Coarse Code	STRENGTH OF MATERIALS 17CV32
CO1	To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion.
CO2	To suggest suitable material from among the available in the field of construction and manufacturing
CO3	To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts
CO4	To understand the basic concept of analysis and design of members subjected to torsion.
CO5	To understand the basic concept of analysis and design of structural elements such as columns and struts.
Coarse Code	**FLUIDS MECHANICS – 17CV33**
CO1	Possess a sound knowledge of fundamental properties of fluids and fluid Continuum
CO2	Compute and solve problems on hydrostatics, including practical applications
CO3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
CO4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
CO5	Compute the discharge through pipes and over notches and weirs
Coarse Code	**BASIC SURVEYING – 17CV34**
CO1	Posses a sound knowledge of fundamental principles Geodetics
CO2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
CO3	Capture geodetic data to process and perform analysis for survey problems
CO4	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours
Coarse Code	**ENGINEERING GEOLOGY – 17CV35**
CO1	Students will able to apply the knowledge of geology and its role in Civil Engineering
CO2	Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
CO3	Analyze the natural disasters and their mitigation
CO4	Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems.

CO5	Apply and asses use of building materials in construction and asses their properties
Coarse Code	**BUILDING MATERIALS AND CONSTRUCTION - 17CV36**
CO1	Select suitable materials for buildings and adopt suitable construction techniques
CO2	Adopt suitable repair and maintenance work to enhance durability of buildings.
Coarse Code	**BUILDING MATERIALS T ESTING LABORATORY – 17CVL37**
CO1	Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
CO2	Identify, formulate and solve engineering problems of structural elements subjected to flexure.
CO3	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials
Coarse Code	**BASIC SURVEYING PRACTICE – 17CVL38**
CO1	Apply the basic principles of engineering surveying for linear and angular measurements.
CO2	Comprehend effectively field procedures required for a professional surveyor
CO3	Use techniques, skills and conventional surveying instruments necessary for engineering practice.
Coarse Code	**ANALYSIS OF DETERMINATE STRUCTURES – 17CV42**
CO1	Evaluate the forces i n determinate trusses by method of joints and sections.
CO2	Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
CO3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.
CO4	Determine the stress resultants in arches and cables
CO5	Understand the concept of influence lines and construct the ILD diagram for the moving loads.
Coarse Code	**APPLIED HYDRAULICS – 17CV43**
CO1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
CO2	Design the open channels of various cross sections including economical channel sections
CO3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,

CO4	Compute water surface profiles at different conditions
CO5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
Coarse Code	**CONCRETE TECHNOLOGY – 17CV44**
CO1	Relate material characteristics and their influence on microstructure of concrete.
CO2	Distinguish concrete behaviour based on its fresh and hardened properties.
CO3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
Coarse Code	**BASIC GEOTECHNICAL ENGINEERING – 17CV45**
CO1	Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties
CO2	Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures
CO3	Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure
CO4	Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory.
CO5	Ability to solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same.
Coarse Code	**ADVANCED SURVEYING – 17CV46**
CO1	Apply the knowledge of geometric principles to arrive at surveying problems
CO2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
CO3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
CO4	Design and implement the different types of curves for deviating type of alignments
Coarse Code	**FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY – 17CVL47**
CO1	Properties of fluids and the use of various instruments for fluid flow measurement.
CO2	Working of hydraulic machines under various conditions of working and their characteristics.
Coarse Code	**ENGINEERING GEOLOGY LABORATORY – 17CVL48**
CO1	Identifying the minerals and rocks and utilize them effectively in civil engineering practices.

CO2	Understanding and interpreting the geological conditions of the area for the implementation o f civil engineering projects.
CO3	Interpreting subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
CO4	The techniques of drawing the curves of electrical resistivity data and its interpretation for geotechnical and aquifer boundaries
Coarse Code	**DESIGN OF RC STRUCTURAL ELEMENTS – 17CV51**
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	owns professional and ethical responsibility
Coarse Code	**ANALYSIS OF INDETERMINATE STRUCTURES – 17CV52**
CO1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
CO2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
CO3	Construct the bending moment diagram for beams and frames by Kani's method.
CO4	Construct the bending moment diagram for beams and frames using flexibility method.
CO5	Analyze the beams and indeterminate frames by system stiffness method.
Coarse Code	**APPLIED GEOTECHNICAL ENGINEERING – 17CV53**
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
Coarse Code	**COMPUTER AIDED BUILDING PLANNING AND DRAWING – 17CV54**
CO1	Gain a broad understanding of planning and designing of buildings

CO2	Prepare, read and interpret the drawings in a professional set up.
CO3	Know the procedures of submission of drawings and Develop working and submission drawings for building
CO4	Plan and design a residential or public building as per the given requirements
Coarse Code	**AIR POLLUTION AND CONTROL - 17CV551**
CO1	Identify the major sources of air pollution and understand their effects on health and environment.
CO2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
CO3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants
CO4	Choose and design control techniques for particulate and gaseous emissions
Coarse Code	**RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS - 17 CV552**
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, harbor, 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 tunneling activities.
Coarse Code	**MASONRY STRUCTURES – 17CV553**
CO1	Explain engineering properties and uses of masonry units, defects and crack in masonry and its remedial measures.
CO2	Summarize various formulae's for finding compressive strength of masonry units.
CO3	Explain permissible stresses and design criteria as per IS: 1905 and SP-20.
CO4	Design different types of masonry walls for different load considerations.
Coarse Code	**THEORY OF ELASTICITY – 17CV554**
CO1	Ability to apply knowledge of mechanics and mathematics to model elastic bodies as continuum
CO2	Ability to formulate boundary value problems; and calculate stresses and strains
CO3	Ability to comprehend constitutive relations for elastic solids and compatibility constraints;

CO4	Ability to solve two-dimensional problems (plane stress and plane strain) using the concept of stress function
Coarse Code	**TAFFIC ENGINEERING – 17CV561**
CO1	Understand the human factors and vehicular factors in traffic engineering design.
CO2	Conduct different types of traffic surveys and analysis of collected data using statistical concepts.
CO3	Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.
CO4	Understand the basic knowledge of Intelligent Transportation System.
Coarse Code	**SUSTAINABILITY CONCEPTS IN ENGINEERING – 17CV562**
CO1	Learn the sustainability concepts; understand the role and responsibility of engineers in sustainable development
CO2	Quantify sustainability, and resource availability, Rationalize the sustainability based on scientific merits.
CO3	Understand and apply sustainability concepts in construction practices, designs, product developments and processes across various engineering disciplines
CO4	Make a decision in applying green engineering concepts and become a lifelong advocate of sustainability in society.
Coarse Code	**REMOTE SENSING AND GIS – 17CV563**
CO1	Collect data and delineate various elements from the satellite imagery using their spectral signature
CO2	Analyze different features of ground information to create raster or vector data.
CO3	Perform digital classification and create different thematic maps for solving specific problems
CO4	Make decision based on the GIS analysis on thematic maps
Coarse Code	**OCCUPATIONAL HEALTH AND SAFETY – 17CV564**
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

Coarse Code	GEOTECHNICAL ENGINEERING LAB – 17CVL57
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)
Coarse Code	**CONCRETE AND HIGHWAY MATERIALS LABORATORY – 17CVL58**
CO1	Conduct appropriate laboratory experiments and interpret the results
CO2	Determine the quality and suitability of cement
CO3	Design appropriate concrete mix
CO4	Determine strength and quality of concrete
CO5	Test the road aggregates and bitumen for their suitability as road material
CO6	Test the soil for its suitability as sub grade soil for pavements.
Coarse Code	**CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP – 17CV61**
CO1	Understand the construction management process.
CO2	Understand and solve variety of issues that are encountered by every professional in discharging professional duties.
CO3	Fulfill the professional obligations effectively with global outlook
Coarse Code	**DESIGN OF STEEL STRUCTURAL ELEMENTS – 17CV62**
CO1	Possess a 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 Understand the Concept of Design of laterally supported and un-supported steel beams.

Coarse Code	HIGHWAY ENGINEERING – 17CV63
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
Coarse Code	**WATER SUPPLY AND TREATMENT ENGINEERING – 17CV64**
CO1	Estimate average and peak water demand for a community
CO2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community
CO3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system
CO4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
Coarse Code	**SOLID WASTE MANAGEMENT – 17CV651**
CO1	Analyse existing solid waste management system and to identify their drawbacks.
CO2	Evaluate different elements of solid waste management system
CO3	Suggest suitable scientific methods for solid waste management elements.
CO4	Design suitable processing system and evaluate disposal sites.
Coarse Code	**MATRIX METHOD OF STRUCTURAL ANALYSIS – 17CV652**
CO1	Evaluate the structural systems to application of concepts of flexibility and stiffness matrices for simple problems
CO2	Identify, formulate and solve engineering problems with respect to flexibility and stiffness matrices as applied to continuous beams, rigid frames and trusses
CO3	Identify, formulate and solve engineering problems by application of concepts of direct stiffness method as applied to continuous beams and trusses.
Coarse Code	**ALTERNATIVE BUILDING MATERIALS - 17CV653**
CO1	Solve the problems of Environmental issues concerned to building materials and cost effective building technologies
CO2	Suggest appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.

CO3	Analyse 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
Coarse Code	**GROUND IMPROVEMENT TECHNIQUES – 17CV654**
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
Coarse Code	**WATER RESOURCES MANAGEMENT – 17CV661**
CO1	Assess the potential of groundwater and surface water resources
CO2	Address the issues related to planning and management of water resources
CO3	Know how to implement IWRM in different regions.
Coarse Code	**ENVIRONMENTAL PROTECTION AND MANAGEMENT – 17CV662**
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
Coarse Code	**NUMERICAL METHODS AND APPLICATIONS – 17CV663**
CO1	After studying this course, The students will have a clear perception of the power of numerical techniques, ideas and would be able to demonstrate the applications of these techniques to problems drawn from Industry, management and other engineering fields.
Coarse Code	**FINITE ELEMENT METHOD - 17CV664**
CO1	The student will have the knowledge on advanced methods of analysis of structures
Coarse Code	**SOFTWARE APPLICATION LAB – 17CVL67**
CO1	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work
Coarse Code	**EXTENSIVE SURVEY PROJECT /CAMP – 17CVL68**

CO1	Apply Surveying knowledge and tools effectively for the projects
CO2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
CO3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.
CO4	Professional etiquettes at workplace, meeting and general
CO5	Establishing trust based relationships in teams & organizational environment
CO6	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques
Coarse Code	**MUNICIPAL AND INDUSTRIAL WASTE WATER ENGINEERING – 17CV71**
CO1	Acquires capability to design sewer and Sewerage treatment plant.
CO2	Evaluate degree of treatment and type of treatment for disposal, reuse and recycle.
CO3	Identify waste streams and design the industrial waste water treatment plant.
CO4	Manage sewage and industrial effluent issues.
Coarse Code	**DESIGN OF RCC AND STEEL STRUCTURES – 17CV72**
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.
Coarse Code	**HYDROLOGY AND IRRIGATION ENGINEERING – 17CV73**
CO1	Understand the importance of hydrology and its components
CO2	Measure precipitation and analyze the data and analyze the losses in precipitation
CO3	Estimate runoff and develop unit hydrographs.
CO4	Find the benefits and ill-effects of irrigation.
CO5	Find the quantity of irrigation water and frequency of irrigation for various crops.
CO6	Find the canal capacity, design the canal and compute the reservoir capacity
Coarse Code	**DESIGN OF BRIDGES – 17CV741**

CO1	Understand the load distribution and IRC standards
CO2	Design the slab and T beam bridges
CO3	Design Box culvert, pipe culvert
CO4	Use bearings, hinges and expansion joints and
CO5	Design Piers and abutments.
Coarse Code	**GROUND WATER & HYDRAULICS – 17CV742**
CO1	Find the characteristics of aquifers
CO2	Estimate the quantity of ground water by various methods
CO3	Locate the zones of ground water resources.
CO4	Select particular type of well and augment the ground water storage
Coarse Code	**DESIGN CONCEPT OF BUILDING SERVICES - 17CV743**
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
Coarse Code	**STRUCTURAL DYNAMIC - 17CV744**
CO1	Apply knowledge of mathematics, science, and engineering by developing the equations of motion for vibratory systems and solving for the free and forced response.
CO2	Basic understanding of fundamental analysis methods for dynamic systems Interpret dynamic analysis results for design, analysis and research purposes
CO3	Apply structural dynamics theory to earthquake analysis, response, and design of structures
Coarse Code	**URBAN TRANSPORTATION AND PLANNING - 17CV751**
CO1	Design, conduct and administer surveys to provide the data required for transportation planning.
CO2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.

CO3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
CO4	Adopt the steps that are necessary to complete a long-term transportation plan.
Coarse Code	**PREFABRICATED STRUCTURES - 17CV752**
CO1	Use modular construction, industrialised construction
CO2	Design prefabricated elements
CO3	Design some of the prefabricated elements
CO4	Use the knowledge of the construction methods and prefabricated elements in buildings
Coarse Code	**REHABILITATION AND RETROFITTING OF STRUCTURES - 17CV753**
CO1	Understand the cause of deterioration of concrete structures
CO2	Able to assess the damage for different type of structures
CO3	Summarize the principles of repair and rehabilitation of structures
CO4	Recognize ideal material for different repair and retrofitting technique
Coarse Code	**REINFORCED EARTH STRUCTURES - 17CV754**
CO1	identify, formulate reinforced earth techniques that are suitable for different soils and in different structures
CO2	understand the laboratory testing concepts of Geosynthetics
CO3	design RE retaining structures and Soil Nailing concepts
CO4	Determine the load carrying capacity of Foundations resting on RE soil bed.
CO5	asses the use of Geo synthetics in drainage requirements and landfill designs
Coarse Code	**ENVIRONMENTAL ENGINEERING LABORATORY - 17CVL76**
CO1	Acquire capability to conduct experiments and estimate the concentration of different parameters
CO2	Compare the result with standards and discuss based on the purpose of analysis.
CO3	Determine type of treatment, degree of treatment for water and waste water

CO4	Identify the parameter to be analyzed for the student project work in environmental stream.
Coarse Code	**COMPUTER AIDED DETAILING OF STRUCTURES - 17CVL77**
CO1	Prepare detailed working drawings
Coarse Code	**QUANTITY SURVEYING AND CONTRACTS MANAGEMENT – 17CV81**
CO1	Prepare detailed and abstract estimates for roads and building
CO2	Prepare valuation reports of buildings
CO3	Interpret Contract document's of domestic and international construction works
Coarse Code	**DESIGN OF PRE STRESSED CONCRETE ELEMENTS - 17CV82**
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
Coarse Code	**EARTHQUAKE ENGINEERING - 17CV831**
CO1	Acquire basic knowledge of engineering seismology
CO2	Develop response spectra for a given earthquake time history and its implementation to estimate response of a given structure
CO3	Understanding of causes and types of damages to civil engineering structures during different earthquake scenarios
CO4	Analyze multi-storied structures modeled as shear frames and determine lateral force distribution due to earthquake input motion using IS-1893 procedures
CO5	Comprehend planning and design requirements of earthquake resistant features of RCC and Masonry structures thorough exposure to different IS-codes of practices.
Coarse Code	**HYDRAULIC STRUCTURES - 17CV832**
CO1	Check the stability of gravity dams and design the dam.
CO2	Estimate the quantity of seepage through earth dams.

CO3	Design spillways and aprons for various diversion works.
CO4	Select particular type of canal regulation work for canal network.
Coarse Code	**PAVEMENT DESIGN - 17CV833**
CO1	Systematically generate and compile required data's for design of pavement (Highway & Airfield).
CO2	Analyze stress, strain and deflection by boussinesq's, burmister's and westergaard's theory.
CO3	Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001.
CO4	Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.
Coarse Code	**ADVANCED FOUNDATION DESIGN - 17CV834**
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