SE CIVIL	
Name Of Subject:	**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:	
CO1	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.
CO2	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
CO3	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.
CO4	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.
CO5	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.
CO6	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
Name Of Subject:	**Building Technology and Architectural Planning**
Course Objectives:	
1	Identify types of building and basic requirements of buildingcomponents
2	Make use of Architectural Principles and Building byelaws for buildingconstruction
3	Plan effectively various types of Residential Building forms according to their utility, functions with reference to National BuildingCode
4	Plan effectively various types of Public Buildings according to their utility functions with reference to National BuildingCode
	Make use of Principles of Planning in Town Planning, Different Villages and Safetyaspects
	Understand different services and safetyaspects
Course Outcomes:	
CO1	Identify types of building and basic requirements of building components.
CO2	Make use of Architectural Principles and Building byelaws for building construction.
CO3	Plan effectively various types of Residential Building forms according to their utility, functions with reference to National Building Code.
CO4	Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
CO5	Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.
CO6	Understand different services and safety aspects
Name Of Subject:	**Mechanics of structure**
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:	
CO1	Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
CO2	Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.
CO3	Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
CO4	Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.
CO5	Analyze axially loaded and eccentrically loaded column.
CO6	Determine the slopes and deflection of determinate beams and trusses.
Name Of Subject:	**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:	
CO1	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
CO2	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
CO3	Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.
CO4	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.
CO5	Assess the Importance of geological nature of the site, precautions and treatments to prove the site conditions for dams, reservoirs, and tunnels..
CO6	Explain geological hazards and importance of ground water and uses of common building stones.
Name Of Subject:	**Engineering Mathematics III**
Course Objectives:	
1	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:	
CO1	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.
CO2	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.
CO3	Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.
CO4	Perform vector differentiation &integration, analyze the vector fields and apply to fluid flow problems.
CO5	Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations
Name Of Subject:	**Survey**
Course Objectives:	
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:	
CO1	Define and Explain basics of plane surveying and differentiate the instruments used for it.
CO2	Express proficiency in handling surveying equipment and analyse the surveying data from these equipment.
CO3	Describe different methods of surveying and find relative positions of points on the surface of earth.
CO4	Execute curve setting for civil engineering projects such as roads, railways etc.
CO5	Articulate advancements in surveying such as space based positioning systems
CO6	Differentiate map and aerial photographs, also interpret aerial photographs
Name Of Subject:	**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.
3	To study the interaction between water and soil and the effects of static vs flowing water on soil strength
Course Outcomes:	
CO1	Identify and classify the soil based on the index properties and its formation process
CO2	Explain permeability and seepage analysis of soil by construction of flow net
CO3	Illustrate the effect of compaction on soil and understand the basics of stress distribution
CO4	Express shear strength of soil and its measurement under various drainage conditions.
CO5	Evaluate the earth pressure due to backfill on retaining structures by using different theories.
CO6	Analysis of stability of slopes for different types of soils.

Name Of Subject:	**Structural Analysis**
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:	
CO1	Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams.
CO2	Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.
CO3	Implement application of the slope deflection method to beams and portal frames.
CO4	Analyze beams and portal frames using moment distribution method
CO5	Determine response of beams and portal frames using structure approach of stiffness matrix method.
CO6	Apply the concepts of plastic analysis in the analysis of steel structures.
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	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:	
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	Understand economical terms and different laws associated with project management
CO6	Apply the methods of project selection and recommend the best economical project.
Name Of Subject:	**Concrete Technology**
Course Objectives:	
1	To know properties of various ingredients of concrete and concept of mix design.
2	To learn the behavior and propertiesof concrete infresh and hardened state.
3	To understand special concrete and their applications.
4	To understand the durability aspects and preventive measures to enhance the fife of concrete.
Course Outcomes:	
CO1	Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete.
CO2	Prepare and test the fresh concrete
CO3	Test hardened concrete with destructive and nondestructive testing instruments
CO4	Get acquainted to concrete handling equipments and different special concrete types.
CO5	Design concrete mix of desired grade
CO6	Predict deteriorations in concrete and repair it with appropriate methods and techniques.

TE CIVIL	
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: Objectives of the Course are	
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	
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:	**Airport and Bridge Engineering**
Course Objectives: Objectives of the Course are	
1	Introduce the aspect of airport and bridge system.
2	Study plans, specifications for planning and design.
3	Involve in the planning and design of new runways and terminal buildings
4	Select and design the bridge that will meet the needs of the area
Course Outcomes: At the end of the course the students will have an ability to	
CO1	Understand the fundamental of airport.
CO2	Understand and design the runway and taxiway and drainage systems.
CO3	Understand the BIM, AR and VR in airport planning and pavement design.
CO4	Plan the lighting and marking of airport and heliport.
CO5	Estimate various components of bridge and loads on bridges.
CO6	Study and design of bridge structures.
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	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	and market trend.
Name Of Subject:	**Hydropower Engineering**
Course Objectives:	
1	Introduce the energy resources planning and potential concept.
2	Estimate the load factor and study the power house components and layout.
3	Understand the design of hydraulic turbines and study the economic consideration of hydroelectric power.
Course Outcomes:	
CO1	Understand the classification of power resources & trends in energy use patterns.
CO2	Identify the components of hydro power plant.
CO3	Analyze the load assessment for turbines.
CO4	Prepare the layout of power house based on the various structures need for it.
CO5	Design the turbines and surge tanks.
CO6	Understand the laws and regulatory aspects of hydroelectric power.
Name Of Subject:	**TQM and MIS**
Course Objectives:	
1	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