



SAPTHAGIRI COLLEGE OF ENGINEERING

Department of Civil Engineering

Course Outcomes

II Year Civil Engineering

Course Code	Course Name	Course Outcomes-On completion of this course the students will be able to
15MAT31	Engineering Mathematics-III	CO1: Know the use of periodic signals and Fourier series to analyze circuits and system communications. CO2: Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform. CO3: Employ appropriate numerical methods to solve algebraic and transcendental equations CO4: apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electromagnetic and gravitational fields and fluid flow problems. CO5:Determine the external of functional and solve the simple problems of the calculus of variations
15CV32	STRENGTH OF MATERIALS	CO1: To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion. CO2: To suggest suitable material from among the available in the field of construction and manufacturing CO3:To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts CO4:To understand the basic concept of analysis and design of members subjected to torsion CO5: To understand the basic concept of analysis and design of structural elements such as columns and struts.
15CV33	FLUID MECHANICS	CO1:To understand the fundamental properties of fluids and fluid continuum CO2: To understand the hydrostatics including practical applications CO3: To understand kinematic concepts related to fluid flow CO4: To understand fundamental law of fluid mechanics and Bernoulli's principle CO5:To understand the discharge through pipes and over notches and weir

15CV34	BASIC SURVEYING	CO1: Understand the concepts of linear measurements CO2: Learn the methods of angular measurements CO3: Learn horizontal and vertical measurements to arrive at solutions to basic surveying problems. CO4: Analyze the data given and calculate the elevation CO5: Employ the area and volume calculating techniques and calculate the Area and volumes
15CV35	Engineering Geology	CO1: Students will able to apply the knowledge of geology and its role in Civil Engineering CO2: Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices. CO3: Analyze the natural disasters and their mitigation. CO4: Assess various structural features and geological tools in ground water exploration, Natural resource estimation and solving civil engineering problems. CO5: Apply and asses use of building materials in construction and asses their properties
15CV36	Building Materials and Construction	CO1: To understand the good materials to be used for the construction work. CO2: To investigation of soil condition, Deciding and design of suitable foundation for different structures. CO3: To understand in supervision of different types of masonry CO4: To understand the selection of materials, design and supervision of suitable type of floor and Roof. CO5: To gain knowledge about doors, windows, plastering, painting, damp proofing, Scaffolding, Shoring, underpinning and to take suitable engineering measures.
15CVL37	Building Materials Testing Laboratory	CO1: Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion. CO2: Identify, formulate and solve engineering problems of structural elements subjected to flexure CO3: Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.
15CVL38	Basic Surveying Practice	CO1: Apply the basic principles of engineering surveying and measurements CO2: Follow effectively field procedures required for a professional surveyor CO3: Use techniques, skills and conventional surveying instruments necessary for engineering practice

15MAT41 15CV42	Engineering Mathematics –IV Analysis of Determinate Structures	CO1:Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods CO2: Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials CO3: Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing. CO4: Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering. CO5: Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process. CO1: Evaluate the forces in determinate trusses by method of joints and sections. CO2: Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods CO3: Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames. CO4: Determine the stress resultants in arches and cables CO5: Understand the concept of influence lines and construct the ILD diagram for the moving loads.
15CV43	Applied Hydraulics	CO1:To Understand dimensional analysis to develop mathematical modeling CO2:To Understand the design of open channels CO3:To Understand the energy concepts of fluid in open channels CO4: To Understand performance of turbines CO5: To Understand concept of centrifugal pump.
15CV44	Concrete Technology	CO1: Relate material characteristics and their influence on microstructure of concrete. CO2: Distinguish concrete behavior based on its fresh and hardened properties. CO3: Illustrate proportioning of different types of mixes for required fresh and hardened properties using professional's codes.
15CV45	Basic Geotechnical Engineering	CO1:Will acquire an understanding of the procedures to determine index properties of any type of soil, classify the soil based on its index properties CO2:Will be able to determine compaction characteristics of soil and apply that knowledge to assess field compaction procedures

		CO3: Will be able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress; Also acquire ability to estimate seepage losses across hydraulic structure CO4: Will be able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory CO5: Ability to solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same.
15CV46	Advanced Surveying	CO1: Apply the knowledge of geometric principles to arrive at surveying problems CO2: Use modern instruments to obtain geo-spatial data and analyze the same to appropriate engineering problems. CO3: Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments; CO4: Design and implement the different types of curves for deviating type of alignments.
15CVL47	Fluid Mechanics Laboratory	CO1: calibrate flow measuring devices CO2. Determine the force exerted by jet of water on vanes CO3. measure discharge and head losses in pipes CO4. understand the fluid flow pattern
15CVL48	Engineering Geology Laboratory	CO1. To identify the minerals and rocks based on their inherent properties and uses in civil engineering CO2. To interpret the geological maps related to civil engineering projects. CO3. To learn the dip and strike, borehole problems, thickness of geological formation related to foundation, tunnels, reservoirs and mining. CO4. To understand subsurface geological conditions through a geophysical techniques and watershed management. CO5. To visit the civil engineering projects like dams, reservoirs, tunnels, quarry sites etc

HOD

III Year Civil Engineering

Course Code	Course Name	Course Outcomes-On completion of this course the students will be able to
15CV51	Design of RC Structural Elements	CO1.Identify, formulate and solve engineering problems of RC elements subjected to different kinds of loading. CO2.Follow a procedural knowledge in designing various structural RC elements. CO3. Impart the culture of following the codes for strength, serviceability and durability as an ethics. CO4. Provide knowledge in analysis and design of RC elements for the success in competitive examination.
15CV52	Analysis of Indeterminate Structures	CO1:Able to determine the unknown slopes and final support moments CO2: Able to solve the simultaneous equations as in the slope deflection method by series of successive approximation. CO3: Able to analyze continuous beams and frames with side sway as well. CO4: Able to construct the bending moment diagram for beams and frames using Flexibility method. CO5:Able to analyze the beam and indeterminate frames by system stiffness method
15CV53	Applied Geotechnical Engineering	CO1:Ability to plan and execute geotechnical site investigation program for different civil engineering projects CO2:Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils CO3:Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures CO4:Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure CO5:Capable of estimating load carrying capacity of single and group of piles
15CV54	Computer Aided Building Planning and Drawing	CO1:Students will be able to gain a broad understanding of planning and designing of buildings CO2: Students will be able to Prepare, read and interpret the drawings in a professional set up. CO3:Students will be able to Know the procedures of submission of drawings and Develop

		working and submission drawings for building CO4: Students will be able to Plan and design a residential or public building as per the given requirements
15CV552	Railways, Harbours, tunneling and Airports	CO1: Acquires capability of choosing alignment and also design geometric aspects of railway system, runway, and taxiway. CO2: Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive. CO3: Develop layout plan of airport, harbor, dock and will be able to relate the gained knowledge to identify required type of visual and/or navigational aids for the same CO4: Apply the knowledge gained to conduct surveying, understand the tunneling activities.
15CV561	Traffic Engineering	CO1: Understand the human factors and vehicular factors in traffic engineering design. CO2: Conduct different types of traffic surveys and analysis of collected data using statistical concepts. CO3: Use an appropriate traffic flow theory and to comprehend the capacity & signalized intersection analysis. CO4: Understand the basic knowledge of Intelligent Transportation System.
15CVL57	Geotechnical Engineering Laboratory	CO1: Physical and index properties of the soil CO2: Classify based on index properties and field identification CO3: To determine OMC and MDD, plan and assess field compaction program CO4: Shear strength and consolidation parameters to assess strength and deformation characteristics CO5: In-situ shear strength characteristics (SPT- Demonstration)
15CVL58	Concrete and Highway Materials Laboratory	CO1: Conduct appropriate laboratory experiments and interpret the results CO2: Determine the quality and suitability of cement CO3: Design appropriate concrete mix CO4: Determine strength and quality of concrete CO5: Test the road aggregates and bitumen for their suitability as road material. CO6: Test the soil for its suitability as sub grade soil for pavements.
15CV61	Construction Management and Entrepreneurship	CO1: Understand and explain the project management process and its significance. CO2: Understand the structure of a construction company and develop the schedules for various activities CO3: Estimate various construction costs. CO4: Explain QMS, TQM and safety at construction sites.

		CO5: Explain the Entrepreneurship and business planning process.
15CV62	Design of Steel Structural Elements	CO1.Understand advantages and disadvantages of steel structures, steel code provisions, and plastic behavior of structural steel. CO2. Learn Bolted connections and Welded connections. CO3. Design of compression members, built-up columns and columns splices. CO4. Design of tension members, simple slab base and gusseted base. CO5. Design of laterally supported and un-supported steel beams.
15CV63	Highway Engineering	CO1:Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data CO2: Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction. CO3: Design road geometrics, structural components of pavement and drainage. CO4: Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.
15CV64	Water Supply and Treatment Engineering	CO1:Able to do the population forecasting for city or town or village CO2:Able to collect the water sample and know how to preserve the sample for the characterization of water quality CO3: Able to choose the best method to Disinfect and Softening the raw water according to their quality. CO4:Able to choose the best method to Disinfect and Softening the raw water according to their quality CO5: Able to formulate the best water network system for different type of city and can you able to identify type of pipe material and pipe appurtenances used in water distribution system.
15CV651	Solid Waste Management	CO1:Analyse existing solid waste management system and to identify their drawbacks CO2:Evaluate different elements of solid waste management system. CO3: Suggest suitable scientific methods for solid waste management elements. CO4: Design suitable processing system and evaluate disposal sites.
15CV661	Water Resource Management	CO1: Assess the potential of groundwater and surface water resources. CO2: Address the issues related to planning and management of water resources. CO3: Know how to implement IWRM in different regions. CO4: Understand the legal issues of water policy. CO5:Select the method for water harvesting based on the area

15CVL67	Software Application Laboratory	CO1. Use industry standard software in a professional set up. CO2: understand the elements of finite element modeling, specification of loads and boundary condition, performing analysis and interpretation of results for final design CO3. Develop customized automation tools
15CVP68	Extensive Survey Project /Camp	CO1.Understand the practical applications of Surveying. CO2. Use Total station and other Measurement Equipments. CO3. Work in teams and learn time management, communication and presentation skills
15CV51	Design of RC Structural Elements	CO1.Identify, formulate and solve engineering problems of RC elements subjected to different kinds of loading. CO2.Follow a procedural knowledge in designing various structural RC elements. CO3. Impart the culture of following the codes for strength, serviceability and durability as an ethics. CO4. Provide knowledge in analysis and design of RC elements for the success in competitive examination.

HOD

IV Year Civil Engineering

Course Code	Course Name	Course Outcomes-On completion of this course the students will be to
15CV71	Municipal and Industrial Waste Water Engineering	CO1:Can able to acquires capability to design sewer and Sewerage treatment plant CO2:Can able to design the organic loading of sewage into receiving waters and maintaining the self purification of streams depending on hydraulic CO3: Can able to evaluate degree of treatment and type of treatment for disposal, reuse and recycle CO4: Can able to Identify waste streams and design the industrial waste water treatment plant. CO5:Can able to Manage sewage and industrial effluent issues
15CV72	Design of RCC and Steel Structures	CO1.Provide basic knowledge in the areas of limit state method and concept of design of RC and Steel structures CO2. Identify, formulate and solve engineering problems in RC and Steel Structures CO3. Give procedural knowledge to design a system, component or process as per needs and specifications of RC Structures like Retaining wall, Footing, Water tanks, Portal Frames and Steel Structures like Roof Truss, Plate Girder and Gantry Girder. CO4. Imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design of RC and Steel Structures. CO5. Provide factual knowledge on analysis and design of RC Structural elements, who can participate and succeed in Competitive examinations.
15CV73	Hydrology and Irrigation Engineering	CO1: Understand the importance of hydrology and its components CO2: Measure precipitation and analyze the data and analyze the losses in precipitation. CO3: Estimate runoff and develop unit hydrographs. 4. Find the benefits and ill-effects of irrigation. CO4: Find the quantity of irrigation water and frequency of irrigation for various crops. CO5: Find the canal capacity, design the canal and compute the reservoir capacity.
15CV741	Design of Bridges	CO1: Understand the load distribution and IRC standards. CO2: Design the straight and skew slab bridges. CO3:Students will be able to develop the loads, moments and Construct the

		reinforcement details for Interior Panel, Longitudinal girder, Cross girder of the bridge. CO4: Students will be able to construct reinforcement details for pipe culvert and box culvert. CO5: Students will be able to develop stresses in abutments and piers.
15CV751	Urban Transportation and Planning	CO1: Design, conduct and administer surveys to provide the data required for transportation planning. CO2: Supervise the process of data collection about travel behavior and analyze the data for use in transport planning. CO3: Develop and calibrate modal split, trip generation rates for specific types of land use developments CO4: Adopt the steps that are necessary to complete a long-term transportation plan.
15CVL76	Environmental Engineering Laboratory	CO1: Acquire capability to conduct experiments and estimate the concentration of different parameters CO2: Compare the result with standards and discuss based on the purpose of analysis CO3: Determine type of treatment, degree of treatment for water and wastewater. CO4: Identify the parameter to be analyzed for the student project work in environmental stream.
15CVL77	Computer Aided Detailing of Structures C	CO1: Students will be able to detail reinforcement for slabs and beams. CO2: Students will be able to detail reinforcement for water tank. CO3: Students will be able to detail reinforcement for cantilever walls. CO4: Students will be able to detail connection for beams to column. CO5: Students will be able to detail connection for bases.
15CVP78	Project Work Phase-I + Project work Seminar	CO1 CO1: Demonstrate their initiative and intellectual achievement, their comprehension of the chosen subject matter, and their capacity of employing the theoretical principles in practical situations CO2: search for technical information from various resources, such as the library, research and technical literature, electronic database and the World Wide Web CO3: be able to formulate engineering problems and develop appropriate solution methods to meet desired needs
15CV81	Quantity Surveying and Contracts Management	CO1: Prepare detailed and abstract estimates for roads and building. CO2: Prepare valuation reports of buildings. CO3: Interpret Contract document's of domestic and international construction works

15CV82	Design of Pre Stressed Concrete Elements	CO1: Understand the requirement of PSC members for present scenario. CO2: Analyze the stresses encountered in PSC element during transfer and at working CO3: Understand the effectiveness of the design of PSC after studying losses CO4: Capable of analyzing the PSC element and finding its efficiency. CO5: Design PSC beam for different requirement
15CV833	Pavement Design	CO1: Systematically generate and compile required data's for design of pavement (Highway & Airfield) CO2: Analyze stress, strain and deflection by boussinesq's, burmister's and westergaard's theory CO3: Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001 CO4: Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.
15CV84	Internship/ Professional Practice	CO1: This course will enable students to get the field exposure and experience
15CVP85	Project Work-II	CO1: understand the professional practices in the civil engineering and the impact of engineering solutions to the society CO2: write scientific report and present their research work in a precise and coherent manner.

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