Sapthagiri College of Engineering
Department of Civil Engineering
Course Outcomes

2018 SCHEME
I Year Civil Engineering

Course Code	Course Name	Course Outcomes-On completion of this course the students will be
18CIV14/24	Elements of Civil Engineering and Mechanics	CO1:Able to mention the applications of various fields of Civil Engineering. CO2:Able to compute the resultant of given force system subjected to various loads. CO3:Able to comprehend the action of Forces, Moments and other loads on systems of rigid bodies and compute the reactive forces that develop as a result of the external loads. CO4:Able to locate the Centroid and compute the Moment of Inertia of regular and built-up sections. CO5:Able to express the relationship between the motions of bodies and analyze the bodies in motion. CO6:Able to apply the concepts of kinetics and kinematics, to understand about curvilinear and rectilinear motion and to analyze the various problems based on these.

II Year Civil Engineering

Course Code	Course Name	Course Outcomes-On completion of this course the students will be
18MAT31	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 extremals of functionals and solve the simple problems of the calculus of variations.
18CV32	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.
18CV33	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
18CV34	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

18CV35	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
18CV36	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.
18CVL37	Computer Aided Building Planning And Drawing	1. Prepare, read and interpret the drawings in a professional set up. 2.KnowtheproceduresofsubmissionofdrawingsandDevelopworkingandsubmissiondrawingsforbuilding. 3. Plananddesignaresidentialorpublicbuildingasperthegivenrequirements.
18CVL38	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.
18MAT41	Engineering Mathematics –IV	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.
18CV42	Analysis of Determinate Structures	CO1:. Evaluate the forces i n 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.
18CV43	Applied Hydraulics	CO1:Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters CO2:Design the open channels of various cross sections including economical channel sections CO3:Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, CO4:Compute water surface profiles at different conditions CO5: Design turbines for the given data, and to know their operation characteristics under different operating conditions
18CV44	Concrete Technology	CO1:Relate material characteristics and their influence on microstructure of concrete. CO2:Distinguish concrete behaviour based on its fresh and hardened properties. CO3:Illustrate proportioning of different types of mixes for required fresh and hardened properties using professionals codes.
18CV45	Advanced Surveying	CO1:Apply the knowledge of geometric principles to arrive at surveying problems CO2:Use modern instruments to obtain geo-spatial data and analyse 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.

18CV46	Water Supply And Treatment Engineering	1. Estimate average and peak water demand for a community. 2. Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community. 3. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system. 4. Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
18CVL478	Fluid Mechanics And Hydraulic Machines 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
18CVL47	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

III Year

18CV51	Construction Management And Entrepreneurship	1.Prepare a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence. 2. Understand labour output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety. 3. Analyze the economics of alternatives and evaluate benefits and profits of a construction activity based on monetary value and time value. 4. Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies.

18CV52	Analysis Of Indeterminate Structures	1.Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method 2. Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method. 3. Construct the bending moment diagram for beams and frames by Kani's method. 4. Construct the bending moment diagram for beams and frames using flexibility method 5. Analyze the beams and indeterminate frames by system stiffness method.
18CV53	Design Of Rc Structural Elements	1.Understand the design philosophy and principles. 2. Solve engineering problems of RC elements subjected to flexure, shear and torsion. 3. Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings. 4. Owns professional and ethical responsibility.
18CV54	Basic Geotechnical Engineering	1. Ability to plan and execute geotechnical site investigation program for different civil engineering projects 2. Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils 3. Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures 4. Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure 5. Capable of estimating load carrying capacity of single and group of piles
18CV55	Municipal Wastewater Engineering	1. Select the appropriate sewer appurtenances and materials in sewer network. 2. Design the sewers network and understand the self purification process in flowing water. 3.Deisgn the varies physic- chemical treatment units 4. Design the various biological treatment units 5. Design various AOPs and low cost treatment units.
18CV56	Highway Engineering	1. Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data. 2. Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction. 3. Design road geometrics, structural components of pavement and drainage. 4. Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.
18CVL57	Surveying Practice	1. Apply the basic principles of engineering surveying and for linear and angular measurements. 2. Comprehendeffectivelyfieldproceduresrequiredforaprofessionalsurveyor. 3. Use techniques, skills and conventional surveying instruments necessary f o r engineering practice.
18CVL58	Concrete And Highway Materials Laboratory	1. Able to interpret the experimental results of concrete and highway materials based on laboratory tests. 2. Determine the quality and suitability of cement. 3. Design appropriate concrete mix Using Professional codes.

		4. Determine strength and quality of concrete. 5. Evaluate the strength of structural elements using NDT techniques. 6. Test the soil for its suitability as sub grade soil for pavements.
18CIV59	Environmental Studies	1: Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale, 2: Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment. 3: Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components. 4: Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.
18CV61	Design Of Steel Structural Elements	1. Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel. 2. Understand the Concept of Bolted and Welded connections. 3. Understand the Concept of Design of compression members, built-up columns and columns splices. 4. Understand the Concept of Design of tension members, simple slab base and gusseted base. 5. Understand the Concept of Design of laterally supported and un-supported steel beams.
18CV62	Applied Geotechnical Engineering	1. Ability to plan and execute geotechnical site investigation program for different civil engineering projects 2. Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils 3. Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures 4. Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure 5. Capable of estimating load carrying capacity of single and group of piles
18CV63	Hydrology And Irrigation Engineering	1. Understand the importance of hydrology and its components. 2. Measure precipitation and analyze the data and analyze the losses in precipitation. 3. Estimate runoff and develop unit hydrographs. 4. Find the benefits and ill-effects of irrigation. 5. Find the quantity of irrigation water and frequency of irrigation for various crops. 6. Find the canal capacity, design the canal and compute the reservoir capacity.
18CV642	Solid Waste Management	1. Analyse existing solid waste management system and to identify their drawbacks. 2. Evaluate different elements of solid waste management system. 3. Suggest suitable scientific methods for solid waste management elements. 4. Design suitable processing system and evaluate disposal sites.
18CV643	Alternate Building Materials	1. Solve the problems of Environmental issues concerned to building materials and cost effective building technologies; 2. Select appropriate type of masonry unit and mortar for civil engineering constructions; also they are able to Design Structural Masonry Elements under Axial Compression. 3. Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner. Also capable of

		suggesting suitable agro and industrial wastes as a building material. 4. Recommend various types of alternative building materials and technologies and design a energy efficient building by considering local climatic condition and building material.
18CV645	Railways, Harbour, Tunneling And Airports	1. Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway. 2. 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. 3. Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same. 4. Apply the knowledge gained to conduct surveying, understand the tunneling activities.
18CV651	Remote Sensing And Gis	1.Collectdataanddelineatevariouselementsfromthesatelliteimageryusingtheirspectralsignature. 2. Analyze different features of ground information to create raster or vector data. 3. Perform digital classificationandcreatedifferentthematicmapsforsolvingspecificproblems 4. Make decision based on the GIS analysis on thematic maps.
18CV652	Traffic Engineering	1. Understandthehumanfactorsandvehicularfactorsintrafficengineeringdesign. 2.Conductdifferenttypesoftrafficsurveysandanalysisofcollecteddatausingstatisticalconcepts. 3.Useanappropriatetrafficflowtheoryandtocomprehendthecapacity&signalizedintersectionanalysis. 4. Understand the basic knowledge of Intelligent Transportation System.
18CVL66	Software Application Laboratory	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work
18CVL67	Environmental Engineering Laboratory	1. Acquire capability to conduct experiments and estimate the concentration of different parameters. 2. Compare the result with standards and discuss based on the purpose of analysis. 3. Determine type of treatment, degree of treatment for water and waste water. 4. Identify the parameter to be analyzed for the student project work in environmental stream.
18CVEP68	Extensive Survey Project	1. Apply Surveying knowledge and tools effectively for the projects 2. Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies. 3. Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills. 4. Professional etiquettes at workplace, meeting and general 5. Establishing trust based relationships in teams & organizational environment 6. Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques

IV YEAR

18CV71	Quantity Surveying And Contract Management	1. Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works. 2. Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works. 3. Prepare the specifications and analyze the rates for various items of work. 4. Assess contract and tender documents for various construction works. 5. Prepare valuation reports of buildings.
18CV72	Design Of Rcc And Steel Structures	1. Students will acquire the basic knowledge in design of RCC and Steel Structures. 2. Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.
18CV733	Pavement Materials And Construction	1. Students will be able to evaluate and assess the suitability of any pavement material to be used in various components of pavement by conducting required tests as per IS,IRC specifications 2. Students will be able to formulate the proportions of different sizes of aggregates to suit gradation criteria for various mixes as per MORTH and also design bituminous mixes. 3. Students will be competent to adapt suitable modern technique and equipment for speedy and economic construction. 4. Student will be able to execute the construction of embankment, flexible, rigid pavement and perform required quality control tests at different stages of pavement construction.
18CV734	Ground Water Hydraulics	1. Find the characteristics of aquifers. 2. Estimate the quantity of ground water by various methods. 3. Locate the zones of ground water resources. 4. Select particular type of well and augment the ground water storage.
18CV745	Urban Transport Planning	1. Design, conduct and administer surveys to provide the data required for transportation planning. 2. Supervise the process of data collection about travel behavior and analyze the data for use in transport planning. 3. Develop and calibrate modal split, trip generation rates for specific types of land use developments. 4. Adopt the steps that are necessary to complete a long-term transportation plan.
18CVL76	Computer Aided Detailing Of Structures	Prepare detailed working drawings
18CVL77	Geotechnical Engineering Laboratory	1. Physical and index properties of the soil 2. Classify based on index properties and field identification 3. To determine OMC and MDD, plan and assess field compaction program 4.Shearstrengthandconsolidationparameterstoassessstrengthanddeformationcharacteristics 5. In-situshear strength characteristics(SPT-Demonstration)
18CV81	Design Of Pre-Stresseconcrete	1. Understand the requirement of PSC members for present scenario. 2. Analyse the stresses encountered in PSC element during transfer and at working. 3. Understand the effectiveness of the design of PSC after studying losses

		4. Capable of analyzing the PSC element and finding its efficiency. 5. Design PSC beam for different requirements.
18CV821	Bridge Engineering	1. Understand the load distribution and IRC standards. 2. Design the slab and T beam bridges. 3. Design Box culvert, pipe culvert 4. Use bearings, hinges and expansion joints and 5. Design Piers and abutments.
18CV825	Pavement Design	1. Systematically generate and compile required data's for design of pavement (Highway & Airfield). 2. Analyze stress, strain and deflection by boussinesq's, bur mister's and westergaard's theory. 3. Design rigid pavement and flexible pavement conforming to IRC58-2002 and IRC37-2001. 4. Evaluate the performance of the pavement and also develops maintenance statement based on site specific requirements.
18CVP83	Project Work Phase-2	Describe the project and be able to defend it. · Develop critical thinking and problem solving skills. · Learn to use modern tools and techniques. · Communicate effectively and to present ideas clearly and coherently both in written and oral forms. · Develop skills to work in a team to achieve common goal. · Develop skills of project management and finance. · Develop skills of self learning, evaluate their learning and take appropriate actions to improve it. · Prepare them for life-long learning to face the challenges and support the technological changes to meet the societal needs.
18CVS84	Technical Seminar	· Develop knowledge in the field of Civil Engineering and other disciplines through independent learning and collaborative study. · Identify and discuss the current, real-time issues and challenges in engineering & technology. · Develop written and oral communication skills. · Explore concepts in larger diverse social and academic contexts. · Apply principles of ethics and respect in interaction with others. · Develop the skills to enable life-long learning.
18CVI85	Internship /Professional Practice	enable students to get the field exposure and experience