



Department of civil Engineering

Syllabus R-16 Regulations

Program Outcomes (POs), Program Specific outcomes (PSOs), Course Outcomes (COs) and CO-PO mapping

POs & PSOs

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: : Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1: Analyse civil engineering problems and apply to real time engineering practice and/or research field.

PSO2: Achieve expertise in design and analysis of civil engineering structures that are based on functionality, safety, economy, serviceability and aesthetics.

Year - Sem	Course	CO. NO	Course Outcomes
I-I	English – I	C111.1	Distinguish social contexts as well as debatable issues of Indian society
		C111.2	Explain the importance of the great cause in spite of disparities and inequalities with special emphasis on communication abilities.
		C111.3	Appraise renowned personalities and examine gender discrimination with emphasis on writing skills.
		C111.4	Justify environmental sustainability and racial issues along with discussions and structured talks.
		C111.5	Illustrate strategies for success and self-esteem through reading skills.
		C111.6	Focused practice of language skills.
I-I	Mathematics - I	C112.1	Analyze the nature of sequence and series.
		C112.2	Apply the concepts of mean value theorems.
		C112.3	Solve linear ordinary differential equations of first order and first degree.
		C112.4	Solve linear ordinary differential equations of higher order and its applications.
		C112.5	Calculate total derivative, Jacobian and maxima/minima of function of two variables.
		C112.6	Find areas and volumes using double and triple integrals.
I-I	Engineering Chemistry	C113.1	Enumerate the uses of polymeric materials.
		C113.2	Describe electrochemical cells, corrosion and its control methods.
		C113.3	Outline the commonly used industrial materials.
		C113.4	Distinguish solid, liquid and gaseous fuels.
		C113.5	Summarize water purification techniques.
		C113.6	Understand nano materials.
I-I	Engineering Mechanics	C114.1	Solve the unknown forces and the orientations of rigid bodies with friction.
		C114.2	Analyze the system of forces using equations of equilibrium.
		C114.3	Determine the Centroid of composite sections and bodies.
		C114.4	Determine the Moment of Inertia of composite sections and bodies.
		C114.5	Discuss the behavior of moving bodies in rectilinear and curvilinear motion using kinematic equations or motion curves.
		C114.6	Analyze the motion of rigid bodies using Work- Energy and impulse- momentum methods.
I-I	Computer Programming	C115.1	Explain the fundamentals of C language, primary data types, operators and numbering system.
		C115.2	Explain selection, decision making and repetition concepts with respect to C.
		C115.3	Apply derived datatypes in C language.
		C115.4	Describe the concepts of pointers and processor commands in C.
		C115.5	Illustrate functions, various I/O file concepts using C language.
		C115.6	Explain primary data types, operators and numbering system.

I-I	Environmental Studies	C116.1	Understand the scope, structure and function of ecosystem as well as the importance of sustainability and natural resources.
		C116.2	Identify various environmental challenges induced due to unplanned anthropogenic activities.
		C116.3	Illustrate the need of conservation practices and remedial solutions for the adverse effects of pollution.
		C116.4	Obtain knowledge about pollution in the environment and prevention methods of pollution in the environment.
		C116.5	Know the social issues of the environment and various environmental protection acts.
		C116.6	Obtain the knowledge about environmental management, for getting safe environment.
I-I	Engineering /Applied Chemistry Laboratory	C117.1	Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C117.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C117.3	Determine the strength of unknown solutions by using different types of volumetric titrations like acid base, redox and complexometric titrations.
		C117.4	Apply the acquired knowledge of electro chemistry to conduct experiments like conductometric, potentiometric and PH metric titrations.
I-I	English - Communication Skills Lab - I	C118.1	Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C118.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C118.3	Make a presentation effectively with confidence, clarity, and conviction and also comprehend and apply the techniques of group discussion
		C118.4	Participate and face the interviews dexterously by grooming personal etiquette.
I-I	Computer Programming Lab	C119.1	Plan solution for a problem and writing a program by understanding the various data types and the conditional statements
		C119.2	Plan a solution for a problem and writing a program by understanding repetitive statements i.e., loops and arrays with different dimensions
		C119.3	Plan a solution for a problem and writing a program by understanding how to access the address locations of a variables using pointers and how the problem can be divided into sub functions to reduce the complexity
		C119.4	Plan a solution for a problem and writing a program by understanding the structures and unions and to access the data from files
II-I	Probability and statistics	C211.1	Differentiate discrete and continuous random variable
		C211.2	Examine the binomial, Poisson and normal distributions
		C211.3	Discuss Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters
		C211.4	Test the hypothesis of few unknown statistical parameters.
		C211.5	Analyze correlation and regression.
		C211.6	Prepare Control Charts using X-bar, P, R Charts

II-I	Basic electrical and electronics engineering	C212.1	Analyze the various electrical networks.
		C212.2	Explain the operation of DC generators, 3-point starter and conduct the Swinburne's Test
		C212.3	Analyze the performance of transformer.
		C212.4	Explain the operation of 3-phase alternator and 3-phase induction motors.
		C212.5	Analyze the operation of half wave, full wave rectifiers and OP-AMPs.
		C212.6	Explain the single stage CE amplifier and concept of feedback amplifier.
II-I	Strength of materials-I	C213.1	Explain the materials behavior under the influence of external loading conditions and the support conditions.
		C213.2	Measuring deflections in beams under various loading and support conditions.
		C213.3	Calculate slope and deflection of beams and trusses using energy theorems
		C213.4	Explain the mechanism of load transfer in beams, the induced stress resultants and deformations
		C213.5	Determine the stresses due to unsymmetrical bending and various theories for failure of material.
		C213.6	Discuss the behavior of columns, beams and failure of materials.
II-I	Building materials and construction	C214.1	Identify different building materials.
		C214.2	Differentiate brick masonry, stone masonry construction.
		C214.3	Use of lime and cement in various constructions.
		C214.4	Describe the various components of a building.
		C214.5	Discuss the requirement of good paint.
		C214.6	Tests on fine and coarse aggregates
II-I	Surveying	C215.1	Explain the compass surveying.
		C215.2	Measure the meridian angles.
		C215.3	Use of the contour.
		C215.4	Discuss the Theodolite survey.
		C215.5	Explain the total situation.
		C215.6	Calculate the irregular boundaries.
II-I	Fluid mechanics	C216.1	Explain the various properties of fluids and their influence on fluid motion.
		C216.2	Calculate the forces that act on submerged planes and curves.
		C216.3	Explain Euler's and Bernoulli's equations for flow.
		C216.4	Analyze laminar and turbulent flows.
		C216.5	Derive an expression for discharge over Notches and weirs.
		C216.6	Describe the following of displacement, momentum and energy thickness of a boundary layer.
II-I	Survey Field Work - I	C217.1	Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C217.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C217.3	Conduct survey of a given area with the help of Chain, Compass and Plane table.
		C217.4	Conduct survey of a given area with the help of Levelling instruments.

II-I	Strength of Materials Lab	C218.1	Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C218.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C218.3	Conduct experiments on mild steel and wood to find mechanical properties with the help of UTM.
		C218.4	Conduct experiments on mild steel to find mechanical properties with the help of Spring, Impact machine, Hardness machine and Torsion testing machine.
II-I	Professional Ethics & Human Values	C219.1	Understand ethical values followed by an engineer by using moral development theories
		C219.2	Discuss the role of an engineer to maintain safety in social experimentation
		C219.3	Recognize ethical issues in globalization and research
III-I	Management science	C311.1	Describe different concepts of management
		C311.2	Apply Quality Control, Work-study principles in real life industry
		C311.3	Explain HRM process and Marketing strategies
		C311.4	Analyze different Project Management techniques
		C311.5	Design and evaluate different strategic management concepts
		C311.6	Describe Strategic Management through contemporary management practices
III-I	Engineering geology	C312.1	Explain the Weathering of rocks
		C312.2	Identify the geological minerals and rocks
		C312.3	Express the geological rock structures
		C312.4	Analyses the ground conditions through geographical surveys
		C312.5	Explain the types of earthquakes and geophysics
		C312.6	Define the geological Dams, Reservoirs and Tunnels
III-I	Structural analysis -II	C313.1	Explain the types of arches
		C313.2	Differentiate Determinate and Indeterminate Structures
		C313.3	analysis of lateral Load structures
		C313.4	Analyse structures using Moment Distribution method
		C313.5	Analyse structures using Kani's Method
		C313.6	Analyse structures using Matrix methods
III-I	Design & drawing of reinforced concrete structures	C314.1	Apply the relevant IS codes
		C314.2	Analysis and design of flexural members and detailing
		C314.3	Design structures subjected to shear, bond and torsion
		C314.4	Design of one way & two-way slabs
		C314.5	Design the type of compression members
		C314.6	Design the types of footings

III-I	transportation engineering –II	C315.1	Identify the components of railway engineering.
		C315.2	Design geometric in a railway track.
		C315.3	Classify Modern signalling installation.
		C315.4	Explain the geometric design of runway.
		C315.5	Discuss the rehabilitation of airfield pavements.
		C315.6	Define dredging and maintenance of ports and harbour.
III-I	Concrete Technology Lab	C316.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C316.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C316.3	Conduct experiments to determine the properties of cement and aggregates.
		C316.4	Conduct experiments to determine the properties of fresh and hardened concrete.
III-I	Geology Lab	C317.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C317.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C317.3	Examine and identify minerals and rocks.
		C317.4	Interpret geological structural models and solve simple structural geological problems.
III-I	Transportation Engineering Lab	C318.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C318.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C318.3	Conduct experiments and evaluate the properties of pavement materials.
		C318.4	Conduct traffic volume studies and calculate earthwork for road construction.
IV-I	Environmental engineering -II	C411.1	Design the sewerage system.
		C411.2	Select the appropriate appurtenances in the sewerage system.
		C411.3	Design a suitable treatment system for sewage treatment.
		C411.4	Identify the critical pollution in a river.
		C411.5	Select a suitable disposal method with respect to effluent standards.
		C411.6	Explain the bio solids.
V-I	Water resource engineering-II	C412.1	Estimate the irrigation water requirements
		C412.2	Design irrigation canals and canal network
		C412.3	Design and plan diversion head works
		C412.4	Analyze stability of gravity and earth dams
		C412.5	Design ogee spillways and energy dissipation works
		C412.6	Design irrigation canal structures

V-I	Geotechnical engineering-ii	C413.1	Explain the shallow foundations and theories
		C413.2	Discuss Earth retaining structures
		C413.3	Explain the types of shallow foundations
		C413.4	Define Load carrying capacity of piles based on static pile
		C413.5	Determine the staining thickness and plug
		C413.6	Design piles based on the principles of bearing capacity
V-I	Remote sensing & GIS applications	C414.1	Explain the Basic concepts of remote sensing and electromagnetic radiation
		C414.2	Describe the elements of visual interpretations
		C414.3	Express the raster data models, vector data models.
		C414.4	Analyses the vector overlay operations, raster overlay operations
		C414.5	Explain the Land cover and land use, agriculture
		C414.6	Define the Flood zoning and mapping, groundwater prospects
V-I	Air pollution & control	C415.1	Analysis of air pollution
		C415.2	Estimate carbon credits for day-to-day activities
		C415.3	Explain properties of atmosphere
		C415.4	Decide ambient air quality based on analysis of air pollution
		C415.5	Design particulate and gaseous control measures for an industry
		C415.6	Judge the plume behaviour in prevailing environmental conditions
V-I	Environmental impact assessment & management	C416.1	Prepare EMP, EIS, and EIA report
		C416.2	Identify the risks and impacts of a project
		C416.3	Selection of an appropriate EIA methodology
		C416.4	Evaluation the EIA report
		C416.5	Estimate the cost benefit ratio of a project
		C416.6	Illustrate the role of stakeholder and public Participation in the preparation of EIA project
V-I	IPR & patents	C417.1	Explain different types of intellectual property rights.
		C417.2	Describe laws related to copyrights
		C417.3	Explain Patent Laws national and international contexts.
		C417.4	Describe Trademark Registration process with needed maintenance measures
		C417.5	Explain different trade secret protection mechanisms
		C417.6	Identify cyber laws to protect against cybercrimes.
V-I	Irrigation design & drawing	C418.1	Design the surplus weir
		C418.2	Describe the Tank sluice with a tower head
		C418.3	Explain the Canal drop- Notch type
		C418.4	Design the canal regulator
		C418.5	Express the types of tunnels
		C418.6	Design the syphon aqueduct type III

V-I	GIS & CAD La	C419.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the
		C419.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C419.3	Extract map features by digitization and develop elevation model using GIS software.
		C419.4	Develop Model, Analyse and Design Structures subjected to different types of loads.
I-II	English – II	C121.1	Leads to simple life and service to the nation
		C121.2	Promote peaceful co-existence and universal harmony among people and society.
		C121.3	Imparts to manage different cultural shocks due to globalization
		C121.4	Highlights insightful commentary on cultural traditions
		C121.5	Contribute to science and technology, and strengthen the nation.
		C121.6	Develop the technology for the betterment of human life
I-II	Mathematics – II (Mathematical Methods)	C122.1	Apply matrix techniques to solve system of linear equations.
		C122.2	Compute various powers of a matrix and identify the nature of the quadratic form.
		C122.3	Identify the nature of the quadratic form.
		C122.4	Solve algebraic and transcendental equations using numerical methods.
		C122.5	Compute interpolating polynomial for the given data
		C122.6	Solve ordinary differential equations using numerical methods
I-II	Mathematics – III	C123.1	Extend calculus to vector functions
		C123.2	Determine Laplace transforms, inverse Laplace transforms and solve linear ODEs.
		C123.3	Calculate the Fourier series and Fourier transforms for certain functions.
		C123.4	Solve the linear and non-linear partial differential equations.
		C123.5	Identify solution methods for partial differential equations that model physical processes.
		C123.6	Learn interpret vector integral theorems.
I-II	Engineering Physics	C124.1	Identify forces and moments in mechanical systems and study different types of harmonic oscillatory motions
		C124.2	Analyse acoustic properties in concert halls and flaw detection techniques using ultrasonics.
		C124.3	Classify the types of elastic moduli and derive their relation.
		C124.4	Illustrate different types of laser systems, sensors and their applications.
		C124.5	Study different types of harmonic oscillatory motions
		C124.6	Explain the concepts of magnetic, dielectric materials and their applications.
I-II	Elements of Mechanical Engineering	C125.1	Determine stress/strain of a mechanical component subjected to loading
		C125.2	Draw the shear force and bending moment diagrams
		C125.3	Analyse thick and thin cylindrical shells
		C125.4	Find the performance of components like Boiler and Compressor
		C125.5	Find the performance of I.C. Engine
		C125.6	Find the mechanical component suitable for the required power transmission

I-II	Engineering Drawing	C126.1	Construct the polygons, curves and scales using different methods.
		C126.2	Draw the orthographic projections of a points, a line inclined to one plane.
		C126.3	Draw the orthographic projections of lines inclined to both the planes.
		C126.4	Draw the projections of a plane inclined to one and both the reference plane.
		C126.5	Draw the projections of simple solids with axis inclined to one and both the reference plane.
		C126.6	Convert the isometric view into orthographic views & vice versa and Draw 2D, 3D objects using Auto CAD.
I-II	English - Communication Skills Lab - II	C127.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C127.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C127.3	Make a presentation effectively with confidence, clarity, and conviction and also comprehend and apply the techniques of group discussion.
		C127.4	Participate and face the interviews dexterously by grooming personal etiquette.
I-II	Engineering /Applied Physics Lab	C128.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C128.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C128.3	Determine the optical parameters using interference and diffraction, observe the frequency response curve in LCR circuit, I-V characteristics of zener diode and the variation of magnetic field along the axis of circular coil.
		C128.4	Find the mechanical properties of solids and understand the resonance phenomenon using sonometer and volume resonator.
I-II	Engg. Workshop & IT Workshop	C129.1	hands-on practice on basic engineering trades and skills.
		C129.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C129.3	Understand the basic components and peripherals of a computer.
		C129.4	Acquire knowledge about the netiquette and cyber hygiene.
II-II	Building Planning & Drawing	C221.1	Define Building Byelaws and Regulations.
		C221.2	Explain Minimum standards for various parts of buildings.
		C221.3	Describe Public Buildings.
		C221.4	Examine the Sign Conventions and Bonds.
		C221.5	Sketch the Doors, Windows, Ventilators and Roofs.
		C221.6	Prepare a Plan and Designing of Buildings.

II-II	Strength of Materials - II	C222.1	Explain the Principal stresses developed in a axis and design the sections
		C222.2	Discuss the stresses in engineering applications like shafts, springs, columns and struts subjected to loading conditions.
		C222.3	Identify the forces behaviour of in different types of trusses used in construction.
		C222.4	calculate combined effect of direct and bending stresses on different engineering structures.
		C222.5	Explain the unsymmetrical bending in beams Location of neutral axis Deflection of beams under unsymmetrical bending.
		C222.6	Determination of Forces in members of plane pin-jointed perfect trusses by different methods.
II-II	Hydraulics & Hydraulic Machinery	C223.1	Describe the uniform flow and non-uniform flow in open channel flow
		C223.2	Examines the principals of dimensional analysis
		C223.3	State the most economical sections
		C223.4	Summarize the Angular momentum principal
		C223.5	Design the Francis turbine and Kaplan turbine
		C223.6	Classify the various types of Pumps
II-II	Concrete Technology	C224.1	Explain the Concrete production and Properties of concrete
		C224.2	Describe the importance of quality of concrete.
		C224.3	Analyse the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
		C224.4	Test the fresh concrete properties and the hardened concrete properties
		C224.5	Design the concrete mix by BIS method.
		C224.6	Discuss about special concrete and their production and applications.
II-II	Structural Analysis - I	C225.1	Analyse the propped cantilevers
		C225.2	Analyse the indeterminate structures.
		C225.3	Analyse the continuous beams using various methods like three moment method, slope deflection method, energy theorems.
		C225.4	Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure.
		C225.5	Analyse the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.
		C225.6	Sketch the influence line diagrams for various types of moving loads on beams/bridges.
II-II	Transportation Engineering - I	C226.1	Explain the highway network for a given area.
		C226.2	Determine Highway alignment and design highway geometrics.
		C226.3	Design Intersections and prepare traffic management plans.
		C226.4	Identify the different highway construction materials.
		C226.5	Judge suitability of pavement materials and design flexible and rigid pavements
		C226.6	Discuss the Construction and Maintenance of highways

II-II	FM & HM Lab	C227.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C227.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C227.3	Conduct experiments, interpret data and arrive at conclusions related to fluid mechanics.
		C227.4	Conduct experiments, interpret data and arrive at conclusions related to hydraulic & hydraulic machinery.
II-II	Survey Field Work - II	C228.1	Compile the data, organize and analyse it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C228.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C228.3	Conduct survey of a given area with the help of Theodolite.
		C228.4	Conduct survey of a given area with the help of Total station.
II-II	Managerial Economics & Financial Analysis	C229.1	Describe optimum utilization of available resources in the business concern.
		C229.2	Explain the production function techniques and cost concepts for decision making
		C229.3	Distinguish different markets for price and output determination, Describe the different forms of business
		C229.4	Prepare Financial statements and the usage of various accounting tools for analysis.
		C229.5	Appraise various investment project proposals with the help of capital budgeting techniques for decision making.
III-II	Design & Drawing of Steel Structures	C321.1	Apply the relevant IS codes
		C321.2	Analysis and design of flexural members and detailing
		C321.3	Design tension, compression members of different types with connection detailing
		C321.4	Design the types of column bases
		C321.5	Design Plate Girder and Gantry Girder with connection detailing
		C321.6	Prepare the drawings pertaining to different components of steel structures
III-II	Geotechnical Engineering – I	C322.1	Derive the relation between Bulk Density, degree of saturation and void ratio.
		C322.2	Explain the procedure to conduct the hydrometer test on a soil sample.
		C322.3	Derive the expression to capillary rise in a soil deposit.
		C322.4	Derive the Boussinesq and Westergaard theories.
		C322.5	Explain the spring analogy of consolidation with neat sketch.
		C322.6	Explain the three standard triaxial shear tests with respect to drainage conditions.
III-II	Environmental Engineering -I	C323.1	Estimation of water demand for a town
		C323.2	Identify the water sources and proper intake structure.
		C323.3	Explain the characteristics of water
		C323.4	Select the suitable treatment flow for raw water treatments.
		C323.5	Explain the minor methods for disinfection of water.
		C323.6	Discuss different types of distribution layouts.

III-II	Water Resource Engineering -I	C324.1	Explain the hydrologic cycle and its relevance to Civil engineering
		C324.2	Define the Evaporation, Evapotranspiration, Infiltration.
		C324.3	Determine storage capacity and life of reservoirs and develop unit hydrograph and synthetic hydrographs
		C324.4	Estimate flood magnitude and carry out flood routing.
		C324.5	Show the aquifer parameters and yield of wells.
		C324.6	Analyze the Advanced Topics in Hydrology.
III-II	Waste water Management	C325.1	Explain the quality and quantity requirements of industrial water
		C325.2	Describe the removal of iron in wastewater
		C325.3	Discuss in detail the characterization of wastewater as per physical and chemical methods
		C325.4	Define the term oxygen sag curve and derive the equation of the same
		C325.5	Identify Various Industries Producing Wastewater and Suggest Appropriate Disposal Method for Each of Them.
		C325.6	Estimation of water demand for a distiller's industry
III-II	Geotechnical Engineering Lab	C326.1	Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C326.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C326.3	Conduct the experiments on assessment on index properties and grain size distribution of soils.
		C326.4	Conduct the experiments on engineering properties of soils.
III-II	Environmental Engineering Lab	C327.1	Compile the data, organize and analyze it for discussion and report the findings and observations from experimental learning activities in the laboratory.
		C327.2	Build holistic development and pleasing disposition by reviewing and correcting the performance to become independent and autonomous thinker.
		C327.3	Conduct the experiments for physical and chemical parameters of water.
		C327.4	Conduct the experiments on water for biological parameters.
III-II	Computer Aided Engineering Lab	C328.1	Draw the Projection of solids inclined to both planes & sectional views of solids
		C328.2	Develop the surfaces of solids & draw the interpenetration curve of two solids
		C328.3	Develop isometric view from orthographic views and vice-a-versa and draw the Perspective Projections of points, lines, planes and simple solids
		C328.4	Apply various commands in Auto CAD to create 2D and 3D wire frame models
		C328.5	Use the commands like save, restore, delete, joint, single option and evaluate the paper space environment.
		C328.6	Generate models of solids, Machines & Machine parts
IV-II	Estimation Specification & Contracts	C421.1	Recall various specifications and components of the buildings
		C421.2	Determine the quantities of components of the buildings
		C421.3	Calculate the rate analysis of quantities of the building components.
		C421.4	Estimate the cost of various building components and finalizing the value of structures.
		C421.5	Estimate the quantity of earth work for roads and canals
		C421.6	Determine the rent fixation and valuation of the properties

IV-II	Construction Technology & Management	C422.1	Discuss the concepts of project planning
		C422.2	Estimate the project evaluation and review technique
		C422.3	Describe the compaction equipment
		C422.4	Explain the functioning of various earth moving equipment's
		C422.5	Classify the consolidation and finishing
		C422.6	Explain different types of form work
IV-II	Prestressed Concrete	C423.1	Analyse the elements of prestressing
		C423.2	Explain the systems and devices used in prestressing
		C423.3	Estimate effective prestress including the short term and long-term deflections
		C423.4	Discuss the losses of prestress including short- and long-term losses
		C423.5	Design prestressed concrete beams under flexural and shear and torsion
		C423.6	Apply the relevant IS Codal provisions for prestressed concrete
IV-II	Solid and Hazardous Waste Management	C424.1	Discuss about soil waste management
		C424.2	State principles of solid waste management and Collection of Solid Waste
		C424.3	Explain transfer and transport operations of solid waste
		C424.4	Analyse Processing and Treatment of waste
		C424.5	Derive the Methods of Disposal waste
		C424.6	Examine the Hazardous Waste Management and E-waste
IV-II	Seminar on Internship Project	C425.1	Discuss about technical Knowledge of their selected domain.
		C425.2	Describe Problem Identification formulation and solution by collecting data using various modern tools
		C425.3	Express the solutions in aspect of society, environment and economy
		C425.4	Summarize Seminar report preparation in standard format
		C425.5	Illustrate the skills in preparing technical presentation
		C425.6	Analyze the knowledge, skills and attitudes of a professional Engineer.
IV-II	Project	C426.1	Apply the Knowledge of Various Engineering Courses to Come out Solutions.
		C426.2	Apply the appropriate modern tools to execute the project work
		C426.3	Practical Knowledge of the Various Techniques of Construction
		C426.4	Learn about Design Parameter through Different Software's.
		C426.5	Validate theoretical and reported data with results obtained from numerical/experimental/ analytical study
		C426.6	Use Various Techniques, Engineering Knowledge and Skill, and Modern Engineering Tools necessary for Planning analysis and designing of various engineering projects.
		C426.7	Carry out review of existing literature in line with the assigned topic
		C426.8	Identify scope of future studies
		C426.9	Know the professional and ethical responsibilities
		C426.10	Prepare project report in standard format

I-I	Environmental Studies	C116.1	1					2	3								
		C116.2	1					2	3								
		C116.3	1					2	3								
		C116.4	3	2													
		C116.5	3	2													
		C116.6	3	2				2	3								
I-I	Engineering /Applied Chemistry Laboratory	C117.1								2	1						
		C117.2							2	2	1						
		C117.3				3				2							
		C117.4				3				2							
I-I	English - Communication Skills Lab - I	C118.1								2	3						
		C118.2						2	2	3							
		C118.3							2	3							
		C118.4							2	3							
I-I	Computer Programming Lab	C119.1	2	3							2	2			1		
		C119.2	2	3							2	2			1		
		C119.3	2	3							2	2			1		
		C119.4	2	3							2	2			1		
II-I	Probability and statistics	C211.1	3													3	
		C211.2	3													3	
		C211.3	3													3	
		C211.4	3	3												3	
		C211.5	3	3												3	
		C211.6	3		3											3	
II-I	Basic electrical and electronics engineering	C212.1		3									2	2			
		C212.2					3						2	2			
		C212.3		3									2	2			
		C212.4					3						2	2			
		C212.5		3									2	2			
		C212.6					3						2	2			

II-I	Strength of materials-I	C213.1	2	3											3			
		C213.2	2	3												3		
		C213.3	2	3												3		
		C213.4	2	3												3		
		C213.5	2	3												3		
		C213.6	2	3												3		
II-I	Building materials and construction	C214.1	2											2	2			
		C214.2	2													2		
		C214.3	2						3								2	
		C214.4	2						2					2	2			
		C214.5	2														2	
		C214.6	2	3					3									2
II-I	Surveying	C215.1		2												3		
		C215.2	3	2													3	
		C215.3					2							2	3			
		C215.4		2													3	
		C215.5					3							3	3			
		C215.6	3	3			2										3	
II-I	Fluid mechanics	C216.1	2													3		
		C216.2	1	2										2	3			
		C216.3	2														3	
		C216.4		3														3
		C216.5				2												3
		C216.6	1															3
II-I	Survey Field Work - I	C217.1								2	3	2						
		C217.2				3					3						2	
		C217.3				3						3						2
		C217.4								2	3	2						
II-I	Strength of Materials Lab	C218.1									3	2						
		C218.2							2	3	2							
		C218.3				3					3						2	
		C218.4				3					3						2	

II-I	Professional Ethics & Human Values	C219.1						2		3				1			
		C219.2						2		3				1			
		C219.3						2		3				1			
III-I	Management science	C311.1						3				3	3	3			
		C311.2		2				3				3	3	3			
		C311.3		2				3				3	3	3			
		C311.4		2				3				3	3	3			
		C311.5			3			3				3	3	3	3		
		C311.6		2				3				3	3	3			
III-I	Engineering geology	C312.1							2				2	3			
		C312.2							2				2	3			
		C312.3							2				2	3			
		C312.4		3			2						3	3			
		C312.5					2		3				3	3			
		C312.6							3				3	3			
III-I	Structural analysis -II	C313.1		2										3			
		C313.2		2									2	3			
		C313.3	1	3											3		
		C313.4	1	3											3		
		C313.5	1	3											3		
		C313.6	1	3											3		
III-I	Design & drawing of reinforced concrete structures	C314.1								3				3	3		
		C314.2	2	2	3										3	3	
		C314.3	1	2	3									2	3	3	
		C314.4	1	2	3									2	3	3	
		C314.5	1	2	3									2	3	3	
		C314.6	1	2	3									2	3	3	

III-I	transportation engineering –II	C315.1													3	
		C315.2	1	2	3					2				2	3	3
		C315.3					3							3	3	
		C315.4	1	2	3			1		2					3	3
		C315.5	1	2	2		3							3	3	3
		C315.6		2			3		2					3	3	3
III-I	Concrete Technology Lab	C316.1								3	2					
		C316.2								2	3	2				
		C316.3				3					3				2	
		C316.4				3					3				2	
III-I	Geology Lab	C317.1								3	2					
		C317.2								2	3	2				
		C317.3				3					3				2	
		C317.4				3					3				2	
III-I	Transportation Engineering Lab	C318.1								3	2					
		C318.2								2	3	2				
		C318.3				3					3				2	
		C318.4				3					3				2	
IV-I	environmental engineering -II	C411.1	2	3	3			2							3	3
		C411.2	2					2	2					2	3	
		C411.3	2	3	3			2	3					3	3	3
		C411.4	2	3				3	3					2	3	
		C411.5	2	2	2			2	2					2	3	2
		C411.6	2					2	2						3	
V-I	Water resource engineering-II	C412.1	1	3				2							3	
		C412.2	1		3			2	2						3	3
		C412.3	1		3										3	3
		C412.4	1	3										2	3	
		C412.5	1		3										3	3
		C412.6	1		3		2							2	3	3

V-I	Geotechnical engineering-ii	C413.1					2						1	3		
		C413.2		2			2							2	3	
		C413.3					2								3	
		C413.4	1												3	
		C413.5	1	2											3	
		C413.6	1	2	3									2	3	3
V-I	Remote sensing & GIS applications	C414.1					3							3	3	
		C414.2					3							3	3	
		C414.3					3							3	3	
		C414.4		3			3							3	3	
		C414.5					3	2						3	3	
		C414.6					3	2						3	3	
V-I	Air pollution & control	C415.1	1	3				2	3					2	3	
		C415.2	1	3			2	3	3						3	
		C415.3		2				3	3					2	3	
		C415.4	1	3				2	3						3	
		C415.5	1	2	3			2	3					3	3	3
		C415.6		3			3	3	3					2	3	2
V-I	Environmental impact assessment & Management	C416.1		3				3	3					2	3	
		C416.2		3			2	3	3						3	
		C416.3		2	2				3					2	3	
		C416.4		2	2			2	3						3	
		C416.5		2					3			3	3	3	3	3
		C416.6						3						2	3	2
V-I	IPR & patents	C417.1		2				3		3				3	3	
		C417.2		2				3		3				3	3	
		C417.3		2				3		3				3	3	
		C417.4		2				3		3				3	3	
		C417.5		2				3		3				3	3	
		C417.6		2				3		3				3	3	

I-II	Elements of Mechanical Engineering	C125.1	3	3				3					1		3		
		C125.2	3	3				3						1		3	
		C125.3	3	3				3						1		3	
		C125.4	3	3				3						1		3	
		C125.5	3	3				3						1		3	
		C125.6	3	3				3						1		3	
I-II	Engineering Drawing	C126.1	2	3		1											
		C126.2	2	3		1											
		C126.3	2	3		1											
		C126.4	2	3		1											
		C126.5	2	3		1											
		C126.6	2	3		1											
I-II	English - Communication Skills Lab - II	C127.1				3					3	3	2				
		C127.2				3					3	3	2				
		C127.3				3					3	3	2				
		C127.4				3					3	3	2				
I-II	Engineering /Applied Physics Lab	C128.1									2	1					
		C128.2								2	2	1					
		C128.3				3					2						
		C128.4				3					2						
I-II	Engg. Workshop & IT Workshop	C129.1	3	3	2	2					3				3		
		C129.2	3	3	2	2					3				3		
		C129.3	3	2													
		C129.4	2	3													
II-II	Building Planning & Drawing	C221.1								2				2	2		
		C221.2								2				2	3		
		C221.3						1							2		
		C221.4													2		
		C221.5			2			1							2		
		C221.6			3		2	2							2	3	3

II-II	Strength of Materials - II	C222.1	1	2	3									3	2	
		C222.2	1	2											2	
		C222.3		2									2		2	
		C222.4	1	3											3	
		C222.5											2		3	
		C222.6	1	3									2		3	
II-II	Hydraulics & Hydraulic Machinery	C223.1						1						3		
		C223.2	1	3										3		
		C223.3		1									2		2	
		C223.4													2	
		C223.5	1		3										3	3
		C223.6		2			1		1				2		3	
II-II	Concrete Technology	C224.1	1	1										2		
		C224.2		2										2		
		C224.3		3				2						3		
		C224.4	1	2										3		
		C224.5	1		3								2		3	3
		C224.6		2			2		2				3		3	
II-II	Structural Analysis - I	C225.1	1	3										3		
		C225.2	1	3										3		
		C225.3	1	3										3		
		C225.4	1	3										3		
		C225.5	1	3										3		
		C225.6			2										3	1
II-II	Transportation Engineering - I	C226.1		2				2						3		
		C226.2	1	3	3			2						3	3	
		C226.3	1	2	3			2					2		3	3
		C226.4											3		3	
		C226.5	1	2	3								2		3	3
		C226.6		2				2					3		3	
II-II	FM & HM Lab	C227.1								3	2					
		C227.2							2	3	2					
		C227.3				3					3				2	
		C227.4				3					3				2	

II-II	Survey Field Work - II	C228.1									3	2					
		C228.2								2	3	2					
		C228.3				3						3					2
		C228.4				3	2					3					2
II-II	Managerial Economics & Financial Analysis	C229.1	2	1							2		3				
		C229.2	2	1							2		3				
		C229.3	2	1							2		3				
		C229.4	2	1							2	2	3				
		C229.5	2	1							2	2	3				
III-II	Design & Drawing of Steel Structures	C321.1	1							3				3	3		
		C321.2	1	3	3										3	3	
		C321.3	1		3											3	
		C321.4	1		3											3	
		C321.5	1		3											3	
		C321.6	1		3			2						2		3	
III-II	Geotechnical Engineering - I	C322.1	2	2											2		
		C322.2	1	3										2	3		
		C322.3	2	2											3		
		C322.4	2	2											3		
		C322.5		2											3		
		C322.6	1	3										2	3		
III-II	Environmental Engineering - I	C323.1	1	2				3							3		
		C323.2		2											3		
		C323.3	1				2	2	1						3		
		C323.4		2			2	2	3					3	3		
		C323.5						3	3					3	3		
		C323.6		2					3						3		
III-II	Water Resource Engineering - I	C324.1	2						2						2		
		C324.2	2						2	2					2		
		C324.3		2	2										3	3	
		C324.4	1	2					2					2	3		
		C324.5								2					2	2	
		C324.6		3						2	2				2	3	

III-II	Waste water Management	C325.1		2				3	2					2	3			
		C325.2		2				2	2							3		
		C325.3		2												3		
		C325.4					2									3		
		C325.5		2					3	3					3	3		
		C325.6		2					2							3		
III-II	Geotechnical Engineering Lab	C326.1								3	2							
		C326.2							2	3	2							
		C326.3				3					3					2		
		C326.4				3					3					2		
III-II	Environmental Engineering Lab	C327.1									3	2						
		C327.2							2	3	2							
		C327.3				3						3						
		C327.4				3						3						
III-II	Computer Aided Engineering Lab	C328.1				2	1				2					3		
		C328.2				2	1				2						3	
		C328.3				2	1					2						3
		C328.4				2	1					2						3
		C328.5				2	1					2						3
		C328.6				2	1					2						3
IV-II	Estimation Specification & Contracts	C421.1												3		2		
		C421.2	2	3			2							3		3		
		C421.3	2	3											3		3	
		C421.4	2	3			2								3		3	
		C421.5	2	3				2							3		3	
		C421.6		3			2	2							3		3	2
IV-II	Construction Technology & Management	C422.1												3		3		
		C422.2					1	2						3	2	3		
		C422.3					2								3	2	3	
		C422.4					2								3	2	3	
		C422.5						2							3		3	
		C422.6					2	2							3	2	3	

IV-II	Prestressed Concrete	C423.1	1	3										3		
		C423.2					3						3	3		
		C423.3	1	2										3		
		C423.4	1											3		
		C423.5	1		3									3	3	
		C423.6	1	2					3					3	3	
IV-II	Solid and Hazardous Waste Management	C424.1					2	3						3		
		C424.2					2	2					2	3		
		C424.3				2		2					2	3		
		C424.4	1	3				3					3	3		
		C424.5	1		2								3	3		
		C424.6		2			2	3	3				3	3		
IV-II	Seminar on Internship Project	C425.1	3										3	3	3	
		C425.2		3	3	3	3							3	3	
		C425.3						3	3	3			3	3	3	3
		C425.4									3	3			3	3
		C425.5									3	3			3	3
		C425.6						3	3	3				3	3	3
IV-II	Project	C426.1	3											3		
		C426.2					3							3		
		C426.3				3					3				3	
		C426.4			3		3								3	
		C426.5		3		3					3				3	
		C426.6	2	3	3		3	3	3				3	3	3	3
		C426.7		3										3		
		C426.8												3		
		C426.9								3						
		C426.10									3	3				