Annamacharya Institute of Technology and Sciences, Tirupati
(Autonomous)
Department of Civil Engineering

R15 REGULATION COURSE OUTCOMES

COURSE NAME	CO	COURSE OUTCOMES
FUNCTIONAL ENGLISH (15A52101)	CO1	Have improved communication in listening, speaking, reading and writing skills in general
	CO2	Have developed their oral communication and fluency in group discussions and interviews
	CO3	Have improved awareness of English in science and technology context
	CO4	Have achieved familiarity with a variety of technical reports.
MATHEMATICS – I 15A54101	CO1	Apply the mathematical concepts of ordinary differential equations of first order and second order
	CO2	Understood the applications of Newton's law of cooling and orthogonal trajectories
	CO3	Applications of Beams, Whirling of shafts, oscillatory electrical circuits
	CO4	Apply integration to find areas, length, volume in Cartesian & polor coordinates
	CO5	Understood to solve double integral and triple integrals
	CO6	Understood to evaluate vector calculus and applications of Green's , Stoke's and Gauss's theorems
COMPUTER PROGRAMMING 15A05101	CO1	Apply problem solving techniques in designing the solutions for a wide-range of problems
	CO2	Choose appropriate control structure depending on the problem to be solved
	CO3	Modularize the problem and also solution
ENGINEERING PHYSICS 15A56101	CO1	The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics
	CO2	The important properties of crystals like the presence of longrange order and periodicity, structure determination using Xray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques
	CO3	The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world
	CO4	The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused
	CO5	The properties and device applications of semiconducting and magnetic materials are illustrated
	CO6	The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated

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ENGINEERING DRAWING 15A03101	**CO1**	Drawing 2D and 3D diagrams of various objects
	CO2	Learning conventions of Drawing, which is an Universal Language of Engineers
	CO3	Drafting projections of points, planes and solids
ENGLISH FOR PROFESSIONAL COMMUNICATION 15A52201	**CO1**	Have acquired ability to participate effectively in group discussions
	CO2	Have developed ability in writing in various contexts
	CO3	Have acquired a proper level of competence for employability
MATHEMATICS – II 15A54201	**CO1**	Apply Laplace Transforms and solve engineering problems
	CO2	Apply the applications of Laplace Transforms to Ordinary differential equations of first order and second order differential equations
	CO3	Understood the concept of Fourier series
	CO4	Apply Fourier Transforms and solve engineering problems
	CO5	Apply the Mathematical concepts of Partial differential equations of first and second order
	CO6	Understood the concept of Z-Transfom and its applications
ENGINEERING MECHANICS 15A01201	**CO1**	Develop students to acquire knowledge of static and dynamic behavior of the bodies
	CO2	Develop students to acquire the knowledge, so that they can understand physical phenomenon with the help of various theories
	CO3	Develop students, who will be able to explain the physical phenomenon with help of diagrams
	CO4	Develop students with a broad vision with the skills of visualizing and developing their own ideas, and to convert those ideas in to engineering problems and solving those problems with the acquired knowledge of the Engineering Mechanics
ENVIRONMENTAL STUDIES 15A01101	**CO1**	Students will get the sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable life styles etc
	CO2	Student will realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	By studying environmental sciences, students is exposed to the environment that enables one to find out solution of various environmental problems encountered on and often
	CO5	At the end of the course, it is expected that students will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. This will enable every human being to live in a more sustainable manner

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MATHEMATICS – III 15A54301	**CO1**	Understand the concepts of Matrices to solve Engineering problems
	CO2	Analyze the concepts of Algebraic & Transcendental Equations to solve different Engineering problems
	CO3	Analyze Interpolation using the concepts of the Numerical Methods
	CO4	Apply the concepts of Integration in Numerical Methods
	CO5	Apply the concepts of O.D.E on Numerical Methods
ELECTRICAL & MECHANICAL TECHNOLOGY 15A0301	**CO1**	The student acquires knowledge on basics of Electrical Circuits, DC Machines, Transformers, Induction motors & Alternators
	CO2	The student gets a thorough knowledge on basics of welding process, turbines, steam engines with which he/she can able to apply the above conceptual things to real- world problems and applications
BUILDING MATERIALS AND CONSTRUCTION 15A01302	**CO1**	Will be able to understand the quality of various construction materials
	CO2	Will be able to prepare plan of staircase block
	CO3	Will be able to supervise the various construction activities at the time of actual execution
	CO4	Will be able to identify and select the materials for construction activities.
STRENGTH OF MATERIALS – I 15A01303	**CO1**	Students would be able to understand the behavior of materials under different stress and strain conditions
	CO2	The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading
	CO3	The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, and columns under various loading conditions using different analysis methods
SURVEYING – I 15A01304	**CO1**	Carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering
	CO2	Plan a survey, taking accurate measurements, field booking, plotting and adjustment of traverse
	CO3	Use various conventional instruments involved in surveying with respect to utility and precision
	CO4	Plan a survey for applications such as road alignment and height of the building
	CO5	Undertake measurement and plotting in civil engineering
FLUID MECHANICS 15A01305	**CO1**	Determine the properties of fluid like pressure and their measurement
	CO2	Compute forces on immersed plane and curved plates
	CO3	Apply continuity equation and energy equation in solving problems on flow through conduits
	CO4	Compute the frictional loss in laminar and turbulent flows
	CO1	Analyse the concepts of probability, probability distributions
	CO2	Apply the concepts of test of hypothesis in engineering field

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PROBABILITY AND STATISTIC 15A54401	**CO3**	Analyse the concepts of test of significance
	CO4	Using the concepts of stastical quality control techniques in engineering field and industry
	CO5	Understand the concepts of queuing theory
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS 15A52301	**CO1**	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets
	CO2	Apply the Concept of Production cost and revenues for effective Business decision
	CO3	Analyze how to invest their capital and maximize returns
	CO4	Evaluate the capital budgeting techniques
	CO5	Define the concepts related to financial accounting and management and able to develop the accounting statements and evaluate the financial performance of business entity
STRENGTH OF MATERIALS – II 15A01401	**CO1**	Carry out advanced surveying techniques in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering
	CO2	Setting out works and carrying out of various curves alignment
	CO3	Use of various advanced instruments involved in surveying with respect to utility and precision
	CO4	Knowledge on remote sensing elements and their applications
STRUCTURAL ANALYSIS – I 15A01403	**CO1**	The student would be able to apply knowledge of various energy theromes
	CO2	The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams, and columns under various loading conditions using different analysis methods
	CO3	The student would be able to apply knowledge on study of slope and deflection of various members with sinking supports also
HYDRAULICS AND HYRAULIC MACHINERY 15A01404	**CO1**	Visualize fluid flow phenomena observed in Civil Engineering systems such as flow in a pipe, flow measurement through orifices, mouth pieces, notches and weirs
	CO2	Analyze fluid flows in open channel hydraulics and devices such as weirs and flumes
	CO3	Design open channels for most economical sections like rectangular, trapezoidal and circular sections
	CO4	Measure velocity through instruments in open channel and pipe flow
	CO5	Calculate forces and work done by a jet on fixed or moving plate and curved plates
	CO6	Apply the working principles of Impulse and Reaction turbines, Select the type of turbine required with reference to available head of water and discharge, Determine the characteristics of centrifugal pump and Apply the working principles of the Reciprocating pump

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DESIGN & DRAWING OF RCC STRUCTURES 15A01501	**CO1**	Will be able to understand the basic concepts of reinforced concrete analysis and design
	CO2	Will be able to understand the behavior and various modes of failure of reinforced concrete members.
	CO3	Will be able to analyze and design various reinforced concrete members such as beams, columns, footings and slabs
ESTIMATION, COSTING AND VALUATION 15A01502	**CO1**	Apply different types of estimates for different building elements.
	CO2	Carry out analysis of rates and bill preparation different building elements
	CO3	Understand the concepts of specification writing
	CO4	Carry out valuation of assets
GEOTECHNICAL ENGINEERING – I 15A01503	**CO1**	Carry out soil classification
	CO2	Solve any practical problems related to soil stresses estimation, permeability and seepage including flow net diagram
	CO3	Estimate the stresses under any system of foundation loads solve practical problems related to consolidation settlement and time rate of settlement
ENGINEERING GEOLOGY 15A01504	**CO1**	The students will have the knowledge of principles of engineering geology
	CO2	The students will have the knowledge of properties of various rocks and minerals
	CO3	The students will be able to judge the suitability of sites for various civil engineering structures
	CO4	The students will exhibit the ability to use the knowledge of geological strata in the analysis and design the civil engineering structures
	CO5	The students will have the knowledge for deciding the suitability of water and soil conservation projects
WATER HARVESTING AND CONSERVATION 15A01506	**CO1**	Appreciate the importance of Water Conservation
	CO2	Understand the methods of Water Harvesting
	CO3	Understand the principles of Watershed Management and its importance in sustainability
STRUCTURAL ANALYSIS – II 15A01505	**CO1**	Apply the methods of indeterminate truss analysis
	CO2	Analyse the behaviour of arches through different methods of analysis
	CO3	Use various classical methods for analysis of indeterminate structures
	CO4	Determine the effect of support settlements for indeterminate structures
	CO5	Able to analyze the beam and frames for vertical and horizontal loads and draw SFD and BMD.
	CO6	Able to calculate forces in members of truss due to load by stiffness method

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CONCRETE TECHNOLOGY (15A01601)	**CO1**	The students will be able to check and recommend different constituent of concrete
	CO2	The students will be able to test strength and quality of plastic and set concrete
	CO3	The students will have understanding of application admixture and its effect on properties of concrete
	CO4	The students will be able to design mix of concrete according to availability of ingredients and design needs.
	CO5	The students will be able to test various strengths of concrete by destructive and non-destructive testing methods.
DESIGN & DRAWING OF STEEL STRUCTURES (15A01602)	**CO1**	Apply the IS code of practice for the design of steel structural elements
	CO2	Design compression and tension members using simple and built-up sections
	CO3	Students will be able to explain the behaviour and modes of failure of tension members and different connections.
	CO4	Students will be able to analyze and design tension members, bolted connections, welded connections, compression members and beams
	CO5	Design welded connections for both axial and eccentric forces
GEOTECHNICAL ENGINEERING – II (15A01603)	**CO1**	Ability to apply the principle of shear strength and settlement analysis for foundation system.
	CO2	Ability to design shallow and deep foundations
	CO3	Ability to analyze and design earth retaining structures.
	CO4	Estimate bearing capacity using IS code methods
TRANSPORTATION ENGINEERING – I (15A01604)	**CO1**	Carry out surveys involved in planning and highway alignment
	CO2	Design cross section elements, sight distance, horizontal and vertical alignment
	CO3	Implement traffic studies, traffic regulations and control, and intersection design
	CO4	Determine the characteristics of pavement materials
	CO5	Design flexible and rigid pavements as per irc
WATER RESOURCES ENGINEERING-I (15A01605)	**CO1**	To understand the basic types of irrigation, irrigation standards and crop water assessment
	CO2	To study the different aspects of design of hydraulic structures
	CO3	To understand various hydraulic structures such as diversion head works and cross regulators, canal falls and structures involved in cross drainage works
REMOTE SENSING AND GIS (CBCC-1) (15A01606)	**CO1**	Principles of Remote Sensing and GIS
	CO2	Analysis of RS and GIS data and interpreting the data for modeling applications
FINITE ELEMENT METHODS (15A01701)	**CO1**	Demonstrate the differential equilibrium equations and their relationship
	CO2	Apply numerical methods to FEM

	CO3	Demonstrate the displacement models and load vectors
	CO4	Compute the stiffness matrix for iso-parametric elements.
	CO5	Analyze plane stress and plane strain problems
TRANSPORTATION ENGINEERING – II (15A01702)	**CO1**	Able to understand the geometric design elements of Railway Track and their design methods
	CO2	Understand the aircraft characteristics and their influence on various design elements
	CO3	Acquire the knowledge of types of Docks, Ports and Harbours.
ENVIRONMENTAL ENGINEERING (15A01703)	**CO1**	Identify the source of water and water demand.
	CO2	Apply the water treatment concept and methods
	CO3	Apply water distribution processes and operation and maintenance of water supply.
	CO4	Prepare basic process designs of water and wastewater treatment plants collect, reduce, analyze, and evaluate basic water quality data
	CO5	Determine the sewage characteristics and design various sewage treatment plants
	CO6	Carry out municipal water and wastewater treatment system design and operation
WATER RESOURCES ENGINEERING-II (15A01704)	**CO1**	Design various canal systems
	CO2	Design head and cross regulator structures
	CO3	Identify various types of reservoir and their design aspects
	CO4	By the Establishes the understanding of cross drainage works and its design, Design different types of dams.
GROUND IMPROVEMENT TECHNIQUES (CBCC - II) (15A01706)	**CO1**	Identify the problems in Expansive soils
	CO2	Implement the stabilization methods
	CO3	Apply grouting and dewatering techniques
REHABILITATION AND RETROFITING OF STRUCTURES(CBCC - III)	**CO1**	Assess the strength and materials deficiency in concrete structures
	CO2	Suggest methods and techniques used in repairing / strengthening existing concrete structures
	CO3	Apply Non Destructive Testing techniques to field problems
	CO4	Apply cost effective retrofitting strategies for repairs in buildings
ADVANCED STRUCTURAL ENGINEERING (MOOCS – II (15A01802	**CO1**	Design of roof systems with reference to Indian standards
	CO2	Design of water retaining and storage structures
	CO3	Design of silos and chimneys
PRESTRESSED CONCRETE (MOOCS – III) (15A01803)	**CO1**	Methods of prestressing and able to design various prestressed concrete structural elements.
	CO2	Analysis of sections to withstand shear and flexure
	CO5	Apply the concept of unconstrained geometric programming for solving the non-linear constraints.