`ROEVER ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
(Inclusion under Sections 2(F) and 12(B) of the UGC Act, 1956)
Elambalur, Perambalur – 621 220.

DEPARTMENT OF CIVIL ENGINEERING
Course Outcome
Regulation 2017

Semester - I		
Course Code & Course Name	**Course outcome**	
HS8151 & Communicative English	CO1	Listen and recognize main ideas from different discourses in different accents.
	CO2	Speak clearly, confidently, comprehensively, and communicate with one or many listeners using appropriate communicative strategies.
	CO3	Read different genres of text adopting various reading strategies.
	CO4	Write cohesively and coherently by using a wide range of vocabulary and organize ideas logically on a topic without grammatical errors
	CO5	Determine the main and subordinate ideas, draw conclusions and summarize information from written material
MA8151 & Engineering Mathematics - I	CO1	Use both the limit definition and rules of differentiation to differentiate functions.
	CO2	Apply differentiation to solve maxima and minima problems
	CO3	Evaluate integrals both by using Reimann sums and by using the fundamental theorem of convergent improper integrals. Evaluate integrals using techniques of integration, such as substitution, partial Fractions, integration by parts and improper integrals.
	CO4	Apply integration to compute multiple integrals, area, volume, integrals in polar Coordinates, in addition to change of order and change of rabbles.
	CO5	Apply various techniques in solving differential equations.
PH8151 & Engineering Physics	CO1	Demonstrate the properties of elasticity and measure the different moduli of elasticity.
	CO2	Examine the characteristics of waves, Laser and optical fiber
	CO3	Illustrate different modes of heat transfer through objects.
	CO4	Explain the block body radiation, properties of matter waves and Schrodinger equations.
	CO5	Classify the bravais lattices, crystal structures, crystal imperfections and crystal growth techniques
CY8151 & Engineering Chemistry	CO1	Explain the hardness of water, its types and estimation, boiler troubles and treatment of boiler feed water.
	CO2	Explain adsorption, types and theories of adsorption isotherm and its application in pollution abatement, theories of catalysis and applications

	CO3	Understand the basic concepts of phase rule and its application to one and two component systems, properties, significance and applications of alloys.
	CO4	Relate the significance of solid, liquid and gaseous fuels and to calculate the calorific value of fuels.
	CO5	Illustrate the methods of harvesting energy from non-conventional energy sources.
GE8151 & Problem Solving and Python Programming	CO1	Develop algorithmic solutions to simple computational problems.
	CO2	Demonstrate programs using simple Python statements and expressions.
	CO3	Explain control flow and functions concept in Python for solving problems.
	CO4	Use Python data structures- lists, tuples & dictionaries for representing Compound data.
	CO5	Explain files, exception, modules and packages in Python for solving problems.
GE8152 & Engineering Graphics	CO1	Familiarize with the fundamentals and standards of engineering graphics.
	CO2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
	CO3	Project orthographic projections of lines and plane surfaces.
	CO4	Draw projections, solids and development of surfaces.
	CO5	Visualize and to project isometric and perspective sections of simple solids.
GE8161 & Problem Solving and Python Programming Laboratory	CO1	Develop solutions to simple computational problems using Python programs.
	CO2	Solve problems using conditionals and loops in Python.
	CO3	Develop Python programs by defining functions and calling them.
	CO4	Use Python lists, tuples & dictionaries for representing compound data.
	CO5	Develop Python programs using files.
GE8161 & Problem Solving and Python Programming Laboratory	CO1	Develop solutions to simple computational problems using Python programs.
	CO2	Solve problems using conditionals and loops in Python.
	CO3	Develop Python programs by defining functions and calling them.
	CO4	Use Python lists, tuples & dictionaries for representing compound data.
	CO5	Develop Python programs using files.
	CO1	Determine and estimate the types of alkalinity & hardness of a given water sample.
	CO2	Estimate the amount of copper content present in a given sample.
	CO3	Determine the strength of an acid by using pH meter.
	CO4	Determine the strength of a pure acid and mixture of acids by using conductivity meter.

	CO5	Estimate the amount of iron content present in a given solution by means of potentiometric titration.
Semester – II		
HS8251 & Technical English	CO1	Read technical texts and write area- specific texts effortlessly
	CO2	Listen and comprehend lectures and talks in their area of specialization successfully
	CO3	Speak appropriately and effectively in varied formal and informal contexts
	CO4	Write reports and winning job applications.
	CO5	Use appropriate technologies to organize, present, and communicate information to address a range of audiences, purposes, genres
MA8251 & Engineering Mathematics - II	CO1	Calculate the eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices
	CO2	Evaluate the line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
	CO3	Determine Analytic functions, conformal mapping and Bilinear transformation.
	CO4	Evaluate the Cauchy's integrals, Taylor's and Laurent's and residue theorem for evaluation for real integrals using circular and semicircular, contour
	CO5	Evaluate Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
PH8201 Physics For Civil Engineering	CO1	the students will have knowledge on the thermal performance of buildings,
	CO2	the students will acquire knowledge on the acoustic properties of buildings,
	CO3	the students will get knowledge on various lighting designs for buildings,
	CO4	the students will gain knowledge on the properties and performance of engineering materials, and
	CO5	the students will understand the hazards of buildings.
BE8251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	ability to identify the electrical components and explain the characteristics of electrical machines.
	CO2	ability to identify electronics components and understand the characteristics
	CO3	ability to identify digital electronics
	CO4	ability to identify semiconductor devices and applications

GE8291 & Environmental Science and Engineering	CO1	Explain the values, threats and conservation of biodiversity and classify various ecosystems.
	CO2	Identify and implement technological and economical solution to environmental pollution.
	CO3	Develop the knowledge on various natural resources, their causes and their effects.
	CO4	Explain various environmental acts and to explain various disaster management.
	CO5	Relate population growth and environment and the role of IT in environment and human health.
GE8292 ENGINEERING MECHANICS	CO1	illustrate the vectorial and scalar representation of forces and moments
	CO2	analyse the rigid body in equilibrium
	CO3	evaluate the properties of surfaces and solids
	CO4	calculate dynamic forces exerted in rigid body
	CO5	determine the friction and the effects by the laws of friction
GE8261 & Engineering Practices Laboratory	CO1	Demonstrate wiring for a simple residential house; identify the ratings of various appliances like fluorescent tube
	CO2	Calculate the different electrical quantities
	CO3	Measure the resistance to earth of electrical equipment
	CO4	Verify the truth tables of logic gates AND
	CO5	Develop soldering in a PCB
CE8211 COMPUTER AIDED BUILDING DRAWING	CO1	The students will be able to draft the plan .
	CO2	The students will be able to elevation and sectional views of the buildings,
	CO3	The students will be able to industrial structures,
	CO4	The students will be able to and framed buildings using computer softwares
	CO5	The students will be able to analysis and design of industrial structures
Semester – III		
MA8353 Transforms and Partial Differential Equations	CO1	Understand how to solve the given standard partial differential equations.
	CO2	Calculate differential equations using Fourier series analysis which plays a vital role in engineering applications.
	CO3	Express the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.

	CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
	CO5	Determine the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems
CE8301 Strength of Materials I	CO1	Understand the concepts of stress and strain, principal stresses and principal planes.
	CO2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
	CO3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
	CO4	Apply basic equation of torsion in design of circular shafts and helical springs,
	CO5	Analyze the pin jointed plane and space trusses
CE8302 Fluid Mechanics	CO1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
	CO2	Understand and solve the problems related to equation of motion.
	CO3	Gain knowledge about dimensional and model analysis.
	CO4	Learn types of flow and losses of flow in pipes.
	CO5	Understand and solve the boundary layer problems.
CE8351 Surveying	CO1	The use of various surveying instruments and mapping
	CO2	Measuring Horizontal angle and vertical angle using different instruments
	CO3	Methods of Levelling and setting Levels with different instruments
	CO4	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
	CO5	Concept and principle of modern surveying
CE8391 Construction Materials	CO1	Ability to compare the properties of stones, bricks and concrete blocks.
	CO2	Understand the typical and potential applications of lime, cement and aggregates.
	CO3	Ability to understand the relationship between material properties and design a concrete mix
	CO4	Ability to compare the properties of timber and other construction materials.
	CO5	Ability to compare the properties of most common and advanced building materials.
CE8392 Engineering Geology	CO1	Understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
	CO2	Get basics knowledge on Physical properties of minerals.
	CO3	Gain knowledge about types of rocks, distribution and uses.

	CO4	Understand the methods of study on geological structure.
	CO5	Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour.
MA8491 Numerical Methods	CO1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
	CO2	Listening the numerical techniques of interpolation and error approximations in various intervals in real life situations.
	CO3	Apply the numerical techniques of differentiation and integration for engineering problems.
	CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
	CO5	Calculate the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
CE8401 Construction Techniques and Practices	CO1	Know the different construction techniques and structural systems
	CO2	Understand various techniques and practices on masonry construction, flooring, and roofing.
	CO3	Plan the requirements for substructure construction.
	CO4	Know the methods and techniques involved in the construction of various types of super Structures
	CO5	Select, maintain and operate hand and power tools and equipment used in the buildingconstruction sites.
Semester – IV		
CE8402 Strength of Materials II	CO1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
	CO2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
	CO3	Prove the load carrying capacity of columns and stresses induced in columns and cylinders.
	CO4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure.
	CO5	Determine the stresses due to unsymmetrical bending of beams locate the shear centre and find the stresses in curved beams.
CE8403 Applied Hydraulic Engineering	CO1	Apply their knowledge of fluid mechanics in addressing problems in open channels.
	CO2	Able to identify a effective section for flow in different cross sections.
	CO3	solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
	CO4	Understand the principles, working and application of turbines.
	CO5	Understand the principles, working and application of pumps.
	CO1	Understand the properties of concrete and roll of ingredients like cement, aggregate, admixtures in concrete

CE8404 Concrete Technology	CO2	Gain knowledge about the chemical and mineral admixtures
	CO3	Proportion the concrete using various mix design concepts
	CO4	Understand the testing procedures for workability and strength for fresh and hardened concrete.
	CO5	Understand the importance and application of special concretes.
CE8491 Soil Mechanics	CO1	Classify the soil and assess the engineering properties based on index properties
	CO2	Understand the stress concepts in soils
	CO3	Understand and identify the settlement in soils
	CO4	Determine the shear strength of soil
	CO5	Analyze both finite and infinite slopes and slope protection measures
CE8501 Design of Reinforced Cement Concrete Elements	CO1	Understand the various design methodologies for the design of RC elements
	CO2	Know the analysis and design of flanged beams by limit state method and
	CO3	Know the design of beams for shear, bond and torsion.
	CO4	Design the various types of slabs and staircase by limit state method.
	CO5	Design columns for axial, uniaxial, biaxially eccentric loadings using LimitState Method as per codal requirements.
Semester – VI		
CE8502 Structural Analysis I	CO1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
	CO2	Analyse the continuous beams and rigid frames by slope defection method
	CO3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
	CO4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
	CO5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.
EN8491 Water Supply Engineering	CO1	Insight into the structure of drinking water supply systems, including water transport, treatment and distribution
	CO2	Acquire knowledge in various unit operations and processes in water treatment
	CO3	Design the various functional units in water treatment
	CO4	Understand the water quality criteria and standards, and their relation to public health
	CO5	Design and evaluate water supply project alternatives on basis of chosen criteria
	CO1	Understand the site investigation, methods and sampling.
	CO2	Get knowledge on bearing capacity and testing methods.

CE8591 Foundation Engineering	CO3	Design of shallow footings.
	CO4	Determine the load carrying capacity, settlement of pile foundation.
	CO5	Determine the earth pressure on retaining walls and analysis for stability
GI8014 Geographic Information System	CO1	Have basic idea about the fundamentals of GIS.
	CO2	Learn the types of data models.
	CO3	Get knowledge about data input and topology.
	CO4	Gain knowledge on data quality and standards.
	CO5	Learn about data management functions and data output
OAI 551 Environment and Agriculture	CO1	Appreciate the role of environment in the current practice of agriculture and concerns of sustainability
	CO2	Apply Fundamental Knowledge on irrigation system and agriculture impacts
	CO3	Understand the context of climate change and emerging global issues
	CO4	Recognized the context of Ecological Diversity in agriculture.
	CO5	Identify the Global governmental Issues and policies about virtual water trade.
CE8512 Water and Waste Water Analysis Laboratory	CO1	Ability to estimate sewage generation and design sewer system including sewage pumping stations
	CO2	Required understanding on the characteristics and composition of sewage, self-purification of streams
	CO3	Ability to perform basic design of the unit operations and processes that are used in sewage treatment
	CO4	Understand the standard methods for disposal of sewage.
	CO5	Knowledge on construction and operation & maintenance of sewage treatment plants.
Semester – VI		
CE8601 Design of Steel Structural Elements	CO1	Understand the technical competence in the design of steel building
	CO2	Understand the concepts of working stress and limit state design philosophies
	CO3	Design common bolted and welded connections for steel structures
	CO4	Design tension members and understand the effect of shear lag.
	CO5	Understand the design concept of axially loaded columns and column
CE8602 Structural Analysis II	CO1	Draw influence lines for statically determinate structures and calculate critical stress resultants.
	CO2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
	CO3	Analyse of three hinged, two hinged and fixed arches.
	CO4	Analyse the suspension bridges with stiffening girders

	CO5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames
CE8603 Irrigation Engineering	CO1	Have knowledge and skills on crop water requirements.
	CO2	Understand the methods and management of irrigation.
	CO3	Gain knowledge on types of Impounding structures
	CO4	Understand methods of irrigation including canal irrigation.
	CO5	Get knowledge on water management on optimization of water use.
CE8604 Highway Engineering	CO1	Get knowledge on planning and aligning of highway.
	CO2	Acquire Geometric design of highways.
	CO3	Design flexible and rigid pavements.
	CO4	Gain knowledge on Highway construction materials, properties, testing methods.
	CO5	Develop the concept of pavement management system, evaluation of distress and maintenance of pavements.
EN8592 Waste Water Engineering	CO1	Ability to estimate sewage generation and design sewer system including sewage pumping stations.
	CO2	Required understanding on the characteristics and composition of sewage, self purification of streams.
	CO3	Ability to perform basic design of the unit operations and processes that are used in sewage treatment.
	CO4	Understand the standard methods for disposal of sewage.
	CO5	Gain knowledge on sludge treatment and disposal.
CE8005 Air Pollution and Control Engineering	CO1	An understanding of the nature and characteristics of the air pollutants.
	CO2	Knowledge on basic concepts of air quality management and ability to identify the various types of plume dispersion.
	CO3	Ability to select appropriate equipments and models to control the pollutants.
	CO4	Capability to monitor the air quality standards for gaseous contaminants.
	CO5	The Competence to identify, control and prevent noise pollution.
CE8612 rrigation and Environmental Engineering Drawing	CO1	Design and drawing of RC sand filters and septic tank with reinforcement details
	CO2	Design and drawing of RC Trickling filter and sedimentation tank reinforcement
	CO3	Design and drawing of RC siphon aqueduct, canal escape with reinforcement details
	CO4	Design and drawing of intake tower with reinforcement details
	CO5	Design and drawing of RC Tank sluice and canal drop with reinforcement
	CO1	Recognize the Employability and career skills

HS8581 Professional Communication	CO2	Express effective presentations
	CO3	Discuss confidently in Group Discussions.
	CO4	Prepare their job interviews and be successful in them
	CO5	Apply adequate Soft Skills required for the workplace
Semester – VII		
CE8701 Estimation, Costing and Valuation Engineering"	CO1	Estimate of quantities of items for different types of buildings by various methods.
	CO2	Prepare rate Analysis for all Building works, canals, roads and Cost Estimate.
	CO3	Understand types of specifications, principles for report preparation and tender notices.
	CO4	Gaining knowledge about type of contracts and drafting of contract documents.
	CO5	Prepare a value estimate and fixing the rent for different properties
CE8702 Railways, Airports, Docks and Harbour Engineering	CO1	Understand the history of Indian railways, components of track and geometric design of railway
	CO2	Understand the concept of drainage, earthwork, tunneling, and modern methods of track maintenance, urban rail, Metro and underground railways.
	CO3	Develop knowledge on airport planning and to acquire knowledge on site investigation for location and design considerations on runway and taxiways.
	CO4	Gain knowledge on airport buildings, motor vehicle parking, lightings and air traffic control systems.
	CO5	Acquaint knowledge on harbor engineering, classification of harbours
CE8703 Structural Design and Drawing	CO1	Design and draw reinforced concrete Cantilever and Counter fort Retaining Walls
	CO2	Design and draw flat slab as per code provision
	CO3	Design and draw reinforced concrete and steel bridge
	CO4	Design and draw reinforced concrete and steel water tanks
	CO5	Design and detail the various steel trusses
CE8011 Design of Prestressed Concrete Structures	CO1	Understand the behaviour of prestressed concrete members and able to analyze theprestressed concrete beams.
	CO2	Design the prestressed concrete members for flexure and shear as per the relevant designcode (IS 1343).
	CO3	Analyze for deflection of prestressed concrete members and design the anchorage zone.
	CO4	Analyze and design of composite beams and continuous beams.
	CO5	Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.

OML751 Testing of Materials	CO1	Acquire basic knowledge on material testing fundamentals, testing organizations, testing standards and procedures.
	CO2	Classify different types of destructive testing methods and its applications.
	CO3	Classify different types of basic non-destructive testing methods and its applications.
	CO4	Function the various optical instruments used for material characterization.
	CO5	Identify the various thermal and chemical testing techniques.
Semester – VIII		
GE8076 Professional Ethics in Engineering	CO1	Understand the essence of Ethics
	CO2	Understand about various morals and values for professional excellence
	CO3	Know the different ideas of Engineering Ethics
	CO4	Stand on the point of safety, responsibility and rights in society
	CO5	Understand and aware about global issues of ethics and its applicability
CE8020 Maintenance, Repair and Rehabilitation of Structures	CO1	Build out causes of deterioration.
	CO2	Apply various durability parameters suitably
	CO3	Classify different type of material used for repair
	CO4	Choose among different techniques of repair
	CO5	Implement various methods of demolition practices
CE8811 PROJECT WORK	CO1	The students will know different legal aspect and its provisions for construction project
	CO2	The students will be able to understand and apply the knowledge of management functions like planning, scheduling, executing and controlling to construction projects.
	CO3	The students will be able to demonstrate their capability for preparing the project networks to work out best possible time for completing the project
	CO4	The students will be able to understand and exercise the time- cost relationship in practices.
	CO5	The students will be able to implement the safety aspects during the execution of civil engineering project