

BharatiVidyapeeth's college of Engineering Lavale
Department of civil Engineering

Program Outcomes

PO-1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and engg. Specialization to the solution of complex engineering problems.
PO-2	Problem analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of mathematics, natural, and engineering sciences.
PO-3	Design/development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO-4	Conduct investigations of complex problems: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO-5	Modern tool usage: 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
PO-6	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.
PO-7	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
PO-8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO-9	Individual and team work: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
PO-10	Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.
PO-11	Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments
PO-12	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.

Building Technology and Architectural Planning Lab

Course Objectives:

1. To enumerate different types of structure and their requirement
2. To describe all basic activities of construction.
3. To study different types of materials, byelaws and Architectural aspects used in construction for civil engineering projects.
4. To plan different building units, Town planning parameters and safety of buildings.

Course Outcomes: On completion of the course, learner will be able to:

1. Identify types of building and basic requirements of building components.
2. Make use of Architectural Principles and Building byelaws for building construction.
3. Plan effectively various types of Residential Building forms according to their utility, functions with reference to National Building Code.
4. Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
5. Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.
6. Understand different services and safety aspects

Engineering Mathematics III

Course Objectives: To make the students familiarize with concepts and techniques in Ordinary & Partial differential equations, Numerical methods, Statistical methods, Probability theory and Vector calculus. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines.

Course Outcomes: At the end of this course, students will be able to

1. Solve Higher order linear differential equations and its applications to modelling and analysing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems.
2. Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems.
3. Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.
4. Perform Vector differentiation & integration, analyze the vector fields and apply to fluid flow problems.
5. Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations.

Surveying

Course Objectives: With the successful completion of the course, the student should have the capability to:

1. Describe the function of surveying in civil engineering construction,
2. Identify the sources of measurement errors and mistakes; understand the difference between accuracy and precision as it relates to distance, differential leveling, and angular measurements,
3. Identify and calculate the errors in measurements and to develop corrected values for differential level circuits, horizontal distances and angles for open or closed-loop traverses,
4. Effectively communicate with team members during field activities; identify appropriate safety procedures for personal protection; properly handle and use measurement instruments.
5. Be able to identify hazardous environments and take measures to insure one's personal and team safety
6. Perform traverse calculations; determine latitudes, departures, and coordinates of control points and balancing errors in a traverse. Use appropriate software for calculations and plotting.
7. Operate a total station to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system,
8. Work as a team member on a surveying party to achieve a common goal of accurate and timely project completion,
9. Calculate, design and establish curves, Understand, interpret, and prepare plan, profile, and cross-section drawings, Work with cross-sections and topographic maps to calculate areas, volumes, and earthwork quantities.

Course Outcomes: On successful completion of this course, Student will be able to:

1. Define and Explain basics of plane surveying and differentiate the instruments used for it.
2. Express proficiency in handling surveying equipment and analyze the surveying data from these equipment.
3. Describe different methods of surveying and find relative positions of points on the surface of earth.
4. Execute curve setting for civil engineering projects such as roads, railways etc.
5. Articulate advancements in surveying such as space based positioning systems
6. Differentiate map and aerial photographs, also interpret aerial photographs.

Mechanics of Structures

Course Objectives:

1. To study various types of stresses for determinate structural members.
2. To learn concept of Shear Force and Bending Moment Diagram for determinate beams.
3. To learn the concept of slope and deflection for determinate structural members.

Course Outcomes: On completion of the course, learner will be able to:

1. Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
2. Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.
3. Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
4. Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.

5. Analyze axially loaded and eccentrically loaded column.
6. Determine the slopes and deflection of determinate beams and trusses.

Geotechnical Engineering

Course Objectives:

1. To describe soil properties, classification and its behavior under stress.
2. To learn methods for measurements and determination of index & engineering properties of soil.
1. To study the interaction between water and soil and the effects of static vs flowing water on soil strength.

Course Outcomes: On completion of the course, learner will be able to,

1. Identify and classify the soil based on the index properties and its formation process
2. Explain permeability and seepage analysis of soil by construction of flow net.
3. Illustrate the effect of compaction on soil and understand the basics of stress distribution.
4. Express shear strength of soil and its measurement under various drainage conditions.
5. Evaluate the earth pressure due to backfill on retaining structures by using different theories.
6. Analysis of stability of slopes for different types of soils.

Fluid Mechanics-I

Course Objectives:

1. To understand conceptually the properties of fluid, fluid statics, fluid kinematics and fluid dynamics, dimensional analysis, boundary layer theory, open channel flow and fluid flow around submerged objects.
2. Apply principles of continuity, mass, momentum and energy as applied to fluid at rest as well as for fluid flow in open channel.
3. To apply fundamental principles of fluid mechanics for the solution of practical Civil Engineering problems.

Course Outcomes: At the end of the course, the learners will be able to

1. Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation and its application for solving practical problems.
2. Understand the concept of fluid kinematics with reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow
3. Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.
4. Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.
5. Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow computation and design of most economical channel section.
6. Understand the concept of gradually varied flow in open channel and fluid flow around submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body.

Structural Analysis I

Course Objectives:

1. This subject will build on the concepts from Engineering Mechanics and Mechanics of Structures.
2. This will create a foundation for analyzing real life structures by imparting knowledge about various methods involved in the analysis of indeterminate structures.

Course Outcomes: On completion of the course, learner will be able to:

1. Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.
2. Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.
3. Implement application of the slope deflection method to beams and portal frames.
4. Analyze beams and portal frames using moment distribution method.
5. Determine response of beams and portal frames using structure approach of stiffness matrix method.
6. Apply the concepts of plastic analysis in the analysis of steel structures.

Engineering Geology

Course Objectives:

1. To get the knowledge of the physical properties of mineral and differentiate between the rocks types, their inherent characteristics with Civil Engineering applications.
2. To learn geomorphic features formed by fluvial, marine processes and their role, Indian stratigraphy and historical geology in civil engineering projects.
3. To comprehend Structural geology applied to civil engineering projects and to get idea about plate tectonics.
4. To acquire and apply knowledge of PGE essential for civil engineering projects.
5. To identify and to enable the Students to examine favorable & unfavorable conditions for the proposed construction of dams, reservoir and tunnels. Precautions and treatments required to improve the site conditions of dams, reservoir and tunnels.
6. To learn the role played by the effect of Ground water, Geological hazards and the requirement and utility of good building stone.

Course Outcomes: After successful completion of course, students will be able to :

1. Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineering constructions.
2. Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and sustainability.
3. Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.
4. Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.
5. Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoirs, and tunnels.

6. Explain geological hazards and importance of ground water and uses of common building stones.

Concrete Technology

Course Objectives:

1. To know properties of various ingredients of concrete and concept of mix design.
2. To learn the behavior and properties of concrete in fresh and hardened state.
3. To understand special concrete and their applications.
4. To understand the durability aspects and preventive measures to enhance the life of concrete.

Course Outcomes:

1. Able to select the various ingredients of concrete and its suitable proportion to achieve desired strength.
2. Able to check the properties of concrete in fresh and hardened state.
3. Get acquainted to concreting equipment, techniques and different types of special concrete.
4. Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques

Project Management

Course Objectives: Students will be able to:

1. Describe the various concepts involved in Project Management.
2. Explain scientific methods of planning and management
3. Segregate the materials as per their annual usage and explain process to find production rate of construction equipment
4. Demonstrates methods of manpower planning and Use various project monitoring methods.
5. Discuss engineering economics and different laws associated with project management.
6. Differentiate the methods of project selection and recommend the best economical project.

Course Outcomes: On completion of the course, student will:

1. Describe project life cycle and the domains of Project Management.
2. Explain networking methods and their applications in planning and management
3. Categorize the materials as per their annual usage and also Calculate production rate of construction equipment
4. Demonstrates resource allocation techniques and apply it for manpower planning.
5. Understand economical terms and different laws associated with project management
6. Apply the methods of project selection and recommend the best economical project.

Soft Skill (Credit)

Course Objectives:

1. To help the students in building interpersonal skills.
2. To develop skill to communicate clearly.
3. To enhance team building and time management skills.
4. To learn active listening and responding skills.

Course Outcomes: On completion of the course, learner will be able to:

1. Make use of techniques for self-awareness and self-development.
2. Apply the conceptual understanding of communication into everyday practice.
3. Understand the importance of teamwork and group discussions skills.
4. Develop time management and stress management.
5. Apply business etiquette skills effectively an engineer requires.

Awareness To Civil Engineering Practices (Credit)

Course Objectives:

1. To provide basic overview of functioning of different Civil Engineering related industries / firms.
2. To create awareness about application of different drawings, contract documents in Civil Engineering.
3. To provide insight of code of ethics, duties and responsibilities, health and safety as a Civil Engineer.

Course Outcomes: On completion of the course, learner will be able to...

1. CO1: Describe functioning/working of different types of industries/sectors in Civil Engineering.
2. CO2: Describe drawings and documents required and used in different Civil Engineering works.
3. CO3: Understand the importance of Code of Ethics to be practiced by a Civil Engineer and also understand the duties and responsibilities as a Civil Engineer.
4. CO4: Understand different health and safety practices on the site

Road Safety Management (Audit)

Course Objectives:

1. To provide basic overview on road safety & traffic management issues in view of the alarming increase in vehicular population of the country.
2. To explain the engineering & legislative measures for road safety.
3. To discuss measures for improving road safety education levels among the public.

Course Outcomes: On completion of the course, learners will be able to...

1. CO1: Summarize the existing road transport scenario of our country
2. CO2: Explain the method of road accident investigation
3. CO3: Describe the regulatory provisions needed for road safety
4. CO4: Identify the safety issues for a road and make use of IRC's road safety manual for conducting road safety audit.

Project Based Learning (Audit)

Course Objectives:

1. To engage students in constructive learning environment and develop self-learning abilities.
2. To develop critical thinking and solving civil engineering problems by exploring and proposing sustainable solutions.
3. To integrate knowledge and skills from civil and other engineering areas.
4. To develop professional skills and project management.

Course Outcomes: After completion of course the students will be able to

1. Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.
2. Analyse and design the physical/ mathematical/ ICT model in order to solve identified problem/project.
3. Create, work in team and applying the solution in practical way to specific problem.