Program Outcomes of all departments

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **. Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

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Civil Engineering

Program Educational Objectives (PEO)

PEO 1: To prepare graduates to solve field problems by applying basic mathematical and scientific principles.

PEO 2: To prepare graduates as professional engineers by teaching them optimum planning, design, analysis with recent technologies.

PEO 3: To empower graduates to explore multidisciplinary corridors emphasizing on environmental and sustainability issues.

Program Specific Outcomes (PSO)

PSO 1: **Proficiency in Core subjects** -The graduates of this program will be able to demonstrate proficiency in the core areas of Structural, Geotechnical and Water Resource Engineering.

PSO 2: **Professional Proficiency** - The graduates will be able to design and implement alternate Civil Engineering solutions to the real-world problems.

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R-15 Course Outcomes

I YEAR I SEM

C101	Course Name: English-I	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Demonstrate real life skills in the light of literature.	III
CO2	Understand influential personalities, and practice human and professional values	II
CO3	Explain new versions of technology for effective use of human resources towards development and to avoid risks	II
CO4	Identify principles and values to build collaborative knowledge and to cultivate social responsibility	I
CO5	Enhance communication skills through grammar, vocabulary with emphasis on LSRW skills.	II

C102	Course Name: Mathematics-I	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Understand the term rank and Elementary Transformations of a Matrix, System of Equations.	II
CO2	Compute Eigenvalues and corresponding Eigenvectors of a square matrix, finding Inverse and methods of Diagonalization	IV
CO3	Evaluate the Mean value theorems and maxima and minima of functions of two variables	V
CO4	Evaluate of improper integrals by using beta, gamma functions and evaluation of double and triple integrals by tracing the region of integration	V
CO5	Apply Laplace transforms of various functions and solve the initial value problems by using Laplace transforms.	III

C103	Course Name: Engineering Physics-I	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Analyze the crystal structures and identify defects in crystals	IV
CO2	Explain the diffraction, interference and polarization phenomenon of light	II
CO3	Understand the basics of statistical mechanics and applications of LASERs in various fields	II
CO4	Interpret the significance of Magnetic materials	III
CO5	Explain fundamentals of Dielectrics and their applications	II

C104	Course Name: C Programming	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Explain the basics of computers and its Generations	II
CO2	Solve problems using flowcharts, algorithms and programs	III
CO3	Develop programs on control structures.	VI
CO4	Develop programs using Arrays, Strings and derived data types	VI
CO5	Design programs on functions	V

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Department of Civil Engineering

R-15 Course Outcomes

C105	Course Name: Electrical Graphics-I	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	CO
CO1	Analyze given solids and represent sectional views, developments and their intersections.	IV
CO2	Represent and differentiate Isometric and Orthographic projections	III
CO3	Generate isometric and corresponding orthographic views of any given component.	II
CO4	Visualize and draw the perspective view of a given solid.	II
CO5	Appreciate the concepts of Computer Aided Drafting.	III

C106	Course Name: Engineering Mechanics -I	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Understand and apply the concepts of force, moment and their resolutions.	II
CO2	Develop free body diagrams in system of forces.	VI
CO3	Analyze and apply the concepts of friction.	IV
CO4	Identify centroid for plane figures and centre of gravity for any given topology.	I
CO5	Calculate area and mass Moment of Inertia for given cross-sections.	III

C107	Course Name: C Programming Lab	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Have Fundamental Concept On Basic Commands In Linux.	II
CO2	Write, Compile And Debug Programs in C Language	I
CO3	Formulate Problems and Implement in C Language.	III
CO4	Choose Control Structures and Arrays to Solve Computing Problems in Real-World	IV
CO5	Implement Functions and Recursion	II

C108	Course Name: English Language Communication Skills Lab-I	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Facilitate computer-aided multimedia instruction enabling individualized and independent language learning.	II
CO2	Improve accent and intelligibility in pronunciation of English through Ice breaking and JAM sessions	IV
CO3	Use vocabulary, glosses and pronunciation for appropriate usage of the target language.	III
CO4	Develop learners' communicative ability through frequent exchange of ideas and discussions.	VI
CO5	Explain the concepts of verbal and non-verbal skills of communication useful in day-to- day life	II

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R-15 Course Outcomes

C109	Course Name: Engineering Physics Lab	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Understand the practical concept of stationary waves using Meld's apparatus	II
CO2	Study the mechanical properties of material using Torsional pendulum	II
CO3	Visualize the fundamental optical phenomenon like Interference, diffraction and Dispersion	IV
CO4	Study the basic Electrical characteristics of LED, RC circuits	III
CO5	Identify the variation of magnetic field by Stewart and Gee's apparatus experimentally	I

C110	Course Name: Engineering Workshop	Bloom's Taxonomy
CO	Year of Study: I YEAR I SEM	
CO1	Study and practice on workshop tools and their operations.	I
CO2	Manufacture wooden and metallic components using carpentry and foundry respectively.	VI
CO3	Join two or materials using welding equipment.	III
CO4	Fabricate ferrous components using blacksmith technique	II
CO5	Demonstrate skills on plumbing and machine shops trades.	III

I YEAR II SEM

C131	Course Name: English-II	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Acquire the real life skills in the light of literature.	I
CO2	Develop managerial skills for successful careers. By making critical decisions	VI
CO3	Demonstrate physical and mental fitness with true sportsman spirit.	III
CO4	Build collaborative knowledge and cultivate social responsibility.	II
CO5	Enhance communication skills through grammar, vocabulary with emphasis on LSRW skills.	II

C132	Course Name: Mathematics-II	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Solve first order differential equations and their applications.	II
CO2	Identify different types of higher order differential equations and their applications in engineering problems	I
CO3	Apply Fourier series and defining it for various types of functions	III
CO4	Evaluating the Fourier transforms of functions of single variable	V
CO5	Justify integrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.	IV

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R-15 Course Outcomes

C133	Course Name: Engineering Physics-II	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Understand the principles of Quantum mechanics & free electron theory.	II
CO2	Differentiate the types of solids based on band theory of solids and to understand the applications of optical fibers in various fields.	IV
CO3	Explain the basics of semiconductors and semiconductor devices	II
CO4	Explain superconductivity and their applications in modern technology	II
CO5	Identify the importance of Nanomaterial's in various fields	I

C134	Course Name: Applied Chemistry	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Understand the operating principles and the reaction mechanisms of batteries and fuel cells.	II
CO2	Apply their knowledge for the protection of different metals from corrosion.	III
CO3	Apply the concept of adsorption in various industries	III
CO4	Apply the knowledge of fuels and lubricants in industry.	III
CO5	Understand the various applications of advanced engineering materials.	II

C135	Course Name: Engineering Mechanics-II	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Analyze given system and find reaction forces in each member of Trusses.	IV
CO2	Identify the rigid body motion to compute velocity and acceleration.	I
CO3	Understand the kinetics of rigid body in translation and rotation.	II
CO4	Analyze the motion of bodies with and without considering cause of motion. Appreciate and apply the concept of Work Energy method.	IV
CO5	Analyze the free vibration concepts from the fundamentals of Simple Harmonic Motion.	IV

C136	Course Name: Engineering Graphics-II	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Analyze given solids and represent sectional views, developments and their intersections.	IV
CO2	Represent and differentiate Isometric and Orthographic projections	V
CO3	Generate isometric and corresponding orthographic views of any given component.	VI
CO4	Visualize and draw the perspective view of a given solid.	II
CO5	Appreciate the concepts of Computer Aided Drafting.	III

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R-15 Course Outcomes

C137	Course Name: English Language Communication Skills Lab-II/	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Build the language proficiency in English with emphasis on LSRW skills.	II
CO2	Develop communication skills through various language learning activities.	VI
CO3	Summarize the nuances of English speech sounds, stress, rhythm, intonation and syllable division.	II
CO4	Acquire and exhibit acceptable etiquette essential in social & professional settings.	II
CO5	Improve the fluency in spoken English and neutralize the mother tongue influence.	III

C138	Course Name: Engineering Physics /Applied Chemistry Lab	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Experiment on Melde's and Torsional pendulum with knowledge in waves and mechanics	IV
CO2	Visualize the fundamental optical phenomenon like Interference, diffraction and Dispersion	II
CO3	Identify the basic Electrical characteristics of LED, RC circuits	I
CO4	Apply Titrimetric analysis for estimating the quantity of the compound accurately.	III
CO5	Evaluate and record the physical properties like Viscosity and Surface tension	V

C139	Course Name: IT & Engineering Workshop	Bloom's Taxonomy
CO	Year of Study: I YEAR II SEM	
CO1	Understand the process of assembly/disassembly of computer parts.	II
CO2	Work on advanced concepts of Microsoft word software.	IV
CO3	Appreciate the usage of advanced options in MS Excel and PowerPoint.	II
CO4	Apply basic electrical engineering knowledge for house wiring practice.	III
CO5	Fabricate components using tin smithy and fitting.	I

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R-15 Course Outcomes

B TECH - II YEAR I SEM

C201	Course Name: Numerical Methods	Bloom's Taxonomy
CO	Year of Study: II YEAR I SEM	
CO1	Develop skills in solving engineering problems involving Algebraic and transcendental equations.	IV
CO2	Acquires the knowledge of interpolation in predicting future outcomes based on the present knowledge	III
CO3	Evaluating the Numerical Solutions for Integrals and Fitting of different types of curves to the given data	V
CO4	Understand the various Numerical Methods to solve Initial Value Problems.	II
CO5	To solve the initial and boundary value problems of differential equations which are essential in engineering applications.	III

C202	Course Name: Engineering Geology	Bloom's Taxonomy
CO	Year of Study: II YEAR I SEM	
CO1	Classify and compare different rocks and minerals across the construction site.	IV
CO2	Identify and build the knowledge on main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and sites.	II
CO3	Define And Interpret The Geological Structures In The Geological Maps And Cross Sections	I
CO4	Understand the importance of graphical studies and various geophysical methods.	II
CO5	Illustrate the factors which affect the dams, reservoirs and tunnels.	II

C203	Course Name: Strength Of Materials I	Bloom's Taxonomy
CO	Year of Study: II YEAR I SEM	
CO1	Examine stress – strain, elastic constants and strain energy.	II
CO2	Analyse the shear force and bending moment diagrams of beams and relationship between them.	III
CO3	Evaluate the flexural and shear stresses for various beam cross sections.	III
CO4	Calculate principal stresses and strains using analytical and graphical solutions for the safety using failure theories.	II
CO5	Determine the deflections of beams with various loadings using different methods.	V

C204	Course Name: Surveying	Bloom's Taxonomy
CO	Year of Study: II YEAR I SEM	
CO1	Evaluate the basic principles of surveying and its Classification.	II
CO2	Determine the contour points and their importance in surveying	III

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R-15 Course Outcomes

CO3	Determine various areas and volumes based on regular and irregular boundaries.	**III**
CO4	Understand the advancements in surveying.	**II**
CO5	Application of Theodolite in surveying and valuation of it with basic surveying	**V**

C205	**Course Name: Environmental Science**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR I SEM**	
CO1	Understand the importance of Ecosystem and its Resources.	**II**
CO2	Be aware on the Variety of Living organism and the need to conserve them.	**III**
CO3	Understand the impacts of Developmental Activities.	**II**
CO4	Understand the Environmental Policies, Management Plan and Regulations.	**II**
CO5	Sensitize on a Sustainable Future.	**V**

C206	**Course Name: Fluid Mechanics**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR I SEM**	
CO1	Understand the Concepts of fluid properties and the relationship between them and to obtain the principles of continuity, momentum, and energy as applied to fluid motions.	**II**
CO2	Differentiate various flow lines and to formulate the Continuity equation for One dimensional, Two dimensional and three dimensional flows.	**IV**
CO3	Formulate the Euler's and Bernoulli's equation with practical applications, to determine the discharge over notches and weirs and to apply the Momentum equation for a pipe bend.	**III**
CO4	Evaluate the head losses in pipes, flow between parallel plates and to solve the pipe network problems.	**IV**
CO5	Demonstrate Boundary layer concepts and to explain the separation of the boundary layer.	**IV**

C207	**Course Name: Survey Lab**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR I SEM**	
CO1	Survey of an area using chains and tapes.	**V**
CO2	Determine the area of land by using a compass	**IV**
CO3	Determine the area of a given field of plane table	**IV**
CO4	Functioning of dumpy level and its applications in leveling.	**V**
CO5	Determine the contour points and their importance in surveying	**IV**

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R-15 Course Outcomes

C208	Course Name: Engineering Geology Lab	Bloom's Taxonomy
CO	Year of Study: II YEAR I SEM	
CO1	To study the physical properties and identification of minerals referred under the theory.	I
CO2	Describe and identify the rocks referred under the theory.	II
CO3	Illustrate the Microscopic study of rocks.	II
CO4	Interpret and draw the sections for geological maps showing tilted beds, faults, unconformities etc.,	IV
CO5	Solve the simple structural geological problems.	IV

B TECH – II YEAR II SEM

C231	Course Name: Probability & Statistics	Bloom's Taxonomy
CO	Year of Study: II YEAR II SEM	
CO1	To differentiate among random variables involved in the probability models which are useful for all branches of engineering	III
CO2	Derive the relationship among a variety of performance measures using probability distributions	IV
CO3	Acquire elementary knowledge of parametric and non-parametric tests and understand the use of observing state analysis for predicting future conditions	III
CO4	Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.	II
CO5	Apply proper measurement, Indicators and techniques of correlation and Regression analysis.	III

C232	Course Name: Structural Analysis I	Bloom's Taxonomy
CO	Year of Study: II YEAR II SEM	
CO1	Analyze propped cantilever, fixed beams for external loadings and support settlements.	IV
CO2	Understand the concept of Slope deflection, moment distribution method and analysis of continuous beams.	II
CO3	Calculate the deflection of beams by different methods for determining slope and deflection and understand the concept of three hinged arches	V
CO4	Analyze the pin-jointed plane frames.	IV
CO5	Draw the influence line diagram for moving loads and calculate critical stress resultants.	III

C233	Course Name: Strength of Materials II	Bloom's Taxonomy
CO	Year of Study: II YEAR II SEM	

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R-15 Course Outcomes

CO1	Realize the basic concepts of torsion and locate the bending stress	**II**
CO2	Identify the types of columns and calculate the failure load for various end conditions	**III**
CO3	Understand the basic concepts of direct and bending stresses and calculate the bending moment	**II**
CO4	Differentiate about thin and thick cylinders and calculate the various stresses	**IV**
CO5	Determine the stresses due to Unsymmetrical bending of beams and locate the shear	**V**

C234	**Course Name: Concrete Technology**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR II SEM**	
CO1	Understanding the properties of cements and admixtures.	**II**
CO2	Analyse the properties of aggregates.	**III**
CO3	Evaluate the properties of fresh concrete.	**IV**
CO4	Analyse the behavior of hardened concrete and durability of concrete.	**II**
CO5	Design the concrete mix using IS Code and describe the special concretes.	**VI**

C235	**Course Name: Hydraulics & Hydraulic Machinery**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR II SEM**	
CO1	Explain the concept of different types of flows, designing of most Economical section of open channel & to understand the concept of specific energy	**V**
CO2	Demonstrate the concept of dimensional quantities and the application of similitude concepts in designing a model and prototype.	**II**
CO3	Understand the concept, working applications of impact of jets with the importance of Constructing velocity triangles.	**II**
CO4	Compare the design concept of Pelton, Francis and Kaplan turbines, Centrifugal pumps along with the most economical designs.	**IV**
CO5	Determine the working mechanism of different types of the pumps with their important characteristic curves	**V**

C236	**Course Name: Building Materials, Construction and Planning**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR II SEM**	
CO1	Develop knowledge of material science and behavior of various building materials used in construction.	**III**
CO2	Provide procedural knowledge of the simple testing methods of cement, lime and Admixtures.	**V**

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R-15 Course Outcomes

CO3	List the building components and Importance of building services.	**I**
CO4	Classify Masonry and finishing work.	**III**
CO5	Applications of Building Bye Laws & formwork.	**IV**

C237	**Course Name: Survey Lab II**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR II SEM**	
CO1	Evaluate horizontal and vertical angles by different methods using a theodolite	**V**
CO2	Assess heights and distances using trigonometric method.	**V**
CO3	Illustrate the principle for theory of errors for correction of measurement.	**II**
CO4	Assess heights and distances by using tachometric survey.	**V**
CO5	Determine area and remote height using a total station.	**V**

C238	**Course Name: Strength of Material Lab**	**Bloom's Taxonomy**
CO	**Year of Study: II YEAR II SEM**	
CO1	Predict the behavior of materials under impact, hardness, tensile and compressive loads	**VI**
CO2	Determine elastic constants by flexural and torsion test.	**V**
CO3	Determine the spring constants under various loadings.	**V**
CO4	Understand the deflection of materials under bending	**II**
CO5	Understand basic material properties stress and strain	**II**

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R-15 Course Outcomes

B TECH - III YEAR I SEM

C301	Course Name: Managerial Economics and Financial Analysis	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Describe the economic activities for profit earning and also understand the significance of demand and its forecasting	IV
CO2	Evaluate the production function through the Cobb Douglas Production Function.	V
CO3	Design and implement different structures of market coverage how price is determined under different market structures.	VI
CO4	Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling the business and decision making.	II
CO5	Describe and demonstrate the concepts of capital budgeting and allocation of the resources through capital budgeting methods	IV, II

C302	Course Name: Design of Reinforced Concrete Structures	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Understand the various design concepts and design a beam under flexure and draw the reinforcement details.	VI
CO2	Design the beam under shear and torsion, Calculate the anchorage and development length and check the serviceability requirements for RC structural elements.	VI
CO3	Analyze and solve various RC slabs and draw the reinforcement details	IV
CO4	Classify short, long columns and draw the reinforcement details	II
CO5	Explore the design concept of footing & staircase.	III

C303	Course Name: Geo-Technical Engineering	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Illustrate the soil formation and classification.	IV
CO2	Explain the Hydrostatic effect in soil mass.	II
CO3	Illustrate the stress distribution mechanism and compaction in soil mass.	II
CO4	Illustrate the mechanism of consolidation.	II
CO5	Identify the Shear strength parameters through analytical and experimental approach.	V

C304	Course Name: Water Resources Engineering –I	Bloom's

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R-15 Course Outcomes

CO	Year of Study: III YEAR I SEM	Taxonomy
CO1	Describe the components in the hydrologic cycle and all hydrological processes and methods.	II
CO2	Analyze the flood analysis and its measurement by means of hydrograph.	IV
CO3	Analyze the phenomenon of Ground water occurrence by means of aquifers.	IV
CO4	Assess the methods of irrigation and its quality with help of duty delta relationship.	V
CO5	Design the canals by using standard theories.	VI

Professional Electives – 1

C305	Course Name: Indeterminate Structural Analysis	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Apply the methods of slope deflection and moment distribution to carry out the structural analysis of Continuous beams and Portal frames.	III
CO2	Analyze the continuous beams, portal frames by Kani's method and pin jointed frames by Castiglione's second theorem.	IV
CO3	Evaluate the shear forces and bending moments in Two-Hinged arches and to execute secondary stresses due to rise of temperature and Elastic Shortening of rib.	V
CO4	Analyze the Multi-storey frames by approximate methods for gravity (vertical) and horizontal loads.	IV
CO5	Understand the concept of Matrix method for the analysis of continuous beams and Pin jointed plane frames.	IV

C306	Course Name: Groundwater Hydrology	Bloom's Taxonomy CO
CO	Year of Study: III YEAR I SEM	
CO1	Understand different types of aquifers and their characteristics	II
CO2	Analysis the pumping test data for different aquifers	IV
CO3	Distinguish the surface and subsurface investigation methods of ground water.	IV
CO4	Discuss the methods of artificial recharging of ground water.	VI
CO5	Evaluation and control of saline water intrusion.	V

C307	Course Name: Rock Mechanics	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Illustrate the physical properties of rocks.	II
CO2	Explain the elastic behavior of rocks.	V

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CO3	Describe the methods of laboratory testing of rocks.	III
CO4	Analysis the stress distribution matrix insitu and around the rock opening.	IV
CO5	Apply the basic rock design principles in the tunneling design system.	III

Open Elective – 1

C308	Course Name: Energy Management	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Understand the process of planning, initiating an energy management program, promoting, monitoring an energy conservation methods in any system.	II
CO2	Evaluate energy potential by conducting a systematic search of energy saving opportunities in different energy conservation schemes.	V
CO3	Understand and exploit the energy saving opportunities in an industry through efficient lighting management and power factor control of the electrical gadgets.	II
CO4	Understand the qualities and functions of Energy manager and language of energy manager.	II
CO5	Economic analysis through various evaluation methods such as depreciation, time value of money, risk analysis and replacement analysis.	IV

C309	Course Name: Non-Conventional Energy Source	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Realize the importance of renewable energy sources for energy planning.	III
CO2	Understand the value of solar energy potential and exploit the solar energy for real world applications.	II
CO3	Understand the potential of wind energy, types of wind mills, performance characteristics and Betz criteria.	II
CO4	Analyze the potential of both tidal and ocean thermal energies and learn the extraction methods.	IV
CO5	Know the potential of Geothermal, biomass energies and learn relevant extraction methods.	II

C310	Course Name: Basic Electronic & Instrumentation	Bloom's Taxonomy CO
CO	Year of Study: III YEAR I SEM	
CO1	Summarize the concepts of different semiconductor devices with its characteristics.	III
CO2	Describe the fundamental concepts and basic principle of meters.	IV
CO3	Categorize different transducers and their working principles	III

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CO4	Explain different bridges and understand how different physical parameters can be acquired.	II

C311	Course Name: Introduction to Microcontrollers and Application	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Describe the architecture of 8051 with its special function registers.	III
CO2	Develop and analyze the programming concepts of 8051	IV
CO3	Understand the various interfacing techniques pertaining to system design.	III
CO4	Express and infer advanced architectures using ARM Controllers.	II

C312	Course Name: Java Programing	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Understand OOP concepts to apply basic Java constructs	II
CO2	Analyze different forms of inheritance and handle different kinds of file I/O	IV
CO3	Evaluate the usage of Exception Handling and Multithreading in complex Java programs	V
CO4	Contrast different GUI layouts and design GUI applications	III
CO5	Construct a full-fledged Java GUI application, and Applet with database connectivity	IV

C313	Course Name: Operating Systems	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Understanding the operating system concepts and process management	II
CO2	Analyze process scheduling and synchronization.	IV
CO3	Understand memory management concepts.	II
CO4	Illustrate File System implementation and Mass Storage Structure.	III
CO5	Analyze Deadlock mechanisms.	IV

C314	Course Name: Total Quality Management in Engineering	Bloom's Taxonomy
CO	Year of Study: III YEAR I SEM	
CO1	Explore the quality framework in production and operational aspects.	III
CO2	Evaluate the role of quality in product design and analysis.	V
CO3	Analyze quality in process improvement and modern production	IV

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	management tools.	
CO4	Analyze the requirements of quality management system.	**IV**

C315	**Course Name: Geotechnical Engineering Laboratory**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR I SEM**	
CO1	Demonstrate the engineering properties the soil.	**II**
CO2	Illustrate the field bulk and dry density of cohesive and cohesion less soils.	**II**
CO3	Classify the Coarse grained soils based on sieve analysis test & a grain size distribution curve.	**II**
CO4	Compute the shear strength of cohesive and cohesion less soil.	**V**
CO5	Determine the permeability of coarse grained soil and fine grained soil by constant head permeability test and falling head method.	**V**

C316	**Course Name: Fluid Mechanics And Hydraulic Machinery Laboratory**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR I SEM**	
CO1	Examine the calibration of different flow meters.	**IV**
CO2	Illustrate flow measuring devices used in pipes, channels and tanks.	**II**
CO3	Determine major and minor losses in pipes.	**V**
CO4	Analyze the energy equation for problems on in pipes flow.	**IV**
CO5	Examine the performance characteristics of turbines and pumps.	**IV**

B TECH - III YEAR II SEM

C331	**Course Name: Environmental Engineering**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Predict the population forecasting and test the quality of water.	**VI**
CO2	Design the filter and apply disinfection practices for water treatment.	**VI**
CO3	Design water distribution system and examine sewage.	**VI**
CO4	Analysis and design sewerage system.	**IV**
CO5	Design different units of sewage treatment plant and trickling filters.	**VI**

C332	**Course Name: Steel Structure Design and Drawing**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Classify the types of connections and specifications as per IS: 800-2007.	**II**
CO2	Apply the provisions of IS: 800-2007 to design tension members.	**III**

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CO3	Analyze and design compression members.	**IV**
CO4	Illustrate behaviour of beams and design strengths as per IS code.	**II**
CO5	Adapt IS code procedures to design welded plate girder.	**VI**

C333	**Course Name: Highway Engineering**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Summarize the road developments in India from different periods.	**II**
CO2	Apply the concept of geometric design in real time engineering.	**III**
CO3	Make use of parameters related to traffic studies.	**III**
CO4	Design & model the intersections with specific standards.	**VI**
CO5	Evaluate the different pavement design methods using IRC standards.	**V**

C334	**Course Name: Foundation Engineering**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Organize the preparation and programme of soil investigation.	**III**
CO2	Examine the earth pressure theories and stability of retaining walls.	**II**
CO3	Evaluate the bearing capacity of soil and allowable settlement.	**II**
CO4	Analyse the capacity and settlement of pile foundation.	**IV**
CO5	Analyse the stability of finite and infinite slopes using various methods.	**IV**

Professional Electives – 2

C335	**Course Name: Ground Improvement Techniques**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Illustrate the several Ground modification mechanisms	**II**
CO2	Illustrate the Ground Improvement Techniques through mechanical approach.	**II**
CO3	Identify the different Hydraulic ground improvement techniques through Dewatering techniques.	**III**
CO4	Explain the quick settlement techniques through chemical and physical modification.	**V**
CO5	Distinguish the inclusion and confinement techniques of ground improvement.	**IV**

C336	**Course Name: Earthquake Engineering**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Quantify mechanical behaviour of earth's surface, seismic hazards and its effects.	**IV**
CO2	Identify, formulate and solves engineering problems subjected to dynamic loading conditions.	**III**

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CO3	Understand the internal parameters of the structures for seismic design source.	**II**
CO4	Assess the design component or process to meet desired needs within realistic constraints.	**VI**
CO5	Analyze and design the members for earthquake resisting parameters.	**VI**

C337	**Course Name: Building, Planning, Design and Drawing**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Identify various building components, conventional signs and symbols.	**III**
CO2	Illustrate the building bye-laws and the principles of planning.	**II**
CO3	Understand about the building services and safety.	**II**
CO4	Design and Sketch the plans of various types of buildings and detailing of doors, windows, etc.	**VI**
CO5	Understand the elements of perspective drawing involving simple problems.	**II**

Open Elective – 2

C338	**Course Name: Fundamentals of Nano Science Technology**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Understand the fundamental concepts of Nano science and Technology	**II**
CO2	Select appropriate synthesis route for production of different nanostructures.	**II**
CO3	Describe principles of operation and uses of various characterization techniques	**III**
CO4	Analyze the properties of nanomaterial's	**IV**
CO5	Apply the Nanostructures for various engineering applications.	**III**

C339	**Course Name: Principles of Electric Power Utilization**	**Bloom's Taxonomy CO**
CO	**Year of Study: III YEAR II SEM**	
CO1	Understand terms and concepts of illumination	**II**
CO2	Apply the concepts of different electric lamps and good lighting Practices for artificial lighting systems.	**III**
CO3	Understands the methods of electric heating and welding	**II**
CO4	Understands the concepts of different electric traction systems and existing traction system in India.	**II**
CO5	Analyze the mechanics of train movement	**IV**

C340	**Course Name: Energy Auditing and Conservation**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	

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R-15 Course Outcomes

CO1	Realize the need for energy auditing and conservation. Get awareness on types of energy audit; represent energy flows and energy consumption in tabular and graphical methods.	**III**
CO2	Understand and exploit energy saving opportunities in energy efficient motors and power factor improvement methods.	**II**
CO3	Learn energy auditing and conservation opportunities in HVAC systems with respect to energy efficient buildings.	**I**
CO4	Analyze the economic viability with respect to real world problems using depreciation methods.	**IV**
CO5	Know the check lists for energy conservation in boilers, heat pumps, cooling systems, compressors and fans.	**II**

C341	**Course Name: Fundamentals of Embedded Systems**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Contrast the basics of embedded system with its application	**IV**
CO2	Illustrate the components required for embedded system design.	**III**
CO3	Summarize the different development tool for embedded system	**II**
CO4	Relate the concepts of RTOS in real time programming	**I**
CO5	Outline the features of advanced buses of distributed data transfer system design.	**III**

C342	**Course Name: Principles of Communications**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Understanding the fundamentals of communications	**III**
CO2	Summarize the different modulation techniques involved in analog Communication	**II**
CO3	Summarize the different modulation techniques involved in digital Communication	**II**
CO4	Identify the applications of various wired and wireless communications in real time.	**III**
CO5	Elaborate the fundamentals of satellite and optical communications.	**II**

C343	**Course Name: Database Management Systems**	**Bloom's Taxonomy**
CO	**Year of Study: III YEAR II SEM**	
CO1	Design Entity-Relationship Model for enterprise level databases.	**V**
CO2	Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.	**II**
CO3	Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement.	**IV**
CO4	Use of suitable Indices and Hashing mechanisms for real time implementation.	**III**
CO5	Analyze various concurrency control protocols and working principles of recovery algorithms	**IV**

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R-15 Course Outcomes

C344	Course Name: Software Engineering	Bloom's Taxonomy
CO	Year of Study: III YEAR II SEM	
CO1	Choose a process model to apply for given project requirements	II
CO2	Analyze and apply the framework activities for a given project	IV
CO3	Design various system models for a given scenario	V
CO4	Design and apply various testing techniques	V
CO5	Understand metrics for Process and Products	III

C345	Course Name: Financial Institutions & Markets	Bloom's Taxonomy
CO	Year of Study: III YEAR II SEM	
CO1	Explore Indian investment environment.	III
CO2	Evaluate available investment avenues.	V
CO3	Analyze the role of regulatory bodies in the Indian Financial system.	IV
CO4	Identify recent trends and challenges in Indian banking sector	II

C346	Course Name: Computer Aided Drafting of Building Lab	Bloom's Taxonomy
CO	Year of Study: III YEAR II SEM	
CO1	Assess the Software with aiding source.	V
CO2	Draft the Plan and Elevation & Sectional views of the buildings.	III
CO3	Develop the components of the building.	III
CO4	Replicate the detailing of framed and Industrial structures.	III
CO5	Interpret the isometric and orthogonal projection of buildings.	II

C347	Course Name: Advance English Communication Skills Lab	Bloom's Taxonomy
CO	Year of Study: III YEAR II SEM	
CO1	Develop sound communication skills in various situations with the help of (enriched) vocabulary.	VI
CO2	Practice reading techniques for a faster and better comprehension.	II
CO3	Exhibit strong writing skills to express ideas effectively.	V
CO4	Demonstrate effective presentation skills.	III
CO5	Use appropriate verbal and non-verbal skills for a successful career.	II

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R-15 Course Outcomes

B.Tech IV YEAR I SEM

C401	Course Name: Estimating & Costing	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Summarize the basic principal and standard methods for working out quantities in estimating.	II
CO2	Determine the earthwork estimate of buildings, roads and canals.	V
CO3	Estimate the rate analysis of the various items of work.	VI
CO4	Understand the process of contracting for roads and buildings.	II
CO5	Evaluate the valuation of buildings and provide practical knowledge of standard specifications of items of building construction.	V

C402	Course Name: Water Resources Engineering-II	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Estimate the capacity of reservoir, life of the reservoir and selection of type of dam along with its site.	VI
CO2	Determine the forces on Gravity dam, practical profile, and limiting the height of Gravity dam with galleries.	V
CO3	Design the Earthen dam and spillways along with measures to control seepage through hydraulic structures.	VI
CO4	Design the Diversion head work and its components along with weir, barrage, silt exclude and silt ejector.	VI
CO5	Design the Canal falls and other regulatory works along with cross drainage work at required site.	VI

C403	Course Name: Railways, Airports and Harbours Engineering	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Define and understand the various components of railways.	II
CO2	Understand and solve the geometric elements needed for the design of permanent way.	II
CO3	Define, understand, and design the various components of the airport.	VI
CO4	Define, understand the planning and requirements of a harbor.	II
CO5	Improve and Visualize the working of intelligent transportation system.	VI

Course Code C404	Course Name: Finite Element Methods	Bloom's Taxonomy

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R-15 Course Outcomes

CO	Year Of Study : IV YEAR I SEM	
CO1	Explain plane stress-plane strain equations and develop displacement functions.	II
CO2	Analyze one-dimensional problems using stiffness matrix.	IV
CO3	Examine the different elements based on continuity and compatibility.	IV
CO4	Illustrate quadrilateral elements using nodal points and shape functions.	II
CO5	Determine displacements, strains and stresses for static loads.	VI
C405	Course Name: Advanced Foundation Engineering	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Identify the suitable bearing capacities theories for different foundation analysis.	II
CO2	Analyze the design of pile foundation.	IV
CO3	Evaluate the of pressure theories in foundation design.	V
CO4	Analyze and design to sheet pile and cofferdam.	IV
CO5	Examine and discuss the various expansive soil problems.	IV

C406	Course Name: Solid Waste Management	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Illustrate the hierarchical structure in solid waste management and a requirement for an integrated solution.	II
CO2	Apply the legal legislation related to solid waste management and make an economical analysis of the solid waste management system.	III
CO3	Identity route optimization for a solid waste collection and transport system.	II
CO4	Evaluate the subject from the technical, legal and economical points by learning of all terms related to general solid waste management.	VI
CO5	Plan site selection for a landfill.	III

C407	Course Name: Remote Sensing & GIS	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Understand the concepts of Photogrammetry and compute the heights of the objects using parallax.	II
CO2	Understand the principles of aerial Photogrammetry and remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies.	II
CO3	Analyze the basic concept of GIS and its applications, able to work with GIS software in various application fields.	IV

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R-15 Course Outcomes

CO4	Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinate systems.	II
CO5	Understand the application of vector and raster data structure to the real world, the importance of source map and learning the on-screen digitization.	II

C408	Course Name: Advanced Structural Design	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Analyze and design of cantilever retaining wall.	IV
CO2	Apply the provision of IS :3370-2009 to design water tank.	III
CO3	Apply the provision of IS 456-2000 for designing flat slab.	III
CO4	Adapt the provision of IRC 21-1987 to class AA loading to design T beam girder.	VI
CO5	Summarize the force components and design principles of RCC Chimney.	II

C409	Course Name: Air Pollution and Control Methods	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Find the sources, causes & effects of air pollution.	I
CO2	Understand the meteorological components and the plume behavior for atmospheric stability conditions.	II
CO3	Identify the types of equipments to control the particulates at sources.	II
CO4	Miimize the control measures of NOX, SOX and other gaseous emissions.	VI
CO5	Examine the SPM, SOx, NOx and CO emission standards.	IV

C410	Course Name: Water Resources Systems Analysis	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Understand the concept of water resource systems and techniques involved in it.	II
CO2	Formulate the linear programming models and examine their application in water resource.	VI
CO3	Measure the sensitivity of formulated models and revised simplex techniques.	V
CO4	Apply the dynamic programming for resource allocation.	III
CO5	Analyze various factors involved in water resource economics and compare the alternate principles of economics for analysis.	IV

C411	Course Name: Industrial Waste Water Treatment	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Define the Physical, chemical, organic and biological properties of industrial wastes.	II
CO2	Illustrate the Pre and primary treatment methods of wastewater.	II

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CO3	Explain the various methods for „Oil separation by floatation" while wastewater treatment process.	II
CO4	Distinguish the different types of Industrial Wastes.	IV
CO5	Summarize the Common effluent treatment plant's location, design, and operation and maintenance problems.	II

C412	Course Name: Electrical & Hybride Vechicles	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Understand the components of electric vehicles and fundamentals of electric vehicles.	II
CO2	Summerize the types of batteries and principles of operation of Batteries.	II
CO3	Preceive the basic principles of electric motors which can be used in electric vehicles	II
CO4	Restate the transmission of the drive system and the components of the transmission.	II
CO5	Outline the concepts of hybrid vehicles and analyze the performance of hybrid vehicles.	II

C413	Course Name: Energy Storage Systems	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Preceive the Electrical Energy Storage Technologies.	II
CO2	Understand the needs of electric energy storage	II
CO3	Analyze the characteristics and features of energy from various sources.	IV
CO4	Classify various types of energy storage and various devices used for the purpose.	III
CO5	Apply the same concepts to real time solutions like electric vehicles, smart Grid and SCADA etc.	III

C414	Course Name: Mat Lab	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Breakdown computational problems into a series of simple steps.	II
CO2	Create programs in the MATLAB language for engineering applications.	V
CO3	Apprise and get familiarized with the visualization techniques.	III
CO4	Formalized with different application tools required different area of the domain.	III
CO5	Expose to the most common algorithms and techniques that are the Building blocks of Mat lab	IV

C415	Course Name: Circuit Simulation using PSPICE	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Describe circuits for PSpice simulation	II
CO2	Outline the types of DC TO AC and their output variable analysis.	II
CO3	Understand the response of transient analysis and obtain their output variable	II
CO4	Analyze and develop simulation circuit for different applications	IV

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R-15 Course Outcomes

C416	Course Name: Information System for Engineers	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Understand the concepts of Information Systems.	II
CO2	Evaluate the design, development and security of Information Systems	V
CO3	Analyze the various modules in social issues while using Information Systems.	IV
CO4	Analyze the issues in data security	IV
CO5	Analyze the concept of ethics in information systems.	IV

C417	Course Name: Web Design	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Create static web pages using HTML	II
CO2	Design styles for HTML web pages	V
CO3	Create interactive web pages using Javascript	IV
CO4	Develop web applications using server side scripting language-PHP	III
CO5	Develop and analyze web applications with Java Server Pages	III

C418	Course Name: Fundamentals of Entrepreneurship	Bloom's Taxonomy
CO	Year of Study: IV YEAR I SEM	
CO1	Provide awareness about entrepreneurship	III
CO2	Develop idea generation, creative and innovative skills among students	IV
CO3	Self motivate the students by making aware of the different opportunities by exploring themselves by discussing the successful growth/failure stories	II
CO4	Start an enterprise and design business plans are those suitable for funding by considering all dimensions of business.	II

C419	Course Name: Concrete & Highway Materials Lab	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Examine the experimental strength of aggregate materials as per codal provisions.	IV
CO2	Illustrate the stability & properties of bituminous materials & mixes by conducting tests.	II
CO3	Determine the properties of cement by conducting the test.	VI
CO4	Define the workability of fresh concrete by conducting tests.	II
CO5	Estimate the strength of hardened concrete by conducting destructive and non destructive testing.	VI

C420	Course Name: Environmental Engineering Lab	Bloom's Taxonomy

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CO5	Apply the latest health monitoring and building instrumentation methods.	III

C433	Course Name: Pre-stressed Concrete Structures	Bloom's Taxonomy
CO	Year Of Study : IV YEAR II SEM	
CO1	Classify the concepts, principles, types and methods of PSC structures.	IV
CO2	Evaluate the losses of PSC structures.	VI
CO3	Analysis and design of PSC slabs and beams using IS:1343 (2012).	IV
CO4	Explain transmission of prestressing force, end block analysis by different methods.	II
CO5	Analyse the stress distribution of composite beams and asses the deflection of beams.	IV

C434	Course Name: Technical Seminar	Bloom's Taxonomy
CO	Year Of Study : IV YEAR II SEM	
CO1	Demonstrate the skills in identifying, analysing, and presenting a research topic.	II
CO2	Demonstrate the quality of knowledge gained from the literature survey on recent technologies.	II
CO3	Demonstrate the skills developed to communicate effectively on engineering activities with the engineering community.	II
CO4	Demonstrate ability to effectively manage time in presentation skills.	II
CO5	Design a technical report with the principal of ethics.	VI

C435	Course Name: Major Project	Bloom's Taxonomy
CO	Year Of Study : IV YEAR II SEM	
CO1	Identity, Analyse and apply suitable current techniques and tools to solve a problem in the civil engineering domain and societal issues.	II
CO2	Function effectively in teams to accomplish a common goal.	IV
CO3	Organise the technical report writing and communication effectively.	III
CO4	Extend in lifelong activity.	II
CO5	Define and analyse a problem to assess health, safety and legal issues.	IV

C436	Course Name: Comprehensive Viva Voce	Bloom's Taxonomy
CO	Year of Study: IV YEAR II SEM	
CO1	Explain comprehensively to answer questions from all the courses.	III
CO2	Test Oral Presentation skills by answering questions in a precise and concise manner	II
CO3	Build confidence and interpersonal skills	IV
CO4	Support the students to face interview both in the academic and the industrial sector	III
CO5	Improve placements and better performers in their future.	III

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(Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziz Nagar Gate, C.B. Post, Hyderabad - 500 075

Department of Civil Engineering

R-15 Course Outcomes

CO	Year Of Study : IV YEAR I SEM	
CO1	Understand principles and their practical application in water treatment.	II
CO2	Determine physical, chemical and biological characteristics of water and wastewater.	VI
CO3	Determine the optimum dose of coagulant.	VI
CO4	Estimate the chloride, nitrate and iron content in water.	VI
CO5	Summarize the solutions using titration, conductivity meter, pH meter, turbidity meter and DO meter.	II

C421	Course Name: Industry Oriented Mini Project	Bloom's Taxonomy
CO	Year Of Study : IV YEAR I SEM	
CO1	Interpret the literature and develop solutions for framing problem statement.	II
CO2	Select software techniques for identifying problems.	III
CO3	Analysis and test the modules of planned project.	IV
CO4	Design technical report and deliver presentations.	VI
CO5	Apply engineering and management principles to achieve project goals.	III

IV YEAR II SEM

C431	Course Name: Construction Management	Bloom's Taxonomy
CO	Year Of Study : IV YEAR II SEM	
CO1	Understand the behavioural aspect of entrepreneurs, various approaches of time management, their strength and weakness.	II
CO2	Apply the concepts of project management during the construction phase, project organization, project planning and control using CPM,PERT techniques.	III
CO3	Analysis various materials and equipment's for construction work.	IV
CO4	Examine the on different types of contracts and specifications.	IV
CO5	Outline the labour regulations and safety in construction.	II

C432	Course Name: Rehabilitation and Retrofitting of Structures	Bloom's Taxonomy
CO	Year Of Study : IV YEAR II SEM	
CO1	Understand the causes and prevention of deterioration in structures.	II
CO2	Identify the types of damages and the mechanisms of corrosion in steel reinforcement and fire induced damages.	III
CO3	Examine to inspect and assess the structures using techniques of visual inspection and NDT.	IV
CO4	Estimate the structural damage and recommend suitable repair and strengthening methods.	VI

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Electrical and Electronics Engineering

Program Educational Objectives (PEO)

PEO 1: To provide the students with a sound foundation in the mathematics, science and engineering fundamentals necessary to become employable.

PEO 2: Graduates able to apply their technical knowledge to take up higher responsibilities in industry, academics and create innovative ideas in the field of Electrical and Electronics Engineering.

PEO 3: Equip graduates with the communication skills, leadership qualities and team work with multi-disciplinary approach and zeal to provide solutions for engineering problems.

PEO 4: To inculcate ethical values and aptitude for lifelong learning needed for a successful professional career of the graduates.

Program Specific Outcomes (PSO)

PSO 1: Design, analysis of different electrical systems with suitable modeling and sustainable control.

PSO 2: Ability to become a global Engineer with entrepreneurial practices and a good research aptitude for higher education.

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II EEE I Semester **R 15**

A13012	**MATHEMATICS-IV**
	After the completion of this course, a student must demonstrate the knowledge and ability to
C211.1	Acquire the knowledge of Special functions.
C211.2	Work with the functions of complex variables and evaluation of complex differentiation.
C211.3	Acquire the knowledge of complex power series and integration.
C211.4	Work with contour integration and evaluation of real definite integrals
C211.5	Acquire the knowledge of evaluating of conformal mapping and bilinear transformations.

A13401	**ELECTRONIC DEVICES & CIRCUITS**
	After the completion of this course, a student must demonstrate the knowledge and ability to
C212.1	Understand different types of diodes, operation and their characteristics.
C212.2	Apply the concepts of semiconductors for circuits like rectifiers, filters.
C212.3	Analyze the operation and characteristics of BJT and FET.
C212.4	Examine the DC bias circuitry of BJT and FET, design biasing circuits using diodes and transistors.
C212.5	Assess the transistor application circuits like amplifier.

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A13204	NETWORK THEORY
	After the completion of this course, a student must demonstrate the knowledge and ability to
C213.1	Understand the concepts of three phase circuits for both balanced and unbalanced loads
C213.2	Apply transient response analysis on RLC circuits with initial conditions for both DC and AC excitations.
C213.3	Analyze network functions – pole-zero plots – and obtain time response from pole-zero plots.
C213.4	Evaluate impedance, admittance, and transmission and hybrid parameters for two port networks.
C213.5	Design low pass, high pass, band pass and band stop prototype filters.

A13205	ELECTRO MAGNETIC FIELDS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C214.1	Understand the concepts of electric field, magnetic field electric potential.
C214.2	Explain the Properties and behavior of conductors, dielectrics, capacitance in electric fields.
C214.3	Apply Biot Savart's law and Ampere circuital law for evaluating magnetic field intensity and current density.
C214.4	Examine Lorentz force equation to electromagnetic systems for the transfer of power and development of torque.
C214.5	Evaluate inductance in electric fields and apply Maxwell equations for time varying fields.

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A13206	ELECTRICAL MACHINES- I
	After the completion of this course, a student must demonstrate the knowledge and ability to
C215.1	Identify different parts of D.C machine and their working.
C215.2	Analyze D.C. machines on load and no load.
C215.3	Understand Principle of operation of a D.C Motor and Torque equation
C215.4	Categorise speed control methods of DC Motors
C215.5	Analyze Various losses, different test in D.C Machines and Calculations of their efficiency.

A13011	ENVIRONMENTAL SCIENCE
	After the completion of this course, a student must demonstrate the knowledge and ability to
C216.1	Understand the importance of ecological balance for sustainable development.
C216.2	Understand the impacts of developmental activities and mitigation measures.
C216.3	Understand the variety of living organisms and the need to conserve them.
C216.4	Sensitization on the ill effects of development and possible solutions to prevent it.
C216.5	Understand the environmental policies and regulations.

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A13281	BASIC SIMULATION TOOLS LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C217.1	Understand the basic commands & operators of MATLAB & PSPICE
C217.2	Develop the program for matrix multiplication & inversion in MATLAB
C217.3	Analyze the series RL,RC & RLC circuits using Simulink for DC & DC excitation using MATLAB .
C217.4	Design DC network and single phase half wave & full wave rectifier using PSPICE.
C217.5	Analyze the transient response of series RL, RC, RLC circuits for DC & AC excitation using PSPICE.

A13282	ELECTRICAL CIRCUITS LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C218.1	Design circuit and conduct experiments for verification of electrical theorems such as Thevenin's, Norton's theorem, Superposition theorem etc.
C218.2	Find Resonance in series and parallel R, L, C Circuits& locus concepts practically.
C218.3	Examine Self inductance, Mutual inductance and Coefficient of coupling and Analyze RMS, Average Value, Form Factor and Peak Factor of Complex wave.
C218.4	Determine two port parameters practically.
C218.5	Measure Active power & Reactive power for star and delta connected balanced loads.

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II EEE II Semester

A14407	ELECTRONIC CIRCUITS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C221.1	Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
C221.2	Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
C221.3	Design and realize different classes of Power Amplifiers useable for audio and Radio applications.
C221.4	Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.
c221.5	Design and realize different classes of tuned amplifiers useable for audio and Radio applications.

A14408	SWITCHING THEORY & LOGIC DESIGN
	After the completion of this course, a student must demonstrate the knowledge and ability to
C222.1	Manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
C222.2	Manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
C222.3	Design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
C222.4	Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
C222.5	To develop the state diagrams with the knowledge of Mealy and Moore circuits and algorithmic state machines for binary multipliers.

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A14311	FLUID MECHANICS AND HYDRAULIC MACHINES
	After the completion of this course, a student must demonstrate the knowledge and ability to
C223.1	Understand the basic mechanics of fluid statics.
C223.2	Understand the principles of flow and energy momentum equations.
C223.3	Analyze the losses in pipe flow, boundary layer, separation of flows, forces on different vanes and quantify the flow of fluid in flow measurement instruments.
C223.4	Understand the working of hydraulic machinery and analyze their characteristic curves.
C223.5	Appreciate the working principles of pumps and their applications.

A14208	ELECTRICAL MACHINES – II
	After the completion of this course, a student must demonstrate the knowledge and ability to
C224.1	Understand the construction and working operations of single phase transformers
C224.2	Distinguish different types of three phase transformers and able to obtain the load sharing of transformers
C224.3	Analyze the performance of induction motors and effect of harmonics.
C224.4	Compare the operation of induction motor using different speed control methods and analyze the circle diagram.
C224.5	Infer the performance of single phase induction motors

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A14209	POWER SYSTEMS-I
	After the completion of this course, a student must demonstrate the knowledge and ability to
C225.1	Explain about electric power generation, selection of power plants, layout and working of steam power stations, gas and nuclear power stations.
C225.2	Classify DC and AC Distribution system, voltage drop calculations etc.
C225.3	Sketch Substation layouts, different types of substations (Indoor& outdoor), like GI substations and design aspects of substation.
C225.4	Analyze power factor and voltage control.
C225.5	Infer load curve, plant usage and various types of tariff

A14210	CONTROL SYSTEMS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C226.1	Understand the basic concepts of control system and develop the mathematical model of simple electrical and mechanical systems.
C226.2	Apply the transient response of first and second order systems through time domain specifications.
C226.3	Sketch root locus technique to know the conditional stability of the system.
C226.4	Calculate the relative stability of the systems with the help of frequency domain indices and design compensators to meet the desired specifications of the systems.
C226.5	Analyze systems using modern control theory through state space analysis.

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A14283	ELECTRICAL MACHINES – I LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C227.1	Identify losses, Output and efficiency of dc motors
C227.2	Identify losses, Output and efficiency of dc generators
C227.3	Apply speed control methods on DC motors.
C227.4	Analyze the magnetization characteristics of DC shunt generator to determine its parameters.
C227.5	Infer the efficiencies of D.C Series Machines.

A14484	ELECTRONIC DEVICES AND CIRCUITS LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C228.1	Understand internal physical behavior of PN junction diode, resistor and capacitor
C228.2	Interpret the breakdown mechanisms in semiconductors so as to construct Zener voltage regulator used in regulated power supplies.
C228.3	Analyze various rectifiers and filter circuits used in regulated power supplies.
C228.4	Contrast the operation and characteristics of Bipolar Junction Transistor, which can be used in the design of amplifiers
C228.5	Analyze the characteristics of FET And UJT

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III EEE I Semester

A15017	MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C311.1	Analyze the scope of managerial economics.
C311.2	Apply managerial tools and techniques to attain optimal decisions.
C311.3	Analyze how production function is carried out to achieve maximum output.
C311.4	Analyze changing business environment in post liberalization scenario.
C311.5	Evaluate and interpret the financial statements to make informed decisions.

A15212	POWER ELECTRONICS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C312.1	Understand various power electronic devices and their commutation procedure.
C312.2	Illustrate the operation of various phase-controlled converters.
C312.3	examine the operation of AC-AC Converters
C312.4	categorize the operation of various DC-DC converters
C312.5	analyze the operation of DC-AC converters

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A15213	POWER SYSTEMS – II
	After the completion of this course, a student must demonstrate the knowledge and ability to
C313.1	Understand and discuss the methods of finding transmission line parameters & modeling of lines and their performance.
C313.2	Apply performance criteria to models of short, medium and long lines, Discuss the models in terms of A, B, C, D parameters.
C313.3	Examine the transient phenomenon on transmission lines
C313.4	Analyze mechanical design, overview of line supports, insulators, sag& Tension calculations, Corona & Radio Interference.
C313.5	Design cables, capacitance of single core & 3 core belted cables, IR values and voltage stress.

A15214	ELECTRICAL MACHINES-III
	After the completion of this course, a student must demonstrate the knowledge and ability to
C314.1	Understand the construction and principle of operation of synchronous machine. Armature reaction , load characteristics, harmonics in generating emf etc.
C314.2	Solve regulation of synchronous generator using various methods.
C314.3	Apply the concept of Parallel operation, load sharing, change of excitation& prime-mover input to alternators
C314.4	Analyse the principle of operation of synchronous motor and working principle of a synchronous condenser in the system, power circle.
C214.5	Categorize different special machines and their performances.

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OPEN ELECTIVES

A15218	NON-CONVENTIONAL ENERGY SOURCES
	After the completion of this course, a student must demonstrate the knowledge and ability to
C315.1	Realize the importance of renewable energy sources for energy planning.
C315.2	Understand the value of solar energy potential and exploit the solar energy for real world applications.
C315.3	Restate the potential of wind energy, types of wind mills, performance characteristics and Betz criteria.
C315.4	Analyze the potential of both tidal and ocean thermal energies and learn the extraction methods.
C315.5	Identify the potential of Geothermal, Bio-mass energies and learn relevant extraction methods.

A15219	ENERGY MANAGEMENT
	After the completion of this course, a student must demonstrate the knowledge and ability to
C316.1	understand the process of planning, initiating energy management program, promoting, monitoring energy conservation methods in any system.
C316.2	evaluate energy potential by conducting a systematic search of energy saving opportunities in different energy conservation schemes.
C316.3	exploit the energy saving opportunities in an industry through efficient lighting management and power factor control of the electrical gadgets.
C316.4	Examine the qualities and functions of Energy manager and language of energy manager.
C316.5	Analyze economics through various evaluation methods such as depreciation, time value of money, risk analysis and replacement analysis.

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A15215	HIGH VOLTAGE ENGINEERNG
	After the completion of this course, a student must demonstrate the knowledge and ability to
C316.1	Understand the concepts of stress Electric Stress, Surge Voltages and their distribution.
C316.2	examine breakdown phenomenon in gases, liquids and solid dielectric media.
C316.3	Apply the concepts of generation of high voltages and currents in power systems
C316.4	Examine the causes of over voltages in power systems concepts of insulation coordination, and DC measurements.
C316.5	Assess high voltage testing techniques of power apparatus

A15285	ELECTRICAL MACHINES – II LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C317.1	understand the basic working principle of a transformer; obtain the equivalent circuit parameters, estimate efficiency & regulation at various loads of 1-Φ transformers.
C317.2	Apply load sharing concepts of transformers & conversion of 3- Φ to 2- Φ supply for trannsformers
C317.3	examine the equivalent circuit parameters of a single phase induction motor, determine the performance characteristics and efficiency by direct and indirect methods of three phase induction motor.
C317.4	analyze the regulation of an alternator by various methods at different power factors.
C317.5	Investigate synchronous motor performance curves at various power factors and field currents.

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A15286	CONTROL SYSTEMS AND SIMULATION LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C327.1	Examine the time response of second order systems, Synchros, and truth tables verification by PLC.
C327.2	Find the transfer function of AC servomotor and DC servomotor practically.
C327.3	Identify the transfer function of DC motor, DC generator practically.
C327.4	Analyze magnetic amplifier characteristics.
C327.5	Examine stability analysis through bode, Nyquist and root locus plots using MATLAB

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III EEE II Semester

A16421	IC APPLICATIONS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C321.1	Ability to elucidate the characteristics of ideal and practical operational amplifier.
C321.2	Apply knowledge of mathematics to analyze operational amplifier in inverting and non-inverting configuration modes and develop the applications of IC 741.
C321.3	Examine and infer the functionality of 555 timer and 565 PLL Integrated circuits and interpret the concepts and features of Analog to Digital and Digital to Analog converter in Integrated circuits form.
C321.4	Evaluate the various Combinational and sequential logic using 74XX Digital Integrated circuits.
C321.5	

A16221	ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C322.1	Discuss about different types of measuring instruments and error compensations.
C322.2	Understand the operation of DC Crompton potentiometer, compare the CT and PT with phasor diagram.
C322.3	Apply the concepts of power and energy measurement by using wattmeter and energy meter.
C322.4	Outline the concept of DC and AC bridges for the measurement of resistance, inductance & capacitance
C322.5	Analyze the concepts of transducers and cathode ray oscilloscopes.

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A16222	POWER SEMICONDUCTOR DRIVES
	After the completion of this course, a student must demonstrate the knowledge and ability to
C323.1	Understand the concepts of the dynamics of electric drives, such as speed torque characteristics etc. Able to review speed control of different types of DC drives using single phase and three phase controlled converter.
C323.2	Analyze four quadrant operations with controlled converter speed control of DC drives.
C323.3	Examine four quadrant operations with Chopper speed control of DC drives.
C323.4	Assess speed control of induction motor using stator voltage and stator frequency variations.
C323.5	Assess speed control of synchronous motor, using voltage source inverter/current source inverter, Cyclo converter, PWM, VFI.

A16223	SWITCHGEAR AND PROTECTION
	After the completion of this course, a student must demonstrate the knowledge and ability to
C324.1	Describe working of circuit breaker and various types of circuit breakers.
C324.2	Outline different circuit breakers and their application in power systems.
C324.3	Use the principle of operation of over current, directional, differential and distance relays in relay design.
C324.4	Analyze the protection of alternators, transformers, bus-bars.
C324.5	Assess the concept of neutral grounding and protection from surge.

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A16227	ENERGY AUDITING AND CONSERVATION
	After the completion of this course, a student must demonstrate the knowledge and ability to
C325.1	Realize the need for energy auditing and conservation. Get awareness on types of energy audit; represent energy flows and energy consumption in tabular and graphical methods.
C325.2	Understand energy saving opportunities in energy efficient motors and power factor improvement methods.
C325.3	Exploit energy auditing and conservation opportunities with respect to energy efficient buildings.
C325.4	Analyze economic viability with respect to real world problems using depreciation methods.
C325.5	Prioritize energy conservation opportunities in boilers, heat pumps, cooling systems, compressors and fans.

A16228	PRINCIPLES OF ELECTRIC POWER UTILIZATION
	After the completion of this course, a student must demonstrate the knowledge and ability to
C326.1	Understand terms and concepts of illumination
C326.2	Apply the concepts of different electric lamps and good lighting Practices for artificial lighting systems.
C326.3	Analyze the methods of electric heating and welding
C326.4	Categorize the concepts of different electric traction systems and existing traction system in India.
C326.5	Investigate the mechanics of train movement

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A16224	RENEWABLE ENERGY SOURCES
	After the completion of this course, a student must demonstrate the knowledge and ability to
C327.1	Understand the concept of solar energy, analysis and applications solar energy.
C327.2	Examine the Environmental impact of solar power, solar plate collectors, and solar energy storage
C327.3	Outline the basic principles of wind, bio-mass and their use for IC engines.
C327.4	Discuss the principles of geo-thermal, OTEC energy sources.
C327.5	Analyze the methods of direct energy conversions, energy storage and Environmental effects of energy and conversion systems.

A16287	POWER ELECTRONICS & SIMULATION LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C328.1	Examine the characteristics of SCR, MOSFET, & IGBT, and analyze triggering circuits
C328.2	Analyze input and output waveforms of AC-DC converters.
C328.3	Identify input and output waveforms of AC-AC converters
C328.4	Identify input and output waveforms of DC-DC Converters
C328.5	Design converters and inverters using p-spice.

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A16090	ADVANCED COMUNICATION SKILLS LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C329.1	Listen to the speakers attentively, accurately and precisely to understand and respond appropriately in different contexts.
C329.2	Analyze and communicate intelligently while speaking with professionalism and enact different roles; engage themselves in preparing, organizing and delivering speeches, presentations etc.
C329.3	Demonstrate command over English vocabulary and develop the ability to read intelligently and imaginatively for comprehending different contexts.
C329.4	Master the mechanics of writing & practice it as a process and communicate the ideas relevantly and coherently.
C329.5	Gain employability skills; develop leadership qualities and problem solving skills to apply them for careers at advanced levels in a wide range of English and enrich themselves to meet industrial needs.

MP-I	INDUSTRY ORIENTED MINI PROJECT
	A student will be able to
C330.1	Understand various requirements and procedures of industry
C330.2	Make links across different core areas of knowledge.
C330.3	Generate, develop and evaluate ideas.
C330.4	Effectively work as a team.
C330.5	Enhance verbal and writing skills.

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IV EEE I Semester

A17231	COMPUTER METHODS IN POWER SYSTEMS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C411.1	Compute Y-bus and Z-bus matrices
C411.2	Apply the concepts of load flow studies in power systems.
C411.3	Analyze faults using for unit system
C411.4	Examine steady state stability of power system.
C411.5	Investigate transient stability of power system.

A17233	ELECTRICAL DISTRIBUTION SYSTEMS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C412.1	Distinguish between transmission and distribution systems, classification of loads and their characteristics.
C412.2	Understand design considerations of distribution feeders and sub-stations
C412.3	Compute voltage drop and power loss in feeders.
C412.4	Apply concepts of protection and coordination to distribution systems
C412.5	Examine the power factor improvement and voltage control

A17230	POWER SYSTEM OPERATION & CONTROL
	After the completion of this course, a student must demonstrate the knowledge and ability to
C413.1	Understand the economic operation of power systems.
C413.2	compute optimal loading of generators for the demand.
C413.3	Analyze modeling of turbines and automatic controllers.
C413.4	Apply the knowledge of single area and two area load frequency control.
C413.5	Examine reactive power control and compensating equipments.

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A17232	OPTIMIZATION METHODS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C414.1	Understand the need of optimization of engineering systems and classical optimization techniques.
C414.2	Restate optimization methods for electrical and electronics engineering problems.
C414.3	Apply unconstrained optimization and transportation problem.
C414.4	Examine the concept of constrained nonlinear programming.
C414.5	Investigate the concept of dynamic programming.

A17238	ELECTRIC VEHICLES AND HYBRID VEHICLES
	After the completion of this course, a student must demonstrate the knowledge and ability to
C415.1	Understand the components of electric vehicles and fundamentals of electric vehicles.
C415.2	Apply the basic concepts of batteries in the design of electric vehicles
C415.3	Differentiate the characteristics of various electric motors which can be used in electric vehicles
C415.4	Analyze the transmission of the drive system and the components of transmission.
C415.5	Design the basic parameters of Electric and hybrid vehicles.

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A17239	ENERGY STORAGE SYSTEMS
	After the completion of this course, a student must demonstrate the knowledge and ability to
C416.1	Understand Electrical Energy Storage Technologies.
C416.2	Outline the needs for electric energy storage
C416.3	Analyze the characteristics and features of energy from various sources.
C416.4	Classify various types of energy storage and various devices used for the purpose.
C416.5	Apply the same concepts to real time solutions like electric vehicles, smart Grid and SCADA etc.

A17288	ELECTRICAL MEASUREMENTS LAB
	After the completion of this course, a student must demonstrate the knowledge and ability to
C417.1	Calibrate voltmeters, ammeters, single phase energy meter.
C417.2	Analyze true and actual values of potentiometer & Power factor meter.
C417.3	verify dielectric property of oil insulation, Analyze the measuring parameters of Anderson & Schering bridge.
C417.4	Test displacement, force, strain, inductance, capacitance & resistance using concepts of electricity.
C417.5	Examine the output of turns ratio and ratio error of CT.

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A17493	MICROPROCESSOR AND INTERFACING LAB
C418.1	After the completion of this course, a student must demonstrate the knowledge and ability to
C418.2	Understand and implement the basic programs of microprocessor (8086).
C418.3	analyze and interpret the interfacing concept of microprocessor (8086) with other Processors.
C418.4	illustrate and show the different programs using Microcontroller (8051)
C418.5	implement and verify the interfacing concepts with 8051 microcontroller.

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IV EEE II Semester

A18240	UTILIZATION OF ELECTRICAL ENERGY
	After the completion of this course, a student must demonstrate the knowledge and ability to
C421.1	Understand illumination methods &solutions for illumination.
C421.2	Apply principles of electrical heating &welding and acquire skills to solve problems.
C421.3	Categorize electrical drives, their characteristics& applications.
C421.4	Analyze features of electric traction movement.
C421.5	Investigate the effects of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

A18241	FUNDAMENTALS OF HVDC AND FACTS DEVICES
C422.1	After the completion of this course, a student must demonstrate the knowledge and ability to
C422.2	Understand the concepts of DC transmission
C422.3	Analyze converters and their control and analyze Harmonics, Filters and Reactive Power Control
C422.4	Apply the basic principles of different types of facts controllers and their characteristics.
C422.5	Categorize types of shunt compensation.
C422.6	Investigate the usage of series compensation.

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A18244	EHVAC TRANSMISSION
C423.1	After the completion of this course, a student must demonstrate the knowledge and ability to
C423.2	Understand the necessity, merits and demerits of EHVAC transmission lines and mechanical aspects.
C423.3	Use the concepts of voltage gradient & effects of corona.
C423.4	Apply the measurement of electrostatic fields and their effects on human & animals.
C423.5	Analyze the lightning stroke mechanism and lightning protection techniques.
C423.6	Categorize the voltage control methods and techniques for compensation.

TS	TECHNICAL SEMINAR
	A student will be able to
C424.1	Choose suitable up to date topic of his choice by doing survey of literature
C424.2	Make an in depth study of the topic and analyze the subject
C424.3	Scrutinize the subject creating newness in its application with scope for future work.
C424.4	Prepare the seminar report and present it in a befitting manner.

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CVV	COMPREHENSIVE VIVA-VOCE
	A student will be able to
C425.1	Relate the technical knowledge of core courses of electrical and electronics engineering programme.
C425.2	Apply the knowledge from courses learnt in the curriculum to the relevant industry.
C425.3	Examine his confidence to face real interviews in their career.
C425.4	Apply the knowledge from courses learnt in the curriculum to the relevant industry.

MP-II	MAJOR PROJECT
	A student will be able to
C426.1	Make links across different core areas of knowledge.
C426.2	Generate, develop and evaluate ideas for the benefit of society
C426.3	Effectively work as a team.
C426.4	Enhance verbal and writing skills.

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Mechanical Engineering

Program Educational Objectives (PEO)

PEO 1: Successful career in mechanical and allied industries through strong foundation in basic sciences, mathematics and engineering fundamentals.

PEO 2: Ability to update knowledge on dynamically changing industrial practices.

PEO 3: Capability to work in a global environment imbibing team spirit with ethical responsibility.

PEO 4: Ability to enrich knowledge, communication and leadership skills through perpetual learning with zeal towards research.

Program Specific Outcomes (PSO)

PSO 1: Analyze and solve problems of thermal and manufacturing by comprehensive design of mechanical engineering components.

PSO 2: Ability to design, develop and implement mechanical engineering solutions keeping in view, sustainability and environmental issues with social responsibility.

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Course Outcomes for B.Tech Mechanical Engineering Programme

I YEAR I SEM		
English-I/ A11001	CO1	Demonstrate real life skills in the light of literature.
	CO2	Understand influential personalities, and practice human and professional values
	CO3	Explain new versions of technology for effective usage of human resources towards development and to avoid risks
	CO4	Identify principles and values to build collaborative knowledge and to cultivate social responsibility
	CO5	Enhance communication skills through grammar, vocabulary with emphasis on LSRW skills.
Mathematics-I/ A11002	CO1	Understand the term rank and Elementary Transformations of a Matrix, System of Equations.
	CO2	Compute Eigen values and corresponding Eigen vectors of a square matrix, finding Inverse and method of Diagonalization
	CO3	Evaluate the Mean value theorems and maxima and minima of functions of two variables
	CO4	Evaluate of improper integrals by using beta gamma functions and evaluation of double and triple integrals by tracing the region of integration
	CO5	Apply Laplace transform of various functions and solve the initial value problems by using Laplace transforms.
Engineering Physics-I/ A11003	CO1	Analyze the crystal structures, properties and to identify defects in crystals
	CO2	Explain the diffraction, interference and polarization phenomenon of light rays
	CO3	Identify the basics of statistical mechanics and applications of LASERs in various fields
	CO4	Interpret the significance of Magnetic materials
	CO5	Explain fundamentals of Dielectrics and their applications
C Programming/ A11501	CO1	Explain the basics of computers and its Generations
	CO2	Solve problems using flow charts, algorithms and programs
	CO3	Develop programs on control structures.
	CO4	Develop programs using Arrays, Strings and derived data types
	CO5	Design programs on functions

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Engineering Graphics-I/ A11301	**CO1**	Understand the usage of different drawing instruments and know the application of different curves used in engineering practice. Appreciate the concept of projections in first angle.
	CO2	Generate various scales used in engineering practice.
	CO3	Conceptualize and draw the projections of points and straight lines.
	CO4	Visualize and project different views of a planes.
	CO5	Visualize and draw the views of a given solid.
Engineering Mechanics-I/ A11302	**CO1**	Understand and apply the concepts of force, moment and their resolutions.
	CO2	Develop free body diagrams in system of forces.
	CO3	Analyze and apply the concepts of friction.
	CO4	Identify centroid for plane figures and centre of gravity for any given topology.
	CO5	Calculate area and mass Moment of Inertia for given cross-sections.
C Programming Lab/ A11581	**CO1**	Have Fundamental Concept On Basic Commands In Linux.
	CO2	Write, Compile And Debug Programs in C Language
	CO3	Formulate Problems and Implement in C Language.
	CO4	Choose Control Structures and Arrays to Solve Computing Problems in Real-World
	CO5	Implement Functions and Recursion
English Language Communication Skills Lab-I/ A11081	**CO1**	Facilitate computer-aided multimedia instruction enabling individualized and independent language learning.
	CO2	Improve accent and intelligibility in pronunciation of English through Ice breaking and JAM sessions
	CO3	Use vocabulary, glosses and pronunciation for appropriate usage of the target language.
	CO4	Develop learners' communicative ability through frequent exchange of ideas and discussions.
	CO5	Explain the concepts of verbal and non-verbal skills of communication useful in day-to- day life
Engineering Physics Lab/ A11082	**CO1**	Understand the practical concept of stationary waves using Melde's apparatus
	CO2	Study the mechanical properties of material using Torsional pendulum
	CO3	Visualize the fundamental optical phenomenon like Interference, diffraction and Dispersion
	CO4	Study the basic Electrical characteristics of LED, RC circuits
	CO5	Identify the variation of magnetic field by Stewart and Gee's apparatus experimentally

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Engineering Workshop/ A11381	**CO1**	Study and practice on workshop tools and their operations.
	CO2	Manufacture wooden and metallic components using carpentry and foundry respectively.
	CO3	Join two or materials using welding equipment.
	CO4	Fabricate ferrous components using blacksmith technique
	CO5	Demonstrate skills on plumbing and machine shops trades.

I YEAR II SEM		
English-II/ A12005	**CO1**	Acquire the real life skills in the light of literature.
	CO2	Develop managerial skills for successful careers. By making critical decisions
	CO3	Demonstrate physical and mental fitness with true sportsman spirit.
	CO4	Build collaborative knowledge and cultivate social responsibility.
	CO5	Enhance communication skills through grammar, vocabulary with emphasis on LSRW skills.
Mathematics-II/ A12006	**CO1**	Solve first order differential equations and their applications.
	CO2	Identify different types of higher order differential equations and their applications in engineering problems
	CO3	Apply Fourier series and defining it for various types of functions
	CO4	Evaluating the Fourier transforms of functions of single variable
	CO5	Justify integrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.
Engineering Physics-II/ A12007	**CO1**	Understand the principles of Quantum mechanics & free electron theory.
	CO2	Differentiate the types of solids based on band theory of solids and to understand the applications of optical fibers in various fields.
	CO3	Explain the basics of semiconductors and semiconductor devices
	CO4	Explain superconductivity and their applications in modern technology
	CO5	Identify the importance and characteristics of nanomaterials in various fields
Applied Chemistry/ A12008	**CO1**	Understand the operating principles and the reaction mechanisms of batteries and fuel cells.
	CO2	Apply their knowledge for the protection of different metals from corrosion.
	CO3	Apply the concept of adsorption in various industries
	CO4	Apply the knowledge of fuels and lubricants in industry.
	CO5	Understand the various applications of advanced engineering materials.

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Engineering Mechanics-II/ A12304	**CO1**	Analyze given system and find reaction forces in each member of Trusses.
	CO2	Identify the rigid body motion to compute velocity and acceleration.
	CO3	Understand the kinetics of rigid body in translation and rotation.
	CO4	Analyze the motion of bodies with and without considering cause of motion. Appreciate and apply the concept of Work-Energy method.
	CO5	Analyze the free vibration concepts from the fundamentals of Simple Harmonic Motion.
Engineering Graphics-II/ A12305	**CO1**	Analyze given solids and represent sectional views, developments and their intersections.
	CO2	Represent and differentiate Isometric and Orthographic projections
	CO3	Generate isometric and corresponding orthographic views of any given component.
	CO4	Visualize and draw the perspective view of a given solid.
	CO5	Appreciate the concepts of Computer Aided Drafting.
English Language Communication Skills Lab-II/ A12085	**CO1**	Build the language proficiency in English with emphasis on LSRW skills.
	CO2	Develop communication skills through various language learning activities.
	CO3	Summarize the nuances of English speech sounds, stress, rhythm, intonation and syllable division.
	CO4	Acquire and exhibit acceptable etiquette essential in social & professional settings.
	CO5	Improve the fluency in spoken English and neutralize mother tongue influence.
Engineering Physics & Chemistry Lab/ A12086	**CO1**	Experiment on Melde's and Torsional pendulum with knowledge in waves and mechanics
	CO2	Visualize the fundamental optical phenomenon like Interference, diffraction and Dispersion
	CO3	Identify the basic Electrical characteristics of LED, RC circuits
	CO4	Apply Titrimetric analysis for estimating the quantity of the compound accurately.
	CO5	Handle instruments like conductometer and potentiometer for measuring conductance & emf value.
	CO6	Evaluate and record the physical properties like Viscosity and Surface tension
IT & Engineering Workshop/ A12087	**CO1**	Understand the process of assembly/disassembly of computer parts.
	CO2	Work on advanced concepts of Microsoft word software.
	CO3	Appreciate the usage of advanced options in MS Excel and PowerPoint.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Fabricate components using tin smithy and fitting.

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II YEAR I SEM		
Numerical Methods/ A13013	**CO1**	Develop skills in solving engineering problems involving Algebraic and transcendental equations.
	CO2	Acquires the knowledge of interpolation in predicting future out comes based on the present knowledge.
	CO3	Evaluating the Numerical Solutions for Integrals and Fitting of different types of curves to the given data
	CO4	Understand the various Numerical Methods to solve Initial Value Problems.
	CO5	To solve the initial and boundary value problems of differential equations which are essential in engineering applications
Electrical and Electronics Engineering/ A13207	**CO1**	Understand different electrical circuits and gain thorough knowledge about DC machines.
	CO2	Identify and formulate outcomes in the part of transformers.
	CO3	Appreciate the working of AC machines along with regulation and efficiency calculations. Know the working of different measuring instruments.
	CO4	Gain knowledge of PN junction diodes, transistor and rectifiers and analyzing characteristics.
	CO5	Understand the working principles of CRT and applications of CRO for measurement of voltage, current and frequency.
Mechanics of solids/A13308	**CO1**	Understand the concepts of stress, strain and material properties. Derive basic stress strain equations with appropriate assumptions.
	CO2	Appreciate the concepts of shear force and bending moments. Generate shear force and bending moment diagrams for any given beam problem.
	CO3	Determine the stresses and strains in the members subjected to bending and shear and interpret the stress distribution across various beams like rectangular, circular, triangular, I, T and angle sections.
	CO4	Calculate and analyze the slope and deflection of beams under different types of loadings.
	CO5	Analyze and compute stresses and strains in thin and thick cylinders.
Thermodynamics/ A13309	**CO1**	Identify thermodynamic systems, understand concepts of zeroth law, first law, work and heat interactions.
	CO2	State and illustrate second law of thermodynamics. Identify and explain concepts of entropy, enthalpy, specific energy, reversibility, availability and irreversibility
	CO3	Understand the concepts of phase transformation of pure substance.
	CO4	Appreciate the concepts of perfect gas laws. Analyze mixtures of perfect gases
	CO5	Understand power cycles and evaluate the performance

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Metallurgy and Material Science/ A13310	**CO1**	Understand the structure of metals and constitution of alloys with phases.
	CO2	Understand the basic concepts of phase transformation during solidification and phase diagrams.
	CO3	Understand different heat treatment processes and their influence on properties of metals and alloys.
	CO4	Understand classifications of steels, cast irons and their alloys. Analyze the structure and properties of different non-ferrous metals.
	CO5	Know the classification, properties and applications of composite and ceramic materials.
Environmental Science/ A13011	**CO1**	Understanding the importance of Ecosystem and its Resources.
	CO2	Appreciate different types of natural resources and the means to utilize them.
	CO3	Identify diiferent root causes for pollution of environment and their control.
	CO4	Understand the impact of global environmental problems and their assessment.
	CO5	Know environmental policy, legislation, rules and regulations
Electrical and Electronics Engineering Lab/ A13282	**CO1**	Perform the tests on D.C. shunt machine, Single phase transformer and brake test on Three phase induction motor.
	CO2	Determination of regulation of alternator by synchronous impedance method.
	CO3	Perform brake test on D.C. shunt motor and determine the speed control methods on D.C. shunt motor.
	CO4	Perform input and output of CE characteristics and full wave rectifier with and without filters.
	CO5	Execute CE amplifiers, class A power amplifier and RC phase shift oscillator and micro processor
Metallurgy and Mechanics of solids Lab/ A13383	**CO1**	Understand the micro structures of pure metals, steels, cast irons, non-ferrous alloys and heat treated steels.
	CO2	Estimate the hardenability of steels by Jominy End Quench test.
	CO3	Determine the hardness of various treated and untreated steels by using Brinells hardness test & Rockwell hardness test.
	CO4	Conduct the direct tension test, torsion test, impact test and punch shear test on metal rod.
	CO5	Perform compression tests on spring and cube, bending test on Simply Supported and Cantilever Beam.

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II YEAR II SEM		
Production Technology/ A14312	**CO1**	Understand the basic concepts of casting processes to make different engineering components of industrial applications
	CO2	Differentiate the types of welding processes and decide which type of process to be selected for any given industrial application.
	CO3	Recognize the differences between hot working and cold working processes and understand the processes of various forging operations.
	CO4	Understand the basic principles of sheet metal operations and known the principles of drawing and extrusion processes.
	CO5	Ability to know the processing of thermo setting and thermo plastics.
Kinematics of Machinery/ A14313	**CO1**	Understand working principles of different lower and higher pairs, mechanisms and their inversions.
	CO2	Mathematical modeling of mechanisms to compute velocity and accelerations of links.
	CO3	Understanding various steering gear mechanisms and Hooke's joint.
	CO4	Appreciate different cams and followers used in mechanical systems.
	CO5	Appreciate the concepts of velocity in gearing systems.
Thermal Engineering-I/ A14314	**CO1**	Understand the concepts of actual cycles and their analysis.
	CO2	Appreciate the working principles of four stroke and two stroke IC engines.
	CO3	Analyze the combustion phenomenon in SI & CI engines
	CO4	Understand the testing and performance of IC engines.
	CO5	Analyze the working of air compressors and evaluate their performance
Mechanics of Fluids and Hydraulic Machines/ A14315	**CO1**	Understand the basic mechanics of fluid statics.
	CO2	Understand the principles of flow and energy momentum equations.
	CO3	Analyze the losses in pipe flow, boundary layer, separation of flows, forces on different vanes. Able to quantify the flow of fluid in flow measurement instruments.
	CO4	Understand the working of hydraulic machinery and analyze their characteristic curves.
	CO5	Appreciate the working principles of pumps and their applications.

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Machine Drawing/ A14316	**CO1**	Understand the conventional representation of materials used in machine drawing.
	CO2	Know various methods of dimensioning and general rules.
	CO3	Draw the machine elements including screw threads, keys, couplings and bearings.
	CO4	Draw the machine elements including cotters, knuckle, riveted, and bolted joints.
	CO5	Construct an assembly drawing using part drawings of machine components.
Probability and Statistics/ A14015	**CO1**	Demonstrate an understanding of the basics concepts of probability, random variables, binomial and normal distributions.
	CO2	Understand the concept of the sampling distribution of a statistics, and in particular describe the behavior of the sample mean.
	CO3	Use the normal distributions to test statistical hypotheses and to Compute confidence intervals.
	CO4	Application of regression analysis to analyze a problem.
	CO5	Application of control charts for quality control and measurement of trends.
Production Technology Lab/ A14384	**CO1**	Understand pattern designs & making, test sand properties and perform moulding, melting & casting
	CO2	Attain knowledge on arc and spot welding processes and able to perform them.
	CO3	Analyze and select suitable welding process based on the type of material used.
	CO4	Study different mechanical press working operations and perform operations like blanking, piercing, deep drawing, extrusion and bending operations
	CO5	Attain knowledge on processing of plastics and perform operations like injection moulding and blow moulding
Mechanics of Fluids and Hydraulic Machines Lab/ A14385	**CO1**	Practical exposure of using components like vacuum gauge, pressure gauge, manometers, pipes, motors, pumps, turbines.
	CO2	Measure fluid flow using Ventutimeter and Orificemeter.
	CO3	Understand friction factor and minor losses in a pipe line
	CO4	Understand and calculate performance of turbines and pumps at constant speed and head.
	CO5	Know and understand the impact of jet on vanes and Bernoulli's theorem.

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III YEAR I SEM		
Design of Machine Members-I/ A15317	**CO1**	Understand the design procedure and selection of material for a specific application. Analyze the simple stresses and strains in components.
	CO2	Appreciate variable stresses in mechanical components, fatigue analysis and fatigue theories of failure.
	CO3	Design fastened joints like riveted and welded joints.
	CO4	Design various joints like bolted joints, keys, cotter joints and knuckle joint.
	CO5	Design shafts for strength and rigidity. Design rigid and flexible shaft couplings.
Thermal Engineering-II/ A15318	**CO1**	Understand the basic concepts of rankine cycle and analyze improvements in rankine cycle, types of fuels and combustion, analysis of fuels and combustion, stoichiometry.
	CO2	Know the working principles of different types of boilers, mountings and accessories. Perform Thermodynamic analysis of nozzles.
	CO3	Analyze impulse and reaction steam turbines and subsequently apply to real time scenarios.
	CO4	Understand working of different types of gas turbines, efficiency improvements. Know the concepts and types of steam condensers.
	CO5	Appreciate different types of propulsive engines, thrust augmentation methods, rockets, propellant types.
Dynamics of Machinery/ A15319	**CO1**	Understand gyroscopic effects of rotating bodies for aero planes, naval ships, automobiles, and two wheelers. Perform static and dynamic force analysis of planar mechanisms.
	CO2	Compute friction in clutches, breaks and dynamometers.
	CO3	Diagrammatically represent turning moment and design flywheels. Understand the applications of Governors in mechanical systems
	CO4	Understand how to balance rotating and reciprocating masses in different planes.
	CO5	Perform calculations pertinent to several parameters of free and forced vibrations.
Machine tools and Metrology/ A15320	**CO1**	Understand the mechanics of metal cutting and working principles of lathe machines.
	CO2	Understand the working, classification, specifications and kinematic schemes of shaping, planing, drilling and boring machines.
	CO3	Know the operations of milling, grinding, lapping, honing and broaching machines.
	CO4	Understand the concepts of limits, fits and interchangeability. Design of GO and NO GO gauges
	CO5	Understand how to measure different parameters of surface roughness. Appreciate measurement of different dimensional parameters in screw threads.

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Automobile Engineering/ A15321	**CO1**	Understand the components of four wheeler automobile engines. Appreciate the functions and importance of lubrication and cooling systems.
	CO2	Know about the fuel systems in SI engine and CI engines.
	CO3	Appreciate the functions and importance of ignition and electrical systems.
	CO4	Explain the working principles, types and importance of transmission and suspension systems
	CO5	Appreciate the working principles, types and importance of braking and steering systems. Understand the environmental implications of automobile emissions and application of various alternative fuels.
OPEN ELECTIVE – I Elements of Mechanical engineering/ A15324	**CO1**	Understand the basic concepts of mechanical engineering.
	CO2	Applying principles of engineering mechanics in mechanism and machines
	CO3	Develop manufacturing methods to produce engineering components.
	CO4	Evaluating alternative designs for the engineering components
	CO5	Comparing various standards relevant to automobiles.
Thermal Engineering lab/ A15386	**CO1**	Investigate IC engines with varied parameters to evaluate the performance.
	CO2	Evaluate engine friction and heat balance of 4-stroke SI and CI engines.
	CO3	Determine A/F ratio, Volumetric Efficiency, Economical Speed and optimum cooling water temperature for IC engines.
	CO4	Acquire hands on experience on the assembly & disassembly of various IC engine parts
	CO5	Test performance of Reciprocating Air-compressor and understand the working of different types of boilers.
Metrology and machine Tools Lab/ A15387	**CO1**	Identify suitable instrument for measuring dimensions and surface roughness of a given component.
	CO2	Perform alignment and flatness tests on given machine and component.
	CO3	Perform wear resistance test and know the usage of tool makers microscope.
	CO4	Operate lathe, milling machines, drilling machine, grinding machines.
	CO5	Select suitable machining operation to fabricate the required product from the given raw material.

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III YEAR II SEM		
Design of Machine Members-II/ A16326	**CO1**	Understand different sliding contact and rolling contact bearings and perform design calculations.
	CO2	Analyze design considerations of IC engine parts like piston, connecting rod and cylinder.
	CO3	Appraise the design of belt and rope drives used in power transmission. Understand the stresses, deflection and energy storage capacity of helical springs.
	CO4	Design spur and helical gear drives by calculating different parameters.
	CO5	Compute design parameters of bevel gear drives. Design power screws applied in various mechanical members.
Heat Transfer/ A16327	**CO1**	Understand the basic modes of heat transfer, steady and unsteady periodic heat transfer.
	CO2	Solve 1-D problems of steady state and transient conduction heat transfer.
	CO3	Appreciate concepts of convective heat transfer process and evaluate heat transfer coefficient for free and forced convection over exterior and interior surfaces with proper boundary conditions.
	CO4	Applying the boiling and condensation principles in the heat transfer equipment design. Analyze the performance of heat exchangers by LMTD and NTU methods.
	CO5	Analyze radiation heat transfer scenarios in black and gray bodies
Finite Element Methods/ A16328	**CO1**	Understand the basics of FEM, stress-strain relations and gain knowledge of Weighted Residual Methods and Variational Methods.
	CO2	Solve 1-D problems by applying the pertinent boundary conditions.
	CO3	Analyze and formulate finite element equations for 1-D planar truss element and beam element.
	CO4	Appreciate the treatment of CST, iso-parametric and axi-symmetric elements to solve 2-D problems.
	CO5	Analyze and solve 1-D and 2-D heat transfer problems using FEM. Formulate Finite element equations for a stepped bar and a beam using dynamic analysis.
Managerial Economics and Financial Analysis/ A16018	**CO1**	Analyze the scope of managerial economics.
	CO2	Apply managerial tools and techniques to attain optimal decisions
	CO3	Analyze how production function is carried out to achieve maximum output.
	CO4	Analyze changing business environment in post liberalization scenario.
	CO5	Evaluate and interpret the financial statements to make informed decisions.

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Refrigeration and Air Conditioning/ A16329	**CO1**	Understand the basic concepts of refrigeration and thermodynamically analyze air refrigeration systems.
	CO2	Appreciate the working principle and thermodynamically analyze vapor compression refrigeration system.
	CO3	Classify basic components of vapor compression refrigeration system according to different criteria and understand their working. Identify the different refrigerants used in the field of refrigeration and air conditioning, and understand their desirable properties and nomenclature.
	CO4	Understand the working principles and thermodynamically analyze vapor absorption refrigeration system, steam jet refrigeration system and different non conventional methods of producing cooling effect.
	CO5	Estimate the air conditioning load for comfort and industrial applications by applying the principles of psychrometry. Appreciate the working of different air conditioning systems, their components, heat pump and different heat pump circuits.
OPEN ELECTIVE – II Basic Automobile engineering/A16332	**CO1**	Understanding the basic structure of an automobile
	CO2	Evaluating different cooling and lubrication systems of an automobile
	CO3	Analyzing the electrical systems in tandem with ignition systems
	CO4	Comparing the various transmission systems for their effectiveness
	CO5	Understanding and there by implement the subsystems in the automobile for its low emission
Heat Transfer Lab/ A16388	**CO1**	Evaluate the amount of heat exchange for plane, cylindrical and spherical geometries
	CO2	Compare the performance of extended surfaces and heat exchangers.
	CO3	Measure heat transfer coefficient in free and forced convection and correlate with theoretical values.
	CO4	Perform tests on Emissivity, Stefan-Boltzmann and Critical Heat Flux apparatus.
	CO5	Demonstrate the working principle of heat pipe and compare convective heat transfer phenomena with phase change heat transfer processes.
Advanced English communication Skills Lab/ A16090	**CO1**	Listen to the speakers attentively, accurately and precisely to understand and respond appropriately in different contexts.
	CO2	Analyze and communicate intelligently while speaking with professionalism and enact different roles; engage themselves in preparing, organizing and delivering speeches, presentations etc
	CO3	Demonstrate command over English vocabulary and develop the ability to read intelligently and imaginatively for comprehending different contexts
	CO4	Master the mechanics of writing and practice it as a process and communicate the ideas relevantly and coherently
	CO5	Gain employability skills; develop leadership qualities and problem solving skills to apply them for careers at advanced levels in a wide range of English and enrich themselves to meet industrial needs

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IV YEAR I SEM		
Operation Research /A17334	**CO1**	Model the real life situations with mathematical models. Understand the concept of linear programming.
	CO2	Solve transportation and assignment problems.
	CO3	Formulate the sequencing of jobs on machines. Understand the various replacement concepts.
	CO4	Identify and apply various inventory models.
	CO5	Apply queuing and dynamic programming models.
CAD/CAM/ A17335	**CO1**	Appreciate CAD/CAM principles and know the various input and output peripherals of computers. Understand geometric modeling principles.
	CO2	Develop mathematical models to represent surfaces and solids.
	CO3	Understand numerical control systems and develop CNC part programs.
	CO4	Understand the elements of group technology and computer aided process planning
	CO5	Acquire knowledge of Flexible Manufacturing Systems, Computer Aided Quality Control and Computer Integrated Manufacturing Systems.
Mechanical measurements and Instrumentation /A17336	**CO1**	Define basic terms related to measurements, understand measurement techniques.
	CO2	Understand working principles of various displacements, pressure and temperature measuring instruments.
	CO3	Describe the working, advantages, disadvantages and applications of various flow, level, speed, acceleration and vibration measuring instruments.
	CO4	Model and analyze various stress, strain, humidity, force, torque and power measuring instruments.
	CO5	Understand control systems and their applications.
Maintenance and safety engineering / A17344	**CO1**	Understanding the need for maintenance of a machine in an industry
	CO2	Identifying various maintenance policies
	CO3	Analyzing the cost and time concepts while implementing the maintenance
	CO4	Evaluating the quality concepts for safety and maintenance of an equipment
	CO5	Appreciating the terms reliability and maintainability with reference

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		the maintenance of an equipment
E-III Robotics/A17337	**CO1**	Understand the basic concepts of robotics and know the components of industrial robots. Analyze the motion of robots with respect to position and orientation.
	CO2	Model forward and inverse kinematics of robot manipulators.
	CO3	Model differential kinematics of robot manipulators. Formulate dynamic analysis equations for robotic manipulators.
	CO4	Plan the trajectory of robot. Know principles of different actuators and feedback components (sensors).
	CO5	Appreciate the industrial applications of robots.
Power Plant Engineering /A70353	**CO1**	Understand the layout of steam power plant and know different handling systems. Appreciate the working principles of various components responsible for combustion.
	CO2	Understand the layout of diesel power plant with detailed emphasis on its auxiliaries.
	CO3	Know the working of hydroelectric power plants and characteristics of hydrographs.
	CO4	Know the advantages, disadvantages & applications of nuclear power plants.
	CO5	Analyze and estimate different power plant economic factors and environmental considerations.
Computer Aided Design and Manufacturing Lab/A17389	**CO1**	Design 2D drawings using solid edge software
	CO2	Develop 3D cad models as per given dimensions
	CO3	Assemble of sub components in their working positions.
	CO4	Perform Finite Element Analysis and obtain results to any given problem.
	CO5	Prepare CNC programs and simulate the manufacturing process
Production Drawing Practice and Instrumentation Lab/A17390	**CO1**	Represent limits, fits, tolerances, surface roughness, heat and surface treatment symbols.
	CO2	Generate detailed and part drawings from assembly drawings.
	CO3	Calibrate pressure, flow, strain and displacement measuring instruments.
	CO4	Use magnetic and speed pickups for speed measurement.
	CO5	Calibrate different instruments used for temperature measurement

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Industrial Oriented Mini Project/A80087	**CO1**	Interact with industry and get familiarized with its practices.
	CO2	Identify a topic in various areas of Mechanical Engineering.
	CO3	Review literature to identify gaps and define objectives & scope of the work.
	CO4	Generate and implement innovative ideas for social benefit.
	CO5	Develop a report that meets specified standards and defend the work.
IV YEAR II SEM		
Production Planning & Control/A18345	**CO1**	Understand the basic concepts of production planning and control.
	CO2	Appreciate principles and importance of forecasting techniques.
	CO3	Analysis of various inventory management and control systems. Plan the stock required based on various methods like MRP, ERP, LOB, JIT and other Japanese concepts.
	CO4	Know the factors of routing and schedule. Apply standard scheduling methods and line balancing.
	CO5	Appreciate dispatching procedure and application of computer in production planning and control.
Plant Layout & Material Handling/A18346	**CO1**	Understand different plant layouts, selection and comparison of process and product layouts.
	CO2	Understand heuristics for plant layouts like ALDEP, CORELAP and CRAFT.
	CO3	Get an overview of material handling systems and relationship between material handling and plant layout.
	CO4	Understand various methods of material handling like path and function oriented systems.
	CO5	Minimize cost of material handling with safety perquisites
Unconventional Machining Processes/A18347	**CO1**	Understand the need, importance and classification of various unconventional machining processes. Gain a thorough understanding of ultrasonic machining.
	CO2	Appreciate basic principles and process parameters of water jet, abrasive jet machining and electro-chemical machining processes.
	CO3	Appreciate thermal energy based machining processes with emphasis on surface finish and accuracy.
	CO4	Understand electron beam machining and laser beam machining along with applications.

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	CO5	Know the advanced unconventional processes like plasma machining, chemical machining, magnetic abrasive finishing and abrasive flow finishing.
Seminar/A80089	**CO1**	Identify and compare technical and practical issues related to the area of course specialization.
	CO2	Outline annotated bibliography of research demonstrating scholarly skills.
	CO3	Prepare a well-organized report employing elements of technical writing and critical thinking.
	CO4	Demonstrate the ability to describe, interpret and analyze technical issues and develop competence in presenting.
	CO5	Communicate and articulate effectively so as to present the required technical content.
Project work/A80088	**CO1**	Identify methods and materials to carry out experiments.
	CO2	Reorganize the procedures with a concern for society, environment and ethics.
	CO3	Analyze and discuss the results to draw valid conclusions.
	CO4	Prepare a report as per recommended format and defend the work.
	CO5	Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.
Comprehensive Viva/A80090	**CO1**	Comprehend the knowledge gained in the course work
	CO2	Infer principles of the working of various systems of mechanical engineering
	CO3	Demonstrate the ability of problem solving.
	CO4	Communicate effectively and enunciate the skills lucidly.
	CO5	Acquire profound knowledge on cutting edge technologies.

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Electronics and Communication Engineering

Program Educational Objectives (PEO)

PEO 1: To impart the student's solid foundation in basic sciences, and Electronics & Communication Engineering with an attitude to pursue continuing education by meeting industry requirements(Continuing Education)

PEO 2: To prepare engineering graduates proficient and competent in application domains: Communication, Signal Processing, Embedded Systems and Solid-state electronics (Excellence in Career)

PEO 3: To develop the students with professional skills to function as members of multi-Disciplinary teams in engineering and to achieve leadership role with innovative skills (Multi-Disciplinary Engineering and Leadership)

PEO 4: To prepare engineering graduates engaged in lifelong learning with professional honesty and integrity together with an appreciation of social responsibility (Contribution to Society).

Program Specific Outcomes (PSO)

PSO 1: To impart knowledge in the field of Electronics & Communication Engineering by training the students in contemporary technologies which meet the needs of industry.

PSO 2: To confide information on thrust areas of semiconductor technologies for students to pursue research in their field of interest.

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ELECTRONICS AND COMMUNICATION ENGINEERING
II B.TECH-I SEM

A13012. MATHEMATICS-IV

(SPECIAL FUNCTIONS AND FUNCTIONS OF A COMPLEX VARIABLE)

COURSE OUTCOMES: After going through this course the student will be able to:

C201.1	Residue Theorem Identify Bessel equation and solve it under special conditions with the help of series solutions method. Also recurrence relations and orthogonality properties of Legendre polynomials.
C201.2	Analyze the complex functions with reference to their analyticity, Integration using Cauchy's integral theorem,
C201.3	Expansion of a given function as a Taylor's
C201.4	Expansion of a given function as a Laurent series
C201.5	Solving Real Definite Integrals using Cauchy's.

A13401. ELECTRONIC DEVICES AND CIRCUITS

COURSE OUTCOMES:

C202.1	Understand and Analyze the different types of diodes, operation and its characteristics
C202.2	To analyze and design diode application circuits like rectifiers,filters.
C202.3	Understand and Analyze the operation and characteristics of BJT and FET.
C202.4	Design and analyze the DC bias circuitry of BJT and FET,
C202.5	Design biasing circuits using diodes and transistors

A13402. SIGNALS AND SYSTEMS

COURSE OUTCOMES:

C203.1	Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
C203.2	Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
C203.3	Understands the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum and can design a system for sampling a signal.
C203.4	For a given system, response can be obtained using Laplace transform, properties and ROC of L.T

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C203.5	Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform.

A13403. SWITCHING THEORY AND LOGIC DESIGN

COURSE OUTCOMES:

After going through this course the student will be able to:

C204.1	Manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
C204.2	Manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
C204.3	Design and analyze small combinational circuits
C204.4	To use standard combinational functions/building blocks to build larger more complex circuits.
C204.5	Design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

A13404. ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

C205.1	Describe the fundamental concepts and principles of instrumentation explain the operations of the various instruments required in measurements.
C205.2	Apply the measurement techniques for different types of tests and to select specific instrument for specific measurement function.
C205.3	Understand principle of operation, working of different electronic instruments like digital multi meter, vector voltmeter.
C205.4	Learners will apply knowledge of different oscilloscopes like CRO, DSO and will understand functioning, specification, and applications of signal analysing instruments.
C205.5	Students will understand functioning, specification, and applications of signal analysing instruments

A13405. PROBABILITY THEORY AND STOCHASTIC PROCESS

COURSE OUTCOMES:

After going through this course the student will be able to:

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C206.1	Demonstrate knowledge in Probability theory Single and multiple random variables
C206.2	Random processes and their characteristics
C206.3	Analyze operations on single and multiple random variables and processes.
C206.4	Will be able to compute: Least -square & maximum likelihood estimators for engineering problems. Mean and covariance functions for simple random processes.
C206.5	Design solutions for complex engineering problems involving random processes.

A13481. ELECTRONIC DEVICES AND CIRCUITS LAB

C207.1	To Identify and use the basic components of basic components of electronics laboratory
C207.2	To understand and use the basic instrument of the laboratories used in measurements
C207.3	To Understand and show the characteristics and applications of Diode
C207.4	To identify and produce the characteristics and applications of transistors
C207.5	To identify and produce the characteristics and applications of FETs

A13482. BASIC SIMULATION LAB

C208.1	To Quantify and verify the various operation on signals.
C208.2	To Analyze and implement the convolution and correlation on signals.
C208.3	To understand and analyze the transforms on signals and systems.
C208.4	To find power spectrum of a given signal
C208.5	To study and implement the noise removal on periodic signal.

II B.TECH-II SEM

A14211. PRINCIPLES OF ELECTRICAL ENGINEERING

COURSE OUTCOMES:

After going through this course the student gets

C209.1	The knowledge on transient analysis of circuits
C209.2	The basic two-port network parameters and the design analysis of the filters and attenuators and their use in the circuit theory.

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C209.3	The operation of DC machines
C209.4	The operation of DC transformers
C209.5	Able to apply the above conceptual things to real-world problems and applications.

A14409. ELECTRONIC CIRCUIT ANALYSIS

COURSE OUTCOMES:

After going through this course the student will be able to:

C210.1	Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
C210.2	Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
C210.3	Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
C210.4	Utilize the Concepts of negative feedback to improve the stability of amplifiers
C210.5	Utilize the Concepts of positive feedback to generate sustained oscillations.

A14410. PULSE AND DIGITAL CIRCUITS

COURSE OUTCOMES:

After going through this course the student will be able to:

C211.1	Understand the applications of diode as integrator, differentiator, clippers, clampler circuits.
C211.2	Learn various switching devices such as diode, transistor, SCR.
C211.3	Difference between logic gates and sampling gates.
C211.4	Design mutivibrators for various applications, synchronization techniques and sweep circuits.
C211.5	Realizing logic gates using diodes and transistors.

A14411. ELECTROMAGENETIC THEORY AND TRANSMISSION LINES

COURSE OUTCOMES:

After going through this course the student will be able to:

C212.1	Study time varying Maxwell's equations and their applications in electromagnetic problems.
C212.2	Determine the relationship between time varying electric and magnetic fields and electromotive force.

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C212.3	Analyze basic transmissions line parameters in phasor domain.
C212.4	Use Maxwells equations to describe the propagation of electromagnetic waves in vaccum.
C212.5	Show how waves propagate in Dielectrics and lossy media and Demonstrate the reflection and refraction of waves at boundaries.

A14412. DIGITAL SYSTEM DESIGN

Course Outcomes:

By the end of this course, students should be able to:

C213.1	Describe Verilog hardware description, languages(HDL) and Design digital circuits.
C213.2	Write Behavioural models of digital circuits and Write Register Transfer Level (RTL) models of Digital Circuits.
C213.3	Verify Behavioural and RTL models and Describe standard cell libraries and FPGAs
C213.4	Synthesize RTL models to standard cell libraries and FPGAs
C213.5	Implement RTL models on FPGAs and Testin and Verification

A14016. ENVIRONMENTAL SCIENCE

(Common to all Branches)

Course Outcomes:

At the end of the course, the student will be able to:

C214.1	Understand the importance of Ecosystem and its Resources.
C214.2	Be aware on the Variety of Living organism and the need to conserve them.
C214.3	Understand the impacts of Developmental Activities.
C214.4	Understand the Environmental Policies, Management Plan and Regulations.
C214.5	Sensitize on a Sustainable Future.

A14485. ELECTRONIC CIRCUITS AND ANALYSIS LAB

C215.1	To Implement and verify the response of small signal Amplifiers
C215.2	To Identify and illustrate the time response of oscillators
C215.3	To Prepare and summarize the response of power amplifiers
C215.4	To illustrate and show the frequency of oscillations of tune amplifiers.

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C215.5	To Implement and verify the response of various feedback amplifiers

A14486. PULSE AND DIGITAL CIRCUITS LAB

C216.1	To Understand and implement the Linear wave shaping circuits
C216.2	To Understand and implement the Non-Linear wave shaping circuits
C216.3	To Analyze and design the different multivibrators
C216.4	To Recite and relate the relaxation oscillator
C216.5	5.To design and analyze switching characteristics of a BJT.

III B.TECH- I SEM

A15413.ANALOG COMMUNICATIONS

Course Outcomes

At the end of the course the student should be able to

C301.1	Understand the importance of probability theory and the properties of Fourier Transformfor the Analysis of Analog Communication Systems.
C301.2	Interpret the Time and Frequency domain analysis of different analog modulation Schemes
C301.3	Analyze the given communication system for computing the transmission bandwidth,Power requirement based on the used modulation schemes.
C301.4	Design and Utilize different modulation and demodulation schemes used in Real time.
C301.5	Differentiate the various divergent noise and its effects on analog modulation schemes, also the various types of receiver characteristics.

A15414. LINEAR AND DIGITAL IC APPLICATIONS

Course Outcomes

At the end of the course the student should be able to

C302.1	Ability to elucidate the characteristics of ideal and practical operational amplifier

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C302.2	Apply knowledge of mathematics to analyze operational amplifier in inverting and non-inverting configuration modes and develop the applications of IC 741.
C302.3	Examine and infer the functionality of 555 timer and 565 PLL Integrated circuits.
C302.4	Interpret the concepts and features of Analog to Digital and Digital to Analog converter in Integrated circuits form.
C302.5	Evaluate the various Combinational and sequential logic using 74XX Digital Integrated circuits.

A15415. CONTROL SYSTEMS ENGINEERING

Course Outcomes

At the end of the course the student should be able to

C303.1	Demonstrate and understand the fundamentals of control systems.
C303.2	Determine and use models of physical systems in different forms suitable for use in the analysis and design of control systems.
C303.3	Relate the time and frequency-domain responses of first order systems to step and sinusoidal inputs.
C303.4	Relate the time and frequency-domain responses of second-order systems to step and sinusoidal inputs.
C303.5	Examine the stability of a closed-loop control system

A15416. COMPUTER ORGANIZATION AND ARCHITECTURE

(Professional Elective-I)

Course Outcomes

At the end of the course the student should be able to

C304.1	Recall the structure and organization involved in digital computer design.
C304.2	Identify the different memory and input- output system involved in system design.
C304.3	Understand the basics of computer organization
C304.4	Understand the design on program control and computer arithmetic operations.
C304.5	Comprehend the various details of multiprocessor in computer design

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A15419. INTRODUCTION TO MICROCONTROLLERS AND APPLICATIONS
(Open Elective – I)

Course Outcomes

At the end of the course the student should be able to

C305.1	Interpret the internal organization of 8051 with its unique features.
C305.2	Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.
C305.3	To understand the various interfacing techniques pertaining to system design.
C305.4	Construct the hardware and software interaction with each other using programming.
C305.5	Summarize the features of the advanced architecture using ARM controller.

SMART CITY (SC)

Course Outcomes

At the end of the course the student should be able to

C305.1	Understand the necessity of smart infrastructure and to promote cities that provide quality of life to citizens.
C305.2	Explain technology-based solution on smart mobility.
C305.3	Illustrate & introduce the smart and sustainable waste and water management for smart cities.
C305.4	Evaluate economical models for smart infrastructure solution.
C305.5	Create healthy and waste ridden environment.

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ELEMENTS OF MECHANICAL ENGINEERING (EME)

Course Outcomes

At the end of the course the student should be able to

C305.1	Understand the basic concepts of mechanical engineering.
C305.2	Applying principles of engineering mechanics in mechanism and machines
C305.3	Develop manufacturing methods to produce engineering components.
C305.4	Evaluating alternative designs for the engineering components
C305.5	Comparing various standards relevant to automobiles.

PRODUCT ENGINEERING (PE)

Course Outcomes

At the end of the course the student should be able to

C305.1	Identifying scheduling techniques for project management.
C305.2	Designing the products and their life cycles.
C305.3	Generating the products with different material requirements.
C305.4	Conceptualization the products with their drawings for standardization.
C305.5	Evaluating the life of the products by conducting various tests.

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JAVA PROGRAMMING(OPEN ELECTIVE)

Course Outcomes

At the end of the course the student should be able to

C305.1	Apply OOP concepts in Java Programming
C305.2	Analyze the concepts of JAVA programming for problem solving
C305.3	Evaluate the concepts of packages and interfaces in java
C305.4	Analyze the usage of Exception Handling and Multithreading in complex Java programs
C305.5	Create GUI Applications and Applets

OPERATING SYSTEMS(OPEN ELECTIVE)

Course Outcomes

At the end of the course the student should be able to

C305.1	Understand the functions of Operating Systems.
C305.2	Evaluate various process scheduling algorithms.
C305.3	Analyze various memory allocation techniques for effective utilization of memory.
C305.4	Evaluate various file concepts for effective storage.
C305.5	Analyze the concepts of deadlocks.

TOTAL QUALITY MANAGEMENT (TQM)

Course Outcomes

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At the end of the course the student should be able to

C305.1	To explore the quality framework in production and operational aspects.
C305.2	To evaluate the role of quality in product design and analysis.
C305.3	To analyze quality in process improvement and modern production management tools.
C305.4	To understand the role of TQM tools and techniques in elimination of wastages and reduction of defects
C305.5	To analyze the requirements of quality management system.

REMOTE SENSING& GIS **(RS&GIS)**

Course Outcomes

At the end of the course the student should be able to

C305.1	Select the type of remote sensing technique / data for required purpose.
C305.2	Identify the earth surface features from satellite images.
C305.3	Analyze the energy interactions in the atmosphere and earth surface features.
C305.4	Prepare thematic maps.
C305.5	Interpretations of satellite data for various applications.

A15420. BASIC ELECTRONICS AND INSTRUMENTATION

(Open Elective-I)

Course Outcomes

At the end of the course the student should be able to

C305.1	Summarize the concepts of different semiconductor devices with its characteristics.
C305.2	Describe the fundamental concepts and basic principle of meters.

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C305.3	To classify the types of transducer with its methodology of data collection.
C305.4	Categorize different transducers and their working principles
C305.5	Explain different bridges and understand how different physical parameters can be acquired.

A15487. ANALOG COMMUNICATION LAB

C306.1	To implement and verify the different techniques in Amplitude modulation.
C306.2	To Analyze and interpret the results in frequency domain using the spectrum Analyzer
C306.3	To recite and relate the frequency modulation and demodulation
C306.4	To implement and summarize the different Pulse modulation and demodulation methods
C306.5	To calculate the frequency response of Pre-Emphasis and De-Emphasis

A15488. LDIC Application Lab

C307.1	To implement and verify the application of IC 741
C307.2	To analyze and interpret the application of IC 555
C307.3	To Implement and verify the Small scale integrated circuits
C307.4	To Understand and evaluate the counter IC's and shift registers.
C307.5	To verify Various logic gates and flip flops.

A158089. ADVANCED COMMUNICATION SKILLS LAB
COURSE OUTCOMES

C308.1	The student will be able to build communication competence in person-to-person interactions to build self-efficacy and to manage relationships and improve communicative behaviour of dyadic interactions in various contexts.
C308.2	The student will be able to annotate effectively for active reading, increased comprehension & retention while synthesizing information both print and online sources for their relevance, accuracy and appropriateness.
C308.3	The student will be able to develop unique qualities of professional rhetoric and writing style and explore different format features in both print, multimedia documents, and develop document design skills.
C308.4	The student will be able to identify essential components of Presentation and will be able to speak with greater control and charisma in front of a larger audience.

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C308.5	The students will be able to know the significance of group activities and acquire oral skills & body language used for effective Group discussion and prepared to face interviews.

III B.TECH- II SEM

A16018. MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Outcomes:- At the end of the course the students is expected

C309.1	to understand and enhance the knowledge regarding managerial economics concepts and obtaining optimal solutions.
C309.2	to get an idea of analysis of firm's financial position with the techniques of financial analysis
C309.3	to get an idea of analysis of firm's financial position with the techniques of ratio analysis.
C309.4	To understand analysis of markets, forms of business organizations,
C309.5	To know the significance of capital budgeting

A16422. VLSI DEISGN

Course Outcomes

At the end of the course the student should be able to

C310.1	Explain the fabrication process involved in Integrated Circuit Technology and label the effects of current and voltage in MOS transistors.
C310.2	Understand the primary and secondary effects of MOSFET and BICMOS
C310.3	Summarize the divergent techniques involved in design of VLSI circuits using Design Rules.
C310.4	List various Static and dynamic CMOS gate circuits involved in System design.
C310.5	Illustrate the process involved in programmable logic design and testing methods.

A16423. DIGITAL SIGNAL PROCESSING

Course Outcomes

At the end of the course the student should be able to

C311.1	Define the different discrete time signals and show the methods of applying Z-transforms on Discrete Time Linear Time Invariant systems (DTLTI).

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C311.2	Able to compute the divergence between the transforms (DTFS/DTFT/DFT) and illustrate the effects of each on Discrete time signals.
C311.3	Interpret the methodology of Discrete Fourier transform with its properties and methodology of faster computations.
C311.4	List, Differentiate Design and implement the different methods involved in Filter design (FIR/IIR)
C311.5	State the effects of different quantization noise on recursive systems and enumerate the role of multirate signal processing on discrete time signals.

A16424. MICROPROCESSORS AND MICROCONTROLLERS

Course Outcomes

At the end of the course the student should be able to

C312.1	Memorize the internal organization of 8086
C312.2	Apply the divergent techniques involved in assembly level language programming of 8086 for different data manipulation applications.
C312.3	To list and analyze the techniques involved in assembly language programming of 8086
C312.4	Summarize various interfacing integrated circuits for peripheral devices using 8086.
C312.5	List and express the internal features of 8051 with its programming.

A16425. OPTICAL COMMUNICATIONS

(Professional Elective-II)

Course Outcomes

At the end of the course the student should be able to

C313.1	Recognize the constructional materials of Optical fibers and its impact on communications.

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C313.2	Summarize the channel impairments (like losses and dispersion)that occur in an opticalcommunications.
C313.3	Compare the different signal sources used for optical communications with its methodology of coupling
C313.4	illustrate the methodology and construction of photodetectors and the performance of digital receivers using optic fiber.
C313.5	Contrast the communication performed in the optic fiber systems and recall the divergent multiplexing techniques involved in it.

A16426. PROGRAMMING IN MATLAB
(Professional Elective-II)
Course Outcomes
At the end of the course the student should be able to

C314.1	Develop codes on various domains of Electronics and Communication Engineering
C314.2	Handle the advanced commands in appropriate fields of engineering
C314.3	Visualize the impact of parameters during simulation
C314.4	Cater the industrial needs pertaining to the semiconductor technologies.
C314.5	Understand the need for Simulink in various domains of Electronics and Communication

A16427. SATELLITE AND WIRELESS COMMUNICATIONS
(Professional Elective-II)
Course Outcomes

C315.1	At the end of the course the student should be able to
C315.2	Understand the concepts and orbital aspects of satellite communication.
C315.3	Summarize the aspects of subsystem design and its involvement in ground tracking with suitable link margins.
C315.4	Outline the fundamentals and principles of wireless communications and networking.
C315.5	Relate and contrast the different layers involved in data communication of WLAN and WWAN.

ENVIRONMENT POLLUTION & CONTROL METHODS (EPCM)

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Course Outcomes

At the end of the course the student should be able to

C316.1	Understanding about the various air pollutants and effect on environment.
C316.2	Analyze quality of air in the form of air quality index and dispersion modeling.
C316.3	Determine sampling and measurements of air Pollutants.
C316.4	Analysis and measurement of soil contamination.
C316.5	Predict types of noise and problems arise due to noise pollution.

GREEN BUILDING TECHNOLOGIES (GBT)

Course Outcomes

At the end of the course the student should be able to

C316.1	Understand the Green building concept and focus on approaches that make building sustainable.
C316.2	Illustrate Green building assessment and accreditation system.
C316.3	Able to apply low energy building strategies.
C316.4	Designing green building and improve sustainability ofinfrastructure.
C316.5	Classify the economic benefits of green buildings.

BASIC AUTOMOBILE ENGINEERING (BAE)

Course Outcomes

At the end of the course the student should be able to

C316.1	Understanding the basic structure of an automobile.
C316.2	Evaluating different cooling and lubrication systems of an automobile.
C316.3	Analyzing the electrical systems in tandem with ignition systems.
C316.4	Comparing the various transmission systems for their effectiveness.

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C316.5	Understanding and there by implement the subsystems in the automobile for its low emission.

MATERIAL SCIENCE ENGINEERING (MSE)

Course Outcomes

At the end of the course the student should be able to

C316.1	Understanding the crystal structures and necessity of alloys.
C316.2	Classifying the ferrous materials and their heat treatment process.
C316.3	Evaluating the non ferrous materials and their applications in Engineering usage.
C316.4	Applying the composite materials as an efficient substitute.
C316.5	Implementing the principles of nano science and their by producing materials.

DATA BASE MANAGEMENT SYSTEMS

Course Outcomes

At the end of the course the student should be able to

C316.1	Understand the Database Management systems concepts
C316.2	Analyze Entity-Relationship Model for enterprise level databases
C316.3	Develop a database and formulate the complex SQL queries
C316.4	Evaluate various Relational Formal Query Languages
C316.5	Analyze various Normal forms to carry out Schema refinement

Software Engineering(Open Elective)

Course Outcomes

At the end of the course the student should be able to

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C316.1	Understand various process models
C316.2	Apply requirement engineering process for a project.
C316.3	Analyze the design engineering and architectural design
C316.4	Evaluate various testing techniques
C316.5	Evaluate various metrics for process and products

FINANCIAL INSTITUTIONS AND MARKETS (FIM)

Course Outcomes

At the end of the course the student should be able to

C316.1	Understand object oriented software development process
C316.2	Gain exposure to object oriented methodologies & UML diagrams
C316.3	Use object oriented behavioral modeling analysis for project
C316.4	Apply object oriented Architectural modeling analysis for project
C316.5	Construct for developing structural design of a given project by using

A16428. FUNDAMENTALS OF EMBEDDED SYSTEMS
(Open Elective-II)

Course Outcomes

At the end of the course the student should be able to

C316.1	Contrast the basics of embedded system with its application
C316.2	Illustrate the components required for embedded system design.
C316.3	Summarize the different development tool for embedded system
C316.4	Relate the concepts of RTOS in real time programming
C316.5	Outline the features of advanced buses for distributed data transfer in system design.

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A16429. PRINCIPLES OF COMMUNICATIONS

(Open Elective-II)

Course Outcomes

At the end of the course the student should be able to

C316.1	Understanding the fundamentals of communications
C316.2	Summarize the different modulation techniques involved in analog and digital Communication.
C316.3	Identify the applications of various wired and wireless communications in real time.
C316.4	Elaborate the fundamentals of satellite and optical communications.
C316.5	Understand various Networking Concepts.

A16489. MICROPROCESSOR AND MICROCONTROLLER LAB

C317.1	To Understand and implement the basic programs of microprocessor (8086)
C317.2	To analyze and interpret the interfacing concept of microprocessor (8086) with other Processors
C317.3	To illustrate and show the different programs using Microcontroller (8051)
C317.4	To implement and verify the interfacing concepts with 8051 microcontroller
C317.5	Analyze Timers with 8051 microcontroller

A16490. DSP AND eCAD LAB

C318.1	To generate and verify the basic concepts of signal processing
C318.2	To design and summarize the result of different types of filters
C318.3	To understand DFT and FFT Algorithms
C318.4	To Implement and verify the combinational circuits using HDL
C318.5	To Understand and evaluate the sequential circuits using HDL

IV B.TECH- I SEM

A17430. DIGITAL COMMUNICATIONS

Course Outcomes:

Upon successful completion of this course, students have the ability to

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C401.1	Understand different digital modulation techniques such as PCM, DM and various shift keying techniques.
C401.2	Calculate different parameters like power spectrum density, probability of error etc of Base Band signal for optimum transmission.
C401.3	Generate and retrieve data using block codes and convolution codes
C401.4	Analyze the error detection and correction capabilities of linear, cyclic and convolution codes.
C401.5	Analyze Performance of spread spectrum communication system

A17431. EMBEDDED SYSTEM DESIGN

Course Outcomes:

Student will be able to

C402.1	Know the fundamentals, hardware and software details of the embedded systems
C402.2	Interface serial, parallel and network communication protocols to embedded systems
C402.3	Know the embedded system design life cycle and co-design issues.
C402.4	Analyze and Develop the various embedded system applications.
C402.5	To design real time operating systems

A17432. ANTENNAS AND MICROWAVE PROPAGATION

COURSE OUTCOMES

At the end of the course the student should be able to

C403.1	Aware of parameter considerations viz. antenna efficiency, beam efficiency, radiation resistance etc. in the design of an antenna.
C403.2	Understand the design issues, operation of fundamental antennas like Yagi-Uda, Horn antennas and helical structure and also their operation methodology in practice.
C403.3	Understand the different types of Wave propagation
C403.4	Understand the significance of microwaves and Analyze the characteristics of microwave tubes and compare them.
C403.5	Be able to list and explain the various microwave solid state devices and Can set up a microwave bench for measuring microwave parameters.

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A17433. DIGITAL IMAGE PROCESSING

(Professional Elective - 3)

Course Outcomes:

Upon successful completion of this course, students will be able to:

C404.1	Discuss digital image fundamentals
C404.2	utilize the Image processing concept to various fields of engineering and real time applications
C404.3	Apply image enhancement and restoration techniques and use image compression and segmentation Techniques.
C404.4	Represent features of images and implement basic image processing concepts using MATLAB.
C404.5	Experiment, analyze & interpret image data

A17437. TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(Professional Elective - 3)

Course Outcomes:

C405.1	Understand the main concepts of telecommunication network design.
C405.2	Analyze and evaluate fundamental telecommunication traffic models.
C405.3	Understand basic modern signaling system.
C405.4	Solve traditional interconnection switching system design problems.
C405.5	Understand the concept of packet switching

A17435. MULTIMEDIA AND SIGNAL CODING

(Professional Elective - 3)

Course Outcomes

Upon successful completion of this course, students will be capable to:

C406.1	Comprehend the fundamentals behind multimedia signal processing.
C406.2	Realize the fundamentals behind multimedia compression.
C406.3	Know the basic principles behind existing multimedia compression and communication standards.
C406.4	Understand future multimedia technologies

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C406.5	apply the acquired knowledge to specific multimedia related problems and projects at work.

A17436. DSP PROCESSORS AND ARCHITECTURES
(Professional Elective - 4)
COURSE OUTCOMES:
At the end of the course the student should be able to

C407.1	To Illustrate the signals and systems in frequency domain.
C407.2	To Evaluate the signals by using Discrete Fourier Series and to compute the Discrete Fourier Transform for different types of signal, To apply the DFT to the signals and systems for analyzing the systems and to represent the discrete time systems by using linear constant coefficient difference equations
C407.3	To Analyze Fast Fourier Transform of the discrete signal for analyzing them and to compare the DFT with FFT with respect to their complexity and time consumption. To explain the multi rate signal processing and to know different blocks like Decimation and Interpolation involved in the multi rate signal processing. To convert the sampling rates and implement the sampling rate conversion
C407.4	Understand the architecture for programmable DSP devices and programmable Digital signal processor
C407.5	Design DSP and FFT algorithms and interfacing of memory and I/O peripherals to programmable DSP devices.

A17438. LOW POWER VLSI DESIGN
(Professional Elective - 4)
Course Outcomes
At the end of the course the students should be able to

C408.1	Understand the need for low power VLSI design.
C408.2	Clearly find the various sources of power dissipation in a given VLSI circuits.
C408.3	Describe the relationship of probability while finding power dissipation of VLSI circuits.
C408.4	Design low power arithmetic circuits and systems.
C408.5	Design a low power memory sub systems.

A17439. PROGRAMMING IN MATLAB

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(Professional Elective - 3)

Course Outcomes:

The students will be able to:

C409.1	Break down computational problems into a series of simple steps.
C409.2	Create programs in the MATLAB language for engineering applications..
C409.3	Appraise and get familiarized with the visualization techniques.
C409.4	Familiarized with Different application tools required for different area of domain
C409.5	Expose to the common algorithms and techniques that are the building blocks of MATLAB.

A17491. EMBEDDED SYSTEM DESIGN LAB

Course Outcomes:

Students can able to

C410.1	Write programs using ARM cortex M0+ processor instruction set.
C410.2	Dump programs into FRDM kit.
C410.3	Communicate among different processors with FRDM kit
C410.4	Interface I/O devices with FRDM kit.
C410.5	Interface LED devices with FRDM kit.

A17492. MICROWAVE ENGINEERING AND DIGITAL COMMUNICATIONS LAB

COURSE OUTCOMES:

At the end of the course, the student should be able to:

C411.1	Explain and verify the characteristics of microwave devices
C411.2	Analyze radiation pattern of antenna.
C411.3	Identify and illustrate the scattering parameters of different microwave devices
C411.4	Demonstrate their knowledge in base band signaling schemes through implementation of FSK, PSK and DPSK
C411.5	Understand Multiplexing of two Band limited Signals through TDM.

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ELEMENTS OF CIVIL ENGINEERING (ECE)

COURSE OUTCOMES:
At the end of the course, the student should be able to:

C412.1	Understand Geological properties and Geotechnical aspect of civil engineering.
C412.2	Plan the concept of different building byelaws and planning principles.
C412.3	Analyse the concept of stress-strain and to identify the properties of the fluid changes treatment process.
C412.4	Apply modern tools of surveying and understand basic concepts of concrete.
C412.5	Evaluate the principles of highway geometric designs and types of pavements as per IRC standards.

INTRODUCTION TO EARTHQUAKE ENGINEERING(IEE)

COURSE OUTCOMES:
At the end of the course, the student should be able to:

C412.1	Understand the Interior Earth' surface, fault attenuation, different wave propagation in Earthquake events.
C412.2	Classify different earthquake hazards and its effects.
C412.3	Examine the mechanical behavior of earth surface and its significance.
C412.4	Evaluate the quantification of Hazard effects - approach methods.
C412.5	Predict the vibration motion and how it influences the earth's surface.

OPTIMIZATION TECHNIQUES (OT)

COURSE OUTCOMES:

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At the end of the course, the student should be able to:

C412.1	Understanding the concepts of optimization techniques.
C412.2	Compute the minimum transportation cost by different methods.
C412.3	Analyzing the waiting lines in terms of Queuing theory parameters.
C412.4	Applying the costing principles in identifying the minimum inventory.
C412.5	Evaluating the simulation process for various OR models.

MAINTENANCE AND SAFETY ENGINEERING (MSE)

COURSE OUTCOMES:
At the end of the course, the student should be able to:

C412.1	Understanding the need for maintenance of a machine in an industry.
C412.2	Identifying various maintenance policies.
C412.3	Analyzing the cost and time concepts while implementing the maintenance.
C412.4	Evaluating the quality concepts for safety and maintenance of an equipment
C412.5	Appreciating the terms reliability and maintainability with reference the maintenance of an equipment.

Information Systems for Engineers(ISE)(Open Elective)
At the end of the course, the student should be able to:

C412.1	Understand the concepts of Information Systems.
C412.2	Evaluate the design, development and security of Information Systems
C412.3	Analyze the various modules in social issues while using Information Systems.

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C412.4	Analyze the issues in data security
C412.5	Analyse the concept of ethics in information systems.

Web Design(Open Elective)

At the end of the course, the student should be able to:

C412.1	Create static web pages using HTML
C412.2	Design styles for HTML web pages
C412.3	Create interactive web pages using Javascript
C412.4	Develop web applications using server side scripting language-PHP
C412.5	Develop and analyze web applications with Java Server Pages

IV B.TECH-II SEM

A18441. CELLULAR AND MOBILE COMMUNICATIONS

Course Outcomes

The student will be able

C413.1	To explain the concept of cell coverage for signal, traffic, and diversity techniques to design an antenna.
C413.2	To use frequency management, Channel assignment for the design of a cellular system.
C413.3	To analyze and design wireless and mobile cellular systems.
C413.4	To classify frequency management, Channel assignment and types of handoff and apply in the design of a cellular system.
C413.5	To understand the cell and base stations

A18442. DATA COMMUNICATIONS AND NETWORKING

Course Outcomes

Students will be able

C414.1	To understand and explore the basics of Computer Networks and Various Protocols.
C414.2	To explain the World Wide Web concepts.
C414.3	To administrate a network and flow of information.
C414.4	To understand easily the concepts of network security, Mobile and ad hoc networks.

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C414.5	

A18443. RADAR ENGINEERING

Course Outcomes:

At the end of the course the student should be able to

C415.1	Understand the concepts of radar fundamentals and analysis of the radar signals.
C415.2	Understand concept of different types of radar waveforms
C415.3	List and differentiate various radar transmitters and receivers.
C415.4	Relate and contrast the different types of radars like MTI, Doppler and tracking radars.
C415.5	Identify detection process of radar signals in noise.

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Computer Science and Engineering

Program Educational Objectives (PEO)

PEO 1: Graduates will be employable as Software professionals

PEO 2: Graduates will be able to develop analytical and computational ability to solve software problems, by applying innovative technical tools in the ever changing World.

PEO 3: Graduates will be able to work in multidisciplinary project teams with effective communication skills and leadership qualities.

PEO 4: Graduates will be able to embrace lifelong learning with professional ethics.

Program Specific Outcomes (PSO)

PSO 1: The ability to design and develop Algorithms to provide optimized solutions for societal needs.

PSO 2: Apply standard approaches and practices in Software Project Development through trending technologies.

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VIDYA JYOTHI INSTITUTE OF TECHNOLOGY

Department of Computer Science & Engineering
Course outcomes

B.TECH (CSE) I YEAR I SEMESTER:ENGLISH-I

After completing this course the student must demonstrate the knowledge and ability to	
C101.1	Students will develop effective writing process to apply various modes of writing & to attain confidence in proficiency of penmanship required for professionals.
C101.2	Students will be able to assimilate influential personalities & gain understanding of human & professional values, & social etiquette.
C101.3	To understand new versions of technology for effective usage of human resources towards development and to avoid risks.
C101.4	Students will be able to identify principles and values that build collaborative knowledge & allow them to cultivate social responsibility.
C101.5	Students will develop effective writing process to apply various modes of writing & to attain confidence in proficiency of penmanship required for professionals.

B.TECH (CSE) I YEAR I SEMESTER: MATHEMATICS -I

After completing this course the student must demonstrate the knowledge and ability to	
C102.1	Understand the term rank and Elementary Transformations of a Matrix, System of Equations.
C102.2	Compute Eigen values and corresponding Eigen vectors of a square matrix, finding Inverse and method of Diagonalization.
C102.3	Verification of the Mean value theorems and to study maxima and minima of functions of two variables.
C102.4	Evaluation of improper integrals by using beta gamma functions and evaluation of double and triple integrals by tracing the region of integration.
C102.5	Finding Laplace transform of various functions and solving the initial value problems by using Laplace transforms.

B.TECH (CSE) I YEAR I SEMESTER: ENGINEERING PHYSICS-I

After completing this course the student must demonstrate the knowledge and ability to	
C103.1	To analyze the crystal structures, properties and to identify defects in crystals.
C103.2	To understand the diffraction, interference and polarization phenomenon of light rays.
C103.3	To know the basics of statistical mechanics and to understand the applications of LASERs in various fields.
C103.4	To interpret the significance of Magnetic materials.

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C103.5	To know the fundamentals of Dielectrics and their applications.

B.TECH (CSE) I YEAR I SEMESTER: COMPUTER PROGRAMMING-I

After completing this course the student must demonstrate the knowledge and ability to	
C104.1	Know the basics of computers and its Generation.
C104.2	Able to write Algorithms, draw flowcharts and write basic programs.
C104.3	Able to implement programs using control structures.
C104.4	To understand derived data types and develop programs using Arrays and Strings.
C104.5	To understand functions and implement Arrays, Strings using functions.

B.TECH (CSE) I YEAR I SEMESTER: ENGINEERING GRAPHICS

After completing this course the student must demonstrate the knowledge and ability to	
C105.1	Understand the usage of different drawing instruments and know the application of different curves used in engineering practice. Appreciate the concept of projections in first angle.
C105.2	Generate various scales used in engineering practice.
C105.3	Conceptualize and draw the projections of points and straight lines.
C105.4	Visualize and project different views of a planes.
C105.5	Visualize and draw the views of a given solid.

B.TECH (CSE) I YEAR I SEMESTER: ENGINEERING CHEMISTRY

After completing this course the student must demonstrate the knowledge and ability to	
C106.1	Ability to understand the various processes of treatment of water for both industrial and domestic purpose.
C106.2	Understand the operating principles and the reaction mechanisms of batteries and fuel cells.
C106.3	Apply the knowledge for protection of different metals from corrosion.
C106.4	An ability to identify and formulate polymers and have knowledge of their engineering applications.
C106.5	Have knowledge of various advanced engineering materials like Nanomaterials, Biodegradable polymers, Biofuels and composites.

B.TECH (CSE) I YEAR I SEMESTER: COMPUTER PROGRAMMING LAB-I

After completing this course the student must demonstrate the knowledge and ability to	
C107.1	Explain basic commands in Linux.
C107.2	Read, understand and trace the execution of programs written in C language.
C107.3	Develop programs in C language.

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C107.4	Design programs for various problems in C language.
C107.5	Solve computing problems using control structures and arrays.

B.TECH (CSE) I YEAR I SEMESTER: ENLISH LANGUAGE COMMUNICATION SKILLS LAB-I

After completing this course the student must demonstrate the knowledge and ability to	
C108.1	Enables students to master individual sounds of English and the manner of articulation in producing speech sounds.
C108.2	Enables even shy learners to be actively involved in communication through ice breaking and JAM sessions.
C108.3	Enables learners to access a variety of information like vocabulary, glosses, pronunciation, grammatical explanations for appropriately use the target language.
C108.4	Enables to achieve swift development among the learners communicative ability through frequent exchange of ideas and discussions.
C108.5	Facilitates continuous evaluation enabling the learners to understand the concepts &skills of communication that are useful in day-to- day life.

B.TECH (CSE) I YEAR I SEMESTER: EP/EC LAB-I

After completing this course the student must demonstrate the knowledge and ability to	
C109.1	To experiment on Melde's and Torsional pendulum with knowledge in waves and mechanics.
C109.2	Visualize the fundamental optical phenomenon like Interference, diffraction and Dispersion.
C109.3	To Study the basic Electrical characteristics of LED, RC circuits.
C109.4	Can use the knowledge of Titrimetric analysis is applied for estimating the quantity of the compound accurately.
C109.5	Can handle instruments like conductometer and potentiometer for quantitative analysis.
C109.6	Able to calculate and record the physical properties like Viscosity and Surface tension

B.TECH (CSE) IYEAR I SEMESTER:ITWS

After completing this course the student must demonstrate the knowledge and ability to	
C110.1	Getting enough knowledge to assemble a computer and identifying various components.
C110.2	To get hands on experience in software Installation.
C110.3	Ability to Understand the trouble shooting problems.
C110.4	To learn the tools Power Point, Documentation, Tabulation and Calculations.
C110.5	To get Exposure how to use Internet and World Wide Web.

B.TECH (CSE) I YEAR II SEMESTER: ENGLISH-II

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Course outcomes

After completing this course the student must demonstrate the knowledge and ability to	
C201.1	Students through appreciation of literature will be able to elicit feelings & use language appropriately as a fundamental of human activity.
C201.2	Students will be able to make critical decisions & manage risks enabling them to bridge the divide between Risk and its Management for successful careers.
C201.3	Students will be able to identify principles and values that build collaborative knowledge & allow them to cultivate social responsibility.
C201.4	Students will be able to read & listen, to comprehend & interpret with analytical proficiency needed for professional endeavors.
C201.5	Students will be able to synthesize information for communication strategies to write, discuss or/and respond in English appropriately and show a nuanced use of the language.

B.TECH (CSE) I YEAR II SEMESTER: MATHEMATICS -II

After completing this course the student must demonstrate the knowledge and ability to	
C202.1	Specify standard methods for solving first order differential equations and their applications.
C202.2	Identify different types of higher order differential equations and their applications in engineering problems.
C202.3	Studying of Fourier series and defining it for various types of functions.
C202.4	Evaluating the Fourier transforms of functions of single variable.
C202.5	Evaluate integrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.

B.TECH (CSE) I YEAR II SEMESTER: ENGINEERING PHYSICS-II

After completing this course the student must demonstrate the knowledge and ability to	
C203.1	To hypothesis the principles of Quantum mechanics & free electron theory.
C203.2	To differentiate the types of solids based on band theory of solids and to understand the applications of optical fibers in various fields.
C203.3	To know the basics of semiconductors and semiconductor devices.
C203.4	To understand superconductivity and their applications in modern technology.
C203.5	To characterize the Nanomaterials and to know the importance of nanomaterials in various fields.

B.TECH (CSE) I YEAR II SEMESTER: COMPUTER PROGRAMMING-II

After completing this course the student must demonstrate the knowledge and ability to

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C204.1	Implement various sorting and searching algorithms
C204.2	Design solutions using derived data types and user defined data types- structures, arrays, pointers.
C204.3	Implement dynamic memory allocation for effective memory utilization.
C204.4	Implement linear data structures-list, stack and queue.
C204.5	Apply various file handling techniques for better data management.

B.TECH (CSE) I YEAR II SEMESTER: MATHEMATICS -III

After completing this course the student must demonstrate the knowledge and ability to	
C205.1	Develop skills in solving engineering problems involving Algebraic and transcendental equations
C205.2	Acquires the knowledge of interpolation in predicting future out comes based on the present knowledge
C205.3	Evaluating the Numerical Solutions for Integrals and Fitting of different types of curves to the given data
C205.4	Understand the various Numerical Methods to solve Initial Value Problems
C205.5	Study the Applications of Partial Differential Equations

B.TECH (CSE) I YEAR II SEMESTER: BASIC ELECTRICAL ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C206.1	To understand the basic electrical circuit parameters and the concepts of AC/DC circuits. Apply theorems to solve both AC and DC circuits.
C206.2	To Understand RMS and Average value calculations for different alternating quantities and the representation of alternating quantities in Phasor form.
C206.3	To understand the construction and operation of the transformer, calculation of efficiency and regulation at different operating power factors.
C206.4	To understand the construction and operation of DC/AC machines and their applications
C206.5	To get the knowledge of the measuring instruments and their operational aspects in detail.

B.TECH (CSE) I YEAR II SEMESTER: COMPUTER PROGRAMMING LAB-II

After completing this course the student must demonstrate the knowledge and ability to	
C207.1	Implement various sorting and searching algorithms
C207.2	Design solutions using derived data types and user defined data types- structures, arrays, pointers
C207.3	Implement dynamic memory allocation for effective memory utilization
C207.4	Implement linear data structures-list,stack and queue
C207.5	Apply various file handling techniques for better data management

B.TECH (CSE) I YEAR II SEMESTER: ENLISH LANGUAGE COMMUNICATION SKILLS LAB-II

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After completing this course the student must demonstrate the knowledge and ability to	
C208.1	Enables the students to develop effective communication with the exposure to speaking and listening practices & short talks to develop speaking and listening skills. Skimming, scanning, summarizing to develop reading skills & provide different sentence structures & exercises in linking sentences for developing writing skills.
C208.2	Enables the students to develop effective communication through various language learning strategies.
C208.3	Enables the students to learn stress, rhythm, intonation, syllable division & minimal pairs to improve the learner's ability to differentiate between similar sounding sets of words in isolation & in sentences.
C208.4	Enables students to know & exhibit proper etiquette is essential in social & professional situations which can mean the difference between success and failure in many aspects of life.
C208.5	Enables the students to develop effective communication with the exposure to natural communication.

B.TECH (CSE) I YEAR II SEMESTER:EWS

After completing this course the student must demonstrate the knowledge and ability to	
C209.1	Study and practice on workshop tools and their operations.
C209.2	Manufacture wooden and metallic components using carpentry and foundry respectively.
C209.3	Join two or materials using welding equipment.
C209.4	Fabricate ferrous components using blacksmithy technique
C209.5	Demonstrate skills on plumbing and machine shops trades.

B.TECH (CSE) II YEAR I SEMESTER: PROBABILITY &STATISTICS

After completing this course the student must demonstrate the knowledge and ability to	
C301.1	Understanding of the basics concepts of probability, random variables, binomial and normal distributions.
C301.2	Understand the concept of the sampling distribution of a statistics, and in particular describethe behavior of the sample mean.
C301.3	Use the normal distributions to test statistical hypotheses and to Compute confidence intervals.
C301.4	Application of regression analysis to analyze a problem.
C301.5	Application of control charts for quality control and measurement of trends.

B.TECH (CSE) II YEAR I SEMESTER: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

After completing this course the student must demonstrate the knowledge and ability to	
C302.1	To evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).
C302.2	Solve discrete mathematics problems that involve: computing permutations and combinations of a set.

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C302.3	Analyze and deduce problems involving recurrence relations and generating functions.
C302.4	Perform operations on discrete structures such as sets, functions, relations and sequences.
C302.5	Apply Graph theory models to solve problems of Computer Science & Engineering.

B.TECH (CSE) II YEAR I SEMESTER: DATA STRUCTURES

After completing this course the student must demonstrate the knowledge and ability to	
C303.1	Analyze the representation of various data structures and implement the mechanisms of Stacks and Queues with their applications.
C303.2	Implement the operations like searching, insertion, deletions and traversing mechanisms on Binary Trees.
C303.3	Implement various advance concepts of trees with real time applications.
C303.4	Implement various algorithms on graph data structures, including finding the minimum spanning tree, shortest path with real time applications, etc.
C303.5	Outline the concepts of hashing, collision and its resolution methods using hash function.

B.TECH (CSE) II YEAR I SEMESTER: DIGITAL LOGIC DESIGN

After completing this course the student must demonstrate the knowledge and ability to	
C304.1	Understand various number systems, conversions, range and error detecting and correcting codes and their significance.
C304.2	Evaluate the minimization of logic gates using Boolean algebraic principles and k-maps.
C304.3	Design various simple and complex combinational circuits with real time applications.
C304.4	Analyze the basic principles behind Flip flops & the design of sequential circuits with real timeapplications.
C304.5	Illustrate various types of memory devices and their design.

B.TECH (CSE) II YEAR I SEMESTER: OBJECT ORIENTED PROGRAMMING

After completing this course the student must demonstrate the knowledge and ability to	
C305.1	Describe importance concepts of Object Oriented Programming.
C305.2	Develop the applications using Object Oriented Programming through C++.
C305.3	Implements the concepts of inheritanceand polymorphism.
C305.4	Apply the IO Streams and files to develop a program for real time problems.
C305.5	Apply advanced features like templates and exception handling to make programs supporting reusability and sophistication.

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C401.5	Analyze NP-Hard and NP-Complete problems.

B.TECH (CSE) II YEAR II SEMESTER: COMPUTER ORGANIZATION

After completing this course the student must demonstrate the knowledge and ability to	
C402.1	Understanding the basic organization of computer and different instruction formats and addressing modes.
C402.2	Analyze the concept of pipelining, segment registers and pin diagram of CPU.
C402.3	Write simple programs on assembly language.
C402.4	Evaluate various modes of data transfer between CPU and I/O devices.
C402.5	Examine various inter connection structures of multi processors.

B.TECH (CSE) II YEAR II SEMESTER: DATABASE MANAGEMENT SYSTEMS

After completing this course the student must demonstrate the knowledge and ability to	
C403.1	Design Entity-Relationship Model for enterprise level databases.
C403.2	Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.
C403.3	Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement.
C403.4	Use of suitable Indices and Hashing mechanisms for real time implementation.
C403.5	Ability to analyze various concurrency control protocols and working principles of recovery algorithms

B.TECH (CSE) II YEAR II SEMESTER: SOFTWARE ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C404.1	Choose a process model to apply for given project requirements
C404.2	Analyze and apply the framework activities for a given project
C404.3	Design various system models for a given scenario
C404.4	Design and apply various testing techniques
C404.5	Understand metrics for Process and Products

B.TECH (CSE) II YEAR II SEMESTER: JAVA PROGRAMMING

After completing this course the student must demonstrate the knowledge and ability to	
C405.1	Understand OOP concepts to apply basic Java constructs.
C405.2	Analyze different forms of inheritance and handle different kinds of file I/O.
C405.3	Evaluate the usage of Exception Handling and Multithreading in complex Java programs.
C405.4	Construct different GUI layouts and design GUI applications.

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C405.5	Construct a full-fledged Java GUI application and Applet with database connectivity.
B.TECH (CSE) II YEAR II SEMESTER: ENVIRONMENTAL STUDIES	
After completing this course the student must demonstrate the knowledge and ability to	
C406.1	Explain the importance of Ecosystem.
C406.2	Identify the importance of Renewable and Non-Renewable Resources.
C406.3	Awareness on the Variety of Living organism and the need to conserve them.
C406.4	Evaluate the sustainable developments towards Pollution free environment
C406.5	Understand the Environmental Policies Management Plan and Regulations.
B.TECH (CSE) II YEAR II SEMESTER: JAVA PROGRAMMING LAB	
After completing this course the student must demonstrate the knowledge and ability to	
C407.1	Apply basic Java constructs and OOP to solve mathematical problems.
C407.2	Apply Inheritance in Java programs to implement File input/output.
C407.3	Analyze Exception Handling code and Multithreading concepts in advanced Java programs.
C407.4	Design different GUI applications using GUI layouts.
C407.5	Apply Applet development and Database connectivity to build GUI applications.
B.TECH (CSE) II YEAR II SEMESTER: DATABASE MANAGEMENT SYSTEMS LAB	
After completing this course the student must demonstrate the knowledge and ability to	
C408.1	Apply SQL statements including DDL, DML and DCL statements to perform different operations.
C408.2	Design different views of tables for different users.
C408.3	Apply various integrity Constraints on the database tables.
C408.4	Apply the Normalization techniques to the data base for consistency.
C408.5	Implement PLSQL concepts like cursors, procedures and triggers.
B.TECH (CSE) III YEAR I SEMESTER: LINUX PROGRAMMING	
After completing this course the student must demonstrate the knowledge and ability to	
C501.1	Understand and make effective use of Linux utilities.
C501.2	Able to write shell scripts to solve the problems.
C501.3	Develop the skills necessary for file system and directory handling.
C501.4	Learn the concepts of process and signal system calls.
C501.5	Implement inter process communication mechanisms.

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B.TECH (CSE) III YEAR I SEMESTER: COMPUTER NETWORKS

After completing this course the student must demonstrate the knowledge and ability to	
C502.1	Understand the concept of network reference models
C502.2	Analyze various connecting devices of a network and describe multichannel access protocols
C502.3	Analysis of routing algorithm and congestion algorithms and classify IPV4 addressing scheme
C502.4	Understand Transport layer protocols
C502.5	Discuss Application layer protocols

B.TECH (CSE) III YEAR I SEMESTER: OPERATING SYSTEMS

After completing this course the student must demonstrate the knowledge and ability to	
C503.1	Understanding the operating system concepts and process management
C503.2	Analyze process scheduling and synchronization
C503.3	Understand memory management concepts
C503.4	Illustrate File system implementation and mass storage structure
C503.5	Analyze deadlock mechanisms

B.TECH (CSE) III YEAR I SEMESTER: FORMAL LANGUAGES & AUTOMATA THEORY

After completing this course the student must demonstrate the knowledge and ability to	
C504.1	Analyze and design Finite state machine for solving problems of computer science.
C504.2	Design regular grammars for Finite Automata.
C504.3	Analyze context free grammars and push down automata.
C504.4	Find the solutions for the problems of computer science using Turing Machines.
C504.5	Analyze Chomsky Hierarchy and computability theory.

B.TECH (CSE) III YEAR I SEMESTER: PRINCIPLES OF PROGRAMMING LANGUAGES

After completing this course the student must demonstrate the knowledge and ability to	
C505.1	Ability to apply suitable programming paradigm for the application.
C505.2	Ability to express syntax and semantics in formal notation.
C505.3	Apply Object Oriented, Concurrency programming constructs
C505.4	Comparing features of different programming languages.

B.TECH (CSE) III YEAR I SEMESTER: HUMAN COMPUTER INTERACTION

After completing this course the student must demonstrate the knowledge and ability to

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C505.1	Understand the capabilities of both humans and computers from the viewpoint of human information processing.
C505.2	Analyze the design process and use the design rules.
C505.3	Identify and analyze the user models and theories.
C505.4	Compare different mobile applications and analyze mobile design.
C505.5	Design the web interface using drag and drop, overlays etc.

B.TECH (CSE) III YEAR I SEMESTER: SOFTWARE PROJECT MANAGEMENT

After completing this course the student must demonstrate the knowledge and ability to	
C505.1	Describe and determine the purpose and importance of project managementfrom the perspectives of planning, tracking and completion of project.
C505.2	Describe Artifacts of the process and process automation.
C505.3	Compare and differentiate organization structures and project structures.
C505.4	Design the web interface using drag and drop, overlays etc.

B.TECH (CSE) III YEAR I SEMESTER: INTRODUCTION TO MICROCONTROLLER & APPLICATIONS

After completing this course the student must demonstrate the knowledge and ability to	
C506.1	Describe the architecture of 8051 with its special function registers
C506.2	Interpret the internal organization of 8051 with its unique features.
C506.3	Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.
C506.4	Construct the hardware and software interaction with each other using programming.
C506.5	Summarize the features of the advanced architecture using ARM controller.

B.TECH (CSE) III YEAR I SEMESTER: BASICELECTRONICS & INSTRUMENTATION

After completing this course the student must demonstrate the knowledge and ability to	
C507.1	Summarize the concepts of different Diode devices with its characteristics.
C507.2	Summarize the concepts of different Transistor devices with its characteristics.
C507.3	Describe the fundamental concepts and basic principle of meters.
C507.4	Categorize different transducers and their working principles
C507.5	Explain different bridges and understand how different physical parameters can beacquired.

B.TECH (CSE) III YEAR I SEMESTER: NON-CONVENTIONAL ENERGY SOURCES

After completing this course the student must demonstrate the knowledge and ability to	
C508.1	Realize the importance of renewable energy sources for energy planning.

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C508.2	Understand the value of solar energy potential and exploit the solar energy for real world applications.
C508.3	Understand the potential of wind energy, types of wind mills, performance characteristics and Betz criteria.
C508.4	Analyze the potential of both tidal and ocean thermal energies and learn the extraction methods.
C508.5	Know the potential of Geothermal, Bio-mass energies and learn relevant extraction methods.

B.TECH (CSE) III YEAR I SEMESTER: ELEMENTS OF MECHANICAL ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C509.1	Understand the basic concepts of mechanical engineering.
C509.2	Applying principles of engineering mechanics in mechanism and machines
C509.3	Develop manufacturing methods to produce engineering components.
C509.4	Evaluating alternative designs for the engineering components
C509.5	Comparing various standards relevant to automobiles.

B.TECH (CSE) III YEAR I SEMESTER: PRODUCT ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C510.1	Identifying scheduling techniques for project management.
C510.2	Designing the products and their life cycles.
C510.3	Generating the products with different material requirements.
C510.4	Conceptualization the products with their drawings for standardization.
C510.5	Evaluating the life of the products by conducting various tests.

B.TECH (CSE) III YEAR I SEMESTER: SMART CITY

After completing this course the student must demonstrate the knowledge and ability to	
C511.1	Understand the necessity of smart infrastructure and to promote cities that provide quality of life to citizens.
C511.2	Explain technology-based solution on smart mobility.
C511.3	Illustrate & introduce the smart and sustainable waste and water management for smart cities.
C511.4	Evaluate economical models for smart infrastructure solution.
C511.5	Create healthy and waste ridden environment.

B.TECH (CSE) III YEAR I SEMESTER: REMOTE SENSING & GIS

After completing this course the student must demonstrate the knowledge and ability to

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C512.1	Select the type of remote sensing technique / data for required purpose.
C512.2	Identify the earth surface features from satellite images.
C512.3	Analyze the energy interactions in the atmosphere and earth surface features.
C512.4	Prepare thematic maps.
C512.5	Interpretations of satellite data for various applications.

B.TECH (CSE) III YEAR I SEMESTER: TOTAL QUALITY MANAGEMENT

After completing this course the student must demonstrate the knowledge and ability to	
C513.1	
C513.2	
C513.3	
C513.4	

B.TECH (CSE) III YEAR I SEMESTER: OPERATING SYSTEMS& COMPUTER NETWORKS THROUGH LINUX LAB

After completing this course the student must demonstrate the knowledge and ability to	
C514.1	Implement Data link layer framing methods.
C514.2	Implement various algorithms for error detection and correction.
C514.3	Simulate various routing algorithms.
C514.4	Implement CPU scheduling algorithms.
C514.5	Simulate various page replacement techniques and file allocation methods.
C514.6	Implement deadlock avoidance and prevention algorithms.

B.TECH (CSE) III YEAR I SEMESTER: ADVANCED COMMUNICATION SKILLS LAB

After completing this course the student must demonstrate the knowledge and ability to	
C515.1	Develop sound communication skills in various situations with the help of (enriched) vocabulary.
C515.2	Practice reading techniques for a faster and better comprehension.
C515.3	Exhibit strong writing skills to express ideas effectively.
C515.4	Demonstrate effective presentation skills.
C515.5	Use appropriate verbal and non-verbal skills for a successful career.

B.TECH (CSE) III YEAR II SEMESTER: WEB TECHNOLOGIES

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After completing this course the student must demonstrate the knowledge and ability to	
C601.1	Create static and dynamic web pages using HTML and java script.
C601.2	Analyze the XML and how to parse XML data with java.
C601.3	Develop web applications using server side scripting language-PHP.
C601.4	Implement the web applications using JDBC and java servlets.
C601.5	Apply web applications with Java Server Pages.

B.TECH (CSE) III YEAR II SEMESTER: COMPILER DESIGN

After completing this course the student must demonstrate the knowledge and ability to	
C602.1	Differentiate the phases in compilation & parsing.
C602.2	Identify the process in parsing and semantic analysis.
C602.3	Explain about symbol tables and code optimization methods.
C602.4	Explain about code optimization methods.
C602.5	Analyze data flow and generate object code.

B.TECH (CSE) III YEAR II SEMESTER: DATA WAREHOUSING AND DATAMINING

After completing this course the student must demonstrate the knowledge and ability to	
C603.1	Understand the fundamentals of Data warehousing and OLAP technology.
C603.2	Understand Data Mining and Data Pre-processing.
C603.3	Analyze and apply association algorithms on large data sets.
C603.4	Analyze and apply classification algorithms on large data sets.
C603.5	Analyze and apply clustering techniques on large data.

B.TECH (CSE) III YEAR II SEMESTER: MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

After completing this course the student must demonstrate the knowledge and ability to	
C604.1	Understand the nature and scope of business economics.
C604.2	Differentiate the various forms of Business organizations.
C604.3	Identify the impact of economic variables on the Business firms.

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C604.4	Analyze the Demand, Supply, Production, Cost, Market Structure, Pricing aspects.
C604.5	Analyze, compare and interpret the Financial Statements of a Company using ratios.

B.TECH (CSE) III YEAR II SEMESTER: OBJECT ORIENTED ANALYSIS & DESIGN

After completing this course the student must demonstrate the knowledge and ability to	
C605.1	Understand object oriented software development process.
C605.2	Gain exposure to object oriented methodologies & UML diagrams.
C605.3	Use object oriented behavioral modeling analysis for project.
C605.4	Apply object oriented Architectural modeling analysis for project.
C605.5	Construct for developing structural design of a given project by using.

B.TECH (CSE) III YEAR II SEMESTER: DISTRIBUTED SYSTEMS

After completing this course the student must demonstrate the knowledge and ability to	
C605.1	Able to understand the characteristics of Distributed Systems and Global States.
C605.2	Able to differentiate the types of Interprocess communication.
C605.3	Able to Understand DNS and Able to implement file service Architecture.
C605.4	Able to Analyze the Distributed Transaction Management

B.TECH (CSE) III YEAR II SEMESTER: INFORMATION RETRIEVAL SYSTEMS

After completing this course the student must demonstrate the knowledge and ability to	
C605.1	Recognize the Boolean Model, Vector Space Model, and Probabilistic Model.
C605.2	Understand retrieval utilities and different formatting tags.
C605.3	Understand cross-language information retrieval.
C605.4	Understand the clustering techniques and determine the efficiency.

B.TECH (CSE) III YEAR II SEMESTER: FUNDAMENTALS OF EMBEDDED SYSTEMS

After completing this course the student must demonstrate the knowledge and ability to	
C606.1	Contrast the basics of embedded system with its application.
C606.2	Illustrate the components required for embedded system design.
C606.3	Summarize the different development tool for embedded system.
C606.4	Relate the concepts of RTOS in real time programming.
C606.5	Outline the features of advanced buses for distributed data transfer in system design.

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B.TECH (CSE) III YEAR II SEMESTER: PRINCIPLES OF COMMUNICATION

After completing this course the student must demonstrate the knowledge and ability to	
C607.1	Understanding the fundamentals of communications.
C607.2	Summarize the different modulation techniques involved in analog Communication.
C607.3	Summarize the different modulation techniques involved in digital Communication.
C607.4	Identify the applications of various wired and wireless communications in real time.
C607.5	Elaborate the fundamentals of satellite and optical communications.

B.TECH (CSE) III YEAR II SEMESTER: PRINCIPLES OF ELECTRICAL POWER UTILIZATION

After completing this course the student must demonstrate the knowledge and ability to	
C608.1	Understand terms and concepts of illumination.
C608.2	Apply the concepts of different electric lamps and good lighting Practices for artificial lighting systems.
C608.3	Understands the methods of electric heating and welding.
C608.4	Understands the concepts of different electric traction systems and existing traction system in India.
C608.5	Analyze the mechanics of train movement.

B.TECH (CSE) IIIYEAR II SEMESTER: ENERGY AUDITING AND CONSERVATION

After completing this course the student must demonstrate the knowledge and ability to	
C609.1	Realize the need for energy auditing and conservation. Get awareness on types of energy audit; represent energy flows and energy consumption in tabular and graphical methods.
C609.2	Understand and exploit energy saving opportunities in energy efficient motors and power factor improvement methods.
C609.3	Learn energy auditing and conservation opportunities in HVAC systems with respect to energy efficient buildings.
C609.4	Analyze economic viability with respect to real world problems using depreciation methods.
C609.5	Know the check lists for energy conservation in boilers, heat pumps, cooling systems, compressors and fans.

B.TECH (CSE) I11 YEARI I SEMESTER: BASIC AUTOMOBILE ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C610.1	Understanding the basic structure of an automobile.

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C610.2	Evaluating different cooling and lubrication systems of an automobile.
C610.3	Analyzing the electrical systems in tandem with ignition systems.
C610.4	Comparing the various transmission systems for their effectiveness.
C610.5	Understanding and there by implement the subsystems in the automobile for its low emission.

B.TECH (CSE) III YEAR II SEMESTER: MATERIAL SCIENCE ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C611.1	Understanding the crystal structures and necessity of alloys.
C611.2	Classifying the ferrous materials and their heat treatment process.
C611.3	Evaluating the non-ferrous materials and their applications in Engineering usage.
C611.4	Applying the composite materials as an efficient substitute.
C611.5	Implementing the principles of nano science and their by producing materials.

B.TECH (CSE) III YEAR II SEMESTER: GREEN BUILDING TECHNOLOGIES

After completing this course the student must demonstrate the knowledge and ability to	
C612.1	Understand the Green building concept and focus on approaches that make building sustainable.
C612.2	Illustrate Green building assessment and accreditation system.
C612.3	Able to apply low energy building strategies.
C612.4	Designing green building and improve sustainability ofinfrastructure.
C612.5	Classify the economic benefits of green buildings.

B.TECH (CSE) III YEAR II SEMESTER: ENVIRONMENT POLLUTION & CONTROL METHODS

After completing this course the student must demonstrate the knowledge and ability to	
C613.1	Understanding about the various air pollutants and effect on environment.
C613.2	Analyze quality of air in the form of air quality index and dispersion modeling.
C613.3	Determine sampling and measurements of air Pollutants.
C613.4	Analysis and measurement of soil contamination.
C613.5	Predict types of noise and problems arise due to noise pollution.

B.TECH (CSE) III YEAR II SEMESTER: FINANCIAL INSTITUTIONS AND MARKETS

After completing this course the student must demonstrate the knowledge and ability	
C614.1	

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C614.2	
C614.3	
C614.4	

B.TECH (CSE) III YEAR II SEMESTER: WEB TECHNOLOGIES & CASE TOOLS LAB

After completing this course the student must demonstrate the knowledge and ability	
C615.1	Create static web application using HTML.
C615.2	Create dynamic web applications XML, Java script and validation of forms.
C615.3	Develop web applications with servlets Java server pages, PHP, MYSQL.
C615.4	Understand how UML supports the entire OOAD process.
C615.5	Apply the phases of OOAD to real time applications.
C615.6	Understand the essential characteristics of tools used for designing a model.

B.TECH (CSE) IV YEAR I SEMESTER: COMPILER DESIGN & DATA MINING LAB

After completing this course the student must demonstrate the knowledge and ability to	
C616.1	Understand the role of Lexical analyzer.
C616.2	Identify the working of compiler construction tools-LEX, YACC and Parser.
C616.3	Derive Machine code from intermediate code.
C616.4	Able to understand WEKA tool.
C616.5	Ability to add mining algorithms as a component to the existing tools.
C616.6	Able to apply mining techniques for realistic data.

B.TECH (CSE) IV YEAR I SEMESTER: MOBILE APPLICATION DEVELOPMENT

After completing this course the student must demonstrate the knowledge and ability to	
C701.1	Understand the concept of J2ME.
C701.2	Design a User interface for a mobile application using J2ME.
C701.3	Create a mobile application for small computing devices.
C701.4	Apply the concepts of JDBC & Embedded SQL for Database Connection.
C701.5	Understand the generic connection framework.

B.TECH (CSE) IV YEAR I SEMESTER: INFORMATION SECURITY

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Course outcomes

After completing this course the student must demonstrate the knowledge and ability to	
C702.1	Identify various security attacks.
C702.2	Understand various encryption principles and algorithms.
C702.3	Analyze different cryptography algorithms.
C702.4	Understand various security association and key management.
C702.5	Design a firewall for security.

B.TECH (CSE) IV YEAR I SEMESTER: CLOUD COMPUTING

After completing this course the student must demonstrate the knowledge and ability to	
C703.1	Understand different Cloud Services.
C703.2	Analyze different Approaches for migration into cloud.
C703.3	Prioritize the challenges in cloud Technology.
C703.4	Understand the Virtualization Concepts.
C703.5	Assess future Research directions in cloud computing.

B.TECH (CSE) IV YEAR I SEMESTER: BIG DATA ANALYTICS

After completing this course the student must demonstrate the knowledge and ability to	
C704.1	Explain the foundations, definitions, and challenges of Big Data.
C704.2	Use Hadoop file system interfaces.
C704.3	Program using HADOOP and Map Reduce,NOSQL.
C704.4	Understand various Hadoop Eco Systems like Pig,Hive.
C704.5	Outline Hadoop Eco System using Hbase,Zookeper.

B.TECH (CSE) IV YEAR I SEMESTER: INTERNET OF THINGS

After completing this course the student must demonstrate the knowledge and ability to	
C705.1	Describe various IoT enabled technologies.
C705.2	Understand the concepts of M2M with necessary protocols.
C705.3	Illustrate Python programming for IoT
C705.4	Examine the Python programming with Raspberry PI
C705.5	Design web applications for IoT

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Course outcomes

B.TECH (CSE) IV YEAR I SEMESTER: IMAGE PROCESSING

After completing this course the student must demonstrate the knowledge and ability to	
C705.1	Understand Digital image fundamentals.
C705.2	Program Image Transformations,
C705.3	Design Colour Image Processing and Restoration,
C705.4	Implement Image segmentation techniques.
C705.5	Program Image Compression techniques.

B.TECH (CSE) IV YEAR I SEMESTER: ADVANCED DATABASES

After completing this course the student must demonstrate the knowledge and ability to	
C706.1	Understand the concepts of Distributed Database Systems.
C706.2	Identify different Architectural Models for Distributed DBMS.
C706.3	Characterize the query processors.
C706.4	Design Algorithms for Concurrency control Mechanisms.
C706.5	Decide different Parallel DBMS Techniques based on given

B.TECH (CSE) IV YEAR I SEMESTER: COMPUTER GRAPHICS

After completing this course the student must demonstrate the knowledge and ability to	
C706.1	Understand the AREAS OF Computer Graphics.
C706.2	Analyze 2 – D Geometrical transforms.
C706.3	Analyze 3 – D Geometrical transforms.
C706.4	Apply different visible surface detection methods.
C706.5	Design of animation sequence.

B.TECH (CSE) IV YEAR I SEMESTER: SOFTWARE TESTING METHODOLOGIES

After completing this course the student must demonstrate the knowledge and ability to	
C707.1	Understand the purpose of Software testing.
C707.2	Outline various transaction flow testing techniques.
C707.3	Understand domain testing.
C707.4	Construct decision tables for Logic Based Testing.

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C707.5	Implement node reduction algorithm.

B.TECH (CSE) IV YEAR I SEMESTER: INTRODUCTION TO MAT LAB

After completing this course the student must demonstrate the knowledge and ability to	
C708.1	Break down computational problems into a series of simple steps.
C708.2	Create programs in the MATLAB language for engineering applications.
C708.3	Appraise and get familiarized with the visualization techniques.
C708.4	Familiarized with Different application tools required for different area of domain.
C708.5	Expose to the common algorithms and techniques that are the building blocks ofMATLAB.

B.TECH (CSE) IV YEAR I SEMESTER: CIRCUIT SIMULATION USING PSPICE

After completing this course the student must demonstrate the knowledge and ability to	
C709.1	Describe circuits for PSpice simulation.
C709.2	Understand the types of DC TO AC and their output variable analysis.
C709.3	Understand the response of transient analysis and obtain their output variables.
C709.4	Analyze simulation circuit for different applications.
C709.5	Develop simulation circuit for different applications.

B.TECH (CSE) IV YEAR I SEMESTER: ENERGY STORAGE SYSTEMS

After completing this course the student must demonstrate the knowledge and ability to	
C710.1	Understand Electrical Energy Storage Technologies.
C710.2	Understand the needs for electric energy storage.
C710.3	Analyze the characteristics and features of energy from various sources.
C710.4	Classify various types of energy storage and various devices used for the purpose.
C710.5	Apply the same concepts to real time solutions like electric vehicles, smart Grid and SCADA etc.

B.TECH (CSE) IV YEAR I SEMESTER: ELECTRICAL VEHICLE & HYBRID VEHICLE

After completing this course the student must demonstrate the knowledge and ability to	
C711.1	Understand thecomponents of electric vehicles and fundamentals of electric vehicles.
C711.2	Understand the types of batteries and principles of operation of Batteries.
C711.3	Understand the basic principles of electric motors which can be used in electric vehicles.

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C711.4	Understand the transmission of the drive system and the components of transmission.
C711.5	Understand the concepts of hybrid vehicles and analyze the performance of hybrid vehicles.

B.TECH (CSE) IV YEAR I SEMESTER: OPTIMIZATION TECHNIQUES

After completing this course the student must demonstrate the knowledge and ability to	
C712.1	Understanding the concepts of optimization techniques.
C712.2	Compute the minimum transportation cost by different methods.
C712.3	Analyzing the waiting lines in terms of Queuing theory parameters.
C712.4	Applying the costing principles in identifying the minimum inventory.
C712.5	Evaluating the simulation process for various OR models.

B.TECH (CSE) IV YEAR I SEMESTER: MAINTENANCE AND SAFETY ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C713.1	Understanding the need for maintenance of a machine in an industry.
C713.2	Identifying various maintenance policies.
C713.3	Analyzing the cost and time concepts while implementing the maintenance.
C713.4	Evaluating the quality concepts for safety and maintenance of equipment.
C713.5	Appreciating the terms reliability and maintainability with reference the maintenance of an equipment.

B.TECH (CSE) IV YEAR I SEMESTER: ELEMENTS OF CIVIL ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C714.1	Understand Geological properties and Geotechnical aspect of civil engineering.
C714.2	Plan the concept of different building byelaws and planning principles.
C714.3	Analyse the concept of stress-strain and to identify the properties of the fluid changes treatment process.
C714.4	Apply modern tools of surveying and understand basic concepts of concrete.
C714.5	Evaluate the principles of highway geometric designs and types of pavements as per IRC standards.

B.TECH (CSE) IV YEAR I SEMESTER: INTRODUCTION TO EARTHQUAKE ENGINEERING

After completing this course the student must demonstrate the knowledge and ability to	
C715.1	Understand the Interior Earth' surface, fault attenuation, different wave propagation in Earthquake events.
C715.2	Classify different earthquake hazards and its effects.
C715.3	Examine the mechanical behavior of earth surface and its significance.

C715.4	Evaluate the quantification of Hazard effects - approach methods.
C715.5	Predict the vibration motion and how it influences the earth's surface.

B.TECH (CSE) IV YEAR I SEMESTER: FUNDAMENTALS OF ENTREPRENEURSHIP

After completing this course the student must demonstrate the knowledge and ability to	
C716.1	
C716.2	
C716.3	
C716.4	

B.TECH (CSE) IV YEAR I SEMESTER: MOBILE APPLICATION DEVELOPMENT LAB

After completing this course the student must demonstrate the knowledge and ability to	
C717.1	Understand the concept of J2ME.
C717.2	Design a User interface for a mobile application using J2ME.
C717.3	Create a mobile application for small computing devices.
C717.4	Apply the concepts of JDBC & Embedded SQL for Database Connection.
C717.5	Understand the generic connection framework.

B.TECH (CSE) IV YEAR I SEMESTER: HADOOP & BIG DATA LAB

After completing this course the student must demonstrate the knowledge and ability to	
C718.1	Understand java programs required for developing map reduce programsin Hadoop.
C718.2	Analyze Installation of Hadoop environment and learn Unix file system commands.
C718.3	Impart Knowledge of map reduce paradigm to solve complex problems.
C718.4	Implement best practices Hadoop programming tool PIG in Hadoop ecosystem.
C718.5	Apply HIVE scripting in Hadoop eco system.

B.TECH (CSE) IV YEAR I SEMESTER: INTERNET OF THINGS LAB

After completing this course the student must demonstrate the knowledge and ability to	
C719.1	Describe various IoT enabled technologies.
C719.2	Understand the concepts of M2M with necessary protocols.
C719.3	Illustrate Python programming for IoT.

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C719.4	Examine the Python programming with Raspberry PI.
C719.5	Design web applications for IoT.

B.TECH (CSE) IV YEAR II SEMESTER: DESIGN PATTERNS

After completing this course the student must demonstrate the knowledge and ability to	
C801.1	Understand the Design patterns in software applications
C801.2	Discuss the Creational Patterns
C801.3	Categorize the Structural Pattern
C801.4	Investigate Behavioral Patterns
C801.5	Construct the good design pattern structures

B.TECH (CSE) IV YEAR II SEMESTER: E-COMMERCE

After completing this course the student must demonstrate the knowledge and ability to	
C802.1	Identify the anatomy of E-commerce applications.
C802.2	Categorize different electronic payment systems.
C802.3	Examine supply chain management.
C802.4	Analyze the various marketing strategies for an online business.
C802.5	Design strategies for E-commerce catalogues.

B.TECH (CSE) IV YEAR II SEMESTER: SEMANTIC WEB & SOCIAL NETWORKS

After completing this course the student must demonstrate the knowledge and ability to	
C803.1	Understand knowledge representation for the Semantic WebIntelligence.
C803.2	Identify the role of Ontologies in the semantic web.
C803.3	Learn Ontology Engineering.
C803.4	Develop Semantic Web Applications and Services.
C803.5	Create OWL-S Ontology for Web Services.

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Course outcomes

B.TECH (CSE) II YEAR I SEMESTER: ELECTRONIC DEVICES & CIRCUITS

After completing this course the student must demonstrate the knowledge and ability to	
C306.1	Apply basics of electronics to design of various complex electronics circuit.
C306.2	Understand and Analyze the different types of diodes, operation and its characteristics.
C306.3	Design and analyze the DC bias circuitry of BJT and FET Design biasing circuits using diodes and transistors.
C306.4	To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

B.TECH (CSE) II YEAR I SEMESTER: ED&CIRCUITS &DLD LAB

After completing this course the student must demonstrate the knowledge and ability to	
C307.1	Verify Super position, Maximum power transfer, Reciprocity, Thevenin's and Norton's theorems.
C307.2	Conduct OC and SC test on single–phase Transformer and calculating efficiency.
C307.3	Understand the characteristics of DC shunt generator and to conduct brake test on DC shunt motor and determination of performance characteristics.
C307.4	Identify the specifications and testing of R, L, C and Bread boards and to find the characteristics of PN junction diode, Zener diode and Transistor CE.

B.TECH (CSE) II YEAR I SEMESTER: DATA STRUCTURES LAB

After completing this course the student must demonstrate the knowledge and ability to	
C308.1	Develop the programs on stack and its applications
C308.2	Demonstrate the operations on trees
C308.3	Demonstrate the implementations of various advanced trees
C308.4	Design and implementation of programs on BST and graph traversals
C308.5	Understand the C++ program structure and also basics of C++ programming.

B.TECH (CSE) II YEAR II SEMESTER: DESIGN & ANALYSIS OF ALGORITHMS

After completing this course the student must demonstrate the knowledge and ability to	
C401.1	Analyze the efficiency of algorithms.
C401.2	Develop algorithms divide & conquer, greedy and related problems.
C401.3	Examine the performance of Dynamic programming.
C401.4	Explain performance of algorithm using Backtracking.

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Information Technology

Program Educational Objectives (PEO)

PEO 1: Impart profound knowledge in humanities and basic sciences along with core engineering concepts for professional enhancement..

PEO 2: Enrich analytical skills and Industry-based modern technical skills in core and interdisciplinary areas for accomplishing research, higher education, entrepreneurship and to succeed in various engineering positions globally.

PEO 3: Infuse life-long learning and professional ethics, adaptation to innovation along with effective communication skills with a sense of social awareness.

Program Specific Outcomes (PSO)

PSO 1: Apply software Engineering practices and strategies in software project development to deliver a quality product.

PSO 2: Able to understand and demonstrate emerging software tools and technologies for social needs.

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Department of Information Technology

Course Outcomes-R15

Course name: C101 (English-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Demonstrate real life skills in the light of literature.
CO2	Understand influential personalities, and practice human and professional values
CO3	Explain new versions of technology for effective usage of human resources towards development and to avoid risks
CO4	Identify principles and values to build collaborative knowledge and to cultivate social responsibility
CO5	Enhance communication skills through grammar, vocabulary with emphasis on LSRW skills.

Course name: C102 (Mathematics-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Understand the term rank and Elementary Transformations of a Matrix, System of Equations.
CO2	Compute Eigen values and corresponding Eigen vectors of a square matrix, finding Inverse and method of Diagonalization
CO3	Evaluate the Mean value theorems and maxima and minima of functions of two variables
CO4	Evaluate of improper integrals by using beta gamma functions and evaluation of double and triple integrals by tracing the region of integration
CO5	Apply Laplace transform of various functions and solve the initial value problems by using Laplace transforms.

Course name: C103 (Engineering Physics-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Analyze the crystal structures, properties and to identify defects in crystals
CO2	Explain the diffraction, interference and polarization phenomenon of light rays
CO3	Identify the basics of statistical mechanics and applications of LASERs in various fields
CO4	Interpret the significance of Magnetic materials
CO5	Explain fundamentals of Dielectrics and their applications

Course name: C104 (C Programming-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Explain the basics of computers and its Generations
CO2	Able to solve problems using flowcharts,algortihms and programs
CO3	Able to develop programs on control structures.
CO4	Develop programs using Arrays, Strings and derived data types
CO5	Design programs on functions

Course name: C105 (Engineering Graphics-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Explain the applications of different curves ,usage of different drawing instruments and projections in first angle.
CO2	Generate various scales used in engineering practice.
CO3	Draw the projections of points and straight lines.
CO4	Visualize and project different views of a planes.

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CO5	Visualize and draw the views of a given solid.

Course name: C106 (Engineering Chemistry -I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Ability to explain the various processes of treatment of water for both industrial and domestic purpose
CO2	Identify the operating principles and the reaction mechanisms of batteries and fuel cells
CO3	Apply the knowledge for protection of different metals from corrosion
CO4	An ability to identify engineering applications of polymers
CO5	Able to list advanced engineering materials and their applications.

Course name: C107 (C Programming Lab)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Understand basic commands in Linux.
CO2	Able to explain the process of execution of programs written in C language
CO3	Develop programs in C language
CO4	Analyze and design C program for a particular problem
CO5	Solve computing problems using control structures and arrays

Course name: C108 (English Language Communication Skills Lab-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Facilitate computer-aided multimedia instruction enabling individualized and independent language learning.
CO2	Improve accent and intelligibility in pronunciation of English through Ice breaking and JAM sessions
CO3	Use vocabulary, glosses and pronunciation for appropriate usage of the target language.
CO4	Develop learners' communicative ability through frequent exchange of ideas and discussions.
CO5	Explain the concepts of verbal and non-verbal skills of communication useful in day-to-day life

Course name: C109 (Engineering Physics/Engineering Chemistry Lab-I)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Experiment on Melde's and Torsional pendulum with knowledge in waves and mechanics
CO2	Visualize the fundamental optical phenomenon like Interference, diffraction and Dispersion
CO3	Identify the basic Electrical characteristics of LED, RC circuits
CO4	Apply Titrimetric analysis for estimating the quantity of the compound accurately.
CO5	Handle instruments like conductometer and potentiometer for measuring conductance & emf value.
CO6	Evaluate and record the physical properties like Viscosity and Surface tension

Course name: C110 (IT Workshop Lab)

After completing this course the student must demonstrate the knowledge and ability to

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CO1	Identify the various components of computer system
CO2	Get hands on experience in software Installation
CO3	Explain the trouble shooting problems
CO4	Use the tools Power Point ,Documentation, Tabulation and Calculations
CO5	Use Internet and World Wide Web

Course name: C111 (English-II)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Acquire the real life skills in the light of literature.
CO2	Develop managerial skills for successful careers. By making critical decisions
CO3	Demonstrate physical and mental fitness with true sportsman spirit.
CO4	Build collaborative knowledge and cultivate social responsibility.
CO5	Enhance communication skills through grammar, vocabulary with emphasis on LSRW skills.

Course name: C112 (Mathematics-II)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Able to solve first order differential equations and their applications.
CO2	Identify different types of higher order differential equations and their applications in engineering problems
CO3	Apply Fourier series and defining it for various types of functions
CO4	Evaluating the Fourier transforms of functions of single variable
CO5	Justify integrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.

Course name: C113 (Engineering Physics-II)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Able to solve first order differential equations and their applications.
CO2	Identify different types of higher order differential equations and their applications in engineering problems
CO3	Apply Fourier series and defining it for various types of functions
CO4	Evaluating the Fourier transforms of functions of single variable
CO5	Justify integrals of functions or vector-related quantities over curves, surfaces, and domains in two- and three-dimensional space.

Course name: C114 (C Programming -II)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Develop various sorting and searching algorithms
CO2	Design solutions using derived data types and user defined data types- structures, arrays, pointers
CO3	Develop programs on dynamic memory allocation for effective memory utilization
CO4	Implement linear data structures-list, stack and queue
CO5	Apply various file handling techniques for better data management

Course name: C115 (Mathematics -III)

After completing this course the student must demonstrate the knowledge and ability to

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CO1	Solve engineering problems involving Algebraic and transcendental equations
CO2	Acquires the knowledge of interpolation in predicting future out comes based on the present knowledge
CO3	Evaluating the Numerical Solutions for Integrals and Fitting of different types of curves to the given data
CO4	Solve Initial Value Problems by Numerical Methods
CO5	Explain the applications of Partial Differential Equations

Course name: C116 (Basic Electrical Engineering)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Explain the basic electrical circuit parameters and the concepts of AC/DC circuits. Apply theorems to solve both AC and DC circuits.
CO2	List RMS and Average value calculations for different alternating quantities and the representation of alternating quantities in Phasor form.
CO3	Identify the process of construction and operation of the transformer, calculation of efficiency and regulation at different operating power factors.
CO4	Identify the construction and operation of DC/AC machines and their applications
CO5	Use the measuring instruments and their operational aspects in detail.

Course name: C117 (English Language Communication Skills Lab-II)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Build the language proficiency in English with emphasis on LSRW skills.
CO2	Develop communication skills through various language learning activities.
CO3	Summarize the nuances of English speech sounds, stress, rhythm, intonation and syllable division.
CO4	Acquire and exhibit acceptable etiquette essential in social & professional settings.
CO5	Improve the fluency in spoken English and neutralize mother tongue influence.

Course name: C118 (C Programming Lab- II)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Develop various sorting and searching algorithms
CO2	Design solutions using derived data types and user defined data types- structures, arrays, pointers
CO3	Develop programs on dynamic memory allocation for effective memory utilization
CO4	Implement linear data structures-list, stack and queue
CO5	Apply various file handling techniques for better data management

Course name: C119 (Engineering Workshop)

After completing this course the student must demonstrate the knowledge and ability to	
CO1	Recite workshop tools and their operations.
CO2	Use wooden and metallic components by carpentry and foundry respectively.
CO3	Use welding equipment.
CO4	Use blacksmithy technique to fabricate ferrous component
CO5	Demonstrate skills on plumbing and machine shops trades.

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Course Outcomes-R15

Course name: C201 (Probability and Statistics)

After completing this course the student must demonstrate the knowledge and ability to	
C201.1	To differentiate among random variables involved in the probability models which are useful for all branches of engineering
C201.2	Derive relationship among variety of performance measures using probability distributions.
C201.3	Acquire elementary knowledge of parametric and non parametric tests and understand the use of observing state analysis for predicting future conditions
C201.4	Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.
C201.5	Apply proper measurement, Indicators and techniques of correlation and Regression analysis.

Course name: C202 (Mathematical Foundation of Computer Science)

After completing this course the student must demonstrate the knowledge and ability to	
C202.1	Evaluate elementary mathematical arguments and identify fallacious reasoning (not just fallacious conclusions).
C202.2	Solve discrete mathematics problems that involve: computing permutations and combinations of a set.
C202.3	Analyze and deduce problems involving recurrence relations and generating functions.
C202.4	Perform operations on discrete structures such as sets, functions, relations and sequences.
C202.5	Apply Graph theory models to solve problems of Computer Science & Engineering.

Course name: C203 (Data Structures)

After completing this course the student must demonstrate the knowledge and ability to	
C203.1	Analyze the representation of various data structures and implement the mechanisms of Stacks and Queues with their applications..
C203.2	Implement the operations like searching, insertion, deletions and traversing mechanisms on Binary Trees.
C203.3	Implement various advance concepts of trees with real time applications.
C203.4	Implement various algorithms on graph data structures, including finding the minimum spanning tree, shortest path with real time applications, etc.
C203.5	Outline the concepts of hashing, collision and its resolution methods using hash function.

Course name: C204 (Digital Logic Design)

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Course Outcomes-R15

After completing this course the student must demonstrate the knowledge and ability to	
C204.1	Understand various number systems, conversions, range and error detecting and correcting codes and their significance.
C204.2	Evaluate the minimization of logic gates using Boolean algebraic principles and k-maps.
C204.3	Design various simple and complex combinational circuits with real time applications.
C204.4	Analyze the basic principles behind Flip flops & the design of sequential circuits with real time applications.
C204.5	Illustrate various types of memory devices and their design.

Course name: C205 (Object Oriented Programming)

After completing this course the student must demonstrate the knowledge and ability to	
C205.1	Describe importance concepts of Object Oriented Programming
C205.2	Develop the applications using Object Oriented Programming through C++
C205.3	Implements the concepts of inheritance and polymorphism
C205.4	Apply the IO Streams and files to develop a program for real time problems
C205.5	Apply advanced features like templates and exception handling to make programs supporting reusability and sophistication

Course name: C206(Electronic Devices &Circuits)

After completing this course the student must demonstrate the knowledge and ability to	
C206.1	Understand and Analyze the different types of diodes, operation and its characteristics.
C206.2	Analyze and design diode application circuits(rectifiers and filters).
C206.3	Design and analyze the DC bias circuitry of BJT and FET Design biasing circuits using diodes and transistors.
C206.4	Analyze and design amplifier circuits and oscillators employing BJT, FET devices.

Course name: C207 (Data Structures Lab)

After completing this course the student must demonstrate the knowledge and ability to	
C207.1	Develop the programs on stack and its applications
C207.2	Demonstrate the operations on trees
C207.3	Demonstrate the implementations of various advanced trees
C207.4	Design and implementation of programs on BST and graph traversals
C207.5	Understand the C++ program structure and also basics of C++ programming.

Course name: C208 (Electronic Devices & circuits and Digital Logic Design lab)

After completing this course the student must demonstrate the knowledge and ability to	
C208.1	Understand and use the basic components and instruments of the electronics laboratory.
C208.2	Understand and verify the characteristics and applications of diodes and transistors.

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C208.3	Implement and verify logic gates and its applications.
C208.4	Design and verify functionality of different circuits using ICs

Course name: C209 (Design and Analysis of Algorithms)

After completing this course the student must demonstrate the knowledge and ability to	
C209.1	Analyze the efficiency of algorithms
C209.2	Develop algorithms divide & conquer, greedy and related problems
C209.3	Examine the performance of Dynamic programming
C209.4	Explain performance of algorithm using Backtracking
C209.5	Analyze NP-Hard and NP-Complete problems

Course name: C210 (Computer Organization)

After completing this course the student must demonstrate the knowledge and ability to	
C210.1	Understanding the basic organization of computer and different instruction formats and addressing modes.
C210.2	Analyze the concept of pipelining, segment registers and pin diagram of CPU.
C210.3	Write simple programs on assembly language.
C210.4	Evaluate various modes of data transfer between CPU and I/O devices.
C210.5	Examine various inter connection structures of multi processors.

Course name: C211 (Database Management Systems)

After completing this course the student must demonstrate the knowledge and ability to	
C211.1	Design Entity-Relationship Model for enterprise level databases.
C211.2	Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.
C211.3	Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement.
C211.4	Use of suitable Indices and Hashing mechanisms for real time implementation.
C211.5	Analyze various concurrency control protocols and working principles of recovery algorithms

Course name: C212 (Software Engineering)

After completing this course the student must demonstrate the knowledge and ability to	
C212.1	Choose a process model to apply for given project requirements
C212.2	Analyze and apply the framework activities for a given project
C212.3	Design various system models for a given scenario
C212.4	Design and apply various testing techniques
C212.5	Understand metrics for Process and Products

Course name: C213 (Java Programming)

After completing this course the student must demonstrate the knowledge and ability to	
C213.1	Understand OOP concepts to apply basic Java constructs
C213.2	Analyze different forms of inheritance and handle different kinds of file I/O

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C213.3	Evaluate the usage of Exception Handling and Multithreading in complex Java programs
C213.4	Contrast different GUI layouts and design GUI applications
C213.5	Construct a full-fledged Java GUI application, and Applet with database connectivity

Course name: C214 (Environmental Science)

After completing this course the student must demonstrate the knowledge and ability to	
C214.1	Understand the importance of Ecosystem and its Resources
C214.2	Be aware on the Variety of Living organism and the need to conserve them
C214.3	Understand the impacts of Developmental Activities.
C214.4	Understand the Environmental Policies, Management Plan and Regulations
C214.5	Sensitize on a Sustainable Future.

Course name: C215 (Java Programming Lab)

After completing this course the student must demonstrate the knowledge and ability to	
C215.1	Familiarize with Java Environment and use of Java Development Kit for the creation and execution of java programs
C215.2	Develop programs on various concepts like data abstraction & data hiding, encapsulation, inheritance, polymorphism.
C215.3	Create and use threads, handle exceptions and write applets.
C215.4	Develop the programs using interfaces, inner classes, wrapper classes and generics.
C215.5	Develop GUI applications

Course name: C216 (Database Management Systems Lab)

After completing this course the student must demonstrate the knowledge and ability to	
C216.1	Apply SQL statements including DDL, DML and DCL statements to perform different operations.
C216.2	Design different views of tables for different users.
C216.3	Apply various integrity Constraints on the database tables
C216.4	Apply the Normalization techniques to the data base for consistency.
C216.5	Implement PLSQL concepts like cursors, procedures and triggers.

Course name:MC1(Intellectual Property rights & Cyber laws)

After completing this course the student must demonstrate the knowledge and ability to	
1	Understand the need for cyber laws in global context
2	Analyze Cyber Crimes & legal framework
3	Identify the application of Cyber laws in India
4	Outline the features of IT Act 2000
5	Analyze the E commerce governing laws in India

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Course Outcomes-R15

Course name: MC2 (Professional Ethics, Human Values & Self Development)

After completing this course the student must demonstrate the knowledge and ability to	
1	Practice optimistic attitude for an efficient socially viable and multi-faceted personality.
2	Demonstrate functions of non-verbal *communication in formal context.*
3	Build effective individual & team dynamics for professional accomplishments.
4	Analyze appropriate strategic Interpersonal Skills for productive workplace relationships.
5	Correspond in multiple contexts, for varied audiences, across genres and modalities.

Course name: C301(Linux Programming)

After completing this course the student must demonstrate the knowledge and ability to	
C301.1	Understand and make effective use of Linux utilities.
C301.2	Able to write shell scripts to solve the problems.
C301.3	Develop the skills necessary for file system and directory handling.
C301.4	Learn the concepts of process and signal system calls.
C301.5	Implement inter process communication mechanisms.

Course name: C302 (Computer Networks)

After completing this course the student must demonstrate the knowledge and ability to	
C302.1	Understand the concept of network reference models
C302.2	To Analyze various connecting devices of a network and describe multichannel access protocols
C302.3	Analysis of routing algorithm and congestion algorithms and classify IPV4 addressing scheme
C302.4	Understand Transport layer protocols
C302.5	Discuss Application layer protocols

Course name: C303 (Operating systems)

After completing this course the student must demonstrate the knowledge and ability to	
C303.1	Understanding the operating system concepts and process management
C303.2	Analyze process scheduling and synchronization.
C303.3	Understand memory management concepts.
C303.4	Illustrate File System implementation and Mass Storage Structure.
C303.5	Analyze Deadlock mechanisms.

Course name: C304 (Cloud Computing)

After completing this course the student must demonstrate the knowledge and ability to	
C304.1	Understand Systems Modeling, Clustering and Virtualization Concepts.

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C304.2	Analyze different cloud deploy & service models.
C304.3	Design the Cloud Virtual Machines Migration and Cloud enhancing service.
C304.4	Understand Monitoring, Management and Applications in Cloud Computing.
C304.5	Understand Data security mechanism and SLA Management in Cloud.

Course name: C305 (Principles of Programming Languages)

After completing this course the student must demonstrate the knowledge and ability to	
C305.1	Ability to apply suitable programming paradigm for the application.
C305.2	Ability to express syntax and semantics in formal notation.
C305.3	Apply Object Oriented, concurrency programming constructs.
C305.4	Comparing features of different programming languages.
C305.5	Ability to write programs in various programming languages

Course name: OE(IME)

At the end of the course the student should be able to	
1	Describe the architecture of 8051 with its special function registers
2	Interpret the internal organization of 8051 with its unique features.
3	Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.
4	Construct the hardware and software interaction with each other using programming
5	Summarize the features of the advanced architecture using ARM controller.

Course name: OE (BEI)

At the end of the course the student should be able to	
1	Summarize the concepts of different Diode devices with its characteristics
2	Summarize the concepts of different Transister devices with its characteristics.
3	Describe the fundamental concepts and basic principle of meters.
4	Categorize different transducers and their working principles.
5	Explain different bridges and understand how different physical parameters can be acquired.

Course name: OE(Total quality management)

After completing this course the student must demonstrate the knowledge and ability to	
1	To explore the quality framework in production and operational aspects.
2	To evaluate the role of quality in product design and analysis.
3	To analyze quality in process improvement and modern production management tools.
4	To analyze the requirements of quality management system.

Course name: C307 (Operating Systems & Computer Networks Lab)

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After completing this course the student must demonstrate the knowledge and ability to	
C307.1	Implement Data link layer framing methods.
C307.2	Implement various algorithms for error detection and correction.
C307.3	Simulate various routing algorithms.
C307.4	Implement CPU scheduling ,deadlock avoidance and prevention algorithms
C307.5	Simulate various page replacement techniques and file allocation methods.

Course name: C308(Advanced Communication Skills Lab)

After completing this course the student must demonstrate the knowledge and ability to	
C308.1	The student will be able to build communication competence in person-to-person interactions to build self-efficacy and to manage relationships and improve communicative behaviour of dyadic interactions in various contexts.
C308.2	The student will be able to annotate effectively for active reading, increased comprehension & retention while synthesizing information both print and online sources for their relevance, accuracy and appropriateness.
C308.3	The student will be able to develop unique qualities of professional rhetoric and writing style and explore different format features in both print, multimedia documents, and develop document design skills.
C308.4	The student will be able to identify essential components of Presentation and will be able to speak with greater control and charisma in front of a larger audience.
C308.5	The students will be able to know the significance of group activities and acquire oral skills & body language used for effective Group discussion and prepared to face interviews.

Course name: C309(PDBS)

After completing this course the student must demonstrate the knowledge and ability to	
C309.1	1. To develop sharpened personality for an efficient socially viable, multi-faceted and impressive personality.
C309.2	To perform well during campus drives and different interviews.
C309.3	To build effective team dynamics for professional accomplishments.
C309.4	To communicate with more confidence using better written and spoken English.

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C309.5	To give better presentations and explanation with the use of digital inventions.

Course name: C310 (Web Technologies)

After completing this course the student must demonstrate the knowledge and ability to	
C310.1	Create static and dynamic web pages using HTML and java script
C310.2	Analyze the XML and how to parse XML data with java
C310.3	Develop web applications using server side scripting language-PHP
C310.4	Implement the web applications using JDBC and java servlets
C310.5	Apply web applications with Java Server Pages

Course name: C311(Automata & Compiler Design)

After completing this course the student must demonstrate the knowledge and ability to	
C311.1	Understand & analyze the phases in compilation & parsing
C311.2	Identify the process in parsing and semantic analysis
C311.3	Apply type checking and also perform type conversions.
C311.4	Understand Symbol tables and code optimization methods
C311.5	Analyze data flow and generate object code

Course name: C312 (Data Warehousing and Data Mining)

After completing this course the student must demonstrate the knowledge and ability to	
C312.1	Understand the fundamentals of Data warehousing and OLAP technology.
C312.2	Understand Data Mining and Data Pre-processing
C312.3	Analyze and apply association algorithms on large data sets.
C312.4	Analyze and apply classification algorithms on large data sets.
C312.5	Analyze and apply clustering techniques on large data.

Course name: C313 (Managerial Economics and Financial Analysis)

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After completing this course the student must demonstrate the knowledge and ability to	
C313.1	Understand the importance of certain basic issues governing the business operations namely demand and supply, production function, cost analysis
C313.2	Apply managerial tools and techniques in obtaining optimal solutions for business problems
C313.3	Differentiate the various forms of business organizations
C313.4	Evaluate and interpret the financial statements of companies using ratios
C313.5	Apply the methods of capital budgeting in effective investment decision making

Course name: C314 Object Oriented Analysis And Design

After completing this course the student must demonstrate the knowledge and ability to	
C314.1	Understand object oriented software development process
C314.2	Gain exposure to object oriented methodologies & UML diagrams
C314.3	Use object oriented behavioral modeling analysis for project
C314.4	Apply object oriented Architectural modeling analysis for project
C314.5	Construct for developing structural design of a given project by using

Course name: OE (PRINCIPLES OF COMMUNICATIONS)

At the end of the course the student should be able to	
1	Understanding the fundamentals of communications
2	Summarize the different modulation techniques involved in analog Communication
3	Summarize the different modulation techniques involved in digital Communication.
4	Identify the applications of various wired and wireless communications in real time.
5	Elaborate the fundamentals of satellite and optical communications.

Course name: OE (Fundamentals of Embedded systems)

At the end of the course the student should be able to	
1	Contrast the basics of embedded system with its application
2	Illustrate the components required for embedded system design.
3	Summarize the different development tool for embedded system
4	Relate the concepts of RTOS in real time programming
5	Outline the features of advanced buses for distributed data transfer in system design

Course name: OE (Financial institutions & markets)

After completing this course the student must demonstrate the knowledge and ability to	
1	To explore Indian investment environment.
2	To evaluate available investment avenues.
3	To analyze the role of regulatory bodies in Indian Financial system.
4	To identify recent trends and challenges in Indian banking sector

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Course Outcomes-R15

Course name: C316 (Web Technologies Lab)

After completing this course the student must demonstrate the knowledge and ability to	
C316.1	Design and implement static & dynamic web pages
C316.2	Implement the concepts of XML and apply parsing of XML data with Java
C316.3	Develop web applications using PHP, Servlets, JSP & MySQL

Course name: C317(Data Mining and case tools lab)

After completing this course the student must demonstrate the knowledge and ability to	
C317.1	Ability to understand various data mining tools and demonstrate the classification clusters etc in data sets.
C317.2	Design & Model ATM system and real world problems using UML

Course name: C318(QMLR)

After completing this course the student must demonstrate the knowledge and ability to	
C318.1	To perform well in various competitive exams and placement drives.
C318.2	To solve basic and complex mathematical problems in short time.
C318.3	To become strong in Quantitative Aptitude and Reasoning which can be applied
C318.4	To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.

Course name: C401 --Mobile Application Development

After completing this course the student must demonstrate the knowledge and ability to	
1	Understand and analyze the limitations and challenges of working in a mobile and wireless environment to implement mobile applications
C401.2	Understand the concepts of J2ME
C401.3	Understand and apply the knowledge of J2ME packages to design and develop user interfaces for mobile applications
C401.4	Apply the concepts of JDBC & Embedded SQL for implementing database applications
C401.5	Understand the generic connection framework.

Course name: C402--Information Security

After completing this course the student must demonstrate the knowledge and ability to	
C402.1	Identify various security attacks.
C402.2	Understand various encryption principles and algorithms.

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C402.3	Analyze different Cryptography algorithms.
C402.4	Understand various security associations and key management.
C402.5	Design a firewall for security.

Course name: C403 --Software Testing Methodologies

After completing this course the student must demonstrate the knowledge and ability to	
C403.1	Understand the purpose of Software testing.
C403.2	Analyze various flow testing techniques.
C403.3	Understand domain testing.
C403.4	Construct decision tables for Logic Based Testing.
C403.5	Understand and apply node reduction algorithm.

Course name: C404- Big Data Analytics(PE3)

After completing this course the student must demonstrate the knowledge and ability to	
C404.1	Understand the foundations, definitions, and challenges of Big Data.
C404.2	Apply Hadoop file system interfaces.
C404.3	Understand Map Reduce features
C404.4	Understand various Hadoop Eco Systems.
C404.5	Understand and analyze various data visualization tools

Course name: OE (INTRODUCTION TO MATLAB)

After completing this course the student must demonstrate the knowledge and ability to	
C	Break down computational problems into a series of simple steps.
C	create programs in the MATLAB language for engineering applications.
2	Apprise and get familiarized with the visualization techniques
3	Formalized with different applications tools required different area of domain.
4	Expose to the common algorithms and techniques that are the Building blocks of MATLAB.

Course name: OE(Fundamentals of Entrepreneurship)

After completing this course the student must demonstrate the knowledge and ability to	
1	To provide awareness about entrepreneurship
2	To develop idea generation, creative and innovative skills among students
3	To self-motivate the students by making aware of different opportunities by exploring themselves by discussing successful growth/failure stories
4	To learn to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business.

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Course name: C406 –Advanced Databases (PE 4)

After completing this course the student must demonstrate the knowledge and ability to	
C406.1	Understand the concepts of Distributed Database Systems.
C406.2	Identify different Architectural Models for Distributed DBMS.
C406.3	Analyze the query processors.
C406.4	Design Algorithms for Concurrency control Mechanisms.
C406.5	Analyze different Parallel DBMS Techniques based on given constraints.

Course name: C407-- Hadoop & Bigdata Lab

After completing this course the student must demonstrate the knowledge and ability to	
C407.1	Understand java programs required for developing map reduce programs in Hadoop.
C407.2	Analyze Installation of Hadoop environment and learn Unix file system commands.
C407.3	Impart Knowledge of map reduce paradigm to solve complex problems.
C407.4	Implement best practices Hadoop programming tool PIG in Hadoop eco system.
C407.5	Apply HIVE scripting in Hadoop eco system.

Course name: C408 --Mobile Application Development Lab

After completing this course the student must demonstrate the knowledge and ability to	
C408.1	Analyze and understand the Mobile Applications Development environment and J2ME wireless tool kit
C408.2	Design and develop real time GUI based mobile applications
C408.3	Design and implement real time J2ME applications

Course name: C409 --Mini Project

After completing this course the student must demonstrate the knowledge and ability to	
C409.1	Analyze and communicate software requirement specifications
C409.2	Apply design and development principles in the construction of software systems of varying complexity
C409.3	Able to function effectively on team to accomplish a common goal
C409.4	Exhibit documentation skills to generate project reports

Course name: C410 (Design Patterns)

After completing this course the student must demonstrate the knowledge and ability to	
C410.1	Understand the Design patterns in software applications.
C410.2	Discuss the Creational Patterns
C410.3	Categorize the Structural Pattern.

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C410.4	Investigate Behavior Patterns
C410.5	Construct the good design pattern structures

Course name: C411 (E-Commerce)

After completing this course the student must demonstrate the knowledge and ability to	
C411.1	Identify the anatomy of E-Commerce applications.
C411.2	Categorize different Electronic payment systems.
C411.3	Examine Supply chain Management.
C411.4	Analyze the various marketing strategies for an online business.
C411.5	Design strategies for E-Commerce Catalogues.

Course name: C412 (Semantic Web and Social Networks)

After completing this course the student must demonstrate the knowledge and ability to	
C412.1	Understand knowledge representation for the Semantic Web Intelligence
C412.2	Identify the role of Ontologies in the semantic web.
C412.3	Learn Ontology Engineering.
C412.4	Develop Semantic Web Applications and Services.
C412.5	Create OWL-S Ontology for Web Services.

Course name: C413 (Technical Seminar)

After completing this course the student must demonstrate the knowledge and ability to	
C413.1	Student able to Communicate effectively
C413.2	Student able to develop good presentation skills
C413.3	Student able to analyze and consolidate the presentation
C413.4	Student able to effectively interact with others
C413.5	Student able to explain the latest technologies and trends in computing.

Course name: C414 --Comprehensive viva

After completing this course the student must demonstrate the knowledge and ability to	
C414.1	Student able to develop self-confidence, spontaneity and communication skills
C414.2	Comprehend for all the courses studied in the entire programme and Continue to advance their knowledge

Course name: C416 (Major Project)

After completing this course the student must demonstrate the knowledge and ability to	
C415.1	Analyze and communicate software requirement specifications
C415.2	Apply design and development principles in the construction of software systems of varying complexity
C415.3	Able to function effectively on team to accomplish a common goal
C415.4	Exhibit documentation skills to generate project reports

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