DEPARTMENT OF CIVIL ENGINEERING

CO – PO MAPPING

YEAR:2017 **SEM: I**

S.NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO1	PO2
					1	2	3	4	5	6	7	8	9	10	11	12		
1	HS8151/ Communicative English	4	HS8151	Read articles of a general kind in magazines and newspapers				√				√						
				Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.				√				√						
				Comprehend conversations and short talks delivered in English				√				√						
				Write short essays of a general kind and personal letters and emails in English				√				√						
2	MA8151/ Engineering Mathematics – I	4	MA8151	Use both the limit definition and rules of differentiation to differentiate functions.	√													
				Apply differentiation to solve maxima and minima problems.	√													
				Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus	√													
				Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	√													
				Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	√													
				Determine convergence/divergence of improper integrals and evaluate convergent improper integrals	√													
				Apply various techniques in solving differential equations.	√													
S.NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO1	PO2
					1	2	3	4	5	6	7	8	9	10	11	12		
3	PH8151/ Engineering Physics	3	PH8151	the students will gain knowledge on the basics of properties of matter and its applications,	√	√	√	√	√	√								
				the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	√	√	√	√	√	√								
				the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,	√	√	√	√	√	√								
				the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, an	√	√	√	√	√	√								
				the students will understand the basics of	√	√	√	√	√	√								

				crystals, their structures and different crystal growth techniques.														
4	CY8151/ Engineering Chemistry	3	CY8151	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.	√	√	√		√	√	√							
5	GE8151/ Problem Solving and Python Programming	3	GE8151	Develop algorithmic solutions to simple computational problems	√	√	√		√	√	√		√	√				
				Read, write, execute by hand simple Python programs.	√	√	√		√	√	√		√	√				
				Structure simple Python programs for solving problems.	√	√	√		√	√	√		√	√				
				Decompose a Python program into functions.	√	√	√		√	√	√		√	√				
				Represent compound data using Python lists, tuples, dictionaries	√	√	√		√	√	√		√	√				
				Read and write data from/to files in Python Programs.	√	√	√		√	√	√		√	√				
6	GE8152/ Engineering Graphics	4	GE8152	familiarize with the fundamentals and standards of Engineering graphics	√	√	√		√	√	√		√	√				
				perform freehand sketching of basic geometrical constructions and multiple views of objects	√	√	√		√	√	√		√	√				
				project orthographic projections of lines and plane surfaces.	√	√	√		√	√	√		√	√				
				draw projections and solids and development of surfaces.	√	√	√		√	√	√		√	√				
				visualize and to project isometric and perspective sections of simple solids.	√	√	√		√	√	√		√	√				
7	GE8161 / Problem Solving and Python Programming Laboratory	2	GE8161	Write, test, and debug simple Python programs.	√	√			√	√	√							
				Implement Python programs with conditionals and loops.	√	√			√	√	√							
				Develop Python programs step-wise by defining functions and calling them.	√	√			√	√	√							
				Use Python lists, tuples, dictionaries for representing compound data	√	√			√	√	√							
				Read and write data from/to files in Python.	√	√			√	√	√							

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					1	2	3	4	5	6	7	8	9	10	11	12		
8	BS8161/ Physics and Chemistry Laboratory	2	BS8161	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	√	√			√	√	√							

YEAR:2017 **SEM: II**

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					1	2	3	4	5	6	7	8	9	10	11	12		
1	HS8251 / Technical English	4	HS8251	Read technical texts and write area-specific texts effortlessly				√				√						
				Listen and comprehend lectures and talks in their area of specialisation successfully.				√				√						
				Speak appropriately and effectively in varied formal and informal contexts.				√				√						
				Write reports and winning job applications.				√				√						
2	MA8251 / Engineering Mathematics II	4	MA8251	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	√													
				Gradient, divergence and curl of a vector point function and related identities.	√													
				Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	√													
				Analytic functions, conformal mapping and complex integration.	√													
				Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	√													
3	PH8201/ PHYSICS FOR CIVIL ENGINEERING	3	PH8201	the students will have knowledge on the thermal performance of buildings,	√	√	√	√	√	√								
				the students will acquire knowledge on the acoustic properties of buildings,	√	√	√	√	√	√								
				the students will get knowledge on various lighting designs for buildings,	√	√	√	√	√	√								
				the students will gain knowledge on the properties and performance of engineering materials, and	√	√	√	√	√	√								
				the students will understand the hazards of buildings.	√	√	√	√	√	√								
4	BE8251/ BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	BE8251	ability to identify the electrical components and explain the characteristics of electrical machines														
				ability to identify electronics components and understand the characteristics														

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					1	2	3	4	5	6	7	8	9	10	11	12		
5	GE8291 / Environmental Science and Engineering	3	GE8291	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.							√			√				
				Public awareness of environmental is at infant stage.							√			√				
				Ignorance and incomplete knowledge has lead to misconceptions							√			√				
				Development and improvement in std. of living has lead to serious environmental disasters							√			√				
6	GE8292/ ENGINEERING MECHANICS	4	GE8292	illustrate the vectorial and scalar representation of forces and moments	√	√	√		√	√	√		√	√				
				analyse the rigid body in equilibrium	√	√	√		√	√	√		√	√				
				evaluate the properties of surfaces and solids	√	√	√		√	√	√		√	√				
				calculate dynamic forces exerted in rigid body	√	√	√		√	√	√		√	√				
				determine the friction and the effects by the laws of friction	√	√	√		√	√	√		√	√				
7	GE8261 / Engineering Practices Laboratory	2	GE8261	Fabricate carpentry components and pipe connections including plumbing works.	√	√				√	√							
				Use welding equipments to join the structures.	√	√				√	√							
				Carry out the basic machining operations	√	√				√	√							
				Make the models using sheet metal works	√	√				√	√							
				Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	√	√				√	√							
				Carry out basic home electrical works and appliances	√	√				√	√							
				Measure the electrical quantities	√	√				√	√							
				Elaborate on the components, gates, soldering practices.	√	√				√	√							
8	CE8211 / COMPUTER AIDED BUILDING DRAWING	2	CE8211	The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer softwares.														

YEAR:2017 **SEM:III**

S. NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO 1	PO 2
					1	2	3	4	5	6	7	8	9	10	11	12		
1	MA8353/ Transforms and Partial Differential Equations	4	MA8353	Understand how to solve the given standard partial differential equations.														
				Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.														
				Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations														
				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.														
				Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.														
2	CE8392/ Engineering Geology	3	CE8392	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.		√	√		√					√				
				Will get basics knowledge on properties of minerals		√	√		√		√			√				
				Gain knowledge about types of rocks, their distribution and uses.		√	√		√		√			√				
				Will understand the methods of study on geological structure		√	√		√		√			√				
				Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor		√	√		√		√			√				
3	CE8391/ Construction Materials	3	CE8391	Compare the properties of most common and advanced building materials.		√	√		√		√			√				
				understand the typical and potential applications of lime, cement and aggregates		√	√		√		√			√				
				know the production of concrete and also the method of placing and making of concrete elements		√	√		√		√			√				
				understand the applications of timbers and other materials		√	√		√		√			√				
				Understand the importance of modern material for construction.		√	√		√		√			√				
4	CE8301/ Strength of Materials I	3	CE8301	Understand the concepts of stress and strain, principal stresses and principal planes.	√	√	√	√	√					√				
				Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	√	√	√	√	√					√				
				Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	√	√	√	√	√					√				
				Apply basic equation of torsion in design of circular shafts and helical springs,	√	√	√	√	√					√				
				Analyze the pin jointed plane and space trusses	√	√	√	√	√					√				

5	CE8302 / Fluid Mechanics	3	CE8302	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium	√	√		√			√	√	√	√				
				Understand and solve the problems related to equation of motion.	√	√		√			√	√	√	√				
				Gain knowledge about dimensional and model analysis.	√	√		√			√	√	√	√				
				Learn types of flow and losses of flow in pipes.	√	√		√			√	√	√	√				
				Understand and solve the boundary layer problems.	√	√		√			√	√	√	√				
6	CE8351/ Surveying	3	CE8351	The use of various surveying instruments and mapping		√	√		√		√			√				
				Measuring Horizontal angle and vertical angle using different instruments		√	√		√		√			√				
				Methods of Leveling and setting Levels with different instruments		√	√		√		√			√				
				Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth		√	√		√		√			√				
				Concept and principle of modern surveying.		√	√		√		√			√				
7	CE8361/ Surveying Laboratory	2	CE8361	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.														
8	CE8311/ Construction Materials Laboratory	2	CE8311	The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.														

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					1	2	3	4	5	6	7	8	9	10	11	12		
9	HS8381/ INTERPERSONAL SKILLS/LISTENING&SPEAKING	1	HS8381	Listen and respond appropriately.														
				Participate in group discussions														
				Make effective presentations														
				Participate confidently and appropriately in conversations both formal and informal														

YEAR:2017 **SEM: IV**

S. NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO 1	PO 2
					1	2	3	4	5	6	7	8	9	10	11	12		
1	MA8491/ Numerical Methods	4	MA8491	Understand the basic concepts and techniques of solving algebraic and transcendental equations.														
				Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations														
				Apply the numerical techniques of differentiation and integration for engineering problems														
				Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations														
				Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.														
2	CE8401/ Construction Techniques and Practices	3	CE8401	know the different construction techniques and structural systems		√			√		√		√	√				
				Understand various techniques and practices on masonry construction, flooring, and roofing.		√			√		√		√	√				
				Plan the requirements for substructure construction.		√			√		√		√	√				
				Know the methods and techniques involved in the construction of various types of super structures		√			√		√		√	√				
				Select, maintain and operate hand and power tools and equipment used in the building construction sites.		√			√		√		√	√				
3	CE8402/ Strength of Materials II	3	CE8402	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.	√	√	√	√	√					√				
				Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements	√	√	√	√	√					√				
				find the load carrying capacity of columns and stresses induced in columns and cylinders	√	√	√	√	√					√				
				Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure	√	√	√	√	√					√				
				Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.	√	√	√	√	√					√				
4	CE8403/ Applied Hydraulic Engineering	3	CE8403	Apply their knowledge of fluid mechanics in addressing problems in open channels.	√	√		√			√	√	√	√				
				Able to identify a effective section for flow in different cross sections.	√	√		√			√	√	√	√				
				To solve problems in uniform, gradually and rapidly varied flows in steady state conditions	√	√		√			√	√	√	√				
				Understand the principles, working and application of turbines.	√	√		√			√	√	√	√				

				Understand the principles, working and application of pumps.	√	√		√			√	√	√	√				
5	CE8404/ Concrete Technology	3	CE8404	The various requirements of cement, aggregates and water for making concrete	√	√		√			√	√	√	√				
				The effect of admixtures on properties of concrete	√	√		√			√	√	√	√				
				The concept and procedure of mix design as per IS method	√	√		√			√	√	√	√				
				The properties of concrete at fresh and hardened state	√	√		√			√	√	√	√				
				The importance and application of special concretes.	√	√		√			√	√	√	√				

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					1	2	3	4	5	6	7	8	9	10	11	12		
6	CE8491/ Soil Mechanics	3	CE8491	classify the soil and assess the engineering properties, based on index properties	√	√					√	√	√	√				
				Understand the stress concepts in soils	√	√					√	√	√	√				
				Understand and identify the settlement in soils	√	√					√	√	√	√				
				Determine the shear strength of soil	√	√					√	√	√	√				
				Analyze both finite and infinite slopes.	√	√					√	√	√	√				
7	CE8481/ Strength of Materials Laboratory	2	CE8481	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.	√	√	√	√	√					√				
8	CE8461/ Hydraulic Engineering Laboratory	2	CE8461	The students will be able to measure flow in pipes and determine frictional losses.	√		√		√	√	√	√	√	√				
				The students will be able to develop characteristics of pumps and turbines.	√		√		√	√	√	√	√	√				
9	HS8461/ Advanced Reading and Writing	1	HS8461	Write different types of essays.														
				Write winning job applications														
				Read and evaluate texts critically.														
				Display critical thinking in various professional contexts														

YEAR: V **SEM: V**

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					1	2	3	4	5	6	7	8	9	10	11	12		
1	CE8501/ Design of Reinforced Cement Concrete Elements	4	CE8501	Understand the various design methodologies for the design of RC elements.	√	√	√	√	√					√				
				Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.	√	√	√	√	√					√				
				design the various types of slabs and staircase by limit state method.	√	√	√	√	√					√				
				Design columns for axial, uniaxial and biaxial eccentric loadings.	√	√	√	√	√					√				
				Design of footing by limit state method.	√	√	√	√	√					√				
2	CE8591/ Foundation Engineering	3	CE8591	Understand the site investigation, methods and sampling.		√		√			√		√	√				
				Get knowledge on bearing capacity and testing methods		√		√			√		√	√				
				Design shallow footings.		√		√			√		√	√				
				Determine the load carrying capacity, settlement of pile foundation.		√		√			√		√	√				
				Determine the earth pressure on retaining walls and analysis for stability.		√		√			√		√	√				
3	CE8502/ Structural Analysis I	3	CE8502	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method	√	√	√	√	√				√	√				
				Analyse the continuous beams and rigid frames by slope defection method.	√	√	√	√	√				√	√				
				Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	√	√	√	√	√				√	√				
				Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	√	√	√	√	√				√	√				
				Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames	√	√	√	√	√				√	√				
4	EN8491/ Water Supply Engineering	3	EN8491	an insight into the structure of drinking water supply systems, including water transport, treatment and distribution			√	√	√	√			√					
				the knowledge in various unit operations and processes in water treatment			√	√	√	√			√					
				an ability to design the various functional units in water treatment			√	√	√	√			√					
				an understanding of water quality criteria and standards, and their relation to public health			√	√	√	√			√					
				the ability to design and evaluate water supply project alternatives on basis of chosen criteria.			√	√	√	√			√					

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					1	2	3	4	5	6	7	8	9	10	11	12		
5	CE8512 / Water and Waste Water Analysis Laboratory	2	CE8512	Quantify the pollutant concentration in water and wastewater		√		√			√			√				
				Suggest the type of treatment required and amount of dosage required for the treatment		√		√			√			√				
				Examine the conditions for the growth of micro-organisms		√		√			√			√				
6	CE8511 / Soil Mechanics Laboratory	2	CE8511	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.			√		√	√								
7	CE8513 / Survey Camp (2 weeks– During V Semester)	2	CE8513				√	√					√					

YEAR:2017 **SEM:VI**

S. NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO 1	PO 2
					1	2	3	4	5	6	7	8	9	10	11	12		
1	CE8601/ Design of Steel Structural Elements	4	CE8601	Understand the concepts of various design philosophies	√	√	√	√	√					√				
				Design common bolted and welded connections for steel structures	√	√	√	√	√					√				
				Design tension members and understand the effect of shear lag	√	√	√	√	√					√				
				Understand the design concept of axially loaded columns and column base connections	√	√	√	√	√					√				
				Understand specific problems related to the design of laterally restrained and unrestrained steel beams.	√	√	√	√	√					√				
2	CE8602/ Structural Analysis II	3	CE8602	Draw influence lines for statically determinate structures and calculate critical stress resultants	√	√	√	√	√				√	√				
				Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams	√	√	√	√	√				√	√				
				Analyse of three hinged, two hinged and fixed arches.	√	√	√	√	√				√	√				
				Analyse the suspension bridges with stiffening girders	√	√	√	√	√				√	√				
				Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames	√	√	√	√	√				√	√				
3	CE8603/ Irrigation Engineering	3	CE8603	Have knowledge and skills on crop water requirements	√	√		√										
				Understand the methods and management of irrigation.	√	√		√										
				Gain knowledge on types of Impounding structures	√	√		√										
				Understand methods of irrigation including canal irrigation.	√	√		√										
				Get knowledge on water management on optimization of water use.	√	√		√										
4	EN8592 / Wastewater Engineering	3	EN8592	An ability to estimate sewage generation and design sewer system including sewage pumping stations	√	√		√										
				The required understanding on the characteristics and composition of sewage, self- purification of streams	√	√		√										
				An ability to perform basic design of the unit operations and processes that are used in sewage treatment	√	√		√										
				Understand the standard methods for disposal of sewage.	√	√		√										
				Gain knowledge on sludge treatment and disposal.	√	√		√										
5	CE8604 / Highway Engineering	3	CE8604	Get knowledge on planning and aligning of highway		√	√	√	√			√						
				Geometric design of highways		√	√	√	√			√						
				Design flexible and rigid pavements.		√	√	√	√			√						
				Gain knowledge on Highway construction materials, properties, testing methods		√	√	√	√			√						
				Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.		√	√	√	√			√						

S. NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO 1	PO 2
					1	2	3	4	5	6	7	8	9	10	11	12		
6	CE8611 / Highway Engineering Laboratory	2	CE8611	Student knows the techniques to characterize various pavement materials through relevant tests.								√						
7	CE8612 / Irrigation and Environmental Engineering Drawing	2	CE8612	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.														
8	HS8581 / Professional Communication	1	HS8581	Make effective presentations														
				Participate confidently in Group Discussions.														
				Attend job interviews and be successful in them.														
				Develop adequate Soft Skills required for the workplace														

YEAR:2017 **SEM:VII**

S. NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO 1	PO 2
					1	2	3	4	5	6	7	8	9	10	11	12		
1	CE8701 / Estimation, Costing and Valuation Engineering	3	CE8701	Estimate the quantities for buildings,	√	√				√	√			√				
				Rate Analysis for all Building works, canals, and Roads and Cost Estimate.	√	√				√	√			√				
				Understand types of specifications, principles for report preparation, tender notices types.	√	√				√	√			√				
				Gain knowledge on types of contracts	√	√				√	√			√				
				Evaluate valuation for building and land.	√	√				√	√			√				
2	CE8702 / Railways, Airports, Docks and Harbour Engineering	3	CE8702	Understand the methods of route alignment and design elements in Railway Planning and Constructions		√		√			√		√	√				
				Understand the Construction techniques and Maintenance of Track laying and Railway stations		√		√			√		√	√				
				Gain an insight on the planning and site selection of Airport Planning and design.		√		√			√		√	√				
				Analyze and design the elements for orientation of runways and passenger facility systems		√		√			√		√	√				
				Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.		√		√			√							
3	CE8703 / Structural Design and Drawing	4	CE8703	Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls	√	√	√	√		√				√				
				Design and draw flat slab as per code provisions	√	√	√	√		√				√				
				Design and draw reinforced concrete and steel bridges	√	√	√	√		√				√				
				Design and draw reinforced concrete and steel water tanks	√	√	√	√		√				√				
				Design and detail the various steel trusses and cantry girders	√	√	√	√		√				√				
4	CE8711 / Creative and Innovative Project (Activity Based - Subject Related)	2	CE8711			√		√			√			√				
5	CE8712 / Industrial Training (4 weeks During VI semester– Summer)	2	CE8712	The intricacies of implementation textbook knowledge into practice				√			√	√		√				
				The concepts of developments and implementation of new techniques				√			√	√		√				

YEAR: **SEM: VIII**

S. NO	SUBJECT NAME/CODE	COURSE CREDIT	COURSE CODE	COURSE OUTCOMES	PROGRAMME OUTCOME (PO)												PO 1	PO 2
					1	2	3	4	5	6	7	8	9	10	11	12		
1	CE8811 / Project Work	10	CE8811	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.		√		√			√			√				