

R21 Course Outcomes

B TECH - I YEAR I SEM

C101	Course Name: Mathematics I	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Write the matrix representation of system of linear equations and identify the consistency of the system of equations.	1
CO2	Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.	4
CO3	Analyze the convergence of sequence and series.	4
CO4	Discuss the applications of mean value theorems to the mathematical problems, Evaluation of improper integrals using Beta and Gamma functions.	3
CO5	Examine the extrema of functions of two variables with/ without constraints.	5

C102	Course Name: ENGINEERING PHYSICS	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Explain the crystal structure of solids	3
CO2	Understand various optical phenomena of matter	2
CO3	Explain the working principle of optical fibers and lasers	2
CO4	Interpret forced damped harmonic oscillations	4
CO5	Apply the knowledge of magnetic behavior of materials	2

C103	Course Name: PHYSICS LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Apply optical phenomena to characterize optical sources and components.	2
CO2	Characterize semiconductors and semiconductor devices.	2
CO3	Study transient response of RC circuit.	2
CO4	Study the properties and resonance mechanisms in mechanical and electrical systems.	3
CO5	Evaluate the magnetic Induction along the axis of current carrying coil.	4

C104	Course Name: English	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Infer the importance of scientific discoveries in promoting social responsibilities.	2
CO2	Comprehend the given texts and respond appropriately for technical and professional purposes.	2
CO3	Communicate confidently and transfer information into various forms	2

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	of writing.	
CO4	Understand the importance of health and nutrition for a better society.	3
CO5	Present various forms of business writing skills for successful careers.	3

C105	Course Name: English Language Skills Lab (ELSL)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Reproduce speech sounds and improve fluency in language.	4
CO2	Understand syllables and consonant clusters for appropriate pronunciation.	2
CO3	Exhibit effective professional skills with rhetoric eloquence.	5
CO4	Deliver enthusiastic and well-practiced presentation.	6
CO5	Learn Task-Based Language Learning (TBLL) through various language learning activities effectively.	2

C106	Course Name: Programming for Problem Solving – I	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Design Algorithms and Flowcharts for real world applications using 'C'.	6
CO2	Know the usage of various operators in Program development.	2
CO3	Design programs involving decision and iteration structures.	6
CO4	Apply the concepts code reusability using Functions.	3
CO5	Analyze various searching and sorting techniques using Arrays.	4

C107	Course Name: Programming for Problem Solving Lab – I	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Apply the specification of syntax rules for numerical constants and variables, data types.	3
CO2	Know the Usage of various operators and other C constructs.	2
CO3	Design programs on decision and control constructs.	6
CO4	Develop programs on code reusability using functions.	6
CO5	Implement various searching and sorting techniques using arrays.	4

C108	Course Name: ENGINEERING GRAPHICS & MODELING	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the concepts of engineering drawing of planes, solids and the CAD drawing software.	2
CO2	Applying the principles of engineering graphics while drawing the engineering components.	6
CO3	Analyse the sectional views for their configurations.	4
CO4	Evaluate the surfaces of solids developed for further processing in the engineering applications.	5

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B TECH - I YEAR II SEM

C131	Course Name: Mathematics – II	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real-world problems.	2
CO2	Solve higher order differential equations and apply the concepts of differential equations to the real-world problems.	3
CO3	Find the Laplace Transform of various functions and apply to find the solutions of differential equations.	5
CO4	Evaluate the multiple integrals and identify the vector differential operators physically in engineering problems.	5
CO5	Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.	5

C132	Course Name: CHEMISTRY	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Acquire knowledge of atomic, molecular and electronic changes related to conductivity.	2
CO2	Apply the various processes of treatment of water for both domestic and industrial purpose.	3
CO3	Apply the knowledge of electrode potentials for the protection of metals from corrosion.	3
CO4	Analyze the major chemical reactions that are used in the synthesis of compounds.	4
CO5	Apply the knowledge of polymers in every day's life.	3

C133	Course Name: CHEMISTRY Lab	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Determination of parameters like hardness, alkalinity and chloride content in water.	4
CO2	Estimation of rate constant of a reaction from concentration-time relationships.	5
CO3	Determination of physical properties like adsorption, surface tension and viscosity.	4
CO4	Synthesize a small drug molecule and analyze a salt sample.	3
CO5	Calculation of strength of compound using instrumentation techniques.	2

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C134	Course Name: Engineering Mechanics	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understanding the concepts of engineering mechanics	2
CO2	Apply the laws of mechanics for various engineering applications	3
CO3	Analyze the motion of body.	4
CO4	Evaluate performance of various engineering components in terms of their energy capacities	5

C135	Course Name: ENGINEERING WORKSHOP	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understanding the tools and methods of using to fabricate engineering components	2
CO2	Applying the measuring techniques to verify the dimensional accuracy	3
CO3	Evaluating various methods and trades of workshop in the component building	5

C136	Course Name: English Communication Skills Lab (ECSL)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the variants in pronunciation.	2
CO2	Identify the diverse purposes of listening and speaking.	2
CO3	Discuss ideas in diverse communicative settings.	3
CO4	Exhibit increased confidence in public speaking.	2
CO5	Display critical thinking, problem solving and decision making skills through GD's.	6

C137	Course Name: Programming for Problem Solving - II	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Identify various string handling functions in 'C'.	2
CO2	Develop programs with user defined data types.	6
CO3	Use Dynamic memory allocation functions with pointers.	2
CO4	Distinguish between Stacks and Queues.	2
CO5	Analyze various Dynamic Data Structures.	5

C138	Course Name: Course Name: Programming for Problem Solving Lab- II	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Build programs on various string handling functions.	6
CO2	Develop applications on user defined data types.	5
CO3	Apply dynamic memory allocation through pointers.	3
CO4	Implement linear data structures through stacks and queues.	3
CO5	Create linked list dynamically through stacks and queues	6

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C201	Course Name: Professional Communication	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Acquire enhanced personality	2
CO2	Exhibit appropriate professional etiquette	5
CO3	Practice team building with strong communication skills	2
CO4	Develop problem solving skills and decision-making	6
CO5	Demonstrate effective presentation skills	2

C202	Course Name: Numerical Methods and Partial Differential Equations	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Develop skills in solving engineering problems involving Algebraic and transcendental equations.	6
CO2	Acquires the knowledge of interpolation in predicting future out comes based on the present knowledge and also to fit different types of Curves.	3
CO3	Know the various types of numerical methods in solving engineering problems.	2
CO4	Classify the nature of second and Higher order partial differential equations and find the solutions of linear and nonlinear PDE.	2
CO5	Apply Partial differential Equations in different engineering problems.	3

C203	Course Name: Fluid Mechanics	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand different properties of fluid and the relationship between them.	2
CO2	Explain the Continuity equation for one dimensional, two dimensional and three-dimensional flows.	4
CO3	Apply the Euler's and Bernoulli's equations in practical civil engineering problems.	6
CO4	Analyze head losses in pipes and flow between parallel plates.	5
CO5	Demonstrate the boundary layer concepts and its separation.	2

C204	Course Name: Solid Mechanics -I	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Examine stress – strain, elastic constants and strain energy.	4
CO2	Analyze the shear force and bending moment diagrams of beams and relationship between them.	4
CO3	Evaluate the flexural and shear stresses for various beam cross sections.	5
CO4	Calculate principal stresses and strains using analytical and graphical solutions for the safety using failure theories.	4
CO5	Determine the deflections of beams with various loadings using different methods.	5

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C205	Course Name: Engineering Geology	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Classify and compare different rocks and minerals across the construction site.	2
CO2	Identify and build the knowledge on main and most common igneous, sedimentary and metamorphic rocks encountered by foundations and sites.	3
CO3	Define and Interpret the geological structures in the geological maps and cross sections	1
CO4	Understand the importance of graphical studies and various geophysical methods.	2
CO5	Illustrate the factors which affect the dams, reservoirs and tunnels.	4

C206	Course Name: Surveying & Geomatics	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Identify a detailed surveying at any site by any method.	3
CO2	Ability to use modern survey equipment to measure angles and distances.	2
CO3	Compute the differences in elevation draw and utilize contour plots, volumes for earthwork.	5
CO4	Understand the working principles of modern equipment and its methodologies.	6
CO5	Analyze the basic concept of GPS and its applications.	2

C207	Course Name: Surveying & Geomatics Lab	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Apply the principle of surveying for civil engineering applications.	3
CO2	Apply the knowledge to calculate areas, drawing plans and contour maps using different measuring equipment at field level.	5
CO3	Identify data collection methods and prepare field notes.	6
CO4	Understand the working principles of survey instruments, measurement errors and corrective measures	2
CO5	Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and its methodologies.	1

C208	Course Name: Engineering Geology Lab	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	To study the physical properties and identification of minerals referred under the theory.	2
CO2	Describe and identify the rocks referred under the theory.	2
CO3	Illustrate the Microscopic study of rocks.	4
CO4	Interpret and draw the sections for geological maps showing tilted beds, faults, unconformities etc.,	4
CO5	Solve the simple structural geological problems.	6

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C209	Course Name: Environmental Science	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Define and explain the structure and functions of ecosystem, value of biodiversity, threats and conservation of biodiversity.	1
CO2	Explain the limitations of the resources and impacts of over utilization of all natural resources.	2
CO3	Identify the sources and effects of environmental pollutions and list the available techniques to control the pollution.	3
CO4	Illustrate the global environmental issues like climate change, ozone hole and can explain the scope of EIA, Environmental Management Plan, environmental audit and list the EIA methods.	4
CO5	Mention the salient features of environmental acts and rules, define the sustainable goals along with measures required for the sustainability.	2

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C231	Course Name: Probability and Statistics	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Differentiate among random variables involved in the probability models which are useful for all branches of engineering.	4
CO2	Derive relationship among variety of performance measures using probability distributions.	6
CO3	Acquire elementary knowledge of parametric and non parametric –tests and understand the use of observing state analysis for predicting future conditions.	2
CO4	Identify and examine situations that generate using problems and able to solve the tests of ANOVA for classified data.	3
CO5	Apply proper measurements, Indicators and techniques of Correlation and regression analysis	3

C232	Course Name: Principle of Electrical Engineering	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand basics of electrical circuits, parameters, and operation of the transformers in the energyconversion process, electromechanical energy conversion,	2
CO2	Analyze DC machines	4
CO3	Use measuring instruments like voltmeter, ammeter, wattmeter for measuring electrical quantities etc.	2
CO4	Apply the concepts of electrical engineering to design or analyze basic electrical circuits and machinery.	2

C233	Course Name: Solid Mechanics-II	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Design and safety of the shaft subjected to Torsion and bending moment.	2
CO2	Calculate the Column capacity for various end conditions due to axial and eccentric loading.	3
CO3	Apply the concepts of direct and bending stresses to evaluate the safety of Structures.	2
CO4	Evaluate the stresses and strains in thin shells and Thick Cylinders.	4
CO5	Determine the stresses due to Unsymmetrical bending of beams and locate the shear Centre.	5

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C234	Course Name: CONCRETE TECHNOLOGY	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understanding the properties of cements and admixtures.	2
CO2	Analyze the properties of aggregates.	4
CO3	Evaluate the properties of fresh concrete.	5
CO4	Analyse the behavior of hardened concrete and durability of concrete.	4
CO5	Design the concrete mix using IS Code and describe the special concretes.	6

C235	Course Name: Structural Analysis	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Analyze propped cantilever, fixed beams for external loadings and support settlements.	4
CO2	Understand the concept of Slope deflection, moment distribution method and analysis of continuous beams.	2
CO3	Examine the beams and arches.	5
CO4	Analyze the pin-jointed plane frames.	4
CO5	Draw the influence line diagram for moving loads .	6

C236	Course Name: Building Materials and Construction	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Identify various building materials and to understand their basic properties.	3
CO2	Understand the minimum standards required to designate and use the materials in construction.	2
CO3	Discuss type metals and finishes used in the construction process.	2
CO4	Understand modern materials in general construction practice.	3
CO5	Recognize the concept of plastering, pointing and various other building services.	3

C237	Course Name: COMPUTER AIDED DRAFTING LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Assess the Software with aiding source.	2
CO2	Demonstrate the different modes of commands.	6
CO3	Draft the plan, Elevation & Sectional Views of the building.	6
CO4	Develop the components of the building	3
CO5	Replicate the complete detailing of Building with BIM input.	5

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C238	Course Name: Solid Mechanics Lab	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Demonstrate of materials under impact, hardness, tensile and compressive loads.	6
CO2	Determine elastic constants by flexural and torsion test.	4
CO3	Illustrate spring constants under various loadings.	4
CO4	Understand the deflection of materials under bending	2
CO5	Compute basic material properties stress and strain.	2

C239	Course Name: Gender Sensitization	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Develop awareness about gender discrimination and take measurable steps to counter it.	5
CO2	Identify the basic dimensions of biological, sociological, psychological and legal aspects of gender.	3
CO3	Acquire knowledge about gendered division of labour in relation to politics and economics.	2
CO4	To prepare the students against gender violence.	3
CO5	To prepare the students to work and live together as equals.	6

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B TECH - III YEAR I SEM

C301	Course Name: Managerial Economics and Financial Analysis	
CO	Students who successfully complete this course will be able to:	
CO1	Understand the nature and scope of business economics.	2
CO2	Differentiate various forms of business organization.	3
CO3	Identify the impact of economic variables on the business firms.	4
CO4	Analyse the demand, supply, production, cost, market structure, pricing aspects.	5
CO5	Analyse, compare and interpret the financial statement of a company using ratios.	3

C302	Course Name: HYDRAULICS & HYDRAULIC MACHINERY	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Determine the Froude number for a given flow to differentiate concepts of sub-critical, critical, and super-critical flows.	2
CO2	Compute the non-uniform flow depths for gradually and rapid varied flow.	2
CO3	Apply dimensional analysis to predict physical parameters that influence the flow in fluid mechanics and use dimensionless parameters	2
CO4	Compute efficiencies of different types of turbines.	4
CO5	Use performance curves to predict performance of centrifugal pumps.	5

C304	Course Name: Design of Reinforced Concrete Structures	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the various design concepts and design a beam under flexure and draw the reinforcement details.	2
CO2	Design the beam under shear and torsion, Calculate the anchorage and development length and check the serviceability requirements for RC structural elements.	6
CO3	Analyze and solve various RC slabs and draw the reinforcement details	4
CO4	Classify short, long columns and draw the reinforcement details	3
CO5	Explore the design concept of footing & staircase.	2

C305	Course Name: Advanced Structural Analysis(PE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Analyze the continuous beams, portal frames by Kani's method.	4
CO2	Differentiate Static and kinematic Indeterminacy of Trusses by Castiglione's second theorem.	4
CO3	Evaluate the shear forces and bending moments in Two-Hinged arches and to execute secondary stresses due to rise of	5

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	temperature and Elastic Shortening of rib.	
CO4	Analyze the Multi-storey frames by approximate methods for gravity (vertical) and horizontal loads.	4
CO5	Understand the concept of Matrix method for the analysis of continuous beams and Pin jointed plane frames	2

C306	Course Name: Building Planning & Drawing(PE2)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Identify various building components, conventional signs and symbols.	2
CO2	Illustrate the building bye-laws and the principles of planning.	4
CO3	Understand about the building services and safety.	2
CO4	Design and Sketch the plans of various types of buildings and detailing of doors, windows, etc.	6
CO5	Understand the elements of perspective drawing involving simple problems.	2

C307	Course Name: Air Pollution and Control Methods(PE3)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Find the sources, causes & effects of air pollution.	2
CO2	Understand the meteorological components and the plume behavior for atmospheric stability conditions.	2
CO3	Identify the types of equipment to control the particulates at sources.	3
CO4	Minimize the control measures of NOX, SOX and other gaseous emissions.	4
CO5	Demonstrate the factors for siting an industry by examining the air quality standards.	4

C308	Course Name: Non Conventional Energy Sources(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Realize the importance of renewable energy sources for energy planning.	3
CO2	Understand the value of solar energy potential and exploit the solar energy for real world applications.	2
CO3	Understand the potential of wind energy, types of wind mills, performance characteristics and Betz criteria.	2
CO4	Analyze the potential of both tidal and ocean thermal energies and learn the extraction methods.	4
CO5	Know the potential of Geothermal, biomass energies and learn relevant extraction methods.	2

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C309	Course Name: Fundamentals of Electrical Power Generation and Protection(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the operation of Thermal power station through its schematic diagram.	2
CO2	Understand the arrangement of Hydro electric power station through its components.	2
CO3	Understand the various components of Nuclear power station	2
CO4	Understand the operation of Gas and Diesel power station through its schematic diagram.	2
CO5	Understand various power system protection components.	2

C310	Course Name: Elements of Mechanical Engineering	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the basic concepts of mechanical engineering.	2
CO2	Apply principles of engineering mechanics in mechanism and machines	3
CO3	Develop manufacturing methods to produce engineering components.	3
CO4	Evaluate alternative designs for the engineering components	3
CO5	Select a suitable type of automation applicable for any industry	2

C311	Course Name: Product Engineering	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Illustrate creativity and study the techniques of innovation	1
CO2	Assess the evaluation techniques for screening ideas	2
CO3	Differentiate the IPR-Patents, Design patents, copy right and trade mark and their laws.	2
CO4	Describe the interaction between design, manufacture, quality and testing	3
CO5	Establish the machining time in various cutting operations; value engineering; GT and concepts of concurrent engineering.	3

C312	Course Name: Introduction to Microcontrollers(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Describe the architecture of 8051 with its special function registers.	3
CO2	Develop and analyze the programming concepts of 8051	4
CO3	Understand the various interfacing techniques pertaining to system design.	3
CO4	Express and infer advanced architectures using ARM Controllers.	2

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C313	Course Name: Basic Electronics(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Summarize the concepts of different semiconductor devices with its characteristics.	3
CO2	Describe the fundamental concepts and basic principle of meters.	4
CO3	Categorize different transducers and their working principles	3
CO4	Explain different bridges and understand how different physical parameters can be acquired.	2

C314	Course Name: Basics of Operating Systems(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understanding the operating system concepts and process management	2
CO2	Analyze process scheduling and synchronization.	4
CO3	Understand memory management concepts.	2
CO4	Illustrate File System implementation and Mass Storage Structure.	4
CO5	Analyze Deadlock mechanisms.	4

C316	Course Name: Fundamentals of Computer Networks(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the overview of reference models.	2
CO2	Classify and illustrate various sub protocols in multi access protocols.	2
CO3	Understand various routing algorithms and their operations.	2
CO4	Analyze transport protocols for the given scenario.	4
CO5	Identify the protocols and functionalities in application lay	3

C318	Course Name: Total Quality Management(OE1)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Explore the quality framework in production and operational aspects.	2
CO2	Evaluate the role of quality in product design and analysis.	3
CO3	Analyze quality in process improvement and modern production management tools.	2
CO4	Explain the various types of Techniques are used to measure Quality.	5
CO5	Analyze the requirements of quality management system.	3

C319	Course Name: GEOTECHNICAL ENGINEERING LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Demonstrate the engineering properties the soil.	2
CO2	Illustrate the field bulk and dry density of cohesive and cohesion less soils.	4
CO3	Classify the Coarse grained soils based on sieve analysis test & a grain size distribution curve.	2
CO4	Compute the shear strength of cohesive and cohesion less soil.	2
CO5	Determine the permeability of coarse grained soil and fine grained soil by constant head permeability test andfalling head method.	5

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C320	Course Name: FLUID MECHANICS & HYDRAULIC MACHINERY LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Examine the calibration of different flow meters.	4
CO2	Illustrate flow measuring devices used in pipes, channels and notches.	2
CO3	Determine major and minor losses in pipes.	5
CO4	Analyse the energy equation for problems in pipe flow.	4
CO5	Examine the performance characteristics of turbines and pumps.	4

C321	Course Name: PERSONALITY DEVELOPMENT AND BEHAVIOURAL SKILLS	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Practice optimistic attitude for an efficient socially viable and multi-faceted personality.	2
CO2	Demonstrate functions of non-verbal communication in formal context.	2
CO3	Build effective individual & team dynamics for professional accomplishments.	3
CO4	Analyze appropriate strategic Interpersonal Skills for productive workplace relationships.	4
CO5	Correspond in multiple contexts, for varied audiences, across genres and modalities.	5

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C331	Course Name: HIGHWAY ENGINEERING	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Summarize the road developments in India from different periods.	2
CO2	Apply the concept of geometric design in real time engineering.	3
CO3	Make use of parameters related to traffic studies.	3
CO4	Design & model the intersections with specific standards.	6
CO5	Evaluate the different pavement design methods using IRC standards.	5

C332	Course Name: Foundation Engineering	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Organize the preparation and programme of soil investigation.	2
CO2	Examine the earth pressure theories and stability of retaining walls.	5
CO3	Evaluate the bearing capacity of soil and allowable settlement.	5
CO4	Analyse the capacity and settlement of pile foundation.	4
CO5	Analyse the stability of finite and infinite slopes using various methods.	4

C333	Course Name: ENVIRONMENTAL ENGINEERING	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Predict the population by different methods.	4
CO2	Design the filter and settling tanks for water treatment.	6
CO3	Examine the characteristics of sewage.	6
CO4	Analyse and design the sewers for sewerage system.	4
CO5	Design different units of sewage treatment plant.	6

C334	Course Name: WATER RESOURCES ENGINEERING	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Describe the components in the hydrologic cycle and interaction among various processes in the hydrologic cycle	2
CO2	Analyze the flood and its measurement by means of hydrograph.	4
CO3	Analyze the phenomenon of Ground water occurrence by means of aquifers.	4
CO4	Assess the methods of irrigation and its quality with the help of duty	5

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	delta relationship.	
CO5	Design the canals by using standard theories.	6

C335	Course Name: CONSTRUCTION ENGINEERING & MANAGEMENT (PE2)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the behavioral aspect of entrepreneurs, various approaches of time management, their strength and weakness.	2
CO2	Apply the concepts of project management Techniques.	2
CO3	Analysis various materials and equipments for construction work.	4
CO4	Examine on different types of contracts and specifications.	5
CO5	Outline the labour regulations and safety in construction.	2

C336	Course Name: GROUND IMPROVEMENT TECHNIQUES (PE2)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Illustrate the several Ground modification mechanisms	4
CO2	Illustrate the Ground Improvement Techniques through mechanical approach.	4
CO3	Identify the different Hydraulic ground improvement techniques through dewatering techniques.	2
CO4	Explain the quick settlement techniques through chemical and physical modification.	2
CO5	Distinguish the inclusion and confinement techniques of ground improvement.	4

C337	Course Name: FINITE ELEMENT METHOD (PE2)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Explain plane stress-plane strain equations and develop displacement functions.	2
CO2	Analyze one-dimensional problems using stiffness matrix.	4
CO3	Examine the different elements based on continuity and compatibility.	4
CO4	Illustrate quadrilateral elements using nodal points and shape functions.	4
CO5	Discuss the solution techniques for static condition.	5

C338	Course Name: PRINCIPLES OF ELECTRIC POWER UTILIZATION (OE2)	Bloom's Taxonomy

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CO	At the end of this course the student will be able to	
CO1	Understand terms and concepts of illumination	2
CO2	Apply the concepts of different electric lamps and good lighting Practices for artificial lighting systems.	3
CO3	Understands the methods of electric heating and welding	2
CO4	Understands the concepts of different electric traction systems and existing traction system in India.	2
CO5	Analyze the mechanics of train movement	4

C339	Course Name: ENERGY AUDITING AND CONSERVATION (OE2)	Bloom's Taxonomy
CO	At the end of this course the student will be able to	
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.	3
CO2	Understand and exploit energy saving opportunities in energy efficient motors and power factor improvement methods.	2
CO3	Learn energy auditing and conservation opportunities in HVAC systems with respect to energy efficient buildings.	1
CO4	Analyze the economic viability with respect to real world problems using depreciation methods.	4
CO5	Know the check lists for energy conservation in boilers, heat pumps, cooling systems, compressors and fans.	2

C340	Course Name: MAINTENANCE AND SAFETY ENGINEERING(OE1)	Bloom's Taxonomy
CO	At the end of this course the student will be able to	
CO1	Understand the need for maintenance in an industry and know about Maintenance Management and Control.	2
CO2	Appreciate and implement various types of maintenance.	3
CO3	Know the concept of inventory control in maintenance.	2
CO4	Evaluate the quality and cost of safety and maintenance.	5
CO5	Appraise the concepts of reliability and maintainability with reference to the maintenance of equipment.	5

C341	Course Name: DATABASE MANAGEMENT SYSTEMS (OE2)	Bloom's Taxonomy
CO	At the end of this course the student will be able to	
CO1	Design Entity-Relationship Model for enterprise level databases.	5
CO2	Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.	2

R21 Course Outcomes

CO3	Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement.	4
CO4	Use of suitable Indices and Hashing mechanisms for real time implementation.	3
CO5	Analyze various concurrency control protocols and working principles of recovery algorithms	4

C346	Course Name: NUTRITIONAL & BIOLOGICAL CHEMISTRY (OE2)	Bloom's Taxonomy
CO	At the end of this course the student will be able to	
CO1	Understand the importance of nutrients and their effects of deficiency in the diet.	2
CO2	Classify the carbohydrates in to mono, di and polysaccharides and their importance.	2
CO3	Describe the structure and function of proteins, vitamins and nucleic acids.	3
CO4	Interpret the uses and effects of antibiotics and Anti tubercular drugs.	4
CO5	Analyse the importance and the negative impacts of using pesticides	4

C348	Course Name: ENVIRONMENTAL ENGINEERING LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand principles and their practical application in water treatment.	2
CO2	Determine physical, chemical and biological characteristics of water and wastewater.	4
CO3	Determine the optimum dose of coagulant.	4
CO4	Estimate the chloride, nitrate and iron content in water.	5
CO5	Summarize the solutions using titration, conductivity meter, pH meter, turbidity meter and DO meter.	2

C349	Course Name: Advanced Communication Skills Lab	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Develop sound communication skills in various situations with the help of enriched vocabulary.	3
CO2	Practice reading techniques for a faster and better comprehension.	4
CO3	Exhibit strong writing skills to express ideas effectively.	3
CO4	Demonstrate effective presentation skills.	2
CO5	Use appropriate verbal and non-verbal skills for a successful career.	1

R21 Course Outcomes

C350	Course Name: Quantitative Methods & Logical Reasoning	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	To perform well in various competitive exams and placement drives.	2
CO2	To solve basic and complex mathematical problems in short time.	4
CO3	To become strong in Quantitative Aptitude and Reasoning which can be applied for GRE, GATE, GMAT or CAT exam also.	3
CO4	To develop problem solving skills and analytical abilities, which play a great role in corporate and industry set up.	6
CO5	To perform well in various competitive exams and placement drives.	4

R21 Course Outcomes

B TECH - IV YEAR I SEM

C401	Course Name: DESIGN OF STEEL STRUCTURES	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Classify the types of connections and specifications as per IS: 800-2007.	2
CO2	Apply the provisions of IS: 800-2007 to design tension members.	3
CO3	Analyze and design compression members.	4
CO4	Illustrate behavior of beams and design strengths as per IS code.	4
CO5	Adapt IS code procedures to design welded plate girder.	6

C402	Course Name: ESTIMATION & COSTING	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Summarize the basic principles and standard methods for working out quantities in estimating.	2
CO2	Determine the earthwork estimate of buildings, roads and canals.	5
CO3	Estimate the rate analysis of the various items of work.	2
CO4	Understand the process of contracting for roads and buildings.	2
CO5	Evaluate the valuation of buildings and provide practical knowledge of standard specifications of items of building construction.	5

C403	Course Name: PRESTRESSED CONCRETE STRUCTURES (PE3)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Classify the concepts, principles, types and methods of PSC structures.	3
CO2	Evaluate the losses of PSC structures.	5
CO3	Analysis and design of PSC slabs and beams using IS:1343 (2012).	4
CO4	Explain transmission of prestressing force, end block analysis by different methods.	2
CO5	Analyse the stress distribution of composite beams and assess the deflection of beams. Understand the different methods of prestressing.	4

C404	Course Name: EARTHQUAKE ENGINEERING (PE3)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Quantify mechanical behaviour of earth's surface, seismic hazards and its effects.	4
CO2	Identify, formulate and solve engineering problems subjected to	2

R21 Course Outcomes

	dynamic loading conditions.	
CO3	Understand the internal parameters of the structures for seismic design source.	2
CO4	Assess the design component or process to meet desired needs within realistic constraints.	5
CO5	Analyze and design the members for earthquake resisting parameters.	4

C405	Course Name: GREEN BUILDING TECHNOLOGIES (PE3)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the Green building concept and focus on approaches that makes building sustainable.	2
CO2	Illustrate Green building assessment and accreditation system.	4
CO3	Able to apply low energy building strategies.	3
CO4	Design green building to improve sustainability of infrastructure.	6
CO5	Classify the economic benefits of green buildings.	3

C406	Course Name: RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING (PE4)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Define and understand the various components of railways.	2
CO2	Understand and solve the geometric elements needed for the design of permanent way.	2
CO3	Define, understand, and design the various components of the airport.	5
CO4	Define, understand the planning and requirements of a harbor.	4
CO5	Improve and Visualize the working of intelligent transportation system.	3

C407	Course Name: ADVANCED STRUCTURAL DESIGN (PE4)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Analyze and design of cantilever retaining wall.	4
CO2	Apply the provision of IS : 3370-2009 to design water tank.	3
CO3	Compile the design aspects of flat slabs.	3
CO4	Adapt the provision of IRC 21-1987 to class AA loading to design T beam girder.	2
CO5	Summarize the force components and design principles of RCC Chimney.	2

R21 Course Outcomes

C408	Course Name: GROUND WATER HYDROLOGY (PE4)	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand different types of aquifers and their characteristics	2
CO2	Analyse the pumping test data for different aquifers	4
CO3	Distinguish the surface and subsurface investigation methods of ground water.	4
CO4	Discuss the methods of artificial recharging of ground water.	2
CO5	Explain the control of saline water intrusions.	5

C409	Course Name: ELECTRICAL & HYBRID VEHICLES (OE3)	Bloom's Taxonomy
CO	At the end of the course, the student will be able to:	
CO1	Understand the components of electric vehicles and fundamentals of electric vehicles.	2
CO2	Summarize the types of batteries and principles of operation of Batteries.	2
CO3	Perceive the basic principles of electric motors which can be used in electric vehicles	3
CO4	Restate the transmission of the drive system and the components of the transmission.	2
CO5	Outline the concepts of hybrid vehicles and analyze the performance of hybrid vehicles.	2

C410	Course Name: ENERGY STORAGE SYSTEMS (OE3)	Bloom's Taxonomy
CO	At the end of the course, the student will be able to:	
CO1	Perceive the Electrical Energy Storage Technologies.	2
CO2	Understand the needs of electric energy storage	2
CO3	Analyze the characteristics and features of energy from various sources.	4
CO4	Classify various types of energy storage and various devices used for the purpose.	2
CO5	Apply the same concepts to real time solutions like electric vehicles, smart Grid and SCADA etc.	3

C411	Course Name: BASIC AUTOMOBILE ENGINEERING (OE3)	Bloom's Taxonomy
CO	At the end of the course, the student will be able to:	
CO1	Understanding the basic structure of an automobile.	2
CO2	Evaluating different cooling and lubrication systems of an automobile	5
CO3	Analyzing the electrical systems in tandem with ignition systems	4

R21 Course Outcomes

CO4	Understand various transmission and suspension systems.	2
CO5	Appraise steering and braking systems. Understand emission norms of automobiles.	5

C412	Course Name: MATERIAL SCIENCE AND ENGINEERING (OE3)	Bloom's Taxonomy
CO	At the end of the course, the student will be able to:	
CO1	Understand structure of metals and constitution of alloys.	2
CO2	Appraise equilibrium diagrams of various alloys.	5
CO3	Classify steels, cast irons and their alloys.	3
CO4	Appreciate different heat treatment processes and their influence on properties of metals and alloys. Know different Non-ferrous Metals and Alloys.	5
CO5	Apply the knowledge of composite and ceramic materials to replace metals and alloys wherever applicable.	3

C415	Course Name: WEB DESIGN (OE3)	Bloom's Taxonomy
CO	At the end of the course, the student will be able to:	
CO1	Create static web pages using HTML	6
CO2	Design styles for HTML web pages	5
CO3	Create interactive web pages using Javascript	6
CO4	Develop web applications using server side scripting language-PHP	3
CO5	Develop and analyze web applications with Java Server Pages	4

C419	Course Name: FUNDAMENTALS OF ENTREPRENEURSHIP (OE3)	Bloom's Taxonomy
CO	At the end of the course, the student will be able to:	
CO1	Provide awareness about entrepreneurship	3
CO2	Develop idea generation, creative and innovative skills among students	6
CO3	Self-motivate the students by making aware of the different opportunities by exploring themselves by discussing the successful growth/failure stories	2
CO4	Start an enterprise and design business plans are those suitable for funding by considering all dimensions of business.	2

C420	Course Name: CONCRETE & HIGHWAY MATERIALS LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	

R21 Course Outcomes

CO1	Examine the experimental strength of aggregate materials as per codal provisions.	4
CO2	Compute the properties of bituminous materials.	4
CO3	Determine the properties of cement by conducting the test.	5
CO4	Define the workability of fresh concrete by conducting tests.	1
CO5	Estimate the strength of hardened concrete by conducting destructive and non destructive testing.	5

C421	Course Name: COMPUTATIONAL LAB	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Encalcate with the usage of recent software's and its applications in the field of civil engineering	3
CO2	Analyse the Beam and Slab using Staad Pro software.	4
CO3	Assess the frame using the Staad Pro.	5
CO4	Interpret the slope stability by using Geo5.	3
CO5	Assess the settlement of footing.	4

C422	Course Name: INDUSTRIAL ORIENTED MINI PROJECT	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Interpret the literature and develop solutions for framing problem statement.	5
CO2	Select software techniques for identifying problems.	3
CO3	Analysis and test the modules of planned project.	4
CO4	Design technical report and deliver presentations.	6
CO5	Apply engineering and management principles to achieve project goals.	3

R21 Course Outcomes

B TECH - IV YEAR II SEM

C431	Course Name: REHABILITATION AND RETROFITTING OF STRUCTURES	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Illustrate the importance of inspection and maintenance.	4
CO2	Summarize the Impacts of corrosion and fire damage on structures.	5
CO3	Identify the damage assessment and testing of structural components.	2
CO4	Understand the materials and techniques needed for repairs.	2
CO5	Examine the failures of the structures and health monitoring with Optimization techniques.	2

C432	Course Name: REMOTE SENSING AND GIS	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Understand the concepts of Photogrammetry and compute the heights of the objects using parallax.	2
CO2	Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies.	2
CO3	Understand the basic concept of GIS and its applications; know different types of data representation in GIS.	3
CO4	Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinates systems.	4
CO5	Remote sensing gives the provision of understanding about water resources management and monitoring.	2

C433	Course Name: TECHNICAL SEMINAR	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	CO1: Demonstrate the skills in identifying, analysing, and presenting a research topic.	3
CO2	CO2: Demonstrate the quality of knowledge gained from the literature survey on recent technologies.	3
CO3	CO3: Demonstrate the skills developed to communicate effectively on engineering activities with the engineering community.	4
CO4	CO4: Demonstrate ability to effectively manage time in presentation skills.	3
CO5	CO5: Design a technical report with the principal of ethics.	6

R21 Course Outcomes

C434	Course Name: COMPREHENSIVE VIVA VOCE	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	Explain comprehensively to answer questions from all the courses.	2
CO2	Test Oral Presentation skills by answering questions in a precise and concise manner.	5
CO3	Build confidence and interpersonal skills.	3
CO4	Support the students to face interview both in the academic and the industrial sector.	2
CO5	Improve placements and better performers in their future.	5

C435	Course Name: MAJOR PROJECT	Bloom's Taxonomy
CO	Students who successfully complete this course will be able to:	
CO1	CO1: Identity, Analyse and apply suitable current techniques and tools to solve a problem in the civil engineering domain and societal issues.	4
CO2	CO2: Function effectively in teams to accomplish a common goal.	4
CO3	CO3: Organise the technical report writing and communication effectively.	6
CO4	CO4: Extend in lifelong activity.	3
CO5	CO5: Define and analyse a problem to assess health, safety and legal issues.	4