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| <b>Coarse Code</b> | <b>TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES - 18MAT31</b>   |
| CO1                | Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering. |
| CO2                | Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.          |
| CO3                | Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.                          |
| CO4                | Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.                              |
| CO5                | Determine the external of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.                           |
| <b>Coarse Code</b> | <b>STRENGTH OF MATERIALS - 18CV32</b>  |
| CO1                | To evaluate the basic concepts of the stresses and strains for different materials and strength of structural elements.  |
| CO2                | To evaluate the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.   |
| CO3                | To analyse different internal forces and stresses induced due to representative loads on structural elements.  |
| CO4                | To evaluate slope and deflections of beams.  |
| CO5                | To evaluate the behaviour of torsion members, columns and struts.  |
| <b>Coarse Code</b> | <b>FLUIDS MECHANICS - 18CV33</b>   |
| 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   |
| <b>Coarse Code</b> | <b>SBUILDING MATERIALS AND CONSTRUCTION - 18CV34</b>   |
| CO1                | Select suitable materials for buildings and adopt suitable construction techniques.  |
| CO2                | Decide suitable type of foundation based on soil parameters  |
| CO3                | Supervise the construction of different building elements based on suitability   |
| CO4                | Exhibit the knowledge of building finishes and form work requirements  |
| <b>Coarse Code</b> | <b>BUILDING MATERIALS AND CONSTRUCTION - 18CV34</b>  |
| CO1                | Select suitable materials for buildings and adopt suitable construction techniques.  |
| CO2                | Decide suitable type of foundation based on soil parameters  |
| CO3                | Supervise the construction of different building elements based on suitability   |
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| <b>Coarse Code</b> | <b>BASIC SURVEYING - 18CV35</b>  |

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| C01                | 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  |
| <b>Coarse Code</b> | <b>ENGINEERING GEOLOGY - 18CV36</b>  |
| C01                | 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                | Civil Engineers are competent enough 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 construction.  |
| <b>Coarse Code</b> | <b>COMPUTER AIDED BUILDING PLANNING AND DRAWING - 18CVL37</b>  |
| C01                | 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 aresidential or public building as per the given requirements.   |
| <b>Coarse Code</b> | <b>BUILDING MATERIALS TESTING LABORATORY - 18CVL38</b>   |
| C01                | 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. |
| <b>Coarse Code</b> | <b>ADDITIONAL MATHEMATICS – I 18MATDIP31</b>   |
| C01                | Apply concepts of complex numbers and vector algebra to analyze the problems arising in related area.  |
| CO2                | Use derivatives and partial derivatives to calculate rate of change of multivariate functions.   |
| CO3                | Analyze position, velocity and acceleration in two and three dimensions of vector valued functions.  |
| CO4                | Learn techniques of integration including the evaluation of double and triple integrals.   |
| CO5                | Identify and solve first order ordinary differential equations.  |
| <b>Coarse Code</b> | <b>COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHOD<br/>18CV41</b>   |
| C01                | Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.  |
| CO2                | Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.                                       |
| CO3                | Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.  |

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| CO4                | Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.   |
| CO5                | Construct joint probability distributions and demonstrate the validity of testing the hypothesis.  |
| <b>Coarse Code</b> | <b>ANALYSIS OF DETERMINATE STRUCTURES - 18CV42</b>   |
| C01                | Identify different forms of structural systems.  |
| CO2                | Construct ILD and analyse the beams and trusses subjected to moving loads  |
| CO3                | Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and beams.                               |
| CO4                | Determine the stress resultants in arches and cables.  |
| <b>Coarse Code</b> | <b>APPLIED HYDRAULICS - 18CV43</b>   |
| C01                | 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                                       |
| <b>Coarse Code</b> | <b>CONCRETE TECHNOLOGY - 18CV44</b>  |
| C01                | Relate material characteristics and their influence on microstructure of concrete.   |
| C02                | Distinguish concrete behavior based on its fresh and hardened properties.  |
| C03                | Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.                         |
| C04                | Adopt suitable concreting methods to place the concrete based on requirement.  |
| C05                | Select a suitable type of concrete based on specific application.  |
| <b>Coarse Code</b> | <b>ADVANCED SURVEYING - 18CV45</b>   |
| C01                | 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.   |
| <b>Coarse Code</b> | <b>WATER SUPPLY AND TREATMENT ENGINEERING - 18CV46</b>   |
| C01                | Estimate average and peak water demand for a community.  |
| C02                | Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.   |
| C03                | Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.  |
| C04                | Design a comprehensive water treatment and distribution system to purify and distribute water The required quality standards.                              |
| <b>Coarse Code</b> | <b>ENGINEERING GEOLOGY LABORATORY - 18CVL47</b>  |
| C01                | The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices.   |

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| C02                | The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects.                                |
| C03                | The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods. |
| C04                | The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the lineaments and other structural features for the given area.    |
| C05                | The students will be able to identify the different structures in the field.  |
| <b>Coarse Code</b> | <b>FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY - 18CVL48</b>  |
| C01                | Properties of fluids and the use of various instruments for fluid flow measurement.   |
| C02                | Working of hydraulic machines under various conditions of working and their characteristics.  |
| <b>Coarse Code</b> | <b>ADDITIONAL MATHEMATICS – II 18MATDIP41</b>   |
| C01                | Solve systems of linear equations using matrix algebra.   |
| C02                | Apply the knowledge of numerical methods in modelling and solving of engineering problems.  |
| C03                | Apply the knowledge of numerical methods in modelling and solving of engineering problems.  |
| C04                | Classify partial differential equations and solve them by exact methods.  |
| C05                | Apply elementary probability theory and solve related problems.   |
| <b>Coarse Code</b> | <b>CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP - 18CV51</b>  |
| C01                | Prepare a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence.                                |
| CO2                | Understand labour output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety.                    |
| CO3                | Analyze the economics of alternatives and evaluate benefits and profits of a construction activity based on monetary value and time value.                        |
| CO4                | Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies.  |
| <b>Coarse Code</b> | <b>ANALYSIS OF INDETERMINATE STRUCTURES - 18CV52</b>  |
| C01                | Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection 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.   |
|                    | Construct the bending moment diagram for beams and frames using flexibility method  |
| CO4                | Analyze the beams and indeterminate frames by system stiffness method.  |
| <b>Coarse Code</b> | <b>DESIGN OF RC STRUCTURAL ELEMENTS - 18CV53</b>  |
| C01                | 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>BASIC GEOTECHNICAL ENGINEERING - 18CV54</b>  |

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| 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>MUNICIPAL WASTEWATER ENGINEERING - 18CV55</b>  |
| CO1                | Select the appropriate sewer appurtenances and materials in sewer network.  |
| CO2                | Design the sewers network and understand the self purification process in flowing water.  |
| CO3                | Design the various physico-chemical treatment units   |
| CO4                | Design the various biological treatment units   |
| CO5                | Design various AOPs and low cost treatment units.   |
| <b>Coarse Code</b> | <b>HIGHWAY ENGINEERING - 18CV56</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>SURVEYING PRACTICE - 18CVL57</b>   |
| CO1                | Apply the basic principles of engineering surveying and 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.   |
| <b>Coarse Code</b> | <b>CONCRETE AND HIGHWAY MATERIALS LABORATORY - 18CVL58</b>  |
| CO1                | Able to interpret the experimental results of concrete and highway materials based on laboratory tests.   |
| CO2                | Determine the quality and suitability of cement.  |
| CO3                | Design appropriate concrete mix Using Professional codes.   |
| CO4                | Determine strength and quality of concrete.   |
| CO5                | Evaluate the strength of structural elements using NDT techniques.  |
| CO6                | Test the soil for its suitability as sub grade soil for pavements.  |
| <b>Coarse Code</b> | <b>DESIGN OF STEEL STRUCTURAL ELEMENTS - 18CV61</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 column splices.   |
| CO4                | Understand the Concept of Design of tension members, simple slab base and gusseted base.  |

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| C05                | Understand the Concept of Design of laterally supported and un-supported steel beams.   |
| <b>Coarse Code</b> | <b>APPLIED GEOTECHNICAL ENGINEERING - 18CV62</b>  |
| C01                | Ability to plan and execute geotechnical site investigation program for different civil engineering projects  |
| C02                | Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils  |
| C03                | Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures   |
| C04                | Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure  |
| C05                | Capable of estimating load carrying capacity of single and group of piles   |
| <b>Coarse Code</b> | <b>HYDROLOGY AND IRRIGATION ENGINEERING - 18CV63</b>  |
| C01                | Understand the importance of hydrology and its components.  |
| C02                | Measure precipitation and analyze the data and analyze the losses in precipitation.   |
| C03                | Estimate runoff and develop unit hydrographs.   |
| C04                | Find the benefits and ill-effects of irrigation.  |
| C05                | Find the quantity of irrigation water and frequency of irrigation for various crops.  |
| C06                | Find the canal capacity, design the canal and compute the reservoir capacity.   |
| <b>Coarse Code</b> | <b>MATRIX METHOD OF STRUCTURAL ANALYSIS (Elective) - 18CV641</b>  |
| C01                | Evaluate the structural systems to application of concepts of flexibility and stiffness matrices for simple problems.   |
| C02                | Identify, formulate and solve engineering problems with respect to flexibility and stiffness matrices as applied to continuous beams, rigid frames and trusses.   |
| C03                | Identify, formulate and solve engineering problems by application of concepts of direct stiffness method as applied to continuous beams and trusses.  |
| C04                | Evaluate secondary stresses.  |
| <b>Coarse Code</b> | <b>SOLID WASTE MANAGEMENT (Elective) - 18CV642</b>  |
| C01                | 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.  |
| <b>Coarse Code</b> | <b>ALTERNATE BUILDING MATERIALS (Elective) - 18CV643</b>  |
| C01                | Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;  |
| C02                | Select appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression.   |
| C03                | 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. |
| C04                | 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>GROUND IMPROVEMENT TECHNIQUES (Elective) - 18CV644</b>   |
| CO1                | Give solutions to solve various problems associated with soil formations having less strength.  |

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| 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>RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS (Elective) - 18CV645</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, 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.  |
| <b>Coarse Code</b> | <b>REMOTE SENSING AND GIS (Elective) -18CV651</b>  |
| 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 the maticmaps for solving specific problems  |
| CO4                | Make decision based on the GIS analysis on thematic maps.  |
| <b>Coarse Code</b> | <b>TRAFFIC ENGINEERING(Elective) - 18CV652</b>   |
| 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 anappropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis.   |
| CO4                | Understand the basic knowledge of Intelligent Transportation System.   |
| <b>Coarse Code</b> | <b>OCCUPATIONAL HEALTH AND SAFETY (Elective) - 18CV653</b>   |
| CO1                | Identify hazards in the work place that poseadangeror threat to their safety or health, orthatofothers.  |
| 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   |
| <b>Coarse Code</b> | <b>SUSTAINABILITY CONCEPTS IN CIVIL ENGINEERING (Elective) - 18CV654</b>   |
| 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.                              |

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| CO4                | Make a decision in applying green engineering concepts and become a lifelong advocate of sustainability in society.   |
| <b>Coarse Code</b> | <b>SOFTWARE APPLICATION LABORATORY - 18CVL66</b>  |
| C01                | Use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work  |
| <b>Coarse Code</b> | <b>ENVIRONMENTAL ENGINEERING LABORATORY - 18CVL67</b>   |
| C01                | 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.   |
| <b>Coarse Code</b> | <b>EXTENSIVE SURVEY PROJECT - 18CVP68</b>   |
| C01                | 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   |
| <b>Coarse Code</b> | <b>QUANTITY SURVEYING AND CONTRACT MANAGEMENT - 18CV71</b>  |
| C01                | Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works.   |
| CO2                | Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works.   |
| CO3                | Prepare the specifications and analyze the rates for various items of work.   |
| CO4                | Assess contract and tender documents for various construction works.  |
| CO5                | Determine the externals of functional and solve the simple problem of the calculus of variations.   |
| <b>Coarse Code</b> | <b>DESIGN OF RCC AND STEEL STRUCTURES - 18CV72</b>  |
| C01                | 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>THEORY OF ELASTICITY (Elective-1) - 18CV731</b>  |
| C01                | 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  |
| <b>Coarse Code</b> | <b>AIR POLLUTION AND CONTROL (Elective-1) - 18CV732</b>   |
| C01                | Identify the major sources of air pollution and understand their effects on health and environment.   |

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| 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.  |
| <b>Coarse Code</b> | <b>PAVEMENT MATERIALS AND CONSTRUCTION (Elective-1) - 18CV733</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>GROUND WATER HYDRAULICS (Elective-1) - 18CV734</b>  |
| 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.   |
| <b>Coarse Code</b> | <b>MASONRY STRUCTURES (Elective-1) - 18CV735</b>   |
| CO1                | Select suitable material for masonry construction by understanding engineering properties.   |
| CO2                | Compute loads, load combinations and analyze the stresses in masonry.  |
| CO3                | Design masonry under compression (Axial load) for various requirements and conditions.   |
| CO4                | Design masonry under bending (Eccentric, lateral, transverse load) for various requirements and conditions.  |
| CO5                | Assess the behavior of shear wall and reinforced masonry.  |
| <b>Coarse Code</b> | <b>EARTHQUAKE ENGINEERING (Elective-2) -18CV741</b>  |
| 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.                             |
| <b>Coarse Code</b> | <b>DESIGN CONCEPT OF BUILDING SERVICES (Elective-2) - 18CV742</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>REINFORCED EARTH STRUCTURES (Elective-2) - 18CV743</b>  |
| CO1                | Identify, formulate reinforced earth techniques that are suitable for different soils and in different structures;   |

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| CO2                | Understand the laboratory testing concepts of Geo synthetics  |
| CO3                | Design RE retaining structures and Soil Nailing concepts  |
| CO4                | Determine the load carrying capacity of Foundations resting on RE soil bed.   |
| <b>Coarse Code</b> | <b>DESIGN OF HYDRAULIC STRUCTURES (Elective-2) - 18CV744</b>  |
| C01                | 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.  |
| <b>Coarse Code</b> | <b>URBAN TRANSPORT PLANNING (Elective-2) - 18CV745</b>  |
| C01                | 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.   |
| <b>Coarse Code</b> | <b>FINITE ELEMENT METHOD (Elective-3) -18CV751</b>  |
| C01                | The student will have the knowledge on advanced methods of analysis of structures.  |
| <b>Coarse Code</b> | <b>NUMERICAL METHODS AND APPLICATIONS (Elective-3) - 18CV752</b>  |
| C01                | 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. |
| <b>Coarse Code</b> | <b>ENVIRONMENTAL PROTECTION AND MANAGEMENT - (Elective-3)</b>   |
| C01                | 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 Organizations.  |
| <b>Coarse Code</b> | <b>COMPUTER AIDED DETAILING OF STRUCTURES - 18CVL76</b>   |
| C01                | Prepare detailed working drawings of Steel Structures   |
| CO2                | Prepare detailed working drawings of RCC Structures   |
| <b>Coarse Code</b> | <b>GEOTECHNICAL ENGINEERING LABORATORY -18CVL77</b>   |
| C01                | 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  |
| <b>Coarse Code</b> | <b>DESIGN OF PRE- STRESSECONCRETE - 18CV81</b>  |
| C01                | 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.   |

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| <b>Coarse Code</b> | <b>BRIDGE ENGINEERING (Elective-2) -18CV821</b>  |
| C01                | 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  |
| CO5                | Design Piers and abutments.  |
| <b>Coarse Code</b> | <b>PREFABRICATED STRUCTURES (Elective-2) -18CV822</b>  |
| C01                | Use modular construction, industrialized 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  |
| <b>Coarse Code</b> | <b>ADVANCED FOUNDATION ENGINEERING (Elective-2) - 18CV823</b>  |
| C01                | 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>REHABILITATION AND RETROFITTING (Elective-2) - 18CV824</b>  |
| C01                | Identify the causes for structural (Concrete) deterioration.   |
| CO2                | Assess the type and extent of damage and carry out damage assessment of structures through various types of tests.           |
| CO3                | Recommend maintenance requirements of the buildings and preventive measures against influencing factors.                     |
| <b>Coarse Code</b> | <b>PAVEMENT DESIGN (Elective-2) - 18CV825</b>  |
| C01                | Systematically generate and compile required data's for design of pavement (Highway & Airfield).                             |
| CO2                | Analyze stress, strain and deflection by boussinesq's, bur mister'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         |
| <b>Coarse Code</b> | <b>PROJECT WORK PHASE-2 - 18CVP83</b>  |
| C01                | Describe the project and be able to defend it.   |
| CO2                | Develop critical thinking and problem solving skills.  |
| CO3                | Learn to use modern tools and techniques.  |
| CO4                | Communicate effectively and to present ideas clearly and coherently both in written and oral forms.                          |
| CO5                | Develop skills to work in a team to achieve common goal.   |
| CO6                | Develop skills of project management and finance.  |
| CO7                | Develop skills of self learning, evaluate their learning and take appropriate actions to improve it.                         |
| CO8                | Prepare them for life-long learning to face the challenges and support the technological changes to meet the societal needs. |

| <b>Coarse Code</b> | <b>TECHNICAL SEMINAR - 18CVS84</b>   |
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| CO1                | Develop knowledge in the field of Civil Engineering and other disciplines through independent learning and collaborative study |
| CO2                | Identify and discuss the current, real-time issues and challenges in engineering & technology.                                 |
| CO3                | Develop written and oral communication skills.   |
| CO4                | Explore concepts in larger diverse social and academic contexts.   |
| CO5                | Apply principles of ethics and respect in interaction with others.   |
| CO6                | Develop the skills to enable life-long learning.   |
| <b>Coarse Code</b> | <b>INTERNSHIP /PROFESSIONAL PRACTICE - 18CVI85</b>   |
| CO1                | Students will get the field exposure and experience  |