators. • Explain the role of synchronous generators operation when connected to an infinite bus or when operating in parallel. • Analyze the performance of synchronous motor for development of torque and power factor correction. • Explain hunting phenomenon and methods of starting of synchronous motor.
III	**I**	**Power Electronics**	• Explain the characteristics of various power semiconductor derive and analyze the operation of diode bridge rectifier. • Design firing circuits for SCR. Analyze the operation of AC voltage controller and half–wave phase controlled rectifiers. • 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 and dual converter. • Analyze the operation of single phase cyclo converters and high frequency dc–dc converters.

			• Explain the working of inverters and application of PWM techniques for voltage control and harmonic mitigation.
III	**I**	**Linear & Digital Ic Applications**	• After completion of this course student can able to differentiate "Analog Circuits & Digital Circuits". • The course content gives an insight in to the fundamentals so that one can design the "Linear Circuits" with their own innovative skills. • Those who are taken this course can specialize in this subject in their Post Graduation. It is a challenging task for the individual to exhibit his logical skills & Analytical ability. • They can design their own circuits which may be useful for current industry needs.
III	**I**	**Intellectual Property Rights And Patents**	• Able to know about the basics of IPR, types of IPR, emerging trends in IPR • Able to know about copy rights, subject matter of copy rights, laws relating to copy rights • Able to know about the patents, types of patents, patents registration process, patent co-operation treaty • Able to know about trademarks, types of trademarks, trade marks registration process • Able to know about the IT-Act- • 2000 provisions cyber crime, cyber security measures, e-commerce ,data security ,digital signature
III/IV R13	**II**	**Switchgear And Protection**	• To be 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 constructional features of different types of electromagnetic protective relays. • Students acquire in depth knowledge of faults that is observed to occur in high power generator and transformers and protective schemes used for all protections. • Improves the ability to understand various types of protective schemes used for feeders and bus bar protection. • Generates understanding of different types of static relays with a view to application in the

			system. • To be able to understand the different types of over voltages appearing in the system, including existing protective schemes required for insulation co–ordination.
III	**II**	**Microprocessors and Microcontrollers**	• To be able to understand the microprocessor capability in general and explore the evalution 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
III	**II**	**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.
III	**II**	**Power System Analysis**	• Able to draw an impedance diagram for a power system network. • Able to form a Y bus matrix for a power system network with or without mutual couplings. • Able to find out the load flow solution of a power system network using different types of load flow methods. • Able to formulate the Zbus for a power system network. • Able to find out the fault currents for all types faults with a view to provide data for the design of protective devices. • Able to find out the sequence components of

			currents for any unbalanced power system network. • Able to analyze the steady state, transient and dynamic stability concepts of a power system.
III	**II**	**Power Semiconductor Drives**	• Explain the fundamentals of electric drive and different electric braking methods. • Analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual converters. • Explain the converter control of dc motors in various quadrants. • Explain the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters. • Explain the principles of static rotor resistance control and various slip power recovery schemes. • Explain the speed control mechanism of synchronous motors .
III	**II**	**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.
IV//IV R13	**I**	**Renewable Energy Sources And Systems**	• Analyze solar radiation data, extraterrestrial radiation, radiation on earth's surface. • Design solar thermal collections. • Design solar photo voltaic systems. • Develop maximum power point techniques in solar PV and wind.

			• Explain wind energy conversion systems, Betz coefficient, tip speed ratio. • Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.
IV	**I**	**HVAC & DC Transmission**	• To be able to acquaint with HV transmission system with regard to power handling capacity, losses, conductor resistance and electrostatic field associate with HV. Further knowledge is gained in area of bundle conductor system to improve electrical and mechanical performance. • To develop ability for determining corona, radio interference, audible noise generation and frequency spectrum for single and three phase transmission lines. • To be able to acquire knowledge in transmission of HVDC power with regard to terminal equipments, type of HVDC connectivity and planning of HVDC system. • To be able to develop knowledge with regard to choice of pulse conversion, control characteristic, firing angle control and effect of source impedance. • To develop knowledge of reactive power requirements of conventional control, filters and reactive power compensation in AC. side of HVDC system. • Able to calculate voltage and current harmonics, and design of filters for six and twelve pulse conversion**.**
IV	**I**	**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

			line power compensation.
		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.
IV	**I**	**Instrumentation (Open Elective)**	• Able to represent various types of signals . • Acquire proper knowledge to use various types of Transducers. • Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc. • Acquire proper knowledge and working principle of various types of digital voltmeters. • Able to measure various parameters like phase and frequency of a signal with the help of CRO. • Acquire proper knowledge and able to handle various types of signal analyzers
IV	**I**	**Non–Conventional Sources Of Energy (Open Elective)**	• Analyze solar radiation data, extraterrestrial radiation, and radiation on earth's surface. • Design solar thermal collections. • Design solar photo voltaic systems. • Develop maximum power point techniques in solar PV and wind. • Explain wind energy conversion systems, Betz coefficient, tip speed ratio. • Explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.
IV	**I**	**Optimization Techniques (Open**	• State and formulate the optimization problem, without and with constraints, by using design variables from an engineering

		Elective)	design problem. • Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution. • Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions. • Solve transportation and assignment problem by using Linear programming Simplex method. • Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions. • Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution
IV	**I**	**VLSI Design** **Elective – I**	• Ability to demonstrate the fundamentals of IC technology such as various MOS fabrication technologies. • Ability to calculate electrical properties of MOS circuits such as Ids – Vds relationship, Vt, gm, gds, figure of merit, sheet resistance, area capacitance. • Ability to demonstrate semi conductor IC design such as PLA's, PAL, FPGA, CPLS's design. • Ability to demonstrate VHDL synthesis, simulation, design capture tools design verification tools, CMOS testing.
IV	**I**	**Electrical Distribution Systems (ELECTIVE–I)**	• Able to understand the 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 on p.f improvement. • Able to understand the effect of voltage, current distribution system performance.
IV	**II**	**Optimization Techniques (Elective-I)**	• State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem. • Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution. • Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions. • Solve transportation and assignment problem by using Linear programming Simplex method. • Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions. • Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
IV	**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.

		Advanced Control Systems **ELECTIVE – II**	• 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 analyse the stability analysis using lypnov method. • Minimization of functionals using calculus of variation studied. • Able to formulate andsolve the LQR problem and riccatti equation.
IV	**I**	**High Voltage Engineering (ELECTIVE – II)**	• To be acquainted with the performance of high voltages with regard to different configurations of electrode systems. • To be able to understand theory of breakdown and withstand phenomena of all types of dielectric materials. • To acquaint with the techniques of generation of AC,DC and Impulse voltages. • To be able to apply knowledge for measurement of high voltage and high current AC,DC and Impulse. • To be in a position to measure dielectric property of material used for HV equipment. • To know the techniques of testing various equipment's used in HV engineering.
IV	**I**	**Special Electrical Machines** **(Elective – II)**	• Explain theory of operation and control of switched reluctance motor. • Explain the performance and control of stepper motors, and their applications. • Describe the operation and characteristics of permanent magnet dc motor. • Distinguish between brush dc motor and brush less dc motor.

			• Explain the theory of travelling magnetic field and applications of linear motors. • Understand the significance of electrical motors for traction drives.
IV	**II**	**Electric Power Quality** **ELECTIVE – III**	• 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	**II**	**Digital Signal Processing (Elective – III)**	• Able to study different types of signals and properties of systems. • Able to apply of Fourier transform to discrete time systems. • Able to apply the FFT and inverse FFT to discrete sequences. • Able to realize and design digital filters. • Able to understand the multi–rate signal processing. • Able to understand architecture of digital signal processors.
IV	**II**	**Flexible Alternating Current Transmission Systems (FACTS)**	• Determine power flow control in transmission lines by using FACTS controllers. • Explain operation and control of voltage source converter. • Discuss compensation methods to improve stability and reduce power oscillations in the

		(Elective – III)	transmission lines. • Explain the method of shunt compensation by using static VAR compensators. • Appreciate the methods of compensations by using series compensators. • Explain the operation of modern power electronic controllers (Unified Power Quality Conditioner and Interline Power Flow Controller).
IV	**II**	**Oops Through JAVA** **ELECTIVE – IV**	• Understand the format and use of objects. • Understand basic input/output methods and their use. • Understand object inheritance and its use. • Understand development of JAVA applets vs. JAVA applications. • Understand the use of various system libraries.
IV	**II**	**Unix And Shell Programming (Elective – IV)**	• Use UNIX shells and commands to create powerful data processing applications. • Build UNIX applications using the shell command interpreter and UNIX commands. • Use UNIX at the command line to manage data, files, and programs. • 4. Use UNIX editors and tools to create and modify data files and documents.
IV	**II**	**AI Techniques (Elective IV)**	• Know different models of artificial neuron. • Use learning methods of ANN. • Use different paradigms of ANN. • Classify between classical and fuzzy sets. • Use different modules of Fuzzy logic controller. • Apply Neural Networks and fuzzy logic for real-time applications.
IV	**II**	**Power System Reforms (Elective IV)**	• Will understand importance of power system deregulation and restructuring. • Able to compute ATC. • Will understand transmission congestion management.

			• Able to compute electricity pricing in deregulated environment. • Will be able to understand power system operation in deregulated environment. • Will understand importance of ancillary services.
IV	**II**	**Systems Engineering (Elective IV)**	• To be able to appreciate and evaluate systems in general and apply to specific systems. • Should engineer successful systems fit for intended purpose. Right from concept to development. • Should be able to successfully deploy the new systems developed. • Should be able to leverage the support systems for success of systems from womb to tomb. • Should be able to apply systems engineering in engineering product and services. • Should be able to relate systems engineering with project management and software engineering.

Mechanical Engineering

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES
I	**I**	**ENGLISH - I**	• The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly. • The lesson motivates the public to adopt road safety measures • The lesson creates an awareness in the readers that mass production is ultimately detrimental to biological survival. • The lesson helps to choose a source of energy suitable for rural India. • The lesson creates an awareness in the reader as to the usefulness of animals for the human society. • The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace
I	**I**	**MATHEMATICS -I**	• Solve linear differential equations of first, second and higher order. • Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE.. • Calculate total derivative, Jocobian and minima of functions of two variables.
I	**I**	**ENGINEERING CHEMISTRY**	• The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion

			control would be understood. The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained. Conductance phenomenon is better understood. The students are exposed to some of the alternative fuels and their advantages and limitations.
I	**I**	**COMPUTER PROGRAMMING**	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. • Use different data types in a computer program. • Design programs involving decision structures, loops and functions. • Explain the difference between call by value and call by reference • Understand the dynamics of memory by the use of pointers • Use different data structures and create/update basic data files.
I	**I**	**ENVIRONMENTAL STUDIES**	• The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources • The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the

			food web • The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity • Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices • Social issues both rural and urban environment and the possible means to combat the challenges • The environmental legislations of India and the first global initiatives towards sustainable development • About environmental assessment and the stages involved in EIA and the environmental audit. • Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, Parking Curriculum.
I	**II**	**ENGLISH -II**	• The lesson underscores that the ultimate aim of Education is to enhance wisdom. • The lesson enables the students to promote peaceful co-existence and universal harmony among people and society. • The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists. • The lesson imparts the students to manage different cultural shocks due to globalization.

			• The lesson highlights insightful commentary on cultural traditions. • The lesson offers several inputs to protect environment for the sustainability of the future generations.
I	**II**	**MATHEMATICS – II (MATHEMATICAL METHODS)**	• Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data. • Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of partial differential equations.
I	**II**	**MATHEMATICS -III**	• Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations. • Solve simultaneous linear equations numerically using various matrix methods. • Determine double integral over a region and triple integral over a volume. • Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.
I	**II**	**ENGINEERING PHYSICS**	• Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study Acoustics, crystallography magnetic

			and dielectric materials enhances the utility aspects of materials
I	**II**	**ENGINEERING DRAWING**	• To introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them. • To introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other. • To make the students draw the projections of the lines inclined to both the planes. • To make the students draw the projections of the plane inclined to both the planes. • To make the students draw the projections of the various types of solids in different positions inclined to one of the planes. • To represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
II/IV R16	**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. • Able to know the properties and applications of ceramic, composite and other advanced materials so as to use the suitable material for practical applications.
II	**I**	**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.
II	**I**	**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.
II	**I**	**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
II	**I**	**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/IV R16	**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.
II	**II**	**Thermal Engineering -I**	• Actual cycles and the effect of various losses occurs in the actual cycles • 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 • perform testing on S.I and C.I Engines for the calculations of performance and emission parameters • Different types of compressors and to calculate power and efficiency of reciprocating compressors • Mechanical details and to calculate power and efficiency of rotary compressors
II	**II**	**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
II	**II**	**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.
II	**II**	**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.
II	**II**	**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/IV R13	**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 it's 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.
III	**I**	**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.
III	**I**	**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.
III	**I**	**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.
III	**I**	**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 • Understand working of jet propulsions and rockets and related problems.
III	**I**	**Metrology**	• Students will be able to design tolerances and fits for selected product quality. • They can choose appropriate method and instruments for inspection of various gear elements and thread elements. • They can understand the standards of length, angles, they can understand the evaluation of surface finish and measure the parts with various comparators. • The quality of the machine tool with alignment test can also be evaluated by them.
III	**I**	**IPR & Patents**	• Able to know about the basics of IPR, types of IPR, emerging trends in IPR • Able to know about copy rights, subject matter of copy rights, laws relating to copy rights • Able to know about the patents, types of patents, patents registration process, patent co-operation treaty • Able to know about trademarks, types of trademarks, trade marks registration process • Able to know about the IT-Act- • 2000 provisions cyber crime, cyber security measures, e-commerce ,data security ,digital signature
III	**II**	**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.
III	**II**	**Interactive Computer Graphics**	• Upon successful completion of the course, students will be able to: • Use the principles and commonly used paradigms and techniques of computer graphics. • Write basic graphics application programs including animation. • Design programs to display graphic images to given specifications. • Possess in-depth knowledge of display systems, image synthesis, shape modeling, and interactive control of 3D computer graphics applications.
III	**II**	**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**.**
III	**II**	**Robotics**	• Identify various robot configuration and components. • Select appropriate actuators and sensors for a robot based on specific application.

			• Carry out kinematic and dynamic analysis for simple serial kinematic chains. • Perform trajectory planning for a manipulator by avoiding obstacles.
III	**II**	**Heat Transfer**	• Understand basic modes of heat transfer and compute temperature distribution in steady state and unsteady state heat conduction • Analyze heat transfer through extended surfaces • Interpret and analyze free & forced convection heat transfer • Comprehend the phenomena and flow regimes of boiling and condensation • Understand the principles of radiation heat transfer • Apply LMTD and NTU methods to design heat exchangers.
III	**II**	**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	**II**	**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
IV/IV R13	**I**	**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
IV	**I**	**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.
IV	**I**	**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.
IV	**I**	**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..
IV	**I**	**Nano Technology (OPEN ELECTIVE)**	• Identify the essential concepts used in nanotechnology. • Identify the materials, properties, syntheses and fabrication, characterization and applications in various fields.
IV	**I**	**Automation In Manufacturing (DEPARTMENTAL ELECTIVE – II)**	• Solve the line balancing problems in the various flow line systems with and without use buffer storage. • Understand the different automated material handling, storage and retrieval systems and automated inspection systems. • Use of Adaptive Control principles and

			implement the same online inspection and control.
IV/IV R13	**II**	**Production Planning and Control**	• Understanding of the concepts of production and service systems • Application of principles and techniques in the design, planning and control of these systems to optimise/make best use of resources in achieving. • Finding different strategies employed in manufacturing and service industries • Calculate effectiveness, identify likely areas for improvement, development • Implementation and improved planning and control methods for different production systems.
IV	**II**	**Green Engineering Systems**	• The student shall understand the principles and working of solar, wind, biomass, geo thermal, ocean energies and green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.
IV	**II**	**Power Plant Engineering(DEPARTMENTAL ELECTIVE – III)**	• 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
IV	**II**	**Non Destructive Evaluation (DEPARTMENTAL ELECTIVE – IV)**	• Able to understand the principle of radiographic technique, sources of radiographic rays, equipment & different techniques of radiography • Able to understand the ultra sonic test, ultra sonic transducers & their characteristics, interpretation of defects, effectiveness & limitations of testing. • Able to understand the concept of liquid penetrate test & eddy current test, test procedure & its applications • Able to understand the concept of Magnetic particle test, test procedure & to interpret the various surface & sub-surface flaws • Able to understand the fundamentals to infrared & thermal testing, contact & non-contact thermal inspection methods, infrared detectors • Able to select the appropriate NDE method based on the application.

Electronics and Communication Engineering

YEAR	SEMESTER	SUBJECT	COS
I	**I**	**ENGLISH - I**	• The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly. • The lesson motivates the public to adopt road safety measures • The lesson creates an awareness in the readers that mass production is ultimately detrimental to biological survival. • The lesson helps to choose a source of energy suitable for rural India. • The lesson creates an awareness in the reader as to the usefulness of animals for the human society. • The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace
I	**I**	**MATHEMATICS-I (Common to all Branch's for I Year B. Tech)**	• Solve linear differential equations of first, second and higher order. • Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE. • Calculate total derivative, Jocobian and minima of functions of two variables.
I	**I**	**ENGINEERING DRAWING**	• To introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them. • To introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other. • To make the students draw the projections of the lines inclined to both

			the planes. • To make the students draw the projections of the plane inclined to both the planes. • To make the students draw the projections of the various types of solids in different positions inclined to one of the planes. • To represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
I	**I**	**C PROGRAMMING**	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. • Use different data types in a computer program. • Design programs involving decision structures, loops and functions. • Explain the difference between call by value and call by reference • Understand the dynamics of memory by the use of pointers • Use different data structures and create/update basic data files.
I	**I**	**APPLIED PHYSICS**	• Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility.
I	**I**	**MATHEMATICS-II (Numerical Methods and Complex Variables)**	• At the end of the Course, Student will be able to: • Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data.. Solve ordinary differential equations numerically using

			Euler's and RK method.
I	**II**	**ENGLISH -II**	• The lesson underscores that the ultimate aim of Education is to enhance wisdom. • The lesson enables the students to promote peaceful co-existence and universal harmony among people and society. • The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists. • The lesson imparts the students to manage different cultural shocks due to globalization. • The lesson highlights insightful commentary on cultural traditions. • The lesson offers several inputs to protect environment for the sustainability of the future generations.
I	**II**	**MATHEMATICS-III**	• Course Outcomes: At the end of the Course, Student will be able to: • Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations. • Solve simultaneous linear equations numerically using various matrix methods. • Determine double integral over a region and triple integral over a volume. • Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.
I	**II**	**APPLIED CHEMISTRY**	• The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood.

			• The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. • The importance of green synthesis is well understood and how they are different from conventional methods is also explained. • Conductance phenomenon is better understood. The students are exposed to some of the alternative fuels and their advantages and limitations.
I	**II**	**ENVIRONMENTAL STUDIES**	• The student should have knowledge on The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources • The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web • The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity • Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices • Social issues both rural and urban environment and the possible means to combat the challenges • The environmental legislations of India and the first global initiatives towards sustainable development • About environmental assessment and the stages involved in EIA and the environmental audit. • Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting,

			Parking Curriculum.
I	**II**	**ELECTRICAL & MECHANICAL TECHNOLOGY**	• Able to analyse the various electrical networks • Able to understand the operation of DC generator, DC Motor ,3-point starter and Speed control methods. • Able to analyse the performance of transformer. • Able to explain the operation of 3-phase alternator and 3-phase induction motors. • Able to explain the working principle of various measuring instruments.
I	**II**	**DATA STRUCTURES**	• 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 all data structures like stacks, queues, trees, lists and graphs and compare their Performance and trade offs
II/IV B.Tech ECE (R16)	**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.
II	**I**	**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.
II	**I**	**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.
II	**I**	**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.
II	**I**	**Random Variables and Stochastic**	• Mathematically model the random phenomena and solve simple probabilistic problems.

		Process	• 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.
II	**I**	**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 Accounting tools for Analysis • To evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
II/IV B. Tech ECE (R16)	**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.
II	**II**	**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.
II	**II**	**Electromagnetic Waves and Transmission Lines**	• Determine E and H using various laws and applications of electric & magnetic fields • 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
II	**II**	**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
II	**II**	**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.
II	**II**	**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	**I**		• Design linear and non-linear wave shaping circuits.

B.Tech ECE (R13)		**Pulse And Digital Circuits**	• Apply the fundamental concepts of wave shaping for various switching and signal generating circuits. • Students can find the switching characteristics of diode and construct various logic gates and compare their performances. • Design different multivibrators for various electronic applications. • Ability to find the time base generators and knowing knowledge about Bootstrap base generators and its basic principles. • Students will understand the principles of synchronization and frequency division and know the basic operating principles of sampling gates and their applications.
III	**I**	**Linear IC Applications**	• Demonstrate how differential amplifiers are designed and its analysis. • Demonstrate about Op-amps functions and its specifications. • Demonstrate about Linear and Non-Linear applications of Op-amps. • Demonstrate about design of filters. Understand about analog multipliers, modulators and their operation. • Analyze the Timers and Phase Locked Loop and its applications. • Understand D/a and A/D conversions by using IC's.
III	**I**	**Control Systems**	• Understand the concept of control systems and able to represent Mechanical and electrical systems using Differential Equations. • Ability to obtain the Transfer Function of a servo motor and represent systems using block diagrams and signal flow graphs. Can derive Transfer function of a system using block diagram or signal flow graph. • Students can obtain Time Domain specifications of second order systems

			and analyze the effect of proportionality controllers. • Students are able to comment on stability of a system from the given characteristics equation. They can locate roots in S-Domain and find critical value of open loop gain K for stability of system using root locus. • Able to analyze the stability of the system in frequency domain and obtaining its specifications. • Able to analyze the effect of Lag, Lead and Lag-Lead controllers in control systems and understand state variable analysis of systems and the relationship with state variables and transfer function.
III	**I**	**Digital System Design & Digital IC Applications**	• Ability to write VHDL programs for basic combinational and sequential circuits. • Learn the simulation and synthesis approaches and also the net list formats for design representation in VHDL. • Learn the internal circuits for different combinational PLDs such as PROM, PAL, PLA, memory(ROM AND RAM) • Design CMOS circuits and learn the static and dynamic electrical behavior of CMOS circuits and also learn TTL and emitter coupled logic. • Learn the internal circuits for different combinational ICs namely decoders, encoders, parity circuits, multiplexers, adders and also write VHDL programs for the ICs. • Learn the internal circuits for different sequential ICs such as Latches, flipflops, registers and counters and also write VHDL programs for the ICs.
III	**I**		• Able to identify antenna parameters.

		Antennas And Wave-Propagation	• Able to Design and analyze wire antennas and loop antennas and Quantify the fieldsradiated by various types of antennas. • Able to design and analyze antenna arrays. • Able to design and analyze long wire antennas, micro strip antennas and helical antennas. • Able to design and analyze reflector antennas, lens antennas and horn antennas and measure their performance. • 6. Able to identify the characteristics of radio wave propagation.
III	**I**	**Intellectual Property Rights And Patents**	• Intellectual property law – evolutionary past – intellectual property law basics - types of intellectual property and over use or misuse of intellectual property rights - compliance and liability issues are understood. • Principles of copyright and limitations infringement of copyright – international copyright law- semiconductor chip protection act are understood. • Patent law – rights and limitations – rights under patent law – patent requirements and new developments in patent law- invention • Developers and promoters are understood. • Trade mark – trade mark registration process – post registration procedures and international trade mark law • Trade secrets – maintaining trade secret – physical security and breach of • Contract – applying state law are understood. • Cyber law – information technology act - cyber crime and e-commerce –

			data security – confidentiality – privacy - international • Aspects of computer and online crime are understood.
III/IV B.Tech ECE (R16)	**II**	**Microprocessors And Micro Controllers**	• Student can understand the basics of 8086 microprocessors • Student can understand how to use instructions with different addressing modes • Able to develop programs for different addressing modes in machine and assembly Languages • Able to interface 8086 with different peripherals and implement programs. • Ability to understand the microcontroller and able to write the programs on 8051 • Student can able to interface 8051 with industrial applications
III	**II**	**Digital Signal Processing**	• Estimate the spectra of signals that are to be processed by a discrete time filters, and to verify the performance of a variety of modern and classical spectrum estimation techniques. • Able to define and use discrete Fourier transforms (DFTs). • Able to realize FIR, IIR filters and use Z-Transforms and discrete time Fourier transforms to analyze digital systems. • Able to design FIR, IIR filters. • Able to understand the concepts of decimation, interpolation. • Able to program a DSP processor to filter signals.
III	**II**	**Digital Communications**	• Understand the working of Pulse Digital Modulation systems such as PCM, DPCM and DM. • Learn various digital Pass Band modulation techniques such as ASK, PSK , QPSK, DPSK and M-array PSK.

			• Analyze the performance of various digital modulation systems in terms of probability of error. • Understand the concepts of information theory and need for source coding. • Learnt the theorems governing the transmission of information over a NET channel and perform the efficiency calculations. • Perform channel coding using linear block codes, cyclic codes etc.
III	**II**	**Microwave Engineering**	• Study about the microwave frequencies and waveguides that are used to carry them, various parameters and characteristics of the rectangular waveguides. • Study the various parameters and characteristics of the circular waveguide, micro strip lines and cavity resonators. • Implement waveguide components and devices for various applications. • Analyze mathematically the operation of the various tubes or sources used for the transmission of the microwave frequencies. • Study the significance, types and characteristics of slow wave structures and cross fields tubes used for the transmission of the microwave frequencies. • Analyze the significance, types and characteristics of microwave solid state devices and acquire knowledge in various microwave measurements.
III	**II**	**Bio Medical Engineering**	• Understand the origin of Bio potential and how to measure various psychological 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 cardio vascular system, measurement of parameters related to cardiology, to 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, ability to understand diagnosis and therapy related equipments. • Learn ultra sound imaging techniques and its usefulness in diagnosis and different types of radio diagnostic techniques. • Understand the importance of patient's safety against electrical hazards, functioning of amplifiers, display devices and signal recorders.
IV/ IV R13	**I**	**VLSI Design**	• Interpret and use mathematical methods and other analysis of cmos circuits. • Analyze and study time varying properties of mos circuits. • Interpret understand the basic nature or the components connected in the circuit and their behavioral nature. • Able to demonstrate the circuit construction and analysis in various circuit technologies. • Demonstrate and compute the functioning of the circuit as a subsystem design. • Design a MOS circuit for various applications and mapping the circuit on FPGA
		Computer Networks	• Understand various network topologies required for communication • Understand the physical layer processes such as switching and encoding and the

			behavior of various transmission media. • Understand the general principles behind addressing, routing, reliable transmission and other MAC protocols. • Analyze various routing algorithms. • Have an informed view of both the internal workings of the Internet and of a number of common Internet applications and protocols.(TCP and UDP)
IV	**I**	**Digital Image Processing**	• Perform different transforms on image useful for image processing Applications • Perform spatial and frequency domain filtering on image. • Implement all smoothing and sharpening operations on images and perform frequency domain filtering. Perform image restoration operations/techniques on images. • Operate effectively on color images and different color conversions • on images and can code images to achieve good compression • Do wavelet based image processing and image compression using Wavelets • Perform all morphological operations on images and can be able todo image segmentation also.
IV	**I**	**Computer Architecture And Organization**	• Understand the fundamentals of different instruction set architectures and their relationship to the CPU design. • Understand the principles and the implementation of computer Arithmetic and ALU. • Student can understand the interconnections and design of CPU. • Understand the memory system, I/O organization

			• Understand the I/O organization • Understand the operation of modern CPUs including interfacing,Pipelining, memory systems and busses. • Understand the principles of operation of multiprocessor systems.
IV	**I**	**Electronic Switching Systems (ELECTIVE-1)**	• Introduce telecommunication switching systems and operation of different switching systems. • Obtain the knowledge of different automatic switching systems. • Analyze the performance of telecommunication network and implenet the signaling techniques in communication networks. • Obtain the knowledge of network architecture and its protocols. • Gained understanding on different switching networks and interconnecting services. • Introduced ISDN and BISDN services in existing data networks.
IV	**I**	**Optical Communication (ELECTIVE-2)**	• Students will be able to choose necessary components required in modern optical communication systems. • Student can know the properties of optical fiber that affect the performance of a Communication link and Design and build optical fiber experiments in the lab and learn how to calculate electromagnetic modes in waveguides. • Students can know the properties of optical fibers and the amount of light lost going through an optical system, dispersion of optical fibers. • Students will be able to know the working of semiconductor lasers and analyze the operation of LEDs and ALSER diodes. • Students will be able to know the

			principles of single and multi-mode optical fibers and their characteristics. • Students will be able to know the Types of photo diode sand analyze the optical fiber and light wave systems.
IV/IV B.Tech (R13)	**II**	**Cellular And Mobile Communications**	• Introduced cellular mobile radio system and how operation takes place in mobile radio environment • Be acquainted with different interference factors influencing cellular and mobile communication and be able to Efficiently used the background behind developing different path loss and/or radio coverage in cellular environment • Gain the understanding of cell site antennas and mobile antennas • Acquainted with the role of cellular and mobile communication in frequency management issues • Acquainted with different interference factors influencing cellular and mobile communication • Obtained the knowledge of different handoff techniques and how dropped calls exist and gain the knowledge of digital cellular networks in different generations
IV	**II**	**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.
IV	**II**	**Satellite Communications (ELECTIVE-3)**	• Student will be able to know on history, applications and frequency oscillations of SATELLITE COMMUNICATIONS s/ms. • Student can learn fundamentals of SATELLITE COMMUNICATIONS

			s/ms. • Student can learn various commands and controlling s/ms of SATELLITEs. • Student will be able to design uplink and down link for SATELLITE COMMUNICATIONS s/ms and understand various multiple access techniques. • Student will be able to understand working of various SATELLITE COMMUNICATIONS transmitters and receivers and their installation, coverage and frequency considerations for efficient COMMUNICATION. • Student will be able to get exposure on working principle of GPS.
IV	**II**	**Embedded Systems (ELECTIVE-3)**	• Understand the building blocks of typical embedded system and different memory technology and memory types. • Learn about communication devices. • Learn concept of firmware design approaches, ISR concept and interrupt sources. • Learn an Operating system and learn how to choose an RTOS, focusing on common underlying modeling concepts, the design of hardware-software interface. • Understand the IDE and hardware debugging. • Understand the debugging tools and testing tools.
IV	**II**	**Wireless Sensor Networks (ELECTIVE--4)**	• 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 MAN

			protocols used in WSN. • Understood the issues in designing routing protocols 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 provide security in WSN. Understood sensor types and applications.
IV	**II**	**Bio-Medical Instrumentation (ELECTIVE-4)**	• 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 • Gain knowledge about fundamental issues and elements of patient care in ICU and Organization of hospitals with quality care and understand the basic knowledge about measurements of parameters related to Respiratory system. • Ability to understand Bio telemetry and related equipments • Learn Ultrasound imaging techniques and understand the importance of patient safety against electrical hazard and functioning of Amplifiers, display devices and signal recorders • Learn Ultrasound imaging techniques and its usefulness in diagnosis and different types of radio diagnostic techniques.

M.Tech

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.
I	**I**	**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
I	**I**	**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.
I	**I**	**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.
I	**I**	**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.
I	**I**	**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.
I	**II**	**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.
I	**II**	**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**	**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.
I	**II**	**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.
I	**II**	**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.
I	**II**	**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.
I	**II**	**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 - I**	• The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly. • The lesson motivates the public to adopt road safety measures • The lesson creates awareness in the readers that mass production is ultimately detrimental to biological survival. • The lesson helps to choose a source of energy suitable for rural India. • The lesson creates awareness in the reader as to the usefulness of animals for the human society. • The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace
I	**I**	**MATHEMATICS-I (Common to all Branch's for I Year B. Tech)**	• Solve linear differential equations of first, second and higher order. • Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE.. • Calculate total derivative, Jocobian and minima of functions of two variables.
I	**I**	**ENGINEERING DRAWING**	• To introduce the use and the application of drawing instruments and

			to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them. • To introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other. • To make the students draw the projections of the lines inclined to both the planes. • To make the students draw the projections of the plane inclined to both the planes. • To make the students draw the projections of the various types of solids in different positions inclined to one of the planes. • To represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
I	**I**	**PROGRAMMING FOR PROBLEM SOLVING USING C**	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. • Use different data types in a computer program. • Design programs involving decision structures, loops and functions.

			• Explain the difference between call by value and call by reference • Understand the dynamics of memory by the use of pointers • Use different data structures and create/update basic data files.
I	**I**	**APPLIED PHYSICS**	• Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility.
I	**I**	**MATHEMATICS - II**	• Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data.. Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of partial differential equations.
I	**II**	**ENGLISH -II**	• The lesson underscores that the ultimate aim of Education is to enhance wisdom. • The lesson enables the students to promote peaceful co-existence and universal harmony among people and society. • The Achievements of C V Raman are

			inspiring and exemplary to the readers and all scientists. • The lesson imparts the students to manage different cultural shocks due to globalization. • The lesson highlights insightful commentary on cultural traditions. • The lesson offers several inputs to protect environment for the sustainability of the future generations.
I	**II**	**MATHEMATICS – II (MATHEMATICAL METHODS)**	• Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data. • Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of partial differential equations.
I	**II**	**MATHEMATICS-III**	• Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations. • Solve simultaneous linear equations numerically using various matrix methods. • Determine double integral over a region and triple integral over a volume. • Calculate gradient of a scalar function,

			divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.
I	**II**	**APPLIED CHEMISTRY**	• The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood. • The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. • The importance of green synthesis is well understood and how they are different from conventional methods is also explained. • Conductance phenomenon is better understood. The students are exposed to some of the alternative fuels and their advantages and limitations.
I	**II**	**OBJECT-ORIENTED PROGRAMMING THROUGH C++**	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. Use different data types in a computer program. • Design programs involving decision

			structures, loops and functions. • Explain the difference between call by value and call by reference
I	**II**	**ENVIRONMENTAL STUDIES**	• The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources • The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web • The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity • Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices • Social issues both rural and urban environment and the possible means to combat the challenges • The environmental legislations of India and the first global initiatives towards sustainable development • About environmental assessment and the stages involved in EIA and the environmental audit. • Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting,

			Parking Curriculum.
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
II	**I**	**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
II	**I**	**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
II	**I**	**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.
II	**I**	**DATASTRUCTURES**	• 1.Illustrate Object Oriented Programming

		THROUGH C++	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
II	**I**	**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	**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
II	**II**	**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.
II	**II**	**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
II	**II**	**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.
II	**II**	**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
II	**II**	**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/IV R13	**I**	**Compiler Design**	• To introduce the major concept areas of language translation and compiler design • To develop an awareness of the function and complexity of compilers. • To provide practical, hands on experience in compiler design

			• Identify the similarities and differences among various parsing techniques and grammar transformation techniques
III	**I**	**Data Communication**	• Knowledge of working of basic communication systems • Ability to evaluate alternative models of communication system design
III	**I**	**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**	**Database Management Systems**	• Define a Database Management System give a description of the Database Management structure • Understand the applications of Databases • Know the advantages and disadvantages of the different models • Compare relational model with the Structured Query Language (SQL) • Know the constraints and controversies associated with relational database model. • know the rules guiding transaction ACID • Understand the concept of data planning and Database design • Identify the various functions of Database Administrator
III	**I**	**Operating Systems**	• Describe the general architecture of computers describe, contrast and compare differing structures for operating Systems

			• Understand and analyse theory and implementation of: processes, resource • Control (concurrency etc.), physical and virtual memory, scheduling, I/O and files
III	**II**	**Computer Networks**	• Independently understand basic computer network technology. • Identify the different types of network topologies and protocols. • Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
III	**II**	**Data Ware housing and Mining**	• understand why there is a need for data warehouse in addition to traditional operational database systems; • Identify components in typical data warehouse architectures; • Design a data warehouse and understand the process required to construct one; • Understand why there is a need for data mining and in what ways it is different from traditional statistical techniques; • understand the details of different algorithms made available by popular commercial data mining software; • solve real data mining problems by using the right tools to find interesting patterns
III	**II**	**Design and Analysis of Algorithms**	• 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. • Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. • Describe the greedy paradigm and explain when an algorithmic design situation calls for it.

			• Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them. • Explain the different ways to analyze randomized algorithms (expected running time, probability of error). Recite algorithms that employ randomization. Explain the difference between a randomized algorithm and an algorithm with probabilistic inputs. • Analyze randomized algorithms. Employ indicator random variables and linearity of expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.
III	**II**	**Software Engineering**	• Knowledge of basic SW engineering methods and practices, and their appropriate application; • General understanding of software process models such as the waterfall and evolutionary models. scheduling, risk management, etc. • Understanding of the role of project management including planning, • Understanding of software requirements and the SRS document. • Understanding of different software architectural styles coding standards. modularity and • Understanding of implementation issues such as static analysis, and reviews. • Understanding of approaches to verification and validation including such as unit testing and integration testing. • Understanding of software testing approaches

			• Understanding of software evolution and related issues such as version management. • Understanding on quality control and how to ensure good quality software. • Understanding of some ethical and professional issues that are important for software engineers. • Development of significant teamwork and project based experience
III	**II**	**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
IV/IV R13	**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
IV	**I**	**UML & DESIGN PATTERNS**	• Identify the purpose and methods of use of common object-oriented design patterns • Select and apply these patterns in their own designs for simple programs • Represent the data dependencies of a simple program using UML • Represent user and programmatic interactions using UML

			• Create design documentation outlining the testable and complete design of a simple program • Produce and present documents for the purpose of capturing software requirements and specification • Produce plans to limit risks specific to software designed for use in a particular social context
IV	**I**	**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
IV	**I**	**SOFTWARE TESTING METHODOLOGIES (Elective 1)**	• Have an ability to apply software testing knowledge and engineering methods. • Have an ability to design and conduct a software test process for a software testing project. • Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation. • Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria,

			strategies, and methods. • Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects. • Have basic understanding and knowledge of contemporary issues in software testing, such as componentbased software testing problems • Have an ability to use software testing methods and modern software testing tools for their testing projects.
IV	**I**	**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

IV/IV R13	**II**	**HUMAN COMPUTER INTERACTION (Elective III)**	• Design, implement and evaluate effective and usable graphical computer interfaces. • Describe and apply core theories, models and methodologies from the field of HCI. • Describe and discuss current research in the field of HCI. • Implement simple graphical user interfaces using the Java Swing toolkit. • Describe special considerations in designing user interfaces for older adults.
IV	**II**	**CLOUD COMPUTING**	• Understanding the key dimensions of the challenge of Cloud Computing • Assessment of the economics , financial, and technological implications for selecting • cloud computing for own organization • Assessing the financial, technological, and organizational capacity of employer's for • Actively initiating and installing cloud-based applications. • Assessment of own organizations' needs for capacity building and training in cloud • computing-related IT areas
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
IV	**II**	**MANAGEMENT SCIENCE**	• To familiarize with the process of management and to provide basic insights into select contemporary management practices

Mtech

YEAR	SEMESTER	SUBJECT	COS
I	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 problem
I	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	**I**	**COMPUTER ORGANIZATION AND ARCHITECTURE**	• Understand the fundamentals of different instruction set architectures and their relationship to the CPU design. • Understand the principles and the implementation of computer arithmetic and ALU. • Understand the memory system, I/O organization • Understand the operation of modern CPUs including interfacing, pipelining, memory systems and busses. • Understand the principles of operation of multiprocessor systems. • Demonstrate the relationship between the software and the hardware and focuses on the foundational concepts that are the basis for current computer design.
I	**I**	**DATABASE MANAGEMENT SYSTEMS**	• Define a Database Management System • Give a description of the Database Management structure

			• Understand the applications of Databases • Know the advantages and disadvantages of the different models • Compare relational model with the Structured Query Language (SQL) • Know the constraints and controversies associated with relational database model. • Know the rules guiding transaction ACID • Understand the concept of data planning and Database design • Identify the various functions of Database Administrator
I	**I**	**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
I	**I**	**DATA WAREHOUSING AND DATA MINING**	• Understand why there is a need for data warehouse in addition to traditional operational database systems;

			• Identify components in typical data warehouse architectures; • Design a data warehouse and understand the process required to construct one; • Understand why there is a need for data mining and in what ways it is different from traditional statistical techniques; • Understand the details of different algorithms made available by popular commercial data mining software; • Solve real data mining problems by using the right tools to find interesting patterns
I	**II**	**CYBER SECURITY**	• Information 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
I	**II**	**COMPUTER NETWORKS**	• Independently understand basic computer network technology. • Identify the different types of network topologies and protocols • Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

I	**II**	**BIG DATA ANALYTICS**	• Illustrate on big data and its use cases from selected business domains. • Interpret and summarize on No SQL, Cassandra • Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications Using Hive. • Make use of Apache Spark, RDDs etc. to work with datasets. • Assess real time processing with Spark Streaming.
I	**II**	**ADVANCED UNIX PROGRAMMING**	• Describe and use the UNIX operating system and shells. • Describe and use the fundamental UnixFile System and I/O utilities. • Describe and write shell scripts, process. • Describe and understand the memory management, IPC, Message Queues in Unix • Describe and understand the Semaphores and Shared Memory in Unix
I	**II**	**SOFTWARE ENGINEERING (elective 1)**	• Apply the Object Oriented Software-Development Process to design software • Analyze and Specify software requirements through a SRS documents. • Design and Plan software solutions to problems using an object-oriented strategy.

			• Model the object oriented software systems using Unified Modeling Language (UML) • Estimate the cost of constructing object oriented software
I	**II**	**CLOUD COMPUTING (elective 2)**	• Understanding the key dimensions of the challenge of Cloud Computing • Assessment of the economics ,financial, and technological implications for selecting cloud computing for own organization • Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications. • Assessment of own organizations' needs for capacity building and training in cloud computing-related IT areas

Information Technology

YEAR	SEMESTER	SUBJECT	COS
I	**I**	**ENGLISH - I**	• The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly. • The lesson motivates the public to adopt road safety measures • The lesson creates awareness in the readers that mass production is ultimately detrimental to biological survival. • The lesson helps to choose a source of energy suitable for rural India. • The lesson creates awareness in the reader as to the usefulness of animals for the human society. • The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace
I	**I**	**MATHEMATICS-I (Common to all Branch's for I Year B. Tech)**	• Solve linear differential equations of first, second and higher order. • Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE.. • Calculate total derivative, Jocobian and minima of functions of two variables.
I	**I**	**ENGINEERING DRAWING**	• To introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them. • To introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other. • To make the students draw the projections of the lines inclined to both the planes. • To make the students draw the projections of the plane inclined to both the planes. • To make the students draw the projections of the various types of solids in different positions inclined to one of the planes. • To represent the object in 3D view through

			isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.
I	**I**	**PROGRAMMING FOR PROBLEM SOLVING USING C**	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. • Use different data types in a computer program. • Design programs involving decision structures, loops and functions. • Explain the difference between call by value and call by reference • Understand the dynamics of memory by the use of pointers • Use different data structures and create/update basic data files.
I	**I**	**APPLIED PHYSICS**	• Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility.
I	**I**	**MATHEMATICS - II**	• Course Outcomes: At the end of the Course, Student will be able to: • Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data.. Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of partial differential equations.
I	**I**	**ENGINEERING / APPLIED CHEMISTRY LABORATORY**	• The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

I	**I**	**COMPUTER PROGRAMMING LAB**	• Apply and practice logical ability to solve the problems. • Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment • Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs • Understand and apply the in-built functions and customized functions for solving the problems. • Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems • Document and present the algorithms, flowcharts and programs in form of user-manuals • •Identification of various computer components, Installation of software
I	**II**	**ENGLISH -II**	• The lesson underscores that the ultimate aim of Education is to enhance wisdom. • The lesson enables the students to promote peaceful co-existence and universal harmony among people and society. • The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists. • The lesson imparts the students to manage different cultural shocks due to globalization. • The lesson highlights insightful commentary on cultural traditions. • The lesson offers several inputs to protect environment for the sustainability of the future generations.
I	**II**	**MATHEMATICS – II (MATHEMATICAL METHODS)**	• Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators. • Compute interpolating polynomial for the given data. • Solve ordinary differential equations numerically using Euler's and RK method. • Find Fourier series and Fourier transforms for certain functions. • Identify/classify and solve the different types of

			partial differential equations.
I	**II**	**MATHEMATICS-III**	• Course Outcomes: At the end of the Course, Student will be able to: • Determine rank, Eigen values and Eigen vectors of a given matrix and solve simultaneous linear equations. • Solve simultaneous linear equations numerically using various matrix methods. • Determine double integral over a region and triple integral over a volume. • Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.
I	**II**	**APPLIED CHEMISTRY**	• The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood. The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. • The importance of green synthesis is well understood and how they are different from conventional methods is also explained. Conductance phenomenon is better understood. • The students are exposed to some of the alternative fuels and their advantages and limitations.
I	**II**	**OBJECT-ORIENTED PROGRAMMING THROUGH C++**	• Understand the basic terminology used in computer programming • Write, compile and debug programs in C language. Use different data types in a computer program. • Design programs involving decision structures, loops and functions. • Explain the difference between call by value and call by reference
I	**II**	**ENVIRONMENTAL STUDIES**	• The student should have knowledge on • The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources • The concepts of the ecosystem and its function in

			the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web • The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity • Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices • Social issues both rural and urban environment and the possible means to combat the challenges • The environmental legislations of India and the first global initiatives towards sustainable development • About environmental assessment and the stages involved in EIA and the environmental audit. • Self Sustaining Green Campus with Environment Friendly aspect of – Energy, Water and Wastewater reuse Plantation, Rain water Harvesting, Parking Curriculum.
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
II	**I**	**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

II	**I**	**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.
II	**I**	**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
II	**I**	**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
II	**I**	**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**	• Know and be able to describe the general software

		GRAPHICS	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).
II	**II**	**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.
II	**II**	**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
II	**II**	**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
II	**II**	**OBJECT ORIENTED ANALYSIS &**	• Ability to find solutions to the complex problems using object oriented approach • Represent classes, responsibilities and states using UML notation

		DESIGN USING UML	• Identify classes and responsibilities of the problem domain
II	**II**	**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/IV R13	**I**	**Software Engineering**	• knowledge of basic SW engineering methods and practices, and their appropriate application; • general understanding of software process models such as the waterfall and evolutionary models. • understanding of the role of project management including planning, scheduling, risk management, etc. • understanding of software requirements and the SRS document. • understanding of different software architectural styles. • understanding of implementation issues such as modularity and coding standards. • understanding of approaches to verification and validation including static analysis, and reviews. • understanding of software testing approachs such as unit testing and integration testing. • understanding of software evolution and related issues such as version management. • understanding on quality control and how to ensure good quality software. • understanding of some ethical and professional issues that are important for software engineers. • development of significant teamwork and project based experience
III	**I**	**Data Communication**	• Knowledge of working of basic communication systems • Ability to evaluate alternative models of communication system design

III	**I**	**Advanced JAVA**	• 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 • Map java inheritance hierarchy with database tables using various mapping techniques. • Persist different types of collections.
III	**I**	**Database Management Systems**	• define a Database Management System • give a description of the Database Management structure • understand the applications of Databases • know the advantages and disadvantages of the different models • compare relational model with the Structured Query Language (SQL) • Know the constraints and controversies associated with relational database model. • know the rules guiding transaction ACID • understand the concept of data planning and Database design • identify the various functions of Database Administrator
III	**I**	**Operating Systems**	• describe the general architecture of computers • describe, contrast and compare differing structures for operating Systems • understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and files
III	**I**	**IPR And Patents- 1**	• Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP. • Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development. • Identify activities and constitute IP infringements

			and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development. • Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy. • Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation. • Be able to demonstrate a capacity to identify, apply and assess ownership rights and marketing protection under intellectual property law as applicable to information, ideas, new products and product marketing;
III	**II**	**Computer Networks**	• Independently understand basic computer network technology. • Identify the different types of network topologies and protocols. • Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
III	**II**	**Data Ware housing and Mining**	• understand why there is a need for data warehouse in addition to traditional operational database systems; • identify components in typical data warehouse architectures; • design a data warehouse and understand the process required to construct one; • understand why there is a need for data mining and in what ways it is different from traditional statistical techniques; • understand the details of different algorithms made available by popular commercial data mining software; • solve real data mining problems by using the right tools to find interesting patterns
III	**II**	**Design and Analysis of Algorithms**	• 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. • Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. • Describe the greedy paradigm and explain when an algorithmic design situation calls for it. • Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them. • Explain the different ways to analyze randomized algorithms (expected running time, probability of error). Recite algorithms that employ randomization. Explain the difference between a randomized algorithm and an algorithm with probabilistic inputs. • Analyze randomized algorithms. Employ indicator random variables and linearity of expectat expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.
III	**II**	**Software Testing**	• Have an ability to apply software testing knowledge and engineering methods. • Have an ability to design and conduct a software test process for a software testing project. • Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation. • Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods. • Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects. • Have basic understanding and knowledge of contemporary issues in software testing, such as component based software testing problems • Have an ability to use software testing methods and modern software testing tools for their testing

			projects.
III	**II**	**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
III	**II**	**Intellectual Property Rights and Patents - II**	• Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP. • Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development. • Identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development. • Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy. • Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation. • Be able to demonstrate a capacity to identify, apply and assess ownership rights and marketing protection under intellectual property law as applicable to information, ideas, new products and product marketing
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.

IV	**I**	**UML & Design Patterns**	• identify the purpose and methods of use of common object-oriented design patterns • select and apply these patterns in their own designs for simple programs • represent the data dependencies of a simple program using UML • represent user and programmatic interactions using UML • create design documentation outlining the testable and complete design of a simple program • produce and present documents for the purpose of capturing software requirements and specification • produce plans to limit risks specific to software designed for use in a particular social context
IV	**I**	**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
IV	**I**	**INFORMATION RETRIEVAL SYSTEM**	• Identify basic theories in information retrieval systems • Identify 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. • Explain the concepts of indexing, vocabulary, normalization and dictionary in information retrieval. • Evaluate information retrieval algorithms, and give an account of the difficulties of evaluation • Use different information retrieval techniques in various application areas • Apply IR principles to locate relevant information large collections of data

			• Analyze performance of retrieval systems when dealing with unmanaged data sources • Implement retrieval systems for web search tasks. • Understand and apply the basic concepts of information retrieval; • Appreciate the limitations of different information retrieval techniques; • Write programs to implement search engines; • Evaluate search engines; • Develop skills in problem solving using systematic approaches; • Solve complex problems in groups and develop group work.
IV	**I**	**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
IV	**II**	**Human Computer Interaction**	• Explain the capabilities of both humans and computers from the viewpoint of human information processing. • Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms. • Apply an interactive design process and universal design principles to designing HCI systems. • Describe and use HCI design principles, standards and guidelines. • Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of • HCI systems.

			• Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.
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
IV	**II**	**Mathematical Opimization**	• Concept of mathematical modeling and development of a model. • Use of graphical solution in solving LPP. • Determining minimum transportation costs. • Use of assignment models in business and industry. • Processing of jobs through different number of machines. • Solving queuing problems in single-channel and multiple-channel situations • Inventory management and management decision making • Project management and simulation techniques • Understand application of probability distributions and markov process in different situations.
IV	**II**	**Management Science**	• Plan ana organizational structure for a given context in the organisation carry out production operations through Work study. • Carry out production operations through Work study. • Understand the markets, customers and competition better and price the given products appropriately. • Ensure quality for a given product or service. • Plan and control the HR function better. • plan, schedule and control projects through PERT and CPM • evolve a strategy for a business or service organisation

Masters of Business Administration

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES:
I	I	**PRINCIPLES OF MANAGEMENT**	• 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	**MANAGERIAL ECONOMICS**	• Know the economy and its principles. • understand the relationship between the demand supply • Learn the types of production and its factors. • To understand the cost concepts, relationship between cost, volume and profit • To know the market structure and pricing theories.
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	**MANAGERIAL COMMUNICAATION AND SOFT SKILLS**	• uptained knowledge of objectives of communication • Acquaint the knowledge interpersonal and intrapersonal communication theories • Obtain the knowledge etiquettes of interview

			• equipped with business correspondence letters • uptained knowledge of interview techniques for group discussion
I	**I**	**BUSINESS ENVIRONMENT**	• Co1:Obtained knowledge on contract and its essentials • understand consumer rights and grievances • gain knowledge about negotiable instruments • Obtained knowledge on partnership firms • understand the company formation and winding up
I	**I**	**QUANTITATIVE ANALYSIS AND 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	**II**	**FINANCIAL MANAGEMENT**	• Co1:gain knowledge about concepts of financial management • Co2:obtain knowledge about Capital structure theories • Co3:understand the Investment decision process & its tools • Co4:understand the theories of Dividend • Co5:acquaint knowledge of Working Capital Cycle.
I	**II**	**HUMAN RESOURCE MANAGEMENT**	• understand 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**	**PRODUCTION AND 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 METHODOLOGY**	• enhanced knowledge and skills to carry out research for business • better awareness on data collection techniques, measurement and scaling • gained knowledge in preparation and presentation of research report • equipped student with statistical techniques • students were in a position to use multivariate techniques
I	**II**	**ORGANAISATIONAL BEHAVIOUR**	• To understand the basic approach of organisation behaviour • To understand the ways of personality development • To understand the decision making system and importance in organisation • To understand the interpersonal communication system with in the organisation • To understand the organisation development(goals, objectives and process)
II	**I**	**STRATEGIC MANAGEMENT**	• Gained knowledge about Vision, Mission and Objectives of the Organisation • Obtained knowledge of strengths, weakness, opportunities and threats of the Organisation • Gained knowledge about framing 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
II	**I**	**LEGAL ASPECTS OF BUSINESS**	• Obtained knowledge on contract and its essentials • understand consumer rights and grievances • gain knowledge about negotiable instruments • Obtained knowledge on partnership firms • understand the company formation and winding up
II	**I**	**BUSINESS ETHICS AND CORPORATE GOVERNANCE**	• Able to understand the values ,ethics and ethical decision making. • Acquaint the knowledge on unethical practices among Indian companies and studies on ethical attitude of managers major Indian scam. • Gain knowledge about product advertising

			,marketing ethics sales and ethical issues in banks and insurance sector. • Students are able to learn an overview of corporate Governance Indian scenario. • Understand the duties and responsibilities of auditors and role of media
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**	**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**	**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**	**STRATEGIC HUMAN**	• Gain Knowledge on Human Resource Manager

		RESOURCE MANAGEMENT	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**	**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 awairness on elements, composition of portifolio and managmeent of portifilio • Obtained the knowledge on evaluation of perfomance of portifolio
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**	**ADVANCED MANAGEMENT ACCOUNTING**	• Gain Knowledge on International Accounting Standards • Obtained knowledge on Analysis of Financial statements • Gain knowledge on preparation of functional budgets • Equippped with applications of marginal costing • understand applications of break even analysis
II	**I**	**STRATEGIC FINANCIAL MANAGEMENT**	• To understand the meaning and concept of strategic financial management and corporate policy • To know the concept of corporate financial strategies • Able to understand the differences between net present value and rate of return. • Able to Compare and contrast corporate financial engineering concepts • Able to gain knowledge aboutResearch 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 process • 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**	• Obtained 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 AND CHANGE DEVELOPMENT**	• 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**	**GLOBAL HUMAN RESOURCE MANAGEMENT**	• Able to understand the -Challenges of Globalization - Implications of Managing People and Leveraging Human Resource International 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**	• understand the welfare legislation of labour

		LEGISLATIONS	• 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
II	**II**	**MANAGEMENT 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**	**FINANCIAL MARKET AND SERVICES**	• 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 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
II	**II**	**RISK MANAGEMENT**	• 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 derivatives basics, types of derivatives , different players in stock market • learner has understood about SWAPS meaning , types, pricing rates of swaps • student has learned about the Options , binomial option pricing model
II	**II**	**TAX MANAGEMENT**	• Able to know about the basics of tax, tax on agriculture income, about the income tax act • Understand all about the Central Value Added

			Tax(CENVAT) • Able to know about the tax planning and legal principles of tax planning • learner understand the elements of tax considerations, tax management , tax decisions • Understand about the international taxation system and legal aspects in international taxation.

Integrated Masters in Business Administration

YEAR	SEMESTER	SUBJECT	COURSE OUTCOMES:
I	**I**	**ENGLISH LANGUAGE-I**	• To make the students understand humour and the contributions of Mokshagundam to build modern india, The students also develop their LSRW skills. • To make the students aware of Polymer currency and inspire them with the unique journey of Helen Keller. • To make the students aware of Man-made disasters and how to prevent and prepare for them. They learn about the South Indian small town life through R.K. Narayan's work • The students gain awareness about human values and ethics which contain the core values of our education policy and also experience the pathos in the story The Last Leaf. • Students learn about the importance of sports and how they can improve their health and also the motivating speech from technocrat Narayanamurthy of Infosys.
I	**I**	**BUSINESS MATHEMATICS**	• Able to understand the knowledge and applications of set theory ,interests and annuities in business • to gain knowledge in the concepts of probability theory and distributions • Able to learn the basics of statistics and classification and tabulation of data. • Acquaint knowledge of drawing and graphical and diagrammatic presentation. • To understand the concept of measures of central tendency and dispersion.
I	**I**	**FUNDAMENTALS OF BUSINESS ORGANISATION**	• To understand the concepts of business • To know the responsibilities , source of finance for an entrepreneur • 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-I**	• students has understood about basics of accounting • students has got awareness 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 awareness on basis of ratio analysis and different types of ratios
I	**I**	**FUNDAMENTALS OF COMPUTER**	• Able to understand the basics of computers & devices • Learner 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 influencing 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 structure and pricing practices.
I	**II**	**FINANCIAL ACCOUNTING-II**	• 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 – Exchange Theory • 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. • Core contemporary issues' 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 awareness on Application of Marginal costing in terms of cost control, Income determinants under marginal cost-Absorption Cost Vs Marginal Cost. Key or Limiting Factor. • Co4: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 AND THEORY 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**	**ENTREPRENEURSHIP 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 ten 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 with in the organisation • To understand the organisation development(goals, objectives and process)
II	**II**	**MANAGEMENT ACCOUTING**	• 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**	**COMPANY 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 TAX**	• 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 analyse 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**	**ENTREPRENEURSHIP DEVELOPMENT (13BM501)**	• 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 ten properties of ED • Able to understand Importance of MSME's • Able to understand the Industrial support to MSME and other Entrepreneurs
III	**I**	**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**	**OPERATION 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**	**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 awareness on Application of Marginal costing in terms of cost control, Income determinants under marginal cost-Absorption Cost Vs Marginal Cost. Key or Limiting Factor.

			• 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,
III	**I**	**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**	**BUSINESS RESEARCH METHODS**	• enhanced knowledge and skills to carry out research for business • better awareness on data collection techniques, measurement and scaling • gained knowledge in preparation and presentation of research report • equipped student with statistical techniques • students were in a position to use multivariate techniques
III	**II**	**SUPPLY CHAIN MANAGEMENT**	• Able to learn the basic supply chain management concepts • Acquaint the knowledge on purchasing issues and facility location decisions. • Understand the concept of management in CRM tools and techniques of CRM • Gain knowledge on supply chain process integration and developing supply chain performance measure. • Able to learn the international supply chain management concepts.

III	**II**	**CREATIVITY AND INNOVATION**	• Able to learn creativity concepts • Acquaint knowledge on the creativity personality • Understand techniques of creative problem solving • Able to understand how to design of an innovative organisation • To gain knowledge about how to manage innovation
III	**II**	**BANKING AND THEORY 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
III	**II**	**TOTAL QUALITY MANAGEMENT**	• able to gain the knowledge about the need for 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 for ISO 9000-2000 Quality system
IV	**I**	**STRATEGIC 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.

IV	**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 • Co4:Obtained knowledsge about Stuctures of organisation and its impact on Strategy • Obtained knowledge of Evaluation of strategy and its control
IV	**I**	**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 knowledge of Corporate Governance • Gained Knowledge of Ethics and Social Responsibilities
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**	**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	**I**	**INVESTMENT MANAGEMENT**	• student has understood about Elements of Portfolio Management, Portfolio Models , Markowitz Model, Efficient Frontier and Selection of Optimal Portfolio. • student has got awareness 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 awareness on The Indian Connection with Commodity Market Commodity and Currency Derivatives Legal Frame Work Policy Liberization
IV	**I**	**TRAINING AND DEVELOPMENT**	• To understand the evolution of training & development, Performance Appraisal. • To provide an insight into what motivates adults to learn and the most appropriate methodologies to impart training • To understand the concept of training audit & training evaluation • To understand the need for and concept of Performance Management. • To understand various strategies used by organizations to measure performance & reward for the same.
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**	**INTELLECTUAL PROPERTY RIGHTS**	• Able to know about the basics of IPR, types of IPR, emerging trends in IPR • Able to know about copy rights, subject matter of copy rights, laws relating to copy rights • Able to know about the patents, types of patents, patents registration process, patent co-operation treaty • Able to know about trademarks, types of trademarks, trade marks registration process • Able to know about the IT-Act- • 2000 provisions cyber crime, cyber security measures, e-commerce ,data security ,digital signature
IV	**II**	**FINANCIAL SYSTEM 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.
IV	**II**	**MANAGEMENT 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 India and types of welfare measures provided in India • Acquaint the knowledge on Employee Grievances and Prevention and Settlement of industrial disputes in India.

IV	**II**	**STRATEGIC FINANCIAL DECISIONS**	• Describe 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**	**COMPENSATION MANAGEMENT**	• To understand the concept of compensation system and how to manage the compensation policy and new trends in compensation management at national and international level. • to study the concept of wage and its theories knowing the wage incentives in India and welfare measures. • to study the concept of wage and salary administration and various acts relating to wages. • Acquaint knowledge about the importance of performance management and various techniques of performance management. • Gain knowledge on appraisal system and counselling objectives and principles.

Master of Computer Application

YEAR	SEMESTER	SUBJECT	Course Outcomes
I	I (R16)	C PROGRAMMING AND DATA STRUCTURES	▪ Design algorithmic solutions for given problems ▪ Analyze problems and construct C Programs that solve it ▪ Design and Implement Modular Programming and memory management using pointers ▪ Choose the appropriate data structure and algorithm design method for a specified application ▪ Apply and Implement learned algorithm design techniques and data structures to solve problems.
		COMPUTER ORGANIZATION	• Basic structure of a digital computer • Arithmetic operations of binary number system • The organization of the control unit, Arithmetic and logical unit, Memory unit and the I/O unit
		DISCRETE MATHEMATICAL STRUCTURES & GRAPH THEORY	• Validate statements using propositional logic and convert them to normal form • Perform operations on various discrete structures such as sets, functions, relations, and sequences • Apply basic counting principles, Ability to solve problems on Recursion and generating functions • Perform different operations on graphs and trees. And learn different properties of them • Apply algorithms and use of graphs and trees as tools to visualize and simplify problems
		STATISTICAL PROGRAMMING WITH R	▪ Manipulate data within R ▪ Perform basic data analysis procedures ▪ Create plots
		ACCOUNTING AND FINANCIAL MANAGEMENT	▪ The fundamental concept of Accounting ▪ The company's proposal/project • How to handle the complicated Financial situations

I	**II (R16)**	**OOPS THROUGH JAVA**	▪ Test a software application written in the Java programming language. ▪ Create a software application using the Java programming language • Debug a software application written in the Java programming language
		OPERATING SYSTEMS	▪ Familiarize with the concepts of the operating system. ▪ Gain knowledge about the fundamental concepts and algorithms used in exiting commercial operating system. • Knowledge on various process scheduling algorithms and IPC
		SOFTWARE ENGINEERING	▪ Develop skills to engineer software of high quality by following sound analysis and design principles. ▪ Learn successful project execution strategies like requirements analysis, estimation, risk management and project scheduling activities • Inculcate quality consciousness through effective software quality management
		OPTIMIZATION TECHNIQUES	▪ Formulate optimization problems; ▪ Understand and apply the concept of optimality criteria for various type of optimization problems; ▪ Solve various constrained and unconstrained problems in single variable as well as multivariable; • Apply the methods of optimization in real life situation.
		COMPUTER GRAPHICS	▪ Know various applications of computer graphics ▪ Understand the basic transformations such as translation,rotation, and scaling ▪ Incorporate Computer graphics in software applications

			▪ Apply Geometric structure for solving algorithmic problems • Analyse various projection types
II	**I (R16)**	**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 (R16)**	**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 TECHNOLOGIES	▪ Write a valid HTML document involving a 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 (R13)**	**INFORMATION SECURITY**	▪ Ability to demonstrate the knowledge of cryptography and network security concepts and applications ▪ Apply security principles in system design • Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them.
		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.

		OBJECT ORIENTED ANALYSIS AND DESIGN	▪ Understand Object oriented software Development Process ▪ Gain exposure to Object Oriented Methodologies &UML Diagrams • To apply Object Oriented Analysis Processes for Projects
		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
		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.