

**SIR C. R. REDDY COLLEGE OF ENGINEERING  
DEPARTMENT OF CIVIL ENGINEERING**

COURSE OUTCOME NUMBER	COURSE OUTCOMES
<b>II - Year Semester – I</b>	
<b>COURSE NAME: PROBABILITY &amp; STATISTICS</b>	
R1621011	Examine, analyze, and compare various Probability distributions for both discrete and continuous random variables.
	Describe and compute confidence intervals for the mean of a population.
	Describe and compute confidence intervals for the proportion and the variance of a population and test the hypothesis concerning mean, proportion and variance and perform ANOVA test.
	Fit a curve to the numerical data.
<b>COURSE NAME: BASIC ELECTRICAL &amp; ELECTRONICS ENGINEERING</b>	
R1621012	Able to analyse the various electrical networks.
	Able to understand the operation of DC generators, 3-point starter and conduct the Swinburne's Test.
	Able to analyse the performance of transformer.
	Able to explain the operation of 3-phase alternator and 3-phase induction motors.
	Able to analyse the operation of half wave, full wave rectifiers and OP-AMPS.
	Able to explain the single stage CE amplifier and concept of feedback amplifier.
<b>COURSE NAME: STRENGTH OF MATERIALS-I</b>	
R1621013	The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
	The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
	The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
	The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lamé's equation.

**COURSE NAME: BUILDING MATERIALS & CONSTRUCTION**

R1621014	The student should be able to identify different building materials and their importance in building construction.
	The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.
	The student should have learnt the importance of building components and finishings.
	The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.

**COURSE NAME: SURVEYING**

R1621015	Illustrate the Principles and classification of Surveying.
	Identify corrections to Linear Measurements & bearings. Appraise the Omitted Measurements in Traversing
	Recognize the concept of leveling and practice the methods of leveling and contours
	Evaluate horizontal and vertical levels by using theodolite, trigonometric leveling and tacheometry
	Design of Curves and define the importance of Total station and GPS
	Appraise the areas of boundaries and volumes of earthwork by various methods.

**COURSE NAME: FLUID MECHANICS**

R1621016	Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics.
	Calculate the forces that act on submerged planes and curves.
	Identify and analyse various types of fluid flows.
	Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.
	Draw simple hydraulic and energy gradient lines.
	Measure the quantities of fluid flowing in pipes, tanks and channels.

**II - Year Semester – II****COURSE NAME: BUILDING PLANNING & DRAWING**

R1622011	Student should be able to plan various buildings as per the building by-laws.
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	The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
	The student is expected to learn the skills of drawing building elements and plan the buildings as per requirements.

**COURSE NAME: STRENGTH OF MATERIALS - II**

R1622012	After going through this course the student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
	The student can assess stresses in engineering applications of shafts, springs, columns and struts subjected to different loading conditions
	The student can assess stresses in engineering applications of columns and struts subjected to different loading conditions
	The student will be able to understand and analyze the determination of stresses in the case of chimneys, retaining walls and dams
	The student will be able to understand and analyze the concept of unsymmetrical bending in beams
	The student will be able to assess forces in different types of trusses used in construction

**COURSE NAME: HYDRAULICS & HYDRAULIC MACHINERY**

R1622013	Solve uniform & non uniform open channel flow problems.
	Apply the principles of dimensional analysis and similitude in hydraulic model testing.
	Calculate the forces exerted by fluid jet on vanes of different shapes either stationary or moving.
	Understand the working principles of various hydraulic machineries.
	Select the suitable pump based on the requirement criteria
	Draw the performance curves for various hydraulic machines.

**COURSE NAME: CONCRETE TECHNOLOGY**

R1622014	Understand the basic concepts of concrete.
	Realize the importance of quality of concrete.
	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
	Test the fresh concrete properties and the hardened concrete properties.
	Evaluate the ingredients of concrete through lab test results. design the concrete mix by BIS method.

	Familiarize the basic concepts of special concrete and their production and applications. understand the behaviour of concrete in various environments.
<b>COURSE NAME: STRUCTURAL ANALYSIS - I</b>	
R1622015	Distinguish between the determinate and indeterminate structures.
	Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure.
	Estimate the bending moment and shear forces in beams for different fixity conditions.
	Analyze the continuous beams using various methods -, three moment method, slope deflection method, energy theorems.
	Draw the influence line diagrams for various types of moving loads on beams/bridges.
	Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.
<b>COURSE NAME: TRANSPORTATION ENGINEERING - I</b>	
R1622016	Plan highway network for a given area.
	Determine Highway alignment and design highway geometrics
	Design Intersections and prepare traffic management plans
	Judge suitability of pavement materials
	design flexible and rigid pavements
	Construct and maintain highways
<b>COURSE NAME: MANAGERIAL ECONOMICS &amp; FINANCIAL ANALYSIS</b>	
R1622019	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
	One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
	*The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
<b>III - Year Semester – I</b>	
<b>COURSE NAME: MANAGEMENT SCIENCE</b>	
R1631011	Describe the concept of management, functions, evolution of management thought and organizational structure

	Applying the concept of work study, statistical quality control and inventory management by using HML, FSN, ABC and SDE analysis
	Put forth the concepts of functional management
	Apply the concepts of PERT & CPM in project management
	knowledge on concepts of strategic management such as SWOT analysis, generic strategy alternatives.
	Understanding modern management practices MIS, TQM, SIX SIGMA, ERP.

**COURSE NAME: ENGINEERING GEOLOGY**

R1631012	Identify and classify the geological minerals
	Measure the rock strengths of various rocks
	Classify and measure the earthquake prone areas to practice the hazard zonation
	Classify, monitor and measure the Landslides and subsidence
	Prepares, analyses and interpret the Engineering Geologic maps
	Analyses the ground conditions through geophysical surveys.
	Test the geological material and ground to check the suitability of civil engineering project construction.
	Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc...

**COURSE NAME: STRUCTURAL ANALYSIS -II**

R1631013	Can you analyse the three hinged & two hinged arches subjected to various loads.
	How do you rate your knowledge on the analysis of multistory frames.
	Can you analyse the forces on cable and suspension bridges.
	Could you compare the methods of analysis between MDM and kani' s method.
	How do you rate your knowledge on the concepts of MM.

**COURSE NAME: DESIGN & DRAWING OF REINFORCED CONCRETE STRUCTURES**

R1631014	Work on different types of design philosophies
	Carryout analysis and design of flexural members and detailing
	Design structures subjected to shear, bond and torsion
	Design different type of compression members and footings

**COURSE NAME: TRANSPORTATION ENGINEERING - II**

R1631015	Learn various components and their functions in a railway track.
	Design the geometrics of a railway track.

	Know the techniques for effective movement of trains.
	Design the airport geometrics and air field pavements.
	Know planning, construction and maintenance of Docks & Harbours.
<b>III - Year Semester – II</b>	
<b>COURSE NAME: DESIGN &amp; DRAWING OF STEEL STRUCTURES</b>	
R1632011	Able to apply relevant IS codes provisions to ensure safety of structural steel elements
	Able to design tension & compression members with welded connections
	Able to design the roof trusses, column bases & splices with welded connection
	Able to design plate girder and gantry girder including stiffeners with welded connections.
	Able to produce the drawings pertaining to different components of steel structures
<b>COURSE NAME: GEOTECHNICAL ENGINEERING - I</b>	
R1632012	Explain the definitions of various soil parameters and establish a relation between them.
	Determine the index properties and classify the soils.
	Understand the importance of various Engineering properties of the soil.
	Understand the concepts of stresses within the soil.
	Apply the concepts in day-to-day Civil Engineering problems.
<b>COURSE NAME: ENVIRONMENTAL ENGINEERING -I</b>	
R1632013	Appraise the quantity of water required for a community
	List with types of intakes
	Examine the water characteristics
	Discuss the Primary treatment of raw water
	Identify the Miscellaneous treatments
	Describe the distribution network
<b>COURSE NAME: WATER RESOURCE ENGINEERING -I</b>	
R1632014	Quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects
	Learn measurement and estimation of the abstractions from the precipitation
	Determination of runoff in various durations through unit hydrograph theory and its analysis.

	Analyzing the flood occurrence and frequency by using statistical technique.
	Determine aquifer parameters and yield of wells.
	Different advanced hydrologic modeling processes.
<b>COURSE NAME: WASTE WATER MANAGEMENT</b>	
R163201D	Enables the student to distinguish between the quality of domestic and industrial water requirements and wastewater quantity generation
	To impart knowledge on selection of treatment methods for industrial wastewater.
	To Know the operational problems of common effluent treatment plant.
	To acquire knowledge on manufacturing process and treatment methods of industries.
<b>IV - Year Semester – I</b>	
<b>COURSE NAME: ENVIRONMENTAL ENGINEERING - II</b>	
R1641011	Able to plan & design a good sewage system.
	Select suitable appurtenances in sewage system.
	Analysis the characteristics of sewage.
	Suggest & design a suitable treatment system for sewage treatment
	Identify the critical point of pollution in a river for a specific amount of pollutant into the river.
	Suggest a suitable disposal method with respect to effluent standarts.
<b>COURSE NAME: WATER RESOURCE ENGINEERING - II</b>	
R1641012	Recognize water requirements and plan an Irrigation system
	Design an Irrigation Canal and its network
	Design an Irrigation Canal structure
	Plan a diversion head works and Design impervious floor of diversion head works
	Select a suitable type of Dam and Appraise the stability of Gravity Dam
	Examine the stability of earth dams, Design principles of Ogee spillways.
<b>COURSE NAME: GEOTECHNICAL ENGINEERING - II</b>	
R1641013	Analyze the slopes to attain the stability.
	Calculate the earth pressures.
	Calculate the bearing capacity of the soils.
	Adopt the suitable foundation for different soils.

	Understand the concept of Caissions & Well Foundations.
	Understand the need of sub soil exploration.

**COURSE NAME: REMOTE SENSING & GIS APPLICATIONS**

R1641014	Acquire the physical principles of remote sensing (scattering, reflection, and absorption of electromagnetic radiation) and Digital image formats (line, pixel, sequential)
	Recognize the visual interpretation processing, enhancement and classification
	Recognize the Spatial data operators, Network for optimal path & Tracing
	Apply RS & GIS tool in the areas of agriculture, forestry, geology, geomorphology and urban land area
	Obtain the concepts & components of GIS and different types of data representation models.

**COURSE NAME: AIR POLLUTION & CONTROL**

R164101C	To know the Sources, sampling analysis of air pollutants
	To know the Applications in the removal of gases
	To acquire the design principles of particulate and gaseous control
	To learn plume Behaviour in different environmental conditions
	To know the Ambient Air Monitoring - Stack Monitoring

**COURSE NAME: ENVIRONMENTAL IMPACT ASSESSMENT & MANAGEMENT**

R164101H	Prepare EMP, EIS, and EIA report
	Identify the risks and impacts of a project
	Selection of an appropriate EIA methodology
	Evaluation the EIA report
	Estimate the cost benefit ratio of a project
	Know the role of stakeholder and public hearing in the preparation of EIA

**IV - Year Semester – II**

**COURSE NAME: ESTIMATION SPECIFICATION & CONTRACTS**

R1642011	Explain the concept of estimating & work out rate analysis for various items of work
	Develop the specifications for different Civil Engineering works
	Prepare contract documents for tenders and valuation of buildings.



	Prepare detailed estimate of different Civil Engineering works.
<b>COURSE NAME: CONSTRUCTION TECHNOLOGY &amp; MANAGEMENT</b>	
R1642012	Value the importance of construction planning by using various network analysis techniques.
	Evaluate PERT, cost analysis, crashing of optimum cost & resources.
	Apply the functioning of various earth moving equipments by their types.
	Classify the functioning of various earth work equipments.
	Examine methods of production of aggregate & conceding equipment.
	Apply the gained knowledge to construction techniques & safety.
<b>COURSE NAME: PRESTRESSED CONCRETE</b>	
R1642013	Understand the different methods of prestressing
	Estimate effective prestress including the short and long term losses
	Analyze and design prestressed concrete beams under flexure and shear
	Understand the relevant IS Codal provisions for prestressed concrete
<b>COURSE NAME: SOLID AND HAZARDOUS WASTE MANAGE</b>	
R164201C	Knowledge about the solid waste generation, composition and factors influencing generation rate.
	Design the collection systems of solid waste of a town
	Design treatment of municipal solid waste and landfill
	Know the criteria for selection of landfill
	Characterize the solid waste and design a composting facility
	Know the Method of treatment and disposal of Hazardous wastes