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DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

SEMESTER	COURSE CODE	COURSE NAME	COURSE ID	COURSE OUTCOME
I	HS8151	COMMUNICATIVE ENGLISH	CO 1	At the end of the course, learners will be able to: Read articles of a general kind in magazines and newspapers.
			CO 2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
			CO 3	Comprehend conversations and short talks delivered in English
			CO 4	Write short essays of a general kind and personal letters and emails in English.
I	MA8151	ENGINEERING MATHEMATICS – I	CO 1	Use both the limit definition and rules of differentiation to differentiate functions.
			CO 2	Apply differentiation to solve maxima and minima problems.
			CO 3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
			CO 4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
			CO 5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
			CO 6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
			CO 7	Apply various techniques in solving differential equations.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

I	PH8151	ENGINEERING PHYSICS	CO 1	Upon completion of this course, the students will gain knowledge on the basics of properties of matter and its applications,
			CO 2	the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
			CO 3	the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
			CO 4	the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
			CO 5	the students will understand the basics of crystals, their structures and different crystal growth techniques.
I	CY8151	ENGINEERING CHEMISTRY	CO 1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
I	GE8151	PROBLEM SOLVING AND PYTHON PROGRAMMING	CO 1	On successful completion of this course, the student will be able to Upon completion of the course, students will be able to Develop algorithmic solutions to simple computational problems
			CO 2	Read, write, execute by hand simple Python programs.
			CO 3	Structure simple Python programs for solving problems.

DEPARTMENT OF CIVIL ENGINEERING

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2017 REGULATION-COURSE OUTCOMES

			CO 4	Decompose a Python program into functions.
			CO 5	Represent compound data using Python lists, tuples, dictionaries.
			CO 6	Read and write data from/to files in Python Programs.
I	GE8152	ENGINEERING GRAPHICS	CO 1	Upon completion of the course, students will be able to familiarize with the fundamentals and standards of Engineering graphics
			CO 2	perform freehand sketching of basic geometrical constructions and multiple views of objects.
			CO 3	project orthographic projections of lines and plane surfaces.
			CO 4	draw projections and solids and development of surfaces.
			CO 5	visualize and to project isometric and perspective sections of simple solids.
I	GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	CO 1	Upon completion of the course, students will be able to Write, test, and debug simple Python programs.
			CO 2	Implement Python programs with conditionals and loops.
			CO 3	Develop Python programs step-wise by defining functions and calling them.
			CO 4	Use Python lists, tuples, dictionaries for representing compound data.
			CO 5	Read and write data from/to files in Python.
I	BS8161		CO 1	Upon completion of the course, the students will be able to,

DEPARTMENT OF CIVIL ENGINEERING

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2017 REGULATION-COURSE OUTCOMES

		PHYSICS AND CHEMISTRY LABORATORY		apply principles of elasticity, optics and thermal properties for engineering applications
			CO 2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
II	HS8251	TECHNICAL ENGLISH	CO 1	At the end of the course learners will be able to: Read technical texts and write area- specific texts effortlessly.
			CO 2	Listen and comprehend lectures and talks in their area of specialisation successfully.
			CO 3	Speak appropriately and effectively in varied formal and informal contexts.
			CO 4	Write reports and winning job applications
II	MA8251	ENGINEERING MATHEMATICS – II	CO 1	After successfully completing the course, the student will have a good understanding of the following topics and their applications: Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
			CO 2	Gradient, divergence and curl of a vector point function and related identities.
			CO 3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
			CO 4	Analytic functions, conformal mapping and complex integration.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
II	PH8201	PHYSICS FOR CIVIL ENGINEERING	CO 1	Upon completion of this course, the students will have knowledge on the thermal performance of buildings,
			CO 2	the students will acquire knowledge on the acoustic properties of buildings,
			CO 3	the students will get knowledge on various lighting designs for buildings,
			CO 4	the students will gain knowledge on the properties and performance of engineering materials, and
			CO 5	the students will understand the hazards of buildings.
II	BE8251	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	CO 1	ability to identify the electrical components and explain the characteristics of electrical machines.
			CO 2	ability to identify electronics components and understand the characteristics
II	GE8291	ENVIRONMENTAL SCIENCE AND ENGINEERING	CO 1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
			CO 2	Public awareness of environmental is at infant stage.
			CO 3	Ignorance and incomplete knowledge has lead to misconceptions

DEPARTMENT OF CIVIL ENGINEERING

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2017 REGULATION-COURSE OUTCOMES

			CO 4	Development and improvement in std. of living has lead to serious environmental disasters
II	GE8292	ENGINEERING MECHANICS	CO 1	On successful completion of this course, the student will be able to illustrate the vectorial and scalar representation of forces and moments
			CO 2	analyse the rigid body in equilibrium
			CO 3	evaluate the properties of surfaces and solids
			CO 4	calculate dynamic forces exerted in rigid body
			CO 5	determine the friction and the effects by the laws of friction
II	GE8261	ENGINEERING PRACTICES LABORATORY	CO 1	On successful completion of this course, the student will be able to fabricate carpentry components and pipe connections including plumbing works.
			CO 2	use welding equipment's to join the structures.
			CO 3	Carry out the basic machining operations
			CO 4	Make the models using sheet metal works
			CO 5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
			CO 6	Carry out basic home electrical works and appliances
			CO 7	Measure the electrical quantities

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 8	Elaborate on the components, gates, soldering practices.
II	CE8211	COMPUTER AIDED BUILDING DRAWING	CO 1	The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.
III	MA8353	TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	CO 1	Upon successful completion of the course, students should be able to: Understand how to solve the given standard partial differential equations.
			CO 2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
			CO 3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
			CO 4	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.
			CO 5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
III	CE8301	STRENGTH OF MATERIALS I	CO 1	Students will be able to Understand the concepts of stress and strain, principal stresses and principal planes.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
			CO 3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
			CO 4	Apply basic equation of torsion in design of circular shafts and helical springs, .
			CO 5	Analyse the pin jointed plane and space trusses.
III	CE8302	FLUID MECHANICS	CO 1	At the end of the course students will be able to Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
			CO 2	Understand and solve the problems related to equation of motion.
			CO 3	Gain knowledge about dimensional and model analysis.
			CO 4	Learn types of flow and losses of flow in pipes.
			CO 5	Understand and solve the boundary layer problems.
III	CE8351	SURVEYING	CO 1	At the end of the course the student will be able to understand The use of various surveying instruments and mapping
			CO 2	Measuring Horizontal angle and vertical angle using different instruments
			CO 3	Methods of Leveling and setting Levels with different instruments
			CO 4	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 5	Concept and principle of modern surveying.
III	CE8391	CONSTRUCTION MATERIALS	CO 1	On completion of this course the students will be able to Compare the properties of most common and advanced building materials.
			CO 2	understand the typical and potential applications of lime, cement and aggregates
			CO 3	know the production of concrete and also the method of placing and making of concrete elements.
			CO 4	understand the applications of timbers and other materials
			CO 5	Understand the importance of modern material for construction.
III	CE8392	ENGINEERING GEOLOGY	CO 1	The students completing this course Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
			CO 2	Will get basics knowledge on properties of minerals.
			CO 3	Gain knowledge about types of rocks, their distribution and uses.
			CO 4	Will understand the methods of study on geological structure.
			CO 5	Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor
III	CE8311	CONSTRUCTION MATERIALS LABORATORY	CO 1	The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

III	CE8361	SURVEYING LABORATORY	CO 1	Students completing this course would have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS and have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.
III	HS8381	INTERPERSONAL SKILLS/LISTENING AND SPEAKING	CO 1	At the end of the course Learners will be able to: Listen and respond appropriately.
			CO 2	Participate in group discussions
			CO 3	Make effective presentations
			CO 4	Participate confidently and appropriately in conversations both formal and informal
IV	MA8491	NUMERICAL METHODS	CO 1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
			CO 2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
			CO 3	Apply the numerical techniques of differentiation and integration for engineering problems.
			CO 4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
IV	CE8401	CONSTRUCTION TECHNIQUES AND PRACTICES	CO 1	On successful completion of this course, students will be able to: know the different construction techniques and structural systems
			CO 2	Understand various techniques and practices on masonry construction, flooring, and roofing.
			CO 3	Plan the requirements for substructure construction.
			CO 4	Know the methods and techniques involved in the construction of various types of super structures
			CO 5	Select, maintain and operate hand and power tools and equipment used in the building construction sites.
IV	CE8402	STRENGTH OF MATERIALS II	CO 1	Students will be able to Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
			CO 2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
			CO 3	find the load carrying capacity of columns and stresses induced in columns and cylinders

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
			CO 5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.
IV	CE8403	APPLIED HYDRAULIC ENGINEERING	CO 1	On completion of this course the students will be able to Apply their knowledge of fluid mechanics in addressing problems in open channels.
			CO 2	Able to identify an effective section for flow in different cross sections.
			CO 3	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
			CO 4	Understand the principles, working and application of turbines.
			CO 5	Understand the principles, working and application of pumps.
IV	CE8404	CONCRETE TECHNOLOGY	CO 1	The various requirements of cement, aggregates and water for making concrete
			CO 2	The effect of admixtures on properties of concrete
			CO 3	The concept and procedure of mix design as per IS method
			CO 4	The properties of concrete at fresh and hardened state
			CO 5	The importance and application of special concretes.
IV	CE8491	SOIL MECHANICS	CO 1	classify the soil and assess the engineering properties, based on index properties.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 2	Understand the stress concepts in soils
			CO 3	Understand and identify the settlement in soils.
			CO 4	Determine the shear strength of soil
			CO 5	Analyze both finite and infinite slopes.
IV	CE8481	STRENGTH OF MATERIALS LABORATORY	CO 1	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.
IV	CE8461	HYDRAULIC ENGINEERING LABORATORY	CO 1	The students will be able to measure flow in pipes and determine frictional losses.
			CO 2	The students will be able to develop characteristics of pumps and turbines.
IV	HS8461	ADVANCED READING AND WRITING	CO 1	At the end of the course Learners will be able to: Write different types of essays.
			CO 2	Write winning job applications.
			CO 3	Read and evaluate texts critically.
			CO 4	Display critical thinking in various professional contexts.
V	CE8501	DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS	CO 1	Understand the various design methodologies for the design of RC elements.
			CO 2	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
			CO 3	Design the various types of slabs and staircase by limit state method.
			CO 4	Design columns for axial, uniaxial and biaxial eccentric loadings.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 5	Design of footing by limit state method.
V	CE8502	STRUCTURAL ANALYSIS I	CO 1	Students will be able to Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
			CO 2	Analyse the continuous beams and rigid frames by slope defection method.
			CO 3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
			CO 4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
			CO 5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.
V	EN8491	WATER SUPPLY ENGINEERING	CO 1	The students completing the course will have, an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
			CO 2	the knowledge in various unit operations and processes in water treatment
			CO 3	an ability to design the various functional units in water treatment
			CO 4	an understanding of water quality criteria and standards, and their relation to public health

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 5	the ability to design and evaluate water supply project alternatives on basis of chosen
V	CE8591	FOUNDATION ENGINEERING	CO 1	Students will be able to, Understand the site investigation, methods and sampling.
			CO 2	Get knowledge on bearing capacity and testing methods.
			CO 3	Design shallow footings.
			CO 4	Determine the load carrying capacity, settlement of pile foundation.
			CO 5	Determine the earth pressure on retaining walls and analysis for stability.
V	CE8511	SOIL MECHANICS LABORATORY	CO 1	Students are able to conduct tests to determine both the index and engineering properties of soils and to characterize the soil based on their properties.
V	CE8512	WATER AND WASTE WATER ANALYSIS LABORATORY	CO 1	Quantify the pollutant concentration in water and wastewater
			CO 2	Suggest the type of treatment required and amount of dosage required for the treatment
			CO 3	Examine the conditions for the growth of micro-organisms
VI	CE8601	DESIGN OF STEEL STRUCTURAL ELEMENTS	CO 1	Students will be able to, Understand the concepts of various design philosophies
			CO 2	Design common bolted and welded connections for steel structures
			CO 3	Students will be able to, Design tension members and understand the effect of shear lag.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 4	Understand the design concept of axially loaded columns and column base connections.
			CO 5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams.
VI	CE8602	STRUCTURAL ANALYSIS II	CO 1	Draw influence lines for statically determinate structures and calculate critical stress resultants.
			CO 2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
			CO 3	Analyse of three hinged, two hinged and fixed arches.
			CO 4	Analyse the suspension bridges with stiffening girders
			CO 5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.
VI	CE8603	IRRIGATION ENGINEERING	CO 1	Students will be able to, Have knowledge and skills on crop water requirements.
			CO 2	Understand the methods and management of irrigation.
			CO 3	Gain knowledge on types of Impounding structures
			CO 4	Understand methods of irrigation including canal irrigation.
			CO 5	Get knowledge on water management on optimization of water use.
VI	CE8604	HIGHWAY ENGINEERING	CO 1	Students will be able to,

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

				Get knowledge on planning and aligning of highway.
			CO 2	Geometric design of highways
			CO 3	Design flexible and rigid pavements.
			CO 4	Gain knowledge on Highway construction materials, properties, testing methods
			CO 5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.
VI	EN8592	WASTEWATER ENGINEERING	CO 1	The students completing the course will have, An ability to estimate sewage generation and design sewer system including sewage pumping stations
			CO 2	The required understanding on the characteristics and composition of sewage, self-purification of streams
			CO 3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment
			CO 4	Understand the standard methods for disposal of sewage.
			CO 5	Gain knowledge on sludge treatment and disposal.
VI	CE8611	HIGHWAY ENGINEERING LABORATORY	CO 1	Student knows the techniques to characterize various pavement materials through relevant tests.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

VI	CE8612	IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING	CO 1	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.
VI	HS8581	PROFESSIONAL COMMUNICATION	CO 1	At the end of the course Learners will be able to: Make effective presentations
			CO 2	Participate confidently in Group Discussions.
			CO 3	Attend job interviews and be successful in them.
			CO 4	Develop adequate Soft Skills required for the workplace
VII	CE8701	ESTIMATION, COSTING AND VALUATION ENGINEERING	CO 1	The student will be able to, Estimate the quantities for buildings,
			CO 2	Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
			CO 3	Understand types of specifications, principles for report preparation, tender notices types.
			CO 4	Gain knowledge on types of contracts
			CO 5	Evaluate valuation for building and land.
VII	CE8702	RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING	CO 1	The student will be able to, Understand the methods of route alignment and design elements in Railway Planning and Constructions.

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

			CO 2	Understand the Construction techniques and Maintenance of Track laying and Railway stations.
			CO 3	Gain an insight on the planning and site selection of Airport Planning and design.
			CO 4	Analyze and design the elements for orientation of runways and passenger facility systems.
			CO 5	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.
VII	CE8703	STRUCTURAL DESIGN AND DRAWING	CO 1	The student will be able to, Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls
			CO 2	Design and draw flat slab as per code provisions
			CO 3	Design and draw reinforced concrete and steel bridges
			CO 4	Design and draw reinforced concrete and steel water tanks
			CO 5	Design and detail the various steel trusses and cantry girders
VII	CE8711	CREATIVE AND INNOVATIVE PROJECT	CO 1	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.
VII	CE8712	INDUSTRIAL TRAINING	CO 1	At the end of the course the student will be able to understand,

DEPARTMENT OF CIVIL ENGINEERING

2.6.1. Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated

2017 REGULATION-COURSE OUTCOMES

				The intricacies of implementation textbook knowledge into practice.
			CO 2	The concepts of developments and implementation of new techniques
VIII	CE8020	MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES	CO 1	Students will be able to understand, the importance of maintenance and assessment method of distressed structures.
			CO 2	the strength and durability properties ,their effects due to climate and temperature.
			CO 3	recent development in concrete
			CO 4	the techniques for repair rand protection methods
			CO 5	repair, rehabilitation and retrofitting of structures and demolition methods.
VIII	CE8018	GEO-ENVIRONMENTAL ENGINEERING	CO 1	Assess the contamination in the soil
			CO 2	Understand the current practice of waste disposal
			CO 3	To prepare the suitable disposal system for particular waste.
			CO 4	Stabilize the waste and utilization of solid waste for soil improvement.
			CO 5	Select suitable remediation methods based on contamination.
VIII	CE8811	PROJECT WORK	CO 1	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.