

<b>Coarse Code</b>	<b>CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES - 21MAT31</b>
CO1	To solve ordinary differential equations using Laplace transform.
CO2	Demonstrate the Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
CO4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
CO5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
<b>Coarse Code</b>	<b>GEODETTIC ENGINEERING - 21CV32</b>
CO1	Execute survey using compass and plane table
CO2	Find the level of ground surface and Calculation of area and volumes
CO3	Operate theodolite for field execution
CO4	Estimate the capacity of reservoir
CO5	Interpret satellite imageries
<b>Coarse Code</b>	<b>STRENGTH OF MATERIALS - 21CV33</b>
CO1	Evaluate the behavior when a solid material is subjected to various types of forces (namely Compressive, Tensile, Thermal, Shear, flexure, Torque, internal fluid pressure) and estimate stresses and corresponding strain developed. (L3)
CO2	Estimate the forces developed and draw schematic diagram for stresses, forces, moments for simple beams with different types of support and are subjected to various types of loads (L3).
CO3	Evaluate the behavior when a solid material is subjected to Torque and internal fluid pressure and estimate stresses and corresponding strain developed. (L3)
CO4	. Distinguish the behavior of short and long column and calculate load at failure & explain the behavior of spring to estimate deflection and stiffness (L3)
CO5	Examine and Evaluate the mechanical properties of various materials under different loading conditions
<b>Coarse Code</b>	<b>EARTH RESOURCES AND ENGINEERING - 21CV34</b>
CO1	Apply geological knowledge in different civil engineering practice.
CO2	Students will acquire knowledge on durability and competence of foundation rocks, and confidence enough to use the best building materials.
CO3	Competent enough to provide services for the safety, stability, economy and life of the structures that they construct
CO4	Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems
CO5	Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering for safe and solid construction.
<b>Coarse Code</b>	<b>COMPUTER-AIDED BUILDING PLANNING AND DRAWING - 21CV35</b>
CO1	Prepare, read and interpret the drawings in a professional set up.
CO2	Know the procedures of submission of drawings and Develop working and submission drawings for building.
CO3	Plan and design of residential or public building as per the given requirements.

<b>Coarse Code</b>	<b>SOCIAL CONNECT AND RESPONSIBILITY– 21SCR33</b>
CO1	The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversational will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem.
<b>Coarse Code</b>	<b>FIRE SAFETY IN BUILDINGS - 21CV385</b>
CO1	Understand types of fire, combustion process and fire resistance
CO2	Plan for fire safety and design of lifts
CO3	Design flow network in buildings
CO4	Design of electrical systems and maintenance
CO5	Perform health evaluation of buildings and suggest remedies
<b>Coarse Code</b>	<b>COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS- 21MAT41</b>
CO1	Use the concepts of an analytic function and complex potential to solve the problems arising in electromagnetic field theory. Utilize conformal transformation and complex integral arising in aerofoil theory, fluid visualization and image processing
CO2	Obtain series solution of ordinary differential equation.
CO3	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statically data.
CO4	Apply discrete and continues probability distribution in analyzing the probability model arising in the engineering field.
CO5	Construct joint probability distribution and demonstration the validity of testing the hypothesis
<b>Coarse Code</b>	<b>FLUID MECHANICS AND HYDRAULICS - 21CV42</b>
CO1	Understand fundamental properties of fluids and solve problems on Hydrostatics
CO2	Apply Principles of Mathematics to represent Kinematics and Bernoulli's principles
CO3	Compute discharge through pipes, notches and weirs
CO3	Design of open channels of various cross sections
CO3	Design of turbines for the given data and understand their operation characteristics
<b>Coarse Code</b>	<b>PUBLIC HEALTH ENGINEERING – 21CV43</b>
CO1	Estimate average and peak water demand for a community.
CO2	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
CO3	Design the different units of water treatment plant
CO4	Understand and design the various units of wastewater treatment plant
CO5	Acquire capability to conduct experiments and estimate the concentration of different parameters and compare the obtained results with the concerned guidelines and regulations.
<b>Coarse Code</b>	<b>ANALYSIS OF STRUCTURES - 21CV44</b>
CO1	Evaluate slope and deflections in beams using geometrical methods.
CO2	Determine deflections in trusses and frames using energy principles.
CO3	Analyse arches and cables for stress resultants.

CO4	Apply slope deflection method in analysing indeterminate structures and construct bending moment diagram
CO5	Analyse continuous beams, frames and trusses using stiffness matrix method of analysis.
<b>Coarse Code</b>	<b>EARTH RESOURCES AND ENGINEERING LABORATORY – 21BE45</b>
CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies
CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
CO3	Corroborate the concepts of biomimetics for specific requirements.
CO4	Think critically towards exploring innovative biobased solutions for socially relevant problems
<b>Coarse Code</b>	<b>EARTH RESOURCES AND ENGINEERING LABORATORY - 21CVL46</b>
CO1	Comprehend the relations between minerals and rocks based on their physical properties
CO2	Assess the suitability of materials used in building construction
CO3	Differentiate geological investigations necessary for the construction of dams, bridges, and tunnels
CO4	Describe the groundwater investigation using resistivity methods
CO5	Understand the applications of Geospatial technology in Civil Engineering
<b>Coarse Code</b>	<b>CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS (CIP) - 21CIP47</b>
CO1	Have constitutional knowledge and legal literacy.
CO2	Understand Engineering and Professional ethics and responsibilities of Engineers.
<b>Coarse Code</b>	<b>GREEN BUILDINGS - 21CV485</b>
CO1	
<b>Coarse Code</b>	<b>UNIVERSAL HUMAN VALUES-II: UNDERSTANDING HARMONY and ETHICAL HUMAN CONDUCT- 21UHV49</b>
CO1	Holistic vision of life
CO2	Socially responsible behaviour
CO3	Environmentally responsible work
CO4	Ethical human conduct
CO5	Having Competence and Capabilities for Maintaining Health and Hygiene
CO6	Appreciation and aspiration for excellence (merit) and gratitude for all
<b>Coarse Code</b>	<b>HYDROLOGY AND WATER RESOURCE ENGINEERING- 21CV51</b>
CO1	Provide a background in the theory of hydrological processes and their measurement
CO2	Estimate runoff and develop unit hydrographs.
CO3	Find the water requirement and frequency of irrigation for various crops.
CO4	Find the canal capacity and compute the reservoir capacity.
CO5	Analyse floods and droughts. Emphasise on the importance of conservation of water and water bodies.
<b>Coarse Code</b>	<b>TRANSPORTATION ENGINEERING- 21CV52</b>
CO1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.

CO2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction
CO3	Design road geometrics, structural components of pavement and drainage.
CO4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.
<b>Coarse Code</b>	<b>DESIGN OF RC STRUCTURAL ELEMENTS- 21CV53</b>
CO1	Understand the design philosophy and principles.
CO2	Solve engineering problems of RC elements subjected to flexure, shear and torsion.
CO3	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings.
CO4	Owens professional and ethical responsibility.
<b>Coarse Code</b>	<b>GEOTECHNICAL ENGINEERING– 21CV54</b>
CO1	Determine the index properties of soil and hence classify the soil
CO2	Assess the compaction and consolidation characteristics of soil
CO3	Determine the permeability of soils and assess the seepage in hydraulic structures
CO4	Evaluate shear parameters of the soil using shear tests
CO5	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
<b>Coarse Code</b>	<b>GEOTECHNICAL ENGINEERING LABORATORY- 21CVL55</b>
CO1	Physical and index properties of the soil
CO2	Classify based on index properties and field identification
CO3	To determine OMC and MDD, plan and assess field compaction program
CO4	Shear strength and consolidation parameters to assess strength and deformation characteristics
CO5	In-situ shear strength characteristics(SPT-Demonstration)
<b>Coarse Code</b>	<b>RESEARCH METHODOLOGY &amp; INTELLECTUAL PROPERTY RIGHTS– 21CV56</b>
CO1	To know the meaning of engineering research.
CO2	To know the procedure of Literature Review and Technical Reading.
CO3	To know the fundamentals of patent laws and drafting procedure.
CO4	Understanding the copyright laws and subject matters of copyrights and designs
CO5	Understanding the basic principal of desiring Rights.
<b>Coarse Code</b>	<b>ENVIRONMENTAL STUDIES – 21CIV57</b>
CO1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
CO2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
CO3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.
CO4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.
<b>Coarse Code</b>	<b>GENDER SENSITISATION - 21CV583</b>

CO1	Appreciate gender issues prevalent in the society
CO2	Value the role of each gender in family, society and state.
CO3	Analyse the gender sensitivity at work place and evolve proper perception of the other gender
CO4	Sensitise oneself towards gender equality
<b>Coarse Code</b>	<b>CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP – 21CV61</b>
CO1	Understand various management principles of construction industry (L2)
CO2	Use planning, organizing, scheduling, monitoring and controlling techniques for managing construction activity (L4)
CO3	Understand importance of quality control and safety in construction.(L2)
CO4	Understand managing data pertaining to construction project. (L4)
CO5	Evaluate alternatives and develop capital budget for different scenarios.
<b>Coarse Code</b>	<b>CONCRETE TECHNOLOGY – 21CV62</b>
CO1	Assess and infer various properties of cement, cementitious materials, Fine and coarse aggregate as per codal provision and specifications (L2)
CO2	Design the concrete mix for the given materials as per IS:10262-2019 provisions (L4)
CO3	Understand the manufacturing process and assess the quality of green (L2)
CO4	Describe the properties of fresh and hardened concrete – Strength and Durability aspects (L3)
CO5	Examine and Evaluate properties of Cement and Concrete
<b>Coarse Code</b>	<b>DESIGN OF STEEL STRUCTURAL ELEMENTS – 21CV63</b>
CO1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.
CO2	Understand the Concept of Bolted and Welded connections
CO3	Understand the Concept of Design of compression members, built-up columns and columns splices
CO4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
CO5	Understand the Concept of Design of laterally supported and un-supported steel beams.
<b>Coarse Code</b>	<b>DESIGN OF PRE-STRESSED CONCRETE STRUCTURES – 21CV641</b>
CO1	Understand the requirement of PSC members for present scenario.
CO2	Analyse the stresses encountered in PSC element during transfer and at working.
CO3	Understand the effectiveness of the design of PSC after studying losses
CO4	Capable of analyzing the PSC element and finding its efficiency.
CO5	Design PSC beam for different requirements.
<b>Coarse Code</b>	<b>APPLIED GEOTECHNICAL ENGINEERING - 21CV642</b>
CO1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects.
CO2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils.
CO3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures.
CO4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure.

CO5	Capable of estimating load carrying capacity of single and group of piles.
<b>Coarse Code</b>	<b>RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS - 21CV643</b>
CO1	Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway
CO2	Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive
CO3	Develop layout plan of airport, harbour, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same
CO4	Apply the knowledge gained to conduct surveying, understand the tunnelling activities
<b>Coarse Code</b>	<b>DESIGN CONCEPTS IN BUILDING SERVICES - 21CV644</b>
CO1	Describe the basics of house plumbing and waste water collection and disposal.
CO2	Discuss the safety and guidelines with respect to fire safety.
CO3	Describe the issues with respect to quantity of water, rain water harvesting and roof top harvesting.
CO4	Understand and implement the requirements of thermal comfort in buildings
<b>Coarse Code</b>	<b>GROUNDWATER HYDRAULICS(Elective) - 21CV645</b>
CO1	Explain the importance of Groundwater
CO2	Paraphrasing the Characteristics of aquifers
CO3	Estimate the quantity of groundwater by various methods
CO4	Analyse the zones of groundwater resource
CO5	Analyse the quality of groundwater and understand Techniques of modeling
<b>Coarse Code</b>	<b>ALTERNATE BUILDING MATERIALS - 21CV646</b>
CO1	Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
CO2	Select appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.
CO3	Analyze different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of suggesting suitable agro and industrial wastes as a building material.
CO4	Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.
<b>Coarse Code</b>	<b>OCCUPATIONAL HEALTH AND SAFETY (Elective) - 21CV651</b>
CO1	Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
CO2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard
CO3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.
CO4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors.
CO5	Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety.
<b>Coarse Code</b>	<b>QUANTITY SURVEY AND CONTRACT MANAGEMENT - 21CV71</b>
CO1	Develop the quantity estimates for different Civil Engineering structures, works & also communicate the cost abstract in a simple form to the stake holders.



CO2	Prepare specifications of various Civil Engineering Structures/works, also will be able to analyse the requirement of a structure /work to arrive at a specific cost for completion of the same.
CO3	Make use of minimum basic knowledge gained in this course to take up entrepreneurship/employment as a contractor.
<b>Coarse Code</b>	<b>CONSTRUCTION TECHNOLOGY FOR SUBSTRUCTURE &amp; SUPERSTRUCTURES– 21CV72</b>
CO1	Select Appropriate technology for underground constructions.
CO2	Able to select appropriate pile construction method and testing of piles.
CO3	Able to select appropriate concreting practices for different constructions
CO4	Able to select appropriate underwater construction technology
<b>Coarse Code</b>	<b>ADVANCED DESIGN OF RCC AND STEEL STRUCTURES (Elective) - 21CV731</b>
CO1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
CO2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.
<b>Coarse Code</b>	<b>ADVANCED GEOTECHNICAL ENGINEERING (Elective) - 21CV732</b>
CO1	Estimate the size of isolated and combined foundations to satisfy bearing capacity and settlement criteria
CO2	Estimate the load carrying capacity and settlement of single piles and pile groups including laterally loaded piles.
CO3	Understand the basics of analysis and design principles of well foundation, drilled piers and caissons.
CO4	Understand basics of analysis and design principles of machine foundations.
<b>Coarse Code</b>	<b>PAVEMENT MATERIALS AND CONSTRUCTION (Elective) - 21CV733</b>
CO1	Students will be able to evaluate and assess the suitability of any pavement material to be used in various components of pavement by conducting required tests as per IS, IRC specifications
CO2	Students will be able to formulate the proportions of different sizes of aggregates to suit gradation criteria for various mixes as per MORTH and also design bituminous mixes.
CO3	Students will be competent to adapt suitable modern technique and equipment for speedy and economic construction.
CO4	Student will be able to execute the construction of embankment, flexible, rigid pavement and perform required quality control tests at different stages of pavement construction.
<b>Coarse Code</b>	<b>SOLID WASTE MANAGEMENT (Elective) - 21CV734</b>
CO1	Identify improper practices of solid waste disposal and their environmental implications. Know the basic engineering principles of solid waste management
CO2	Describe the need for economics in collection and transportation of solid waste and clearly discuss various types of collection systems and analyse system dynamics
CO3	Understand the management concepts, define 4 R approach, apply PPP model and community involvement for effective management of solid waste
CO4	Develop a concise idea on various conventional and advanced treatment options for solid waste

CO5	Conceive the design aspects of engineered disposal options and apply the gained knowledge
<b>Coarse Code</b>	<b>GROUND IMPROVEMENT TECHNIQUES- 21CVL742</b>
CO1	Give solutions to solve various problems associated with soil formations having less strength.
CO2	Use effectively the various methods of ground improvement techniques depending upon the requirements.
CO3	Utilize properly the locally available materials and techniques for ground improvement so that economy in the design of foundations of various civil engineering structures
<b>Coarse Code</b>	<b>ENVIRONMENTAL PROTECTION AND MANAGEMENT- 21CV753</b>
CO1	Appreciate the elements of Corporate Environmental Management systems complying to international environmental management system standards
CO2	Lead pollution prevention assessment team and implement waste minimization options
CO3	Develop, Implement, maintain and Audit Environmental Management systems for Organisations