Civil Deparment

Program Objectives

1	Have successful career in the diversified sectors of the engineering industry and/or higher studies by acquiring knowledge in mathematical, scientific and engineering fundamentals.
2	Analyze and design Civil engineering systems with social awareness and responsibility.
3	Exhibit professionalism, ethical approach, communication skills, team work in their profession and adapt to modern trends by engaging in lifelong learning.

Program Outcomes

PO1	Engineering knowledge : An ability to apply knowledge of computing, mathematics, science and engineering fundamentals appropriate to Civil Engineering.
PO2	Problem analysis : An ability to define the problems and provide solutions by designing and conducting experiments, interpreting and analyzing data.
PO3	Design/development of solutions : An ability to design, implement and evaluate a system, process, component and program to meet desired needs within realistic constraints.
PO4	Conduct investigations of complex problems : An ability to investigate, formulates, analyze and provide an appropriate solution to the engineering problems.
PO5	Modern tool usage : An ability to use modern engineering tools and technologies necessary for engineering practices.
PO6	The engineer and society : An ability to analyze the local and global impact of computing on individuals, organizations and society.

PO7	Environment and sustainability : An ability to understand the environmental issues and provide the sustainable system.
PO8	Ethics : An ability to understand professional and ethical responsibility.
PO9	Individual and teamwork : An ability to function effectively as an individual or as a team member to accomplish the goal.
PO10	Communication : An ability to communicate effectively at different levels.
PO11	Project management and finance : An ability to keep abreast with contemporary technologies through lifelong learning.
PO12	Life-long learning : An ability to apply knowledge of principles of resource management and economics to provide better services in the field of technology.

SE CIVIL SEMESTER-I

Name Of Subject:	**Mechanics of Structures**
Course Objectives:	
1	Analysis of simple and compound stresses and strains, including thermal effects and indeterminate structures.
2	Construction and interpretation of shear force and bending moment diagrams.
3	Understanding bending and shear stresses in beams.
4	Understand the torsional effects in shafts and determination of principal stresses & strains in beams

5	Evaluation of strength of columns under axial loading & Determination of slope and deflection in beams.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Understand stress-strain behavior, apply Hooke's law, and analyze axial stresses, strains and deformations in structures.
CO2	Analyze shear force & bending moment under various loading conditions.
CO3	Analyze bending & shear stresses in beams.
CO4	Apply torsion theory to circular shafts & determine principal stresses in beams.
CO5	Analyze axially loaded columns and determine slope and deflection of beams.

Name Of Subject:	**Surveying**
Course Objectives:	
1	To learn the fundamental concepts and instruments used for compass, plane table surveying and leveling.
2	To study concepts of leveling, methods of leveling and contouring.
3	To learn the essentials of theodolite and theodolite traversing.
4	To study tachometry and tachometric contouring.

5	To study various types of curves and methods of setting out of curves.
6	To study modern instruments like EDM and total station
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Understand the concept of linear & angular measurements.
CO2	Demonstrate the knowledge of leveling for determination of reduced levels of various points on the earth surface.
CO3	Demonstrate the use of theodolite for the measurement of horizontal and vertical angles.
CO4	Apply the knowledge of tacheometric method of surveying for the preparation of contour map of a given area by conducting tacheometric survey.
CO5	Apply various methods of curve setting for setting out the horizontal & vertical curves for highway or railway alignment.
CO6	Apply various methods of curve setting for setting out the horizontal & vertical curves for highway or railway alignment.

Name Of Subject:	**Building Construction and Materials**
Course Objectives:	
1	To understand fundamental concepts of building construction technology.
2	To study building components, traditional and modern construction techniques.

3	To study different conventional building materials with an emphasis on sustainability.
4	To study green building planning and sustainable materials.
5	To learn building bye-laws, regulations and drawing norms, standards with respect to UDCPR, Maharashtra State.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Understand Building Construction Technology – Demonstrate knowledge of fundamental building construction concepts, including structural and non-structural components.
CO2	Explain Conventional Building Materials techniques.
CO3	Summarize Modern Construction Techniques.
CO4	Apply Green Building Concepts – Integrate principles of green building planning and sustainable materials into construction projects.
CO5	Describe Building Bye-laws & Regulations – Interpret and apply building bye-laws, regulations, and drawing standards, particularly in line with UDCPR, Maharashtra State.

Name Of Subject:	**Digital Marketing**
Course Objectives: After completing this course students of civil engineering will be able to:	
1	To understand the basic Concepts of Digital marketing and the road map for successful Digital marketing strategies.
2	To know the importance of Social Media Platforms importance in Digital Marketing

3	To understand the technological importance of Search Engine Optimization (SEO)
Course Outcomes:	
CO1	Learn and understand the basic Concepts of Digital marketing
CO2	Apply digital marketing tools for suitable applications
CO3	Examine the various social media and design Advertising campaigns
CO4	Learn search engine optimization (SEO) techniques and apply it for suitable application to increase page views
CO5	Explore YouTube Digital Advertising

Name Of Subject:	**Engineering Mathematics III**
Course Objectives:	
1	To strengthen the foundation in ordinary and partial differential equations applicable in civil engineering also introduce Laplace Transforms and their engineering applications.
2	Solve Algebraic & Transcendental equations and System of linear equations using numerical techniques
3	Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in dynamic chemical processes.
4	Perform Vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.

5	To equip students with statistical and probability tools for analyzing engineering data.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Solve linear ordinary and simultaneous differential equations with constant coefficients.
CO2	Use Laplace transforms to analyze and model civil engineering systems.
CO3	Formulate and solve partial differential equations in engineering contexts.
CO4	Employ numerical methods for solving nonlinear and differential equations.
CO5	Apply vector calculus (gradient, divergence, curl, and integrals) in fields like fluid mechanics and structures.
CO6	Use statistical techniques for curve fitting, correlation, regression, and probability modeling.

Name Of Subject:	**Economics for Civil Engineers**
Course Objectives:	
1	To provide students with a comprehensive understanding of economic principles and financial management in the context of civil engineering projects.
2	To equip students with the skills necessary to analyze, evaluate and make decisions regarding the financial aspects of construction projects.
Course Outcomes: After completing this course students of civil engineering will be able to:	

CO1	Understand the fundamental economic principles and their application in the construction industry.
CO2	Analyze the financial aspects of construction projects using financial statements and key metrics.
CO3	Evaluate the feasibility of construction projects by applying costing concepts and techniques.
CO4	Apply economic decision-making tools, such as capital budgeting techniques, to assess construction projects and understand the importance of taxation.

Name Of Subject:	**Universal Human Values and Professional Ethics**
Course Objectives:	
1	To help the students develop a holistic, humane world-vision, and appreciate the essential complementarity between values and skills to ensure mutual happiness and prosperity.
2	To elaborate on 'Self-exploration' as the process for Value Education
3	To facilitate the understanding of harmony at various levels starting from self and going towards family and society.
4	To elaborate on the salient aspects of harmony in nature and the entire existence.
5	To explain how the Right understanding forms the basis of Universal human values and definitiveness of Ethical human conduct.
6	To provide the vision for a holistic way of living and facilitate transition from chaotic life to an orderly life

Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Recognize the concept of self-exploration as the process of value education and see they have the potential to explore on their own right.
CO2	Explore the human being as the coexistence of self and body to see their real needs / basic aspirations clearly.
CO3	Explain the relationship between one self and the other self as the essential part of relationship and harmony in the family.
CO4	Interpret the interconnectedness, harmony and mutual fulfilment inherent in nature and the entire existence.
CO5	Draw ethical conclusions in the light of Right understanding facilitating the development of holistic technologies production systems and management models.

Name Of Subject:	**Structural Analysis**
Course Objectives:	
1	This course aims to develop a solid understanding of the fundamental concepts of structural forms and indeterminacy, enabling students to classify structures and determine their degrees of freedom.
2	It introduces the analysis of statically indeterminate beams, frames, and trusses using methods such as consistent deformation and unit load method, considering various effects like external loads, support settlements, temperature changes, and fabrication errors.
3	The course covers approximate methods for analyzing multi-storey, two-bay rigid frames using Cantilever and Portal methods.
4	This will explore classical techniques such as the slope-deflection method and moment distribution method for analyzing indeterminate beams and frames, including sway and non-sway conditions.

5	This will introduce matrix-based analysis using the stiffness method, focusing on structural and member approaches for analyzing beams and rigid frames with limited degrees of indeterminacy.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Classify different types of structures and determine static and kinematic indeterminacy of beams, frames, and trusses.
CO2	Analyze statically indeterminate beams, frames, and trusses using the consistent deformation method and unit load method for various loading and support conditions.
CO3	Apply approximate methods such as Cantilever and Portal methods to analyze multi-storey, two-bay rigid frames.
CO4	Apply slope-deflection and moment distribution methods to analyze indeterminate beams and rigid jointed frames, including both sway and non-sway conditions.
CO5	Apply the stiffness method (structure approach) to analyze beams and rigid frames using matrix formulation for systems with up to three degrees of indeterminacy.

Name Of Subject:	**Project Management**
Course Objectives:	
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	Differentiate and apply methods of project selection
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Describe project life cycle and the domains of project management.
CO2	Explain networking methods and their applications in planning and management.
CO3	Categorize the materials as per their annual usage and also calculate production rate of construction equipment.
CO4	Demonstrates resource allocation techniques and apply it for manpower planning.
CO5	Apply the methods of project selection and recommend the best economical project.

Name Of Subject:	**Fluid Mechanics**
Course Objectives:	
1	To study fluid properties, fluid statics.
2	To study fluid kinematics.
3	To study & apply fluid dynamics equations.

4	To calculate different types of losses in pipes.
5	To study open channel flow with reference to energy-depth relationship and uniform flow.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Understand fluid properties and concepts of fluid statics and solve problems based on practical applications.
CO2	Understand fundamentals of fluid kinematics and apply it to solve fluid flow problems.
CO3	Solve fluid flow problems using Bernoulli's equation.
CO4	Calculate major and minor losses in the pipe network.
CO5	Apply the knowledge of uniform flow and depth-energy to solve problems on open channel flow.

Name Of Subject:	**Concrete Technology**
Course Objectives:	

1	To introduce the fundamental concepts of concrete technology and the role of concrete in civil engineering applications.
2	To understand the properties and functions of constituent materials of concrete, such as cement, aggregates, water, and admixtures.
3	To study the behaviour and characteristics of fresh and hardened concrete.
4	To develop the ability to design concrete mixes based on strength, workability, and durability requirements.
5	To create awareness of durability issues, deterioration mechanisms, and modern types of concrete for sustainable construction practices.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Describe the composition, properties, and functions of various ingredients of concrete.
CO2	Understand standard tests on fresh and hardened concrete and interpret results related to workability, strength, and durability.
CO3	Design concrete mixes using IS 10262 for various applications, including performance based requirements.
CO4	Analyze durability concerns in concrete and recommend suitable preventive or mitigation measures.
CO5	Compare and evaluate advanced concrete, sustainable materials, and smart technologies for modern construction.

Name Of Subject :	**Engineering Geology**
Course Objectives:	
1	To give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures, basic Geology, Geological Hazardous and Environmental Geology.
2	To focus on the core activities of engineering geologists – site characterization and geologic hazard identification and mitigation. Planning and construction of major Engineering projects.
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Explain about the basic concepts of engineering geology, important rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in engineering constructions as well as other industry.
CO2	Exploring the importance of Surveying with reference to modern technologies and also to understand the fundamentals of surface water and Groundwater regime for sustainable of life.
CO3	Recognize effect of plate tectonics, structural geology and their significance and utility in engineering activities. 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.
CO4	Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoir, tunnels and highways.
CO5	Explain geological hazards and importance.

Name Of Subject :	Open Elective - II (Project Management)
Course Objectives:	
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	Differentiate and apply methods of project selection
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Describe project life cycle and the domains of project management.
CO2	Explain networking methods and their applications in planning and management.
CO3	Categorize the materials as per their annual usage and also calculate production rate of construction equipment.
CO4	Demonstrates resource allocation techniques and apply it for manpower planning.
CO5	Apply the methods of project selection and recommend the best economical project.

Name Of Subject :	Environment Awareness
Course Objectives:	
1	To explain concepts of sustainable development, components of the environment, and analyze ecosystem dynamics including biotic and abiotic factors, food chains, food webs, and energy flow.
2	To identify and evaluate conservation methods for renewable and nonrenewable resources, and to understand the value of biodiversity with current conservation efforts at national and local levels.
3	To provide a comprehensive understanding of environmental pollution, its monitoring and control technologies, and examine real-world environmental issues through scientific theory and field-based examples.
4	To understand the evolution of environmental policies and laws, and explore the interrelationship between environment and development within a regulatory and sustainability context
Course Outcomes: After completing this course students of civil engineering will be able to:	
CO1	Apply an integrative and sustainable approach to environmental issues, including understanding organism roles in ecosystem energy transfers.
CO2	Differentiate renewable and nonrenewable resources, assess personal resource consumption, and identify biodiversity threats with strategies for conservation policy.
CO3	Understand environmental pollution, related scientific principles, relevant laws, and identify violations by industries.
CO4	Analyze human impacts on the environment, assess conservation challenges, and apply research skills to address real-world environmental issues.

TE CIVIL SEMESTER-II	
Name Of Subject:	**Hydrology and Water Resources**
Course Objectives:	
1	To introduce students to different government organizations and make them aware about precipitation, runoff, runoff hydrographs and streams gauging.
2	To introduce the concept of reservoir planning, capacity of reservoir, economics of reservoir, floods, hydrologic routing and use of Q-GIS software in hydrology.
3	To impart knowledge of irrigation, crop water requirement, canal distribution network, piped distribution network, revenue collection, ground water hydrology, water logging, and drainage and water management.
Course Outcomes:	
CO1	Understand government organizations, apply & analyze precipitation & its abstractions.
CO2	Understand, apply & analyze runoff, runoff hydrographs and gauging of streams.
CO3	Understand, apply & analyze floods, hydrologic routing & Q-GIS software in hydrology.
CO4	Understand, apply & analyze reservoir planning, capacity of reservoir & reservoir economics.
CO5	Understand water logging & water management, apply & analyze ground water hydrology
CO6	Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement.

Name Of Subject:	**Water Supply Engineering**
Course Objectives:	

1	To make students understand importance of water infrastructure with respect to needs of various users.
2	To discuss and demonstrate the principles of water treatment plant and layout.
3	To inculcate and impart design principles and working of WTP components.
4	To interpret need of contemporary issues in water treatment.
Course Outcomes:	
CO1	Define identify, describe reliability of water sources, estimate water requirement for various sectors
CO2	Ascertain and interpret water treatment method required to be adopted with respect to source and raw water characteristics
CO3	Design various components of water treatment plant and distribution system.
CO4	Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.
CO5	Design elevated service reservoir capacity and understand the rainwater harvesting.
CO6	Understand the requirement of water treatment plant for infrastructure and Government scheme.

Name Of Subject:	**Engineering Economics and Financial Management**
Course Objectives:	

1	To apply the knowledge of accounting and financial management in civil engineering projects.
2	To prepare, appraise, evaluate, and approve financial plans and interpret financial data.
Course Outcomes:	
CO1	Understand basics of construction economics.
CO2	Develop an understanding of financial management in civil engineering projects.
CO3	Prepare and analyze the contract account.
CO4	Decide on right source of fund for construction projects.
CO5	Understand working capital and its estimation for civil engineering projects.
CO6	Illustrate the importance of tax planning & understand role of financial regulatory bodies

Name of Subject:	**Construction Management**
Course Objectives:	
1	To understand various construction activities and evaluating construction projects.
2	To handle all situations with knowledge of various labour laws and financial aspects of construction projects.
3	To know about risk management and value engineering
4	To utilize material and human resources efficiently with managerial skills interpersonal and intrapersonal skills.
5	To apply knowledge of artificial intelligence on construction project
Course Outcomes: At the end of the course the students will have an ability to	

CO1	Understand the overview of construction sector.
CO2	Illustrate construction scheduling, work study and work measurement.
CO3	Acquaint various labor laws and financial aspects of construction projects.
CO4	Explain elements of risk management and value engineering.
CO5	State material and human resource management techniques in construction.

Understand basics of artificial intelligence techniques in civil engineering.

Name Of Subject:	**Waste Water Engineering**
Course Objectives:	
1	To introduce students about the need of sanitation infrastructure, wastewater treatment, sludge management system and to identify potential of wastewater for recycle and reuse
2	To inculcate an ability to learn the working principle, operation and design of various units of wastewater treatment plant
Course Outcomes:	
CO1	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams
CO2	Design preliminary and primary unit operations in waste water treatment plant
CO3	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process
CO4	Understand and design suspended and attached growth wastewater treatment systems
CO5	Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems

CO6	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment

Name Of Subject:	**Design of RC Structures**
Course Objectives:	
1	To provide the students with basic concepts of reinforced concrete structures.
2	To analyze, design and detailing of different component of reinforced concrete structures.
Course Outcomes:	
CO1	Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.
CO2	Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.
CO3	Design & detailing of rectangular one way and two-way slab with different boundary conditions
CO4	Design & detailing of dog legged and open well staircase
CO5	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
CO6	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings.

Name Of Subject:	**Remote Sensing and GIS**
Course Objectives:	
1	To comprehend fundamentals and principles of RS and GIS techniques.

2	To enhance students' capacity to interpret images and extract information of earth surface from multi-resolution imagery at multi-scale level.
3	To develop skills of Image processing and GIS
4	To utilize RS and GIS techniques in Engineering Geology and civil engineering.
5	To study satellite image processing, satellite image interpretation, digitization and generation of thematic maps in a GIS.
6	To learn buffering and layer analysis for civil engineering applications
Course Outcomes:	
CO1	Articulate fundamentals and principles of RS techniques.
CO2	Demonstrate the knowledge of remote sensing and sensor characteristics.
CO3	Distinguish working of various spaces-based positioning systems.
CO4	Analyze the RS data and image processing to utilize in civil engineering
CO5	Explain fundamentals and applications of RS and GIS
CO6	Acquire skills of data processing and its applications using GIS

Name Of Subject:	**Architecture and Town Planning**
Course Objectives:	
1	To use principles of architectural planning and understand futuristic need of users.
2	To discuss and demonstrate the concepts of landscaping, urban renewal and sustainable architecture.
3	To distinguish and relate planning levels and understand use of act and to develop neighborhood plan.
4	To interpret need of civic surveys for DP proposal and value planning agencies and ITS.

5	To understand and demonstrate planning strategy with reference to different acts, guidelines, norms.
6	To appraise multifaceted zones like SEZ, CRZ and Special township, understand applications of modern Tools like GIS / GPS / RS in town planning and need of Rural Planning.
Course Outcomes:	
CO1	Apply the principles of architectural planning and landscaping for improving quality of life.
CO2	Understand the confronting issues of the area and apply the acts.
CO3	Evaluate and defend the proposals.
CO4	Appraise the existing condition and to develop the area for betterment.

BE CIVIL SEMESTER-I	
Name Of Subject:	**Foundation Engineering**
Course Objectives:	
1	To know various methods for subsurface investigations for foundations.
2	To learn to perform geotechnical design of shallow and deep foundations.
3	To study the problems related to foundations on expansive soil and ways to solve them

Course Outcomes:	
CO1	Perform subsurface investigations for foundations using different methods.
CO2	Estimate the bearing capacity of shallow foundations.
CO3	Calculate immediate and primary consolidation settlement of shallow foundations.
CO4	Decide the capacity of a pile and pile group.
CO5	Understand the steps in geotechnical design of shallow foundations and well foundations.
CO6	Analyze problems related to expansive soil and overcome them using design principles, construction techniques in black cotton soi

Name Of Subject:	**Transportation Engineering**
Course Objectives:	
1	To learn principles and practices of transportation planning
2	To describe traffic studies, their analysis and their interpretation.
3	To learn Geometric Design of Cross Sectional Elements of pavement.
4	To study characteristic, properties and testing procedures of highway materials.

5	To enumerate different types of pavements and design of flexible and rigid pavement
6	To understand the fundamentals of Bridge Engineering and Railway Engineering
Course Outcomes:	
CO1	Understand principles and practices of transportation planning.
CO2	Demonstrate knowledge of traffic studies, analysis and their interpretation.
CO3	Design Geometric Elements of road pavement.
CO4	Evaluate properties of highway materials as a part of road pavement.
CO5	Appraise different types of pavements and their design.
CO6	Understand the fundamentals of Bridge Engineering and Railway Engineering

Name Of Subject:	**Coastal Engineering**
Course Objectives:	

1	To make students aware about basics of ocean waves
2	To introduce students to the wave properties and analysis
3	To impart knowledge about tides and it's dynamic theory
4	To introduce students to important aspects of longshore transport
5	To impart knowledge about to the coastal structures, shore protection
6	To impart knowledge about coastal management

Course Outcomes:

CO1	Understand basic of ocean waves including wave generation, classification, propagation, wave theories, wave diffraction, wave refection and wave breaking.
CO2	Understand and apply short term and long-term wave analysis.
CO3	Understand basic characteristics of tides, tide producing forces, dynamic theory of tides.
CO4	Understand coastal process of erosion/accretion due to waves, bed forms, long shore transport (Littoral drift) and estimation of wave induced sediment quantity.
CO5	Understand the coastal structures and shore protection methods.
CO6	Understand coastal zone management activities, issues related to integrated coastal zone management and regulation of coastal zone

Name of Subject:	**Air Pollution and Control**
Course Objectives: Objectives of the Course are	
1	To study the relation between Meteorology and Air Pollution
2	To learn the stack emission monitoring
3	To learn Sources, Causes & effects of indoor Air Pollution
4	To study methods and equipments used for controlling air pollution
5	To study methods and equipments used for controlling air pollution
6	To provide knowledge about EIA and its role
Course Outcomes:	
CO1	Apply the knowledge of meteorology to control air pollution
CO2	To conduct air pollution survey
CO3	Identify the sources of air pollutants and their effect on human, plants and materials

CO4	Design of air pollution controlling equipment
CO5	Use knowledge of legislation for prevention and control of air pollution
CO6	To prepare EIA of projects

Name Of Subject:	**Dams and Hydraulics Structures**
Course Objectives:	
1	To study different types of dams and instrumentation
2	To study the stability analysis of Gravity Dam
3	To study the spillways and design philosophy of Ogee spillway.
4	To study the failures and stability analysis of an earthen dam
5	To study design of canals and types of canal structures
6	Analysis of design of diversion headwork and of Cross drainage work
Course Outcomes:	

CO1	Understand types of dams and instrumentation working
CO2	Execute stability analysis of Gravity Dam
CO3	Understand types of spillways & Design of Ogee spillway
CO4	Illustrate the failures and analyze stability of earthen dam
CO5	Design Canals and understand the canal structures
CO6	Analysis of the Diversion headwork and Cross Drainage work

Name Of Subject:	**Quantity Surveying, Contracts and Tenders**
Course Objectives:	
1	Impart knowledge to prepare approximate and detailed estimate of Civil Engineering works
2	To teach concepts of tendering process, contract document & Arbitration
3	To draft detailed specification and work out rate analysis according to material, labor requirements as per specified norms.
4	Impart knowledge of valuation, depreciation to carry out valuation of properties

Course Outcomes:	
CO1	Understand concept of estimates and prepare approximate estimate for various for Civil Engineering works.
CO2	Describe tendering process, construction contracts, and aspects of Arbitration and prepare tender documents.
CO3	Prepare detailed estimate of various items of work by different methods and calculate quantity of steel from Bar bending schedule.
CO4	Apply engineering knowledge to prepare estimate for roads, culverts, and water tank (Elevated storage tank)
CO5	Apply concepts of specification to draft brief specification, detailed specification and prepare detailed rate analysis report.
CO6	Evaluate depreciation and valuation of property on the basis of present condition, specifications and market trend.

Name Of Subject:	**TQM and MIS**
Course Objectives:	
1	Engineers with the ability to propose total quality management system in the construction projects
2	Engineers with the ability to appraise quality system standards in the construction projects
3	Engineers with the ability to choose MIS for a construction organizations

Course Outcomes:	
CO1	Recognize quality and contribution of quality gurus for evaluation of best practices
CO2	Relate the functioning and application of TQM & Six Sigma in the domain of construction sector
CO3	Recommend ISO 9001 principles in preparation of quality manual to construction business
CO4	Apply management control & certification systems for construction industry
CO5	Choose TQM process implementation and various quality awards for construction sector
CO6	Propose MIS for allied fields in construction sector

Name Of Subject:	**Irrigation and Drainage**
Course Objectives:	
1	To provide the students with basic concepts of reinforced concrete structures
2	To analyze, design and detailing of different component of reinforced concrete structures.

Course Outcomes:	
CO1	Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.
CO2	Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.
CO3	Design & detailing of rectangular one way and two-way slab with different boundary conditions
CO4	Design & detailing of dog legged and open well staircase
CO5	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion.
CO6	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings.