AKSHAYA
COLLEGE OF ENGINEERING AND TECHNOLOGY
(Approved by AICTE, Affiliated to Anna University & Accredited by NAAC)
Kinathukadavu, Coimbatore - 642 109.

Department of Civil Engineering

List of Course Outcomes for Academic year 2023-2024

Sl No.	Year & Semester	Course Code	Course Name	Course Outcome
1	II/III	MA3351	Transforms and Partial Differential Equations	CO1 Understand how to solve the given standard partial differential equations. CO2 Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. CO3 Appreciate 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 Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
2		E3351	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 distributed forces CO4 Determine the friction and the effects by the laws of friction CO5 Calculate dynamic forces exerted in rigid body
3		E3301	Fluid Mechanics	CO1 Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions. CO2 Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.

				CO3 Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies. CO4 Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. CO5 Explain the concept of boundary layer and its application to find the drag force excreted by the fluid on the flat solid surface
4		CE3302	Construction Materials and Technology	CO1 Identify the good quality brick, stone and blocks for construction. CO2 Recognize the market forms of timber, steel, aluminum and applications of various composite materials. CO3 Identify the best construction and service practices such as thermal insulations and air conditioning of the building CO4 Select various equipments for construction works conditioning of building CO5 Understand the construction planning and scheduling technique
5		CE3303	Water Supply and Wastewater Engineering	CO1 Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission CO2 Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations CO3 Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process CO4 Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods. CO5 Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage
6		E3351	Surveying and Levelling	CO1 Introduce the rudiments of various surveying and its principles. CO2 Imparts knowledge in computation of levels of terrain and ground features

				CO3 Imparts concepts of Theodolite Surveying for complex surveying operations CO4 Understand the procedure for establishing horizontal and vertical control CO5 Imparts the knowledge on modern surveying instruments
7		CE3361	Surveying and Levelling Laboratory	CO1 Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments CO2 Able to use levelling instrument for surveying operations CO3 Able to use theodolite for various surveying operations CO4 Able to carry out necessary surveys for social infrastructures CO5 Able to prepare planimetric maps
8		CE3311	Water and Wastewater Analysis Laboratory	CO1 Calibrate and standardize the equipment CO2 Collect proper sample for analysis CO3 To know the sample preservation methods CO4 To perform field oriented testing of water, wastewater CO5 To perform coliform analysis
9		GE3361	Professional Development	CO1 Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements CO2 Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding CO3 Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects
10		CE3401	Applied Hydraulics Engineering	CO1 Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application CO2 Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades. CO3 Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.

				CO4 Design turbines and explain the working principle CO5 Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps
11		CE3402	Strength of Materials	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.73 CO4 Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements. CO5 Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure
12	II/IV	CE3403	Concrete Technology	CO1 Understand the requirements of cement, aggregates and water for concrete CO2 Select suitable admixtures for enhancing the properties of concrete CO3 Design concrete mixes as per IS method of mix design CO4 Determine the properties of concrete at fresh and hardened state. CO5 Know the importance of special concretes for specific requirements.
13		CE3404	Soil Mechanics	CO1 Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems CO2 Show the basic understanding of flow through soil medium and its impact of engineering solution CO3 Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation CO4 Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils. CO5 Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications
14		CE3405	Highway and Railway Engineering	CO1 Plan a highway according to the principles and standards adopted in various institutions in India. CO2 Design the geometric features of road network and components of pavement

				CO3 Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management. CO4 Understand the methods of route alignment and design elements in railway planning and constructions. CO5 Understand the construction techniques and maintenance of track laying and railway stations
15		GE3451	Environmental Sciences and Sustainability	CO1 To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation. CO2 To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society. CO3 To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations. CO4 To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development. CO5 To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization
16		E3411	Hydraulic Engineering Laboratory	CO1 Apply Bernoulli equation for calibration of flow measuring devices. CO2 Measure friction factor in pipes and compare with Moody diagram CO3 Determine the performance characteristics of rotodynamic pumps. CO4 Determine the performance characteristics of positive displacement pumps. CO5 Determine the performance characteristics of turbines
17		CE3412	Materials Testing Laboratory	CO1 Determine the mechanical properties of steel. CO2 Determine the physical properties of cement CO3 Determine the physical properties of fine and coarse aggregate. CO4 Determine the workability and compressive strength of concrete. CO5 Determine the strength of brick and wood.

18		CE3413	Soil Mechanics Laboratory	CO1 Conduct tests to determine the index properties of soils CO2 Determine the insitu density and compaction characteristics. CO3 Conduct tests to determine the compressibility, permeability and shear strength of soils. CO4 Understand the various tests on Geosynthetics
19	III/V	CE3501	Design of Reinforced Concrete Structural Elements	CO1 Know the various design concepts and design RC rectangular beams by working stress and limit state methods CO2 Understand the design of flanged beams, design for shear and torsion, and anchorage and development length. CO3 Design a RC slabs and staircase and draw the reinforcement detailing. CO4 Design short columns for axial, uni-axial and bi-axial eccentric loadings CO5 Design wall footings, isolated footings and combined rectangular footing
20		CE3502	Structural Analysis I	CO1 Analyze the pin-jointed plane and space frames. 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.
21		CE3503	Foundation Engineering	CO1 Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation CO2 Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications. CO3 Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications. CO4 Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications. CO5 Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications.

22			Rehabilitation/ Heritage Restoration	CO1 Know the importance of inspection and maintenance. CO2 Study the Impacts of cracks, corrosion and climate on structures. CO3 Know about various special concretes CO4 Understand the testing techniques and various protection measures CO5 Know the Repair of structures and Restoration of Heritage structures
23			Advanced Construction Techniques	O1 Understand the modern construction techniques used in the sub structure construction. CO2 Demonstrate knowledge and understanding of the principles and concepts relevant to super structure construction for buildings CO3 Understand the concepts used in the construction of special structures CO4 Knowledge on Various strengthening and repair methods for different cases. CO5 Identify the suitable demolition technique for demolishing a building.
24		CE3026	Traffic Engineering and Management	CO1 Apply the knowledge of science and engineering fundamentals in conducting traffic surveys, analyze the problems and relating it with standards CO2 Understand the principles of traffic flow characteristics and their relationships CO3 Understand various traffic management measures in addressing the demand Pricing and ITS applications. CO4 Designing various types of control and regulatory measures to meet an efficient traffic network. CO5 Understand various type of facilities and plan for Non Motorised Transport
25		MX3084	Disaster Risk Reduction and Management	CO1: To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR) CO2: To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction CO3: To develop disaster response skills by adopting relevant tools and technology CO4: Enhance awareness of institutional processes for Disaster response in the country and CO5: Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

26		CE3511	Highway Engineering Laboratory	CO1 Characterize Pavement Aggregate through relevant test. CO2 Ascertain the Quality of Bitumen. CO3 Determine the Optimum Binder Content Using Marshall Method. CO4 Evaluate the Consistency and Properties of Bitumen. CO5 Determine the Bitumen Content in the Bituminous Mixes
		CE3512	Survey Camp (2 weeks)	CO1:Handle the modern surveying instruments like Total station and GPS CO2:Apply modern surveying techniques in field to establish horizontal control. CO3:Understand the surveying techniques in field to establish vertical control CO4:Apply different survey adjustment techniques. CO5:Carry out different setting out works in the field
27	IV/VII	CE8701	Estimation, Costing and Valuation Engineering	CO1: Estimate the quantities for buildings, Rate CO2:Analysis for all Building works, canals, and Roads and Cost Estimate. CO3:Understand types of specifications, principles for report preparation, tender notices types. CO4:Gain knowledge on types of contracts CO5:Evaluate valuation for building and land.
28		CE8702	Railways, Airports, Docks and Harbour Engineering	CO1:Understand the methods of route alignment and design elements in Railway Planning and Constructions. CO2:Understand the Construction techniques and Maintenance of Track laying and Railway stations. CO3Gain an insight on the planning and site selection of Airport Planning and design. CO4: Analyse and design the elements for orientation of runways and passenger facility systems. CO5:Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.
29		CE8703	Structural Design and Drawing	CO 1:Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls CO 2:Design and draw flat slab as per code provisions CO3: Design and draw reinforced concrete and steel bridges CO4:Design and draw reinforced concrete and steel water tanks CO5:Design and detail the various steel trusses and cantry girders

		OME 754	Industrial safety	CO1:Students must be able to identify and prevent chemical, CO2:environmental mechanical, fire hazard through analysis and CO3: apply proper safety techniques on. CO4: safety engineering and management CO5:Safety regulations Product safety
		EN8591	Municipal solid waste management	CO1: understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management. CO2:Reduction, reuse and recycling of waste CO3: ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste CO4: knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context CO5:Design and operation of sanitary landfill.
30		CE8711	Creative and Innovative Project (Activity Based - Subject Related)	To identify a topic of interest in consultation with Faculty/Supervisor. Review the literature and gather information pertaining to the chosen topic. State the objectives and develop a methodology to achieve the objectives. Carryout the design / fabrication or develop computer code. Demonstrate the novelty of the project through the results and outputs
31		CE8712	Industrial Training (4 weeks During VI Semester – Summer)	The intricacies of implementation textbook knowledge into practice The concepts of developments and implementation of new techniques
32	IV/VIII	GE8076	Professional Ethics in Engineering	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society
33		CE8020	Maintenance, Repair and Rehabilitation of structures.	CO1: The importance of maintenance and assessment method of distressed structures. CO2: The strength and durability properties ,their effects due to climate and temperature. CO3:recent development in concrete CO4: the techniques for repair rand protection methods CO5: repair, rehabilitation and retrofitting of structures and demolition methods.
34		CE8811	Project Work	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology