

## CIVIL ENGINEERING

<b>Course Code</b>	<b>ELEMENTS OF CIVIL ENGINEERING AND MECHANICS - 15CIV13/23</b>
CO1	Know basics of Civil Engineering, its scope of study, knowledge about Roads, Bridges and Dams;
CO2	Comprehend the action of Forces, Moments and other loads on systems of rigid bodies;
CO3	Compute the reactive forces and the effects that develop as a result of the external loads;
CO4	Locate the Centroid and compute the Moment of Inertia of regular crosssections.
CO5	Express the relationship between the motion of bodies and
CO6	Equipped to pursue studies in allied courses in Mechanics.
<b>Course Code</b>	<b>ENVIRONMENTAL STUDIES - 15CIV18/15CIV28</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 abiotic 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>Course Code</b>	<b>STRENGTH OF MATERIALS - 15CV32</b>
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
<b>Course Code</b>	<b>FLUIDS MECHANICS - 15CV33</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>Course Code</b>	<b>BASIC SURVEYING - 15CV34</b>
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
<b>Course Code</b>	<b>ENGINEERING GEOLOGY - 15CV35</b>
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
<b>Course Code</b>	<b>BUILDING MATERIALS AND CONSTRUCTION - 15CV36</b>
CO1	Select suitable materials for buildings and adopt suitable construction techniques.
CO2	Adopt suitable repair and maintenance work to enhance durability of buildings.
<b>Course Code</b>	<b>MATERIALS TESTING LABORATORY - 15CVL37</b>
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.
<b>Course Code</b>	<b>BASIC SURVEYING PRACTICE - 15CVL38</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>Course Code</b>	<b>ANALYSIS OF DETERMINATE STRUCTURES - 15CV42</b>
CO1	Evaluate the forces in 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
<b>Course Code</b>	<b>APPLIED HYDRAULICS - 15CV43</b>
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, Compute water surface profiles at different conditions
CO4	Design turbines for the given data, and to know their operation characteristics under different Operating conditions
<b>Course Code</b>	<b>CONCRETE TECHNOLOGY - 15CV44</b>
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.
<b>Course Code</b>	<b>BASIC GEOTECHNICAL ENGINEERING - 15CV45</b>
CO1	Solving any practical problems related to Geotechnical properties of soils
CO2	Estimating the geostatical stresses
CO3	Solving practical problems related to consolidation settlement and time rate of settlement in soils

CO4	Communicating with other engineers (geotechnical engineers or non-geotechnical engineers) using the proper soil terminology.
CO5	Ability to solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same
<b>Course Code</b>	<b>ADVANCED SURVEYING - 15CV46</b>
CO1	Apply the knowledge of geomatic 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>Course Code</b>	<b>FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY (0:1:2) - 15CVL47</b>
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.
<b>Course Code</b>	<b>ENGINEERING GEOLOGY LABORATORY - 15CVL48</b>
CO1	The students able to identify the minerals and rocks and utilize them effectively in civil engineering practices.
CO2	The students will interpret and understand the geological conditions of the area for the Implementation of civil engineering projects.
CO3	The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
CO4	The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the presence of lineaments and other structural features for the given area
<b>Course Code</b>	<b>Design of RC Structural Elements - 15CV51</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>Course Code</b>	<b>ANALYSIS OF INDETERMINATE STRUCTURES - 15CV52</b>
CO1	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.
CO4	Construct the bending moment diagram for beams and frames using flexibility method
CO5	Analyze the beams and indeterminate frames by system stiffness method.
<b>Course Code</b>	<b>APPLIED GEOTECHNICAL ENGINEERING - 15CV53</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>Course Code</b>	<b>COMPUTER AIDED BUILDING PLANNING AND DRAWING - 15CV54</b>
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
<b>Course Code</b>	<b>AIR POLLUTION AND CONTROL - 15CV551</b>
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.
<b>Course Code</b>	<b>OCCUPATIONAL HEALTH AND SAFETY-15CV564</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>Course Code</b>	<b>GEOTECHNICAL ENGINEERING LAB - 15CVL57</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>Course Code</b>	<b>CONCRETE AND HIGHWAY MATERIALS LABORATORY - 15CVL58</b>
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.
<b>Course Code</b>	<b>CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP - 15CV61</b>
CO1	It gives a comprehensive knowledge to understand the construction management process.
CO2	It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.
CO3	It provides the student the sensitivity and global outlook in the contemporary world to Fulfil the professional obligations effectively.
<b>Course</b>	<b>DESIGN OF STEEL STRUCTURAL ELEMENTS - 15CV62</b>

<b>Code</b>	
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.
CO5	Understand the Concept of Design of laterally supported and un-supported steel beams.
<b>Course Code</b>	<b>WATER SUPPLY AND TREATMENT ENGINEERING - 15CV64</b>
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.
<b>Course Code</b>	<b>ALTERNATIVE BUILDING MATERIALS - 15CV651</b>
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.
<b>Course Code</b>	<b>WATER RESOURCES MANAGEMENT - 15CV661</b>
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.
CO4	Understand the legal issues of water policy.
CO5	Select the method for water harvesting based on the area.
<b>Course Code</b>	<b>SOFTWARE APPLICATION LAB - 15CVL67</b>
CO1	Use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work
<b>Course Code</b>	<b>EXTENSIVE SURVEY PROJECT /CAMP - 15CVL68</b>
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 behavioural 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>Course</b>	<b>DESIGN OF RCC AND STEEL STRUCTURES - 15CV72</b>

<b>Code</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>Course Code</b>	<b>HYDROLOGY AND IRRIGATION ENGINEERING - 15CV73</b>
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
<b>Course Code</b>	<b>URBAN TRANSPORTATION AND PLANNING - 15CV751</b>
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.
<b>Course Code</b>	<b>ENVIRONMENTAL ENGINEERING LABORATORY - 15CVL76</b>
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.
<b>Course Code</b>	<b>COMPUTER AIDED DETAILING OF STRUCTURES - 15CVL77</b>
CO1	Prepare detailed working drawings
<b>Course Code</b>	<b>QUANTITY SURVEYING AND CONTRACTS MANAGEMENT – 15CV81</b>
CO3	Prepare detailed and abstract estimates for roads and building
CO4	Prepare valuation reports of buildings
CO5	Interpret Contract document's of domestic and international construction works
<b>Course Code</b>	<b>DESIGN OF PRE STRESSED CONCRETE ELEMENTS – 15CV82</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>COURSE CODE</b>	<b>EARTHQUAKE RESISTANT DESIGN OF STRUCTURES – 15CV831</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>COURSE CODE</b>	<b>HYDRAULIC STRUCTURES – 15CV832</b>
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
<b>COURSE CODE</b>	<b>PAVEMENT DESIGN – 15CV833</b>
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.
<b>COURSE CODE</b>	<b>Advanced Foundation Design - 15CV834</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