Department of Civil Engineering

Course Outcome (CO)

First Year -2015 Course			
Semester I			
Course Code	**Course Name**	**Course Outcomes**	
101005	**Basic Civil and Environmental Engineering**	CO 1	**Students will understand the basic areas of civil engineering.**
		CO 2	**Student will understand the types of structure and construction materials**
		CO 3	**Student will be able to use modern surveying equipments**
		CO 4	**Student will to use the natural resources more effectively and reduce the waste generations**
		CO5	**Student will be able to acquire the self-learning with Presentation in a group on the topic related to environment and energy.**
		CO6	**Student will be able to remember the principles and bye rules for building planning.**
Semester II			
101011	**Engineering Mechanics**	CO 1	**Acquire the basic knowledge of resolution of all force systems**
		CO 2	**Solve numerical of rectilinear motion of particles**

		CO 3	**Solve numerical of curvilinear motion of particles**
		CO 4	**Understand and apply Work-energy and impulse momentum methods**
		CO 5	**Understand Equilibrium of force system and analyze equilibrium of space force system**
		CO 6	**Solve trusses, frames for finding member forces and friction between sliding surfaces**
Second Year -2015 Course			
Semester I			
201001	**Building Technology and Materials**	CO 1	Identify types of building and basic requirements of building components.
		CO 2	Explain types of masonry, formwork, casting procedure and necessity of underpinning and scaffolding.
		CO 3	Elucidate different types of flooring and roofing materials.
		CO 4	Describe types of doors, windows, arches and lintel.
		CO 5	Illuminate means of vertical circulation and protective coatings.
		CO 6	Explain different materials especially eco-friendly materials and safety measures to be adopted at any construction site.
207001	**Engineering Mathematics III**	CO 1	Solve higher order linear differential equations and apply to civil engineering problems such as bending of beams and whirling of shafts.

		CO 2	Solve system of linear equations using direct and iterative numerical techniques and develop solutions to ordinary differential equations using single step and multistep methods applied to structural systems.
		CO 3	Apply statistical methods like correlation, regression analysis in analyzing and interpreting experimental data and probability theory applied to construction management.
		CO 4	Perform vector differentiation and integration, analyze the vector fields and apply to fluid flow problems.
		CO 5	Solve various partial differential equations such as wave equation, one and two dimensional heat flow equations.
201006	**Surveying**	CO 1	Operate and use surveying equipment.
		CO 2	Draw plan or map of the existing permanent features on the ground.
		CO 3	Classify the ground features from the map or plan.
		CO 4	Analyze temporary adjustments and check permanent adjustments of the Theodolite.
201002	**Strength of Materials**	CO 1	Compute different type of stresses in determinate, indeterminate, homogeneous and composite structures.
		CO 2	Develop bending and shear stress diagram.
		CO 3	Determine the torsional stresses and stresses due to strain energy for different loading conditions.

		CO 4	Explain the concept of principal stresses due to combined loading and able to compare the values of analytical and graphical (Mohr's circle) method.
		CO 5	Plot loading diagram, Shear Force Diagram (SFD) and Bending Moment Diagram (BMD).
		CO 6	Analyze axially and eccentrically loaded column
201003	**Geotechnical Engineering**	CO 1	Differentiate the different types of soil and their engineering properties and classify them
		CO 2	Determine the soil properties in laboratory and develop a proficiency in handling experimental data
		CO 3	Understand of the concept of effective stress and its influence on soil behavior.
		CO 4	Develop an understanding of the influence of water flow on the engineering behaviour of soils.
		CO 5	Analyze engineering properties like compaction, permeability, soil shear strength.
		CO 6	Compute the lateral thrust due to backfill on the retaining walls.
	Audit Course: Awareness to Civil Engineering Practices	CO 1	Study different types of civil engineering industries and their functioning.
		CO 2	Applications of different documents, drawings, regulations in Civil Engineering industries.
		CO 3	Code of ethics to be practiced by a Civil Engineer and understand duties and responsibilities as a Civil

			Engineer
		CO 4	Students will be able to find different safety practices on the site.
Semester II			
201004	**Fluid Mechanics-I**	CO 1	Use fluid properties, dimensional analysis for solving problems of fluid flow.
		CO 2	Solve fluid statics problems.
		CO 3	Measure fluid pressure.
		CO 4	Calibrate discharge measuring instrument like venturimeter, orifice meter
		CO 5	Distinguish between various types of fluid flows and find the fluid velocity using principles of Kinematics and Dynamics.
		CO 6	Design pipes to carry particular amount of discharge.
201005	**Architectural Planning and Design of Buildings**	CO 1	Make use of principles of planning and principles of architectural Planning.
		CO 2	Analyze the available primary or secondary data and plan different types of structures considering futuristic need of an area.
		CO 3	Improve the status of existing structures by proposing appropriate green measures.

		CO 4	Plan effectively various types of buildings according to their utility with reference to different codes.
		CO 5	Understand and resolve contemporary issues at multi-dimensional functional levels.
201008	**Structural Analysis I**	CO 1	Understand the basic concept of static and kinematic indeterminacy, slope and deflection of determinate and indeterminate beams for analysis of structures.
		CO 2	Analyze indeterminate beams structures and frames.
		CO 3	Evaluate determinate and indeterminate trusses and its application in the field.
		CO 4	Apply influence line diagrams for the analysis of structures under moving load.
		CO 5	Analyze two and three hinged arches and its application.
		CO 6	Apply plastic analysis for indeterminate steel structures by limits state method.
207009	**Engineering Geology**	CO 1	Explain basic concepts, common rocks, minerals, their significance and application in civil engineering.
		CO 2	Recognize tectonic effects, Geological structures and their significance in Civil Engineering.
		CO 3	Recall geomorphology, stratigraphy and physiographic divisions of India.
		CO 4	Incorporate findings of Geological investigation, remote sensing and GIS techniques in civil engineering.

		CO 5	Infer Geological conditions, nature of rocks, and site suitability for construction of building, road, dam, tunnel and treatment to unfavourable rocks masses
		CO 6	Explain geological hazards, geo-hydrological characters of the rocks, mass wasting processes, and good building stones.
201007	**Concrete Technology**	CO 1	Understand chemistry, properties, and classification of cement, fly ash, aggregates and admixtures, and hydration of cement in concrete.
		CO 2	Prepare and test the fresh concrete
		CO 3	Test hardened concrete with destructive and nondestructive testing instruments
		CO 4	Get acquainted to concrete handling equipments and different special concrete types.
		CO 5	Design concrete mix of desired grade
		CO 6	Predict deteriorations in concrete and repair it with appropriate methods and techniques.
201010	**Soft Skill**	CO 1	Make use of techniques for self-awareness and self-development.
		CO 2	Apply the conceptual understanding of communication into everyday practice.
		CO 3	Apply business etiquette skills effectively an engineer requires.

		CO 4	Understand the importance of teamwork and group discussions skills.
		CO 5	Develop leadership qualities.
		CO 6	Develop time management and stress management.
	Audit Course: Road Safety Management	CO 1	Show changes in awareness levels, knowledge and understanding.
		CO 2	Remember a change in attitudes / behavior e.g. against drink-drive.
		CO 3	Utilize remedial education for those who make mistakes and for low level offences where this is more effective than financial penalties and penalty points.
		CO 4	Understand road safety together leading to casualty reduction
Third Year			
Semester I			
301001	**Hydrology and Water Resources Engineering**	CO 1	To impart knowledge of hydrological processes, precipitation, abstractions in precipitation and stream gauging.
		CO 2	To introduce students the concept of irrigation and water requirement of crops and assessments of canal revenue.
		CO 3	To inculcate an ability to apply the theories of groundwater hydrology along with the concepts of groundwater movement and storage to solve problems related to yield of wells

		CO 4	To impart knowledge of rainfall-runoff relationship and flood using hydrograph theory and to solve problems related to runoff and flood discharge.
		CO 5	To introduce students the concept of, Reservoir planning, yield of reservoir, demand and supply conditions and flood routing.
		CO 6	To expose the students to water management, water logging and drainage
301002	**Infrastructure Engineering and Construction Techniques**	CO 1	Student will understand to know the scope of infrastructure engineering in national and global development
		CO 2	Student will Able to determine various components of railway engineering, the types and functions of track, junctions and railway stations
		CO 3	Applying different construction techniques as dewatering, dredging, slip form and hoists cranes
		CO 4	Remembering of tunnelling methods and various operations required in tunnelling
		CO 5	To discuss about the types and components of docks and harbours.
		CO 6	Concepts of Construction techniques and its practical applications, Earth moving equipment
301003	**Structural design I**	CO 1	Understand the behaviour and properties of structural steel members to resist shear, tension ,bending and compression and apply relevant I.S. codes

		CO 2	Understand the concepts of analysis and design of compression member
		CO 3	Understand the concepts of built up section used as column
		CO 4	To understand concept of analysis and design of laterally restrained and unrestrained beams
		CO 5	Ability to study beam to beam connection, beam to column connection and design of welded plate Girder
		CO 6	Analysis and Design of roof truss and gantry girder for industrial building
301004	**Structural Analysis II**	CO 1	Use slope deflection equations to solve statically indeterminate structures.
		CO 2	Apply concepts of moment distribution for analysis of continuous beams.
		CO 3	Find support reactions and end moments of structure by flexibility methods.
		CO 4	Find slopes and end moments of structure by stiffness matrix methods.
		CO 5	Find slopes at nodes in simple beams and internal stresses of members of multi-storied frames by portal and cantilever methods.
		CO 6	Understand basics of finite element method.

301005	**Fluid Mechanics II**	CO 1	To impart knowledge about Fluid flow around submerged objects and understand the characteristics of unsteady flow
		CO 2	Students will be able to study and learn about Open Channel Flows and their depth energy relationship
		CO 3	Students will be able to learn about Uniform Flow and its computations also study analyse the hydraulic jump
		CO 4	To impart the knowledge about Impact of Jet &studying the Centrifugal Pump along with its efficiencies
		CO 5	To impart the knowledge about Hydro-Power generation and basic design of turbines along with their performances
		CO 6	Students will be able to learn about Gradually varied flow and its computations through various analysis
301006	**Employability Skills Development**	CO 1	Ability to understand employer's requirements.
		CO 2	Ability to understand need of technical competence required for problem solving.
		CO 3	Ability to understand presentation skills
		CO 4	Ability to understand Communication skills
		CO 5	Ability to understand professional, group behavioural

			ethics and commercial interaction skill.
		CO 6	Development of personal skills to manage work load.
Semester II			
301007	**Advanced Surveying**	CO 1	Determine intervisisbility of stations
		CO 2	Describe various methods of Hydrographic Surveying
		CO 3	Describe the systems of Remote sensing and GIS
		CO 4	Identify errors in triangulation
		CO 5	Interpret the concepts of Photogrammetry and its applications such as determination of heights of objects on terrain.
		CO 6	Apply setting out principles to construction work-bridge
301008	**Project Management and Engineering Economics**	CO 1	To study the importance of project management.
		CO 2	To study project planning, scheduling, Monitoring and control.
		CO 3	To study project resources and site planning.
		CO 4	To study project economics and Appraisal.

		CO 5	To study project related finance and economics
		CO 6	To study the feasibility of construction projects.
301009	**Foundation Engineering**	CO 1	To understand the purpose and methods of soil exploration
		CO 2	To determine the bearing capacity of footing by different methods
		CO 3	To understand the settlement and consolidation of footing
		CO 4	To understand the deep foundation types and their uses
		CO 5	To understand the types, concept of cofferdams and the techniques in design of foundation in BC soil
		CO 6	To understand concepts of soil reinforcement, geosynthetics material in soil structure and Earthquake Geo-techniques
301010	**Structural Design II**	CO 1	Understand design philosophies of RC structure and relevant IS provisions to ensure safety and serviceability
		CO 2	Evaluate load transfer calculation and design of two dimensional structural element i.e. slab
		CO 3	Design and structural detailing of structural element staircase
		CO 4	Able to design the flexural members

		CO 5	Analyse flexural members for shear , bond and torsion
		CO 6	Design and structural drawing of column and isolated footing
301011	**Environmental Engineering-I**	CO 1	Engineers with the ability to analyze and control of Air pollution, noise pollution and s solid waste.
		CO 2	Engineers with the ability to analyze and asses the quality of water.
		CO 3	Engineers with the ability to analyze design and execute the water works.
		CO 4	Engineers having the ability to improve the existing systems, coagulation and flocculation.
		CO 5	Engineers with the ability to working as entrepreneur in this stream by getting the knowledge of water softening
		CO 6	Engineers having ability to perform post-graduation in the subject and to use the knowledge in competitive examinations.
301012	**Seminar**	CO 1	To study research papers for understanding of a new field, in the absence of a textbook, to summarise and review them.
		CO 2	To identify promising new directions of various cutting edge technologies
		CO 3	To impart skills in preparing detailed report describing the project and results
		CO 4	To effectively communicate by making an oral presentation before an evaluation committee

Fourth Year			
Semester I			
401001	**Environmental Engineering II**	CO 1	An ability to analyze design and executive the wastewater works
		CO 2	An ability to improve the existing wastewater works system
		CO 3	An ability to design advance waste water systems
		CO 4	An ability to function as a leader or member of a multidisciplinary team
		CO 5	An ability to perform post-graduation in the subject and use the knowledge in competitive examinations
		CO 6	Students will learn advanced treatment technology
401002	**Transportation Engineering**	CO 1	Understand history of road development, roads classification in India.
		CO 2	Able to fix road alignment, Geometric parameters, and highway drainage system
		CO 3	Understand traffic Engineering, controlling devices, Accident studies, types of road intersections; parking studies; highway lighting in India.
		CO 4	Able to understand materials used in Highway Construction and related tests.
		CO 5	Able to understand computation of design traffic, stresses in pavements, design guidelines for flexible pavements, rigid pavements and concrete pavements

		CO 6	Understand Construction process of pavements and Modern Trends in Highway Materials, Construction & Maintenance
401003	**Structural Design and Drawing III**	CO 1	Application of different specification of IS 1343: 1980 for prestressed concrete
		CO 2	Able to differentiate between pre-tensioning and post tensioning systems
		CO 3	Able to analyze and design prestressed flat slab.
		CO 4	Understand and designing of earth Retaining structures
		CO 5	Able to analyze and design the liquid retaining structures.
		CO 6	Understanding the concept of vibration and earthquake analysis.
401004	**Elective-I: Advanced Engineering Geology with Rock Mechanics**	CO 1	Explain distribution, characters and Civil Engineering significance of major rock formations of India.
		CO 2	Explain geohydrological characters, morphometric analysis, geological aspects of water conservation and the process of soil formation.
		CO 3	Apply geological knowledge in planning, development and resource engineering.
		CO 4	Validate the suitability of rocks on the basis of physical and mechanical properties, R.Q.D. and geophysical investigation.

		CO 5	Explore subsurface Geology for various Civil Engineering projects, foundation, treatments and tail channel.
		CO 6	Illustrate the suitability of various rock fields for tunnelling and bridge.
401005	**Elective II: TQM & MIS in Civil Engineering**	CO 1	students will get to knowabout the basic concepts and history of TQM
		CO 2	students will be able to understand defect's in material and six sigma
		CO 3	students get knowledge about ISO principles & other quality manuals
		CO 4	students will know about various certifications in quality management
		CO 5	students know the techniques about TQM and awards
		CO 6	students get knowledge of MIS concepts
401006	**Project Phase I**	CO 1	Work in a team to select a topic/problem for project work
		CO 2	Collect and review the literatures on selected topic
		CO 3	Formulate the methodology to work on project topic
		CO 4	Understand materials for work and its properties through observations and experimentation.

		CO 5	Identify an engineering problem, analyse and propose a work plan to solve it.
		CO 6	Prepare and present project stage 1 progress report
Semester II			
401007	**Dams and Hydraulic Structures**	CO 1	Students can understand Dam, its Safety and Behavioral aspects of Dam with Instruments.
		CO 2	Students can analyze and design Gravity Dam with different stability conditions.
		CO 3	Student's awarded the Spillway, Gates and layout of the Hydropower plant.
		CO 4	Students gained the knowledge in failure aspects of Earthen Dam and Design of Diversion Head Works.
		CO 5	Students are able to design canal and canal structures.
		CO 6	Students are understood C. D. Work and River Training Works.
401008	**Quantity Surveying, Contracts and Tenders**	CO 1	student should understandthe types of estimates , DSR and its pre-requisites
		CO 2	students will be able to calculate theestimates and bar bending schedule
		CO 3	students will be able to determinerates of various items and learn specifications
		CO 4	students will be able tounderstandvaluation and methods of valuation

		CO 5	students will be able to understand about tenders and methods of work execution
		CO 6	students will be able to understandabout contracts and arbitration
401009	**Elective III: Hydropower Engineering**	CO 1	Student will be able to describe and Understand various sources of Energy
		CO 2	Students can understand and identify various types of hydropower plant and their components
		CO 3	Students will be able to understand and do the load assessment of power plant
		CO 4	Students will gain the knowledge of water conductor system and power house
		CO 5	Students will be able to describe the working principles of different types of turbine and understand the phenomenon associated with it.
		CO 6	Students will gain the knowledge of economics of Hydropower plants as well as laws and regulatory aspects of electricity.
401010	**Elective IV: Construction Management**	CO 1	To enrich the students with the concepts and applications of Management
		CO 2	To make the learners understand the basic functions of Financial Management
		CO 3	To facilitate the students with the fundamental concepts of Technology management
		CO 4	To facilitate the students with the Risk Management of Construction Sector

		CO 5	To impart the importance of Human Resources in the organizational context
		CO 6	To gain knowledge related to artificial intelligence and applications
401006	**Project (Phase-II)**	CO 1	Work in a team to select a topic/problem for project work
		CO 2	Collect and review the literatures on selected topic.
		CO 3	Formulate the methodology to work on project topic
		CO 4	Understand materials for work and its properties through observations and experimentation.
		CO 5	Able to use waste materials in construction industry with engineering knowledge, skill and modern engineering tools for planning, construction, analysis and designing of engineering structures.
		CO 6	Prepare and present project report with effective writing and communication skills.