



GANDHI ACADEMY OF TECHNOLOGY AND ENGINEERING

DEPARTMENT OF CIVIL ENGINEERING

Subject: BASIC CIVIL ENGINEERING (Code: 23ES1005)

- CO₁: Describe the use of different materials in Civil Engineering
- CO₂: Interpret various aspect of the building and town planning
- CO₃: Identify the various building components, method of constructions, and services
- CO₄: Describe various public transportation systems, water conservation methods.
- CO₅: Use different equipments for angular & linear measurements
- CO₆: Water -waste water quality and advances in civil engineering

Subject: MECHANICS OF SOLID (Code: RME3C001)

- CO₁: Explain and Analyze the stress and strain developed due to applied load in any structural Member.
- CO₂: Construct shear force & bending moment diagram for beams under various loading & Support condition.
- CO₃: Explain the existence of shear stresses in the different layers of the beam for various loadings.
- CO₄: Apply the torsion equation & pure torsion
- CO₅: Analyze the loaded structural members for deflection.
- CO₆: Evaluate the principal stress & strain at a point of a stressed member.

Subject: FLUID MECHANICS AND HYDRAULIC MACHINES (Code: RME3C002)

- CO₁: Understand the various properties of fluids and their influence on fluid motion and analyze a variety of problems in fluid statics & dynamics.
- CO₂: Calculate the forces that act on submerged planes and curves.
- CO₃: Ability to analyze various types of fluid flows.
- CO₄: Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes & ducts in order to predict relevant pressures, velocities and forces.
- CO₅: Draw simple hydraulic and energy gradient lines.
- CO₆: Able Measure the quantities of fluid flowing in pipes, tanks and channels.

Subject: SURVEYING (Code: RC14C001)

- CO₁: To demonstrate the basic surveying skills
- CO₂: To use various surveying instruments.
- CO₃: To perform different methods of surveying
- CO₄: To compute various data required for various methods of surveying.
- CO₅: To integrate the knowledge and produce topographical map.
- CO₆: To calculate areas and volumes.

Subject: TRANSPORTATION ENGINEERING. (Code: RC14C002)

- CO1: Plan highway network for a given area.
- CO2: Determine Highway alignment and design highway geometrics
- CO3: Design Intersections and prepare traffic management plans
- CO4: Judge Suitability of pavement materials.
- CO5: Design of different types of pavements using various methods.
- CO6: Construct and maintain highways

Subject: CONCRETE TECHNOLOGY (Code: RC14D002)

- CO₁: Understand the basic concepts of concrete
- CO₂: Realize the importance of quality of concrete
- CO₃: Test the concrete properties and hardened concrete properties.
- CO₄: Evaluate the ingredients of concrete through lab test results
- CO₅: Design the concrete mix by IS code.
- CO₆: Familiarize the basic concepts of special concrete and their production and applications. Understand the behavior of concrete in various environments.
- CO₇: Familiarize the basic ingredients of concrete and their role in the production of concrete and its behavior in the field.

Subject: REMOTE SENSING & GEOGRAPHIC INFORMATION SYSTEM (Code: RC14D003)

- CO1: Introduce the basic principles of remote sensing and GIS techniques.
- CO2: Be familiar with ground, air and satellite-based sensor platforms.
- CO3: Interpret the aerial photographs and satellite imageries.
- CO4: Create and input special data for GIS applications
- CO5: Apply RS and GIS concepts in water resources engineering
- CO6: Apply RS and GIS concepts in water resources engineering

Subject: DESIGN OF CONCRETE STRUCTURES (Code: RC15C001)

- CO1: Explain the basic concepts of structural design Methods of RCC to the practical problem
- CO2: Apply the concepts of pre stressed concrete in real problems.
- CO3: Use the knowledge of the structural properties of materials (i.e. steel and concrete) in assessing the strength
- CO4: Use the knowledge in structural planning and design of various components of buildings
- CO5: Explain the composite action of reinforced steel and concrete in reinforced concrete structural members. Explain and design the slabs.
- CO6: Design of different types of Footings

Subject: WATER AND WASTE WATER ENGINEERING (Code: RC15C002)

- CO₁: Examine composition of typical municipal wastes, their sources, and collection, treatment and disposal methods.
- CO₂: Interpret the different characteristics of water & waste water and determine the necessity of treatment required.
- CO₃: Compare the functions of water & waste water treatment and their different processes in water & waste water treatment plant.
- CO₄: Design different units of water & waste water treatment plant.
- CO₅: Evaluate an ability to use the techniques, skills, and modern engineering tools necessary for environmental engineering practices
- CO₆: Discuss about recent development in water & waste water treatment.

Subject: GEOTECHNICAL ENGINEERING (Code: RC15C003)

- CO₁: Find the index and engineering properties of the soil.
- CO₂: Identify the suitability of foundation for a particular type of soil.
- CO₃: Determine properties & demonstrate interaction between water and soil.
- CO₄: Classify and characterize the soils.
- CO₅: Analyze and compute principles of compaction & consolidation settlements of soil.
- CO₆: Evaluate the stresses in the soil mass.

Subject: STRUCTURAL ANALYSIS - II (Code: RC15D001)

- CO₁: Differentiate Determinate and Indeterminate Structures
- CO₂: Carryout lateral Load analysis of structures
- CO₃: Analyze Cable and Suspension Bridge structures
- CO₄: Analyze structures using Moment Distribution Method
- CO₅: Analyze structures using Kan's Method.
- CO₆: Analyze structures using Matrix methods

Subject: DESIGN OF STEEL STRUCTURES (Code: RC16C001)

- CO₁: Uses of all loadings and limit state design method for steel structure.
- CO₂: Analyze and design the Tension and compression member
- CO₃: Explain the behavior of various connections and able to solve the problems various fasteners (Bolted and welded) used in steel construction.
- CO₄: Use of knowledge of analysis in structural planning and design of various components of buildings.
- CO₅: Analyze and design the built up section
- CO₆: Analyze and design the roof trusses.

Subject: HYDROLOGY & IRRIGATION ENGINEERING (Code: RC16C002)

- CO₁: Apply the knowledge of hydrology in day to day life & utilize its basics for the measurement of precipitation.
- CO₂: Define and explain Infiltration, Evaporation & Transpiration & apply its knowledge to measure Infiltration and Interception
- CO₃: Apply the knowledge of irrigation engineering to determine crop water requirement.
- CO₄: Explain the profiles of dams, Distinguish the types of dams & Utilize the knowledge in checking the stability of dam against overturning and sliding.
- CO₅: Explain the theories of spillway and canal design and apply the concept to design lined and unlined canals.
- CO₆: Describe canal regulation work, Cross drainage work, perceive the effects of water logging & adapt the preventive measures

Subject: GROUND IMPROVEMENT TECHNIQUE (Code: RC16D002)

- CO1: By the end of the course, the student should be able to possess the knowledge of various in-situ densification methods for granular soils and cohesive soils..
- CO2: The student able to know various dewatering methods and their suitability in field conditions.
- CO3: The student should acquire the knowledge of various stabilization methods and their application in field.
- CO4: The student should be in a position to design a reinforced earth embankment and check its stability.
- CO5: The student should know the various functions of Geo synthetics & their applications in Civil Engineering practice
- CO6: The student should be able to understand the concepts & applications of grouting.

Subject: OPTIMIZATION IN ENGINEERING (Code: ROE6A001)

- CO₁: Formulate the engineering problems as an optimization problem.
- CO₂: Apply necessary and sufficient conditions for a given optimization problem for optimality
- CO₃: Select appropriate solution method strategies for solving an optimization problem and interpret and analyze the solution obtained by optimization algorithms
- CO₄: Justify and apply the use of modern heuristic algorithms for solving optimization problems
- CO₅: Solve engineering design & manufacturing related optimization problem and compare the results of different methods.
- CO₆: Analyze outcomes of different techniques or methods by using software tool

Subject: MAJOR PROJECT/INTERNSHIP (Code: RMP8H201)

- CO₁: Work in a group to select a problem related to real life problem.
- CO₂: Review the literature to search for technical information from various resources on selected problem.
- CO₃: Formulate new expressions, equations to solve that chosen problem
- CO₄: Apply basic engineering principles to solve the problem
- CO₅: Identify thrust area in civil engineering and finalize problem statement.
- CO₆: Prepare a report and presentation of project.

Subject: GROUND WATER HYDROLOGY (Code: RC17D005)

- CO1: Design rain gauge network and calculate depth of precipitation, runoff, Infiltration, peak flow over the basin using different methods.
- CO2: Estimate peak flows and fix design flood by different methods.
- CO3: Select a suitable type of dam to be constructed according to the site Requirements.
- CO4: Design different types of dams i.e. gravity dam, earthen dam, arch and buttress dam.
- CO5: Plan, design and execute by applying various concepts in the irrigation structures.

Subject: WATER RESOURCE ENGINEERING (Code: RC17D006)

- CO1: Develop the basic knowledge of hydrologic cycle, precipitation, evaporation, evapo-transpiration, infiltration process
- CO2: Demonstrate the stream flow measurement
- CO3: Apply fundamental concept of mathematics to obtain hydrograph characteristics.
- CO4: Develop the basic knowledge of types of irrigation systems, methods of irrigation, water requirement of crops, design of unlined alluvial channels by silt theories with canal irrigation
- CO5: Understand solution regarding water logging and drainage.
- CO6: Built up the introduction to ground water flow and solve the problem on well irrigation on the basis of Darcy's Law.

Subject: GREEN TECHNOLOGY (Code: RGT6A003)

- CO1: Realize the importance of green technologies in sustainable growth of industry and society.
- CO2: Protect the environment, repair damage done to the environment in the past, and conserve the Earth's natural resources.
- CO3: Equip students in working with projects and to take up research work integrating with renewable power sources.
- CO4: Analyze the energy efficiency and its methods in green building
- CO5: Understand indoor environmental quality and the codes followed for green building initiative
- CO6: Understand the features and green building infrastructure and its standards

Subject: MINOR PROJECT (Code: RMP7H201)

- CO₁: Collect the information for a given project.
- CO₂: Apply principles, theorems and bye-laws in the project planning and design.
- CO₃: Enhance creative thinking, Interpret and analyze the data.
- CO₄: Develop professional abilities such as persuasion, confidence, perseverance and Communication skill.
- CO₅: Develop presentation skill
- CO₆: Prepare project report and present it

Subject: SEMINAR - II (Code: RSM7H202)

- CO1: Establish motivation for any topic of interest and develop a thought process for technical presentation.
- CO2: Organize a detailed literature survey and build a document with respect to technical publications.
- CO3: Analysis and comprehension of proof-of-concept and related data
- CO4: Effective presentation and improve soft skills.
- CO5: Make use of new and recent technology (e.g. Latex) for creating technical reports
- CO6: Prepare report and present it

Subject: PRESTRESSED CONCRETE (Code: RC17D001)

- CO1: Familiarize students with concepts of pre stressing
- CO2: Understand the different methods of pre stressing.
- CO3: Estimate the effective pre stress including the short & long term losses
- CO4: Analyze and design pre stressed concrete beams under flexure and shear
- CO5: Understand the relevant IS codes provisions for pre stressed concrete
- CO6: Applications of Pre stressed concrete

Subject: CONSTRUCTION TECHNOLOGY (Code: RC14D001)

- CO₁: The student should be able to identify different building materials and their importance in building construction
- CO₂: The student is expected to understand brick masonry, stone masonry construction.
- CO₃: The student is expected to understand the use of lime and cement in various constructions.
- CO₄: The student should have learnt the importance of building components.
- CO₅: The student will be able to learn the concept of finishing and understand different types of paints and to construct form work and scaffolding.
- CO₆: The student is expected to know the classification of aggregates sieve analysis and moisture content usually required in building construction.

Subject: RAILWAY AND AIRPORT ENGINEERING (Code: RC15D004)

- CO₁: Identify various parts and functions of permanent way
- CO₂: Determine railway alignment and to design various element of railway track.
- CO₃: To understand the track layout system and electrical signaling system
- CO₄: Understand the planning of an airport.
- CO₅: Design and maintain flexible and rigid pavements for runway.
- CO₆: Understand construction and maintenance of Docks and Harbors

Subject: ESTIMATING COSTING & PROFESSIONAL PRACTICE (Code: RC17D003)

- CO₁: Explain the importance of preliminary estimate for administrative approval & technical sanction for a civil engineering project
- CO₂: Utilize contracts and tenders in construction practices
- CO₃: Analyze, & assess the quantity of materials required for civil engineering works as per specifications
- CO₄: Analyze and choose cost effective approach for civil engineering projects
- CO₅: Evaluate & estimate the cost of expenditure and prepare a detailed rate analysis report
- CO₆: Construct detailed report on estimation and valuation process.

Subject: STRUCTURAL ANALYSIS - I (Code: RC14C003)

- CO₁: Classify & discuss statically determinate & indeterminate structure.
- CO₂: Apply & Analyze the concept of influence lines for deciding the critical forces and sections while designing.
- CO₃: Apply concept of strain energy and analyze redundant frames.
- CO₄: Explain the importance of horizontal thrust in maintaining parabola of two hinged parabolic arch for external loading and analyze the same.
- CO₅: Identify, analyze, & solve problems using slope deflection method.
- CO₆: Apply the concept of force to solve indeterminate structure.

Subject: DESIGN OF CONCRETE STRUCTURES-II (Code: RC17D002)

- CO₁: Identify various reinforced concrete structural members, its behavior and its purposes.
- CO₂: Analyze the structural member and apply the knowledge in designing
- CO₃: Utilize of the knowledge of analysis and design and apply it in practical life
- CO₄: Discuss the behavior and failure modes of different reinforced concrete members.
- CO₅: Test the serviceability criteria of various reinforced concrete members.
- CO₆: Utilize the relevant software in the analysis and design of reinforced concrete members.