



**MARATHA VIDYA PRASARAK SAMAJ'S**  
**KARMAVEER ADV. BABURAO GANPATRAO THAKARE**  
**COLLEGE OF ENGINEERING**



[www.kbtcoe.org](http://www.kbtcoe.org)

Permanently Affiliated to Savitribai Phule Pune University Vide Letter No: CA/1542  
& Approved by AICTE New Delhi Vide Letter No: 740-89-32 (E) ET/98  
AISHE Code - C-41622

**Program: Civil Engineering**

**COURSE OUTCOMES**  
**(2019 Pattern)**

### **Vision**

To be the leading department providing quality education to develop competent Civil Engineers, Entrepreneurs, and innovators to serve the nation.

### **Mission**

M1- To provide technical education.

M2- To prepare competitive students for employment/self-employment

M3 –To focus on developing the professional skills as well as the values

### **Program Educational Objectives**

1. To ensure that graduates will have a mastery of fundamental knowledge, problem solving skills, engineering experimental abilities, and design capabilities necessary for entering civil engineering career and/or graduate school.
2. To incorporate verbal and written communication skills necessary for successful professional practice.
3. Demonstrate knowledge of management principles and engineering techniques for effective project management.
4. To prepare graduates to deal with ethical and professional issues, taking into account the broader societal implications of civil engineering.

## Program Outcomes

<b>PO1</b>	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3</b>	<b>Design/development of solutions:</b> 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.
<b>PO4</b>	<b>Conduct investigations of complex problems:</b> 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.
<b>PO5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO6</b>	<b>The engineer and society:</b> 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.
<b>PO7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10</b>	<b>Communication:</b> 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.
<b>PO11</b>	<b>Project management and finance:</b> 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.
<b>PO12</b>	<b>Life-long learning:</b> 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.

## Program Specific Outcome

<b>PSO 1</b>	Graduates will apply technical knowledge, engineering skills, and competencies necessary for entering civil engineering career.
<b>PSO 2</b>	Graduates will demonstrate knowledge and techniques in engineering fields for effective management and professional development.
<b>PSO 3</b>	Graduates will apply technical and professional skills to be nationally competitive for employment/self-employment thereby benefit the society.

**SE Civil**  
**Course Outcomes (2019 Pattern)**  
**Semester – I**

Course Code	Course: Building Technology and Architectural Planning (201001)
C201.1	Identify types of building and basic requirements of building construction and masonry.
C201.2	Make use of Architectural Principles and Building bye laws for building construction.
C201.3	Identify and select various building components according to their requirement.
C201.4	Plan effectively various types of Residential Building and green building according to their utility, functions with reference to National Building Code.
C201.5	Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
C201.6	Make use of Principles of Planning in Town Planning, Safety aspects, building services.

Course Code	Course: Mechanics of structure (201002)
C202.1	Use concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
C202.2	Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.
C202.3	Apply the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
C202.4	Determine the torsion stresses in circular shaft and Principal stresses and strains.
C202.5	Analyse axially loaded and eccentrically loaded column.
C202.6	Determine the slopes and deflection of determinate beams and trusses.

Course Code	Course: Fluid Mechanics (201003)
C203.1	Explain the fluid properties, the concept and basic equation of fluid statics, measurement of fluid pressure and the concept of buoyancy and floatation.
C203.2	Describe the fluid kinematics with reference to continuity equation and fluid dynamics with Modified Bernoulli's equation and its application to measure fluid flow.
C203.3	Demonstrate the concept of dimensional analysis using Buckingham $\pi$ theorem with similarity and model laws and application of boundary layer theory for solving practical problem of fluid flow.
C203.4	Explain the laminar and turbulent flow through pipes, losses in pipes and analyze the pipe network using Hardy Cross method.
C203.5	Illustrate the open channel flow, uniform flow formulae, most efficient channel section, concept of specific energy and specific force diagram.
C203.6	Describe gradually varied flow in open channel flow, methods of computation of GVF profile and fluid flow around submerged bodies.

<b>Course Code</b>	<b>Course: Engineering Mathematics III (207001)</b>
<b>C204.1</b>	Solve higher order linear differential equations.
<b>C204.2</b>	Solve system of linear equations and ordinary differential equations by numerical methods.
<b>C204.3</b>	Apply Statistical methods and probability theory in data analysis and predictions in civil engineering.
<b>C204.4</b>	Perform vector differentiation and analyze the vector fields.
<b>C204.5</b>	Perform vector integration and apply it to fluid mechanics.
<b>C204.6</b>	Apply Partial differential equations for wave and 1D and 2D heat flow problems.

<b>Course Code</b>	<b>Course: Engineering Geology (207009)</b>
<b>C205.1</b>	Explain basic concepts, common rocks, minerals, their significance and application in civil engineering.
<b>C205.2</b>	Infer the stratigraphy, physiographic divisions of India, mass wasting and tectonic processes responsible for geomorphic features.
<b>C205.3</b>	Recognise tectonic effects, Geological structures and their significance in Civil Engineering.
<b>C205.4</b>	Integrate findings of Geological Surveys, investigations, remote sensing and GIS techniques in civil engineering.
<b>C205.5</b>	Assess Geological conditions, nature of rocks, site suitability, precautions and treatments to improve the site for dams, reservoirs and tunnels.
<b>C205.6</b>	Explain geological hazards, geo-hydrological characters of the rocks, and good building stones.

<b>Course Code</b>	<b>Course: Building Technology and Architectural Planning Lab (201004)</b>
<b>C206.1</b>	Identify types of building and basic requirements of building construction and masonry.
<b>C206.2</b>	Make use of Architectural Principles and Building byelaws for building construction.
<b>C206.3</b>	Identify and select various building components according to their requirement.
<b>C206.4</b>	Plan effectively various types of Residential Building and green building according to their utility, functions with reference to National Building Code.

<b>Course Code</b>	<b>Course: Mechanics of Structure Lab (201005)</b>
<b>C207.1</b>	Examine tensile, shear, torsion and impact strength of metals.

<b>C207.2</b>	Test the compressive and flexural strength of timber.
<b>C207.3</b>	Determine the properties of bricks and tiles.
<b>C207.4</b>	Construct influence line diagrams for determinate beams
<b>C207.5</b>	Compare the cost of structural materials.

<b>Course Code</b>	<b>Course: Fluid Mechanics Lab (201006)</b>
<b>C208.1</b>	Study of uniform flow formulae, velocity distribution, and calibration of notches in open channel
<b>C208.2</b>	Measurement of Viscosity and surface tension of given fluid
<b>C208.3</b>	Verification of Bernoulli's theorem, Calibration of Venturimeter /Orifice meter
<b>C208.4</b>	Determination of Darcy-Weisbach friction factor (f) and minor losses in a given pipe
<b>C208.5</b>	Experiment with flow around a circular Cylinder/Aerofoil
<b>C208.6</b>	Construct flow net by Electrical Analogy for flow below weir.

<b>Course Code</b>	<b>Course: Engineering Geology Lab (207010)</b>
<b>C209.1</b>	Explain common rocks, minerals, their use, significance, and application in civil engineering.
<b>C209.2</b>	Construct sections from contoured geological maps, interpretation of it and giving solutions of engineering geological problems in civil engineering.
<b>C209.3</b>	Interpret the core drilling data to apply in civil engineering.
<b>C209.4</b>	Recognize geological features in field, their significance in civil engineering and study of suitable software.

<b>Course Code</b>	<b>Audit Course 1 Awareness to Civil Engineering Practices (201007)</b>
<b>C210.1</b>	Classify sectors/sub-disciplines in civil engineering and eminent institutes in India and abroad.
<b>C210.2</b>	Interpret drawings and documents required and used in different Civil Engineering works
<b>C210.3</b>	Explain the importance of Code of Ethics to be practiced by a Civil Engineer.
<b>C210.4</b>	Identify health hazards on site and suggest safety measures.

**SE Civil**  
**Course Outcomes (2019 Pattern)**  
**Semester – II**

<b>Course Code</b>	<b>Course: Geotechnical Engineering (201008)</b>
<b>C211.1</b>	Identify and classify the soil based on the index properties and its formation process.
<b>C211.2</b>	Explain permeability and seepage analysis of soil by construction of flow net.
<b>C211.3</b>	Illustrate the effect of compaction on soil and understand the basics of stress distribution.
<b>C211.4</b>	Determine shear strength of soil and its measurement under various drainage conditions.
<b>C211.5</b>	Evaluate the earth pressure due to backfill on retaining structures by using different theories.
<b>C211.6</b>	Analysis of stability of slopes for different types of soils.

<b>Course Code</b>	<b>Course: Survey (201009)</b>
<b>C212.1</b>	Apply concept of bearing, plane table surveying and levelling on field measurements.
<b>C212.2</b>	Operate theodolite to carry out angular measurement.
<b>C212.3</b>	Explain contouring and determine horizontal distances and elevations by tacheometry.
<b>C212.4</b>	Explain the curves and setting out of curves using linear and angular methods.
<b>C212.5</b>	Illustrate construction survey, modern techniques and setting out and alignment of civil structures.
<b>C212.6</b>	Explain geodetic survey, hydrographic survey and aerial photogrammetry.

<b>Course Code</b>	<b>Course: Concrete Technology (201010)</b>
<b>C213.1</b>	Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete.
<b>C213.2</b>	Understand how to prepare and test the fresh concrete
<b>C213.3</b>	Understand how to test hardened concrete with destructive and non-destructive testing instruments
<b>C213.4</b>	Design concrete mix of desired grade
<b>C213.5</b>	Get acquainted to concrete handling equipment's and different special concrete types.
<b>C213.6</b>	Predict deteriorations in concrete and repair it with appropriate methods and techniques.

<b>Course Code</b>	<b>Course: Structural Analysis (201011)</b>
<b>C214.1</b>	Explain the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.
<b>C214.2</b>	Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frame
<b>C214.3</b>	Analyze beams and portal frames using Slope and deflection method
<b>C214.4</b>	Analyze beams and portal frames using moment distribution method
<b>C214.5</b>	Analyze the structure using stiffness matrix method.
<b>C214.6</b>	Apply the concepts of plastic analysis in the analysis of steel structures

<b>Course Code</b>	<b>Course: Project Management (201012)</b>
<b>C215.1</b>	Describe concepts and domains of Project Management.
<b>C215.2</b>	Apply project planning and scheduling techniques in construction.
<b>C215.3</b>	Determine the materials as per their usage and production rate of construction equipment with safety measures.
<b>C215.4</b>	Demonstrates resource allocation techniques for planning.
<b>C215.5</b>	Explain economical terms and laws associated with project management
<b>C215.6</b>	Apply the methods of project selection for the best economical project.

<b>Course Code</b>	<b>Course: Geotechnical Engineering Lab (201013)</b>
<b>C216.1</b>	Examine index properties of soil using Water content test, Pycnometer test, Sieve analysis test, Consistency limits test, and Field density test.
<b>C216.2</b>	Analyse permeability of soil using Constant head and Variable head permeability test.
<b>C216.3</b>	Evaluate the Optimized Moisture Content and Maximum Dry Density using Standard Proctor test.
<b>C216.4</b>	Determine shear strength of soil using direct shear test, unconfined compression test, Vane Shear test.
<b>C216.5</b>	Evaluate the earth pressure using Rebhann's and Cullman's graphical method, Differential free swell test.

<b>Course Code</b>	<b>Course: Survey Lab (201014)</b>
<b>C217.1</b>	Experiment the magnetic bearing, plane table survey and, simple and differential levelling.
<b>C217.2</b>	Use the theodolite for angular measurement, tacheometry, setting out curve and building.



<b>C217.3</b>	Use the nautical sextant, instruments used in hydrographic surveying and special functions available in total station.
<b>C217.4</b>	Summarize city survey, and spatial database creation using GIS software.
<b>C217.5</b>	Explain finding out the scale of photograph and air base distance.
<b>C217.6</b>	Compile the data of total station traversing, road project data to obtain sections and contouring data to create contour map.

<b>Course Code</b>	<b>Course: Concrete Technology Lab (201015)</b>
<b>C218.1</b>	Check the suitability of cement to be used for the concrete construction.
<b>C218.2</b>	Check the suitability of fine and coarse aggregate to be used for the concrete construction.
<b>C218.3</b>	Select the various ingredients of concrete and its suitable proportion to achieved desired strength.
<b>C218.4</b>	Check the properties of concrete in fresh and hardened state.

<b>Course Code</b>	<b>Course: Project Based Learning (201017)</b>
<b>C219.1</b>	Identify the community/ practical/ societal needs
<b>C219.2</b>	Apply the physical/ mathematical/ ICT model in order to solve identified problem/project to convert the idea into a product/ process/service.
<b>C219.3</b>	Prepare a report and present/demonstrate in a team.

<b>Course Code</b>	<b>Audit Course II: Disaster Management (201018)</b>
<b>C220.1</b>	Explain the type and risk of disasters.
<b>C220.2</b>	Discuss important disasters like earthquake, flood, landslides & drought.
<b>C220.3</b>	Summarise the mitigation and management techniques of disasters.
<b>C220.4</b>	Apply the various advanced techniques for disaster management

**TE Civil**  
**Course Outcomes (2019 Pattern)**  
**Semester – I**

<b>Course Code</b>	<b>Course: Hydrology and Water Resource Engineering (301001)</b>
<b>C301.1</b>	Compute the various parameter of hydrological cycle
<b>C301.2</b>	Determine the Crop water requirement
<b>C301.3</b>	Evaluate occurrence, distribution, and movement of ground water.
<b>C301.4</b>	Analyze runoff and flood frequency by different methods
<b>C301.5</b>	Assess various parameter for reservoir planning and sedimentation
<b>C301.6</b>	Extend water management techniques to overcome water logging problems

<b>Course Code</b>	<b>Course: Water Supply Engineering (301002)</b>
<b>C302.1</b>	Define identify, describe reliability of water sources, estimate water requirement for various sectors.
<b>C302.2</b>	Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics
<b>C302.3</b>	Design various components of water treatment plant and distribution system.
<b>C302.4</b>	Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.
<b>C302.5</b>	Design elevated service reservoir capacity and understand the rainwater harvesting.
<b>C302.6</b>	Understand the requirement of water treatment plant for infrastructure and Government scheme.

<b>Course Code</b>	<b>Course: Design of Steel Structures (301003)</b>
<b>C303.1</b>	Demonstrate knowledge about the types of steel structures, steel code provisions and design of the adequate steel section subjected to tensile force.
<b>C303.2</b>	Determine the adequate steel section subjected to compression load and design of built-up columns along with lacing and battening.
<b>C303.3</b>	Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending.
<b>C303.4</b>	Design of laterally restrained and unrestrained beam with and without flange plate using rolled steel section.
<b>C303.5</b>	Analyze the industrial truss for dead, live and wind load and design of gantry girder for moving load.

<b>C303.6</b>	Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections.
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<b>Course Code</b>	<b>Course: Engineering Economics and Financial Management (301004)</b>
<b>C304.1</b>	Analyse basics of construction economics.
<b>C304.2</b>	Analyse understanding of financial management in civil engineering projects.
<b>C304.3</b>	Prepare and analyze the contract account.
<b>C304.4</b>	Articulate Capital Budgeting
<b>C304.5</b>	Articulate Working Capital and Apply Inventory Management Techniques
<b>C304.6</b>	Get acquainted with Taxation and Financial Regulatory Bodies

<b>Course Code</b>	<b>Course: Elective I Construction Management (301005)</b>
<b>C305.1</b>	Infer the overview of construction sector.
<b>C305.2</b>	Illustrate construction scheduling, work study and work measurement.
<b>C305.3</b>	Discuss various labor laws and financial aspects of construction projects.
<b>C305.4</b>	Explain elements of risk management and value engineering.
<b>C305.5</b>	Apply material management techniques in construction.
<b>C305.6</b>	Describe the applications of human resource management and artificial intelligence techniques in civil engineering.

<b>Course Code</b>	<b>Course: Seminar (301006)</b>
<b>C306.1</b>	Appraise the current civil engineering research / techniques / developments / interdisciplinary areas.
<b>C306.2</b>	Review and organize literature survey utilizing technical resources, journals etc.
<b>C306.3</b>	Evaluate and draw conclusions related to technical content studied.
<b>C306.4</b>	Demonstrate the ability to perform critical writing by preparing a technical report.
<b>C306.5</b>	Develop technical writing and presentation skills.

<b>Course Code</b>	<b>Course: Hydrology and Water Resources Engineering Lab (301007)</b>
<b>C307.1</b>	Determine average annual precipitation and yield using topo sheet
<b>C307.2</b>	Analyze rainfall data and frequency
<b>C307.3</b>	Demonstrate software used in water resources system
<b>C307.4</b>	Determine peak flood discharge of basin and storage capacity of a reservoir
<b>C307.5</b>	Explain the components of hydrological cycle on field

<b>Course Code</b>	<b>Course: Water Supply Engineering Lab (301008)</b>
<b>C308.1</b>	Determine the physical, chemical, and biological characteristics of water sample.
<b>C308.2</b>	Design the water distribution network.
<b>C308.3</b>	Illustrate the working of water treatment units.
<b>C308.4</b>	Explain water intake structure.
<b>C308.5</b>	Design water treatment plant

<b>Course Code</b>	<b>Course: Design of Steel Structures Lab (301009)</b>
<b>C309.1</b>	Design and detailing of Tension member as per IS 800-2007
<b>C309.2</b>	Design and detailing of compression member as per IS 800-2007
<b>C309.3</b>	Design and detailing of slab base and gusseted base
<b>C309.4</b>	Design and detailing of laterally supported and unsupported flexural members
<b>C309.5</b>	Design and detailing of welded plate girder
<b>C309.6</b>	Design and detailing of truss

<b>Course Code</b>	<b>Course: Elective I Construction Management Lab (301010)</b>
<b>C310.1</b>	Illustrate construction scheduling, work study and work Break Down Structure
<b>C310.2</b>	Interpret Financial statement of construction Project
<b>C310.3</b>	Summarize Risk Management with help of case study
<b>C310.4</b>	Apply Economic order Quantity for material management.
<b>C310.5</b>	Explain Artificial Intelligence Techniques in civil Engineering

<b>Course Code</b>	<b>Audit Course I Professional Ethics and Etiquettes (301011)</b>
<b>C311.1</b>	Apply the concept of ethics in Engineering.
<b>C311.2</b>	Apply the concept Research Ethics and Codes of Ethics.
<b>C311.3</b>	Understand Safety, Responsibilities and Rights.
<b>C311.4</b>	Understand Professional Etiquette.

<b>Course Code</b>	<b>Honours Course: Urban Housing and Infrastructure Planning (301401)</b>
<b>C312.1</b>	Identify the factors to be considered for planning of residential areas
<b>C312.2</b>	Interpret the housing for urban poor
<b>C312.3</b>	Classify different housing policies and finance
<b>C312.4</b>	Collect the data for Urban Infrastructure Planning

<b>C312.5</b>	Classify Networks and Services System related to urban infrastructure
<b>C312.6</b>	Differentiate various infrastructure network

<b>Course Code</b>	<b>Honours Course: Urban Housing and Infrastructure Planning Lab. (301402)</b>
<b>C313.1</b>	Prepare report on housing layouts for different economic classes
<b>C313.2</b>	Prepare report on housing policies of urban poor India
<b>C313.3</b>	Prepare report on urban infrastructure standards using different norms such as URDPFI, NBC, and TCPO
<b>C313.4</b>	Prepare report on urban infrastructure network for local area
<b>C313.5</b>	Prepare plans, elevations, sections, centre line plan, structural plan, footing detailing for an apartment unit
<b>C313.6</b>	Prepare financial feasibility, for residential and public Projects

**TE CIVIL**  
**Course Outcome (2019 Pattern)**  
**Semester - II**

<b>Course Code</b>	<b>Course: Wastewater Engineering (301012)</b>
<b>C314.1</b>	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams.
<b>C314.2</b>	Design preliminary and primary unit operations in wastewater treatment plant.
<b>C314.3</b>	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process.
<b>C314.4</b>	Understand and design suspended and attached growth wastewater treatment systems.
<b>C314.5</b>	Explain and apply the concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems.
<b>C314.6</b>	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment.

<b>Course Code</b>	<b>Course: Design of RC Structures (301013)</b>
<b>C315.1</b>	Assess different design philosophies of R.C.C. structure and estimate the moment carrying capacity of singly, Doubly and Flanged section.
<b>C315.2</b>	Design & detailing of rectangular one way and two-way slab with different boundary conditions
<b>C315.3</b>	Design & detailing of dog legged and open well staircase
<b>C315.4</b>	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
<b>C315.5</b>	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
<b>C315.6</b>	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending

<b>Course Code</b>	<b>Course: Remote Sensing and GIS (301014)</b>
<b>C316.1</b>	Articulate fundamentals and principles of RS techniques.
<b>C316.2</b>	Demonstrate the knowledge of remote sensing and sensor characteristics.
<b>C316.3</b>	Distinguish working of various spaces-based positioning systems.
<b>C316.4</b>	Analyze the RS data and image processing to utilize in civil engineering
<b>C316.5</b>	Explain fundamentals and applications of RS and GIS
<b>C316.6</b>	Acquire skills of data processing and its applications using GIS

<b>Course Code</b>	<b>Course: Elective II Advanced Engineering Geology with Rock Mechanics (301015-a)</b>
<b>C317.1</b>	Illustrate seismic zones, plate tectonics and civil engineering significance of major rock formations of India with their characteristics.
<b>C317.2</b>	Explain soil profile, geo-hydrological characters of various rock formations and necessity of geological studies in water conservation.
<b>C317.3</b>	Apply knowledge of geology in Infrastructural, Urban development and demonstrate importance of national wealth.
<b>C317.4</b>	Validate the suitability of rocks based on mechanical properties, R.Q.D. and geophysical exploration.
<b>C317.5</b>	Explore subsurface Geology for civil engineering projects to suggest foundation treatments for various geological defects and channel erosion.
<b>C317.6</b>	Illustrate the suitability of proposed alignments for tunnels and bridges on the basis of Geological investigations.

<b>Course Code</b>	<b>Course: Internship (301016)</b>
<b>C318.1</b>	Develop professional competence through industry internship
<b>C318.2</b>	Apply academic knowledge in a personal and professional environment
<b>C318.3</b>	Build the professional network and expose students to future employees
<b>C318.4</b>	Apply professional and societal ethics in their day-to-day life
<b>C318.5</b>	Become a responsible professional having social, economic, and administrative considerations
<b>C318.6</b>	Make own career goals and personal aspirations

<b>Course Code</b>	<b>Course: Wastewater Engineering Lab (301017)</b>
<b>C319.1</b>	Determine the physical, chemical, and biological characteristics of wastewater sample.
<b>C319.2</b>	Illustrate the working of sewage treatment units.
<b>C319.3</b>	Design sewage treatment plant
<b>C319.4</b>	Explain sewer materials, choice of materials, testing of sewer pipes, sewer appurtenances.

<b>Course Code</b>	<b>Course: Design of RC Structures Lab. (301018)</b>
<b>C320.1</b>	Design of slab as per 456-2000 and detailing as per SP 34- 1987
<b>C320.2</b>	Design of beam as per 456-2000 and detailing as per SP 34- 1987
<b>C320.3</b>	Design of column as per 456-2000 and detailing as per SP 34- 1987
<b>C320.4</b>	Design of footing as per 456-2000 and detailing as per SP 34- 1987

<b>Course Code</b>	<b>Course: Remote Sensing and GIS Lab. (301019)</b>
<b>C321.1</b>	Summaries the fundamental tools and steps to import and export data in GIS software.
<b>C321.2</b>	Generate thematic maps using GIS software.
<b>C321.3</b>	Interpret the data from the aerial photographs and satellite images.
<b>C321.4</b>	Apply RS & GIS techniques for development of smart cities, land use classification and DEM for geomorphological features.

<b>Course Code</b>	<b>Course: Elective II Advanced Engineering Geology with Rock Mechanics Lab (301020-a)</b>
<b>C322.1</b>	Explain Geology, soil profile, seismic zones of India and parameters of morphometric analysis of river.
<b>C322.2</b>	Examine the site suitability for civil engineering structures using RQD and electrical resistivity survey.
<b>C322.3</b>	Analyze the drill hole data to check suitability of site for civil engineering projects.
<b>C322.4</b>	Illustrate geological aspects of civil engineering project in field and their significance in civil engineering.

<b>Course Code</b>	<b>Audit Course II (C323) Industrial Safety301021)</b>
<b>C323.1</b>	Classify techniques for industrial safety
<b>C323.2</b>	Explain techniques for industrial safety performance and preventions of accidents
<b>C323.3</b>	Illustrate general accident prevention, safety measures and training elements.
<b>C323.4</b>	Explain safety work practices, job safety analysis and reporting of accidental occurrences.

<b>Course Code</b>	<b>Honours Course: -Sustainable Architectural and Landscape Design (301403)</b>
<b>C324.1</b>	Describe the planning technologies used in ancient India
<b>C324.2</b>	Explain basics of sustainable development
<b>C324.3</b>	Study techniques for sustainable planning
<b>C324.4</b>	Demonstrate knowledge of fundamental concept and idea in the field of landscape architectures
<b>C324.5</b>	Express Knowledge of landscape architecture on field
<b>C324.6</b>	Compare the landscape planning in urban and rural areas and landscape treatment in special areas.



**BE CIVIL**  
**Course Outcome (2015 Pattern)**  
**Semester - I**

<b>Course Code</b>	<b>Course: Environmental Engineering II (401001)</b>
<b>C401.1</b>	Identify the sources, characterization, and quantity of wastewater.
<b>C401.2</b>	Design of preliminary and primary wastewater treatment units.
<b>C401.3</b>	Design the secondary wastewater treatment units.
<b>C401.4</b>	Illustrate the low-cost wastewater treatment methods.
<b>C401.5</b>	Illustrate anaerobic wastewater treatment process.
<b>C401.6</b>	Interpret the various industrial wastewater treatment processes.

<b>Course Code</b>	<b>Course: Transportation Engineering (401002)</b>
<b>C402.1</b>	Discuss the highway development and planning.
<b>C402.2</b>	Design of road geometry with drainage system.
<b>C402.3</b>	Discuss the traffic engineering and control methods.
<b>C402.4</b>	Analysis various pavement materials.
<b>C402.5</b>	Design of Road Pavement.
<b>C402.6</b>	Discuss pavement construction and apply modern trends in Highway materials.

<b>Course Code</b>	<b>Course: Structural Design and Drawing III (401003)</b>
<b>C403.1</b>	Analyze the pre-stressed concrete beams under various stages with due consideration of losses.
<b>C403.2</b>	Design simply supported prestressed concrete post tensioned girder.
<b>C403.3</b>	Design prestressed concrete flat slab using direct design method.
<b>C403.4</b>	Design cantilever type reinforced concrete earth retaining wall.
<b>C403.5</b>	Design reinforced concrete ground resting water storage tank.
<b>C403.6</b>	Estimate the earthquake forces on a building by approximate method and evaluate combined effect of lateral and gravity loads.

<b>Course Code</b>	<b>Course: Elective I (Systems Approach in Civil Engineering) (401004-(2))</b>
<b>C404 (2).1</b>	Acquainted with the various optimization techniques and their use in civil engineering.
<b>C404 (2).2</b>	Apply stochastic programming to reduce the processing time.

<b>C404 (2).3</b>	Optimize transportation cost and proficiently allocating scarce resources to optimize and maximize the profit.
<b>C404 (2).4</b>	Formulate and analyze linear programming problems.
<b>C404 (2).5</b>	Optimize different nonlinear functions.
<b>C404 (2).6</b>	Utilize dynamic programming in decision making for linear programming problems.

<b>Course Code</b>	<b>Course: Elective I (Advanced Engineering Geology with Rock Mechanics) (401004-(5))</b>
<b>C404 (5).1</b>	Explain the distribution, Geological characters, and civil engineering significance of major rock formations of India.
<b>C404 (5).2</b>	Investigate subsurface geology to know geological set up, depth of foundation and treatment to weak zone.
<b>C404 (5).3</b>	Explain Geo-hydrological Characters, morphometric analysis of river basin and Geological aspects of water conservation.
<b>C404 (5).4</b>	Determine physical and mechanical properties of rocks and rock quality designation.
<b>C404 (5).5</b>	Identify favourable and unfavourable field characters of rocks for tunnelling and bridge.
<b>C404 (5).6</b>	Apply geological knowledge in Civil Engineering planning, development and use of suitable construction material.

<b>Course Code</b>	<b>Course: Elective II (Earthquake Engineering) (401005-(4))</b>
<b>C405 (4).1</b>	Explain the basic concept of Earthquake Engineering.
<b>C405 (4).2</b>	Analyze problem on structural vibration.
<b>C405 (4).3</b>	Analyze Reinforced Concrete Structures using various seismic methods.
<b>C405 (4).4</b>	Design earthquake resisting structures.
<b>C405 (4).5</b>	State various control system and disaster management system.
<b>C405 (4).6</b>	Explain various methods adopted in Strengthening and Retrofitting of structures.

**BE Civil**  
**Course Outcome (2015 Pattern)**  
**Semester – II**

<b>Course Code</b>	<b>Course: Dams and Hydraulic Structures (401007)</b>
<b>C407.1</b>	Classify various types of dams and its safety monitoring.
<b>C407.2</b>	Analyze stability of gravity dam.
<b>C407.3</b>	Design profile of spillway and energy dissipater.
<b>C407.4</b>	Analyze zoned earthen dam and diversion head works.
<b>C407.5</b>	Design of canal and its components.
<b>C407.6</b>	Explain cross drainage works and river training structures

<b>Course Code</b>	<b>Course: Quantity Surveying, Contracts and Tenders (401008)</b>
<b>C408.1</b>	Explain terms related to estimation along with preparation of approximate estimate.
<b>C408.2</b>	Compute the quantities to prepare the detailed estimate.
<b>C408.3</b>	Prepare specification and rate analysis for item.
<b>C408.4</b>	Prepare the valuation of property.
<b>C408.5</b>	State the tender, types of tenders, tendering procedure, and methods of executing the work.
<b>C408.6</b>	Compare contracts, types of contract and conditions of contract.

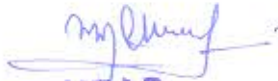
<b>Course Code</b>	<b>Course: Elective III (Airport and Bridge Engineering) (401009- (6))</b>
<b>C409 (6).1</b>	Plan airport as per specifications of international organizations
<b>C409 (6).2</b>	Plot airport layout and design runway and taxiway
<b>C409 (6).3</b>	Design runway and taxiway pavements and drainage
<b>C409 (6).4</b>	Locate heliports w.r.t landing area, marking, and lighting
<b>C409 (6).5</b>	Investigate site for bridge construction and analyze it with different loading conditions.
<b>C409 (6).6</b>	Classify bridges and bearings.

<b>Course Code</b>	<b>Course: Elective IV (Construction Management) (401010- (1))</b>
<b>C410 (1).1</b>	Explain overview of construction sector.
<b>C410 (1).2</b>	Illustrate construction scheduling, work study and work measurement.
<b>C410 (1).3</b>	Acquaint various labour laws and financial aspects of construction projects.

C410 (1).4	Explain elements of risk management and value engineering.
C410 (1).5	State material and human resource management techniques in construction.
C410 (1).6	Discuss basics of artificial intelligence techniques in civil engineering.

Course Code	Course: Project (401006)
C406.1	Identify thrust area in civil engineering and finalize problem statement.
C406.2	Review the literature to search for technical information from various resources on selected problem.
C406.3	Formulate the appropriate solution methodology.
C406.4	Apply the principles, tools, and techniques to solve the problem.
C406.5	Prepare a report and presentation of project.



  
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