PRIST
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UNIVERSITY
NAAC ACCREDITED
THANJAVUR – 613 403 - TAMIL NADU

DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

B.TECH (F.T)-2017R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	17147S11	Communicative English	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			✓							
	17148S12	Engineering Mathematics – I	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.	✓									
	17149S13	Engineering Physics	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, and	✓									
			the students will understand the basics of crystals, their structures and different crystal growth techniques.			✓	✓						
	17149S14	Engineering Chemistry	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.	✓	✓		✓	✓	✓				
	17150S15	Engineering Graphics	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.	✓									
	17154S15	Problem Solving and Python Programming	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, and dictionaries.										
			Read and write data from/to files in Python Programs.										
	17150L17	Problem Solving and Python Programming Laboratory	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, and dictionaries.	✓									
			Read and write data from/to files in Python Programs.	✓									
	17149L18	Physics and Chemistry Laboratory	Upon completion of the course, the students will be able to apply principles of elasticity, optics and thermal properties for engineering applications	✓			✓	✓	✓				
			The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.										

	171VEA 19	Value Education	To learn about philosophy of Life and Individual qualities	✓										
			To learn and practice social values and responsibilities											
			To learn and practice mind culture, forces acting on the body.											
SEM 2	17147S21	Technical English	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.							✓				
	17148S22A	Engineering Mathematics – II	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.											
	17149S23D	Physics for Civil Engineering	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.	✓				✓						
	17149S24D	Basic Electrical and Electronics Engineering	Ability to identify the electrical components and explain the characteristics of electrical machines.	✓										
			Ability to identify electronics components and understand the characteristics											
	17153S25E	Environmental Science and Engineering	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 disaster											
	17154S26D	Engineering Mechanics	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											
	17154L27	Engineering Practices Laboratory	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, foundry and fittings	✓										
			Carry out basic home electrical works and appliances											
			Measure the electrical quantities											
			Elaborate on the components, gates, soldering practices.											
	17155L28E	Computer Aided Building Drawing	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.	✓			✓							
	171ICA29	Fundamentals of Indian constitution and Economy	describe the salient features of the constitution of India	✓										
			interpret, integrate and critically analyse the political economy of Indian international relations.											
SEM 3	17148C31C	Transforms and Partial Differential Equations	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	✓										

	17155C32	Engineering Geology	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 harbour										
	17155C33	Construction Materials	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.										
	17155C34	Strength of Materials I	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										
	17155C35	Fluid Mechanics	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.										
	17155C36	Surveying	The use of various surveying instruments and mapping	✓	✓		✓		✓			✓	
			Measuring Horizontal angle and vertical angle using different instruments						✓			✓	
			Methods of Levelling 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.										

	17155L37	Surveying Laboratory	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.	✓	✓		✓		✓			✓	
	17155L38	Construction Materials Laboratory	the students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.	✓	✓				✓				
	17155L39	Interpersonal Skills / Listening and Speaking	Listen and respond appropriately.	✓									
			Participate in group discussions	✓									
			Make effective presentations	✓									
			Participate confidently and appropriately in conversations both formal and informal	✓									
SEM 4	17148S41C	Numerical Methods	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.	✓									
	17155C42	Construction Techniques and Practices	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.						✓		✓		
	17155C43	Strength of Materials II	Classify the soil and assess the engineering properties, based on index properties.	✓	✓	✓	✓	✓					✓
			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.										✓
	17155C44	Applied Hydraulic Engineering	Classify the soil and assess the engineering properties, based on index properties.	✓	✓		✓			✓	✓	✓	✓
			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.										
	17155C45	Concrete Technology	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.										
	17155C46	Soil Mechanics	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.										
	17155L47	Strength of Materials Lab	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.	✓	✓	✓	✓	✓					✓
	17155L48	Hydraulic Engineering Lab	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.					✓	✓		✓	✓	
	17155L49	Advanced Reading & Writing	Write different types of essays.	✓									
			Write winning job applications.										
			Read and evaluate texts critically.	✓			✓						
	17155CRS	Research Led Seminar	Exposure to various research domains	✓									
			Acquaintance with languages of research										
			Development of research aptitude										

SEM 5	17155C51	Design of Reinforced Cement Concrete Elements	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.										
	17155C52	Structural Analysis I	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method	✓	✓	✓	✓	✓				✓	✓
			Analyze 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.				✓					✓	✓
			Analyze 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.		✓	✓						✓	✓
	17155C53	Water Supply Engineering	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			✓	✓					✓	
	17155E55C	Geographic Information System	Have basic idea about the fundamentals of GIS.	✓									
			Understand the types of data models.										
			Get knowledge about data input and topology.	✓									
			Gain knowledge on data quality and standards.										
			Understand data management functions and data output	✓			✓						
	17155C56	Foundation Engineering	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.							✓				✓
	17155L57	Soil Mechanics Lab	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.			✓		✓	✓					
	17155L58	Water and Waste Water Analysis Lab	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		✓		✓							✓
	17155L59	Survey Camp	Interpret the contours			✓	✓						✓	
			Work in a teamwork											
			Mark a road alignment of (L-section, Cross-section) a given gradient connecting any two stations on the map				✓						✓	
			Calculate the earth work			✓								
			Prepare a topographical plan of a given area		✓			✓						
	17155CRM	Research Methodology	Ability to carry out independent literature survey corresponding to the specific publication type and assess basic experimental as well as conceptual set up.	✓										
	17155C61	Design of Steel Structural Elements	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.	✓										
	17155C62	Structural Analysis II	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.											
	17155C63	Irrigation Engineering	Have knowledge and skills on crop water requirements.	✓	✓		✓							

SEM 6			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.				✓							
	17155C64	Highway Engineering	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.		✓	✓								
	17155C65	Waste Water Engineering	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.				✓							
	17155E66A	Ground Improvement Techniques	Gain knowledge on methods and selection of ground improvement techniques.	✓			✓			✓				
			Understand dewatering techniques and design for simple cases.	✓										
			Get knowledge on insitu treatment of cohesionless and cohesive soils.							✓				
			Understand the concept of earth renforcement and design of reinforced earth.						✓					
			Get to know types of grouts and grouting technique.					✓						
	17155E66B	Introduction to soil dynamics and machine foundation	Understand the theory and measurement of vibration.	✓						✓				
			Understand the concept of wave propagation in infinite medium and due to machine foundation.	✓			✓		✓					
			Get knowledge on dynamic properties of soils and laboratory and field testing.											
			Design of foundation for different types of machines						✓					
			Understand liquefaction, motion isolation and vibration control.					✓						
	17155E66C	Rock Engineering	Classify the rocks, study the index properties of rock systems.	✓										
			Understand the modes of rock failure, stares-strain characteristics, failure criteria.	✓		✓	✓							
			Estimate the stresses in rocks.											

			Apply rock mechanics in engineering.						✓					
			Get knowledge on rock stabilization.					✓						
	17155E66D	Urban planning and development	Describe basic issues in urban planning	✓										
			Formulate plans for urban and rural development and	✓			✓							
			Plan and analyse socio economic aspects of urban and rural planning				✓		✓					
			Design of urban development projects.											
			Manage urban development projects.					✓						
	17155E66E	Building Technology	To understand elements of building construction with respect to substructure and superstructure	✓					✓					
			To understand the construction of built forms from foundation to roof in various building practices	✓		✓								✓
			To gain in depth knowledge and understanding of different building materials used for construction			✓	✓		✓					
			To understand the contextual relevance of natural and man made materials and their applicability in various construction practices											
	17155E66F	Intellectual property rights	Ability to manage Intellectual Property portfolio to enhance the value of the firm.	✓				✓						
	17155L67	Highway Engineering Laboratory	Student knows the techniques to characterize various pavement materials through relevant tests.	✓			✓				✓			
	17155L68	Irrigation and Environmental Engineering Drawing	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.	✓	✓		✓							
	17155L69	Professional communication	Make effective presentations	✓			✓							
			Participate confidently in Group Discussions.											
			Attend job interviews and be successful in them.		✓			✓						
			Develop adequate Soft Skills required for the workplace											
	17155CBR	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	✓			✓			✓				
			Evolution of research intuitiveness and orientation									✓		
			Familiarity with cutting edge research trends		✓			✓						
SEM 7	17155C71	Estimation , Costing & Valuation Engineering	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.										
	17155C72	Railways, Airports, Docks And Harbour Engineering	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.									✓	
	17155C73	Structural Design and drawing	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						✓				
	17155E75 A	Pavement Engineering	Get knowledge about types of rigid and flexible pavements.		✓		✓			✓		✓	
			Able to design of rigid pavements.							✓		✓	
			Able to design of flexible pavements.		✓		✓						
			Determine the causes of distress in rigid and flexible pavements.							✓		✓	
			Understand stailisation of pavements, testing and field control.				✓						
	17155E75 B	Engineering Economics and Cost Analysis	To provides the students with knowledge of basic economic problems and the relationship between engineering technology and economics.		✓		✓			✓		✓	
			To give knowledge to the students about various costs for determining the manufacturing of a product.							✓			
	17155E75 C	Transport and Environment	Understood the impact of Transportation projects on the environment.		✓		✓			✓		✓	
			Get knowledge on methods of impact analysis and their applications.							✓		✓	
			Understand environmental Laws on Transportation Projects and the mitigative measures adopted in the planning stage.		✓		✓						
			Predict and assess the impact of transportation projects.							✓			
	17155E75 D	Industrial Structures	Know the requirements of various industries and get an idea about the materials used and planning of various industrial components	✓	✓	✓	✓	✓					✓
			Understand the functional requirements for industrial structures.				✓	✓					✓

			Design special steel structures like bunkers, silos, crane girders, chimneys and pre-engineered buildings.			✓	✓						✓
			Design special RC structures like corbels, silos, bunkers, chimneys, plates and shells.	✓	✓								
			Understand the principles of prefabrication and prestressing										
	17155E75 E	Environmental and social impact assessment	carry out scoping and screening of developmental projects for environmental and social assessments	✓			✓						
			explain different methodologies for environmental impact prediction and assessment			✓	✓					✓	
			plan environmental impact assessments and environmental management plans										
			evaluate environmental impact assessment reports										
	17155E75 F	Design of prestressed concrete structures	Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.		✓	✓	✓						
			Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).				✓	✓					
			Analyze for deflection of prestressed concrete members and design the anchorage zone.	✓	✓	✓	✓	✓					✓
			Analyze and design of composite beams and continuous beams.										
			Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.										✓
	17155E75 G	Construction planning and scheduling	Understand basic concepts of construction planing.	✓							✓	✓	
			Schedule the construction activities.								✓		
			Forecast and control the cost in a construction.										
			Understand the quality control and safety during construction.				✓		✓				
			Organize information in Centralized database Management systems.										
	17155E75 H	Municipal solid waste management	understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.	✓			✓			✓			
			Reduction, reuse and recycling of waste.										
			ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.							✓			✓
			knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.			✓			✓				
			Design and operation of sanitary landfill.					✓			✓		

	17155E75 I	Total quality management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	✓							✓	✓		
	17155L76	Creative and Innovation project (activity based –subject related)	On completion of the design project students will have a better experience in designing various design problems related to Civil Engineering.		✓		✓			✓				
	17155L77	Industrial Training (4weeks During VI Semester – Summer)	The intricacies of implementation textbook knowledge into practice				✓			✓	✓			
			The concepts of developments and implementation of new techniques											
	17155L78	Technical Seminar	To effectively communicate by making an oral presentation	✓			✓							
			To study research papers for understanding of anew field, in the absence of a text book, to summarize and review them.		✓			✓						
	17155CSR	Design / Socio - Technical Project (Scaffolded Research)	Sensitization of social needs for innovation						✓		✓			
			Team work towards interdisciplinary synchronous research strategy	✓			✓		✓					
			Development of critical thinking and synergistic research approach.							✓		✓		
	17155E81 A	Coastal Engineering	Understand coastal engineering aspects of harbors methods to improve navigation	✓			✓		✓					
			Understand the wave properties and analysis of wave.											
			Understand the concepts of sediment transport.				✓				✓			
			Design of shore defense structures.							✓				✓
			Gain knowledge in modeling in coastal engineering.											
	17155E81 B	Participatory water resources management	Gain knowledge on various processes involved in participatory water resource management.	✓										
			Understand famers participation in water resources management.			✓								
			ware of the issues related to water conservation and watershed Development					✓						
			Get knowledge in participatory water conservation				✓				✓			
			Understand concept, principle , approach of watershed management.						✓					

17155E81 C	Integrated water resources management	Understand objectives, principles and evolution of integrated water resources management.			✓		✓						
		Have an idea of contextualizing IWRM						✓		✓			
		Gain knowledge in emerging issues in water management, flood, drought, pollution and poverty.											
		Understand the water resources development in India and wastewater reuse.						✓		✓			
		Gain knowledge on integrated development of water management.			✓		✓						
17155E81 D	Groundwater engineering	Understand aquifer properties and its dynamics			✓		✓						
		Get an exposure towards well design and practical problems											
		Develop a model for groundwater management.		✓									
		Students will be able to understand the importance of artificial recharge and groundwater quality concepts					✓						
		Gain knowledge on conservation of groundwater.				✓							✓
17155E81 E	Water resources system systems engineering	Exposed to the economic aspects and analysis of water resources systems by which they will get an idea of comprehensive and integrated planning of a water resources project.			✓		✓						
		Understanding the concept of linear programming and apply in water resource system.	✓				✓						
		Understanding the concept of dynamic programming and apply in water resource system.		✓									
		Develops simulation models.					✓						
		developing skills in solving problems in operations research through LP, DP and Simulation techniques.				✓							✓
17155E81 F	Geo-environmental engineering	Assess the contamination in the soil	✓			✓							
		Understand the current practice of waste disposal			✓	✓					✓		
		To prepare the suitable disposal system for particular waste.											
		Stabilize the waste and utilization of solid waste for soil improvement.			✓	✓			✓				
		Select suitable remediation methods based on contamination.											
17155E81 G	Hydrology and water resources engineering	an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,			✓		✓						✓

			ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge	✓			✓	✓					
			ability to conduct Spatial analysis of rainfall data and design water storage reservoirs		✓								
			Understand the concept and methods of ground water management.					✓					
	17155E81H	Professional ethics in engineering	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.	✓			✓		✓				
	17155E82A	Computer aided design of structures	Understand the concepts of Computer-Aided Design, Software requirements and Hardware components in CAD system.			✓							
			Acquire the knowledge in Computer Graphics and Computer aided drafting using Auto CAD software							✓			
			Understand the fundamentals of finite element analysis and be able use software for modeling, analysis and design of structures.				✓					✓	
			Understand the concepts of Optimization techniques and its practical applications to structural engineering.		✓								
			Acquire the knowledge in Artificial Intelligence and Knowledge based expert systems.										
	17155E82B	Maintenance, repair and rehabilitation of structures	the importance of maintenance and assessment method of distressed structures.							✓			
			the strength and durability properties ,their effects due to climate and temperature.				✓					✓	
			recent development in concrete										
			the techniques for repair rand protection methods							✓			
			repair, rehabilitation and retrofitting of structures and demolition methods.				✓					✓	
	17155E82C	Structural dynamics and earthquake engineering	Student will develop knowledge in the simulation and mathematical model development.							✓			
			Students will be trained to identify, formulate and solve complicated problem.	✓			✓					✓	
			Students will be able to understand the role of natural calamity in the damage of structures.						✓				✓
			Students will be able to develop the skill to analyse data and to apply the same in the practical problems.	✓						✓			✓

			Students will be able to apply the developed methodologies for the safe and stable design of structures.				✓					✓	
	17155E82D	Prefabricated structures	The student will have good knowledge about design principles, layout of factory and stages of loading in precast construction.							✓			
			Acquire knowledge about panel systems, slabs, connections used in precast construction and they will be in a position to design the elements.	✓			✓					✓	
			Acquire knowledge about types of floor systems, stairs and roofs used in precast construction.						✓				✓
			Acquire knowledge about types of walls used in precast construction, sealants, design of joints.	✓						✓			✓
			Acquire knowledge about components in industrial building.				✓					✓	
	17155E82E	Bridge engineering	Identify loads on bridges and selection of type of bridge for the site condition	✓						✓			
			Analyze the super structure by various methods.				✓					✓	
			Design the trussed bridge and plate girder bridges						✓				✓
			Design reinforced concrete slab and T beam bridges and prestressed concrete bridges	✓						✓			✓
			Decide the appropriate sub structural systems , bearings and expansion joints for the bridges.				✓					✓	
	17155E82F	Foundation of nano science	Will familiarize about the science of nanomaterials					✓			✓		
			Will demonstrate the preparation of nanomaterials		✓					✓			
			Will develop knowledge in characteristic nanomaterial										✓
	17155P83	Project Work	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.		✓		✓			✓			

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DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

B.TECH (P.T)-2017R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
I	17148S11P	Transforms and Partial Differential Equations	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	✓									
	17155H12P	Mechanicsof solids I	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										
	17155H13P	Fluid Mechanics-I	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.										
	17155H14P	Surveying	The use of various surveying instruments and mapping	✓	✓		✓		✓			✓	
			Measuring Horizontal angle and vertical angle using different instruments						✓			✓	
			Methods of Levelling 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.										
	17155H15P	Irrigation Engineering	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.				✓						
II	17148S21P	Numerical Methods	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.	✓									
17155H22P	Strength of Materials	Classify the soil and assess the engineering properties, based on index properties.	✓	✓	✓	✓	✓					✓
		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.										✓
17155H23P	Fluid Mechanics-II	Classify the soil and assess the engineering properties, based on index properties.	✓	✓		✓			✓	✓	✓	✓
		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.										
17155H24P	Concrete Technology	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.										

III	17155H25P	Soil Mechanics	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.			✓					✓		
	17148S31P	Probability & Statistics	Analyze both finite and infinite slopes.										
	17155H32P	Design of reinforced concrete structures-I	The student shall be in a position to design the basic elements of reinforced concrete structures.	✓	✓					✓	✓		
	17155H33P	Structural Analysis I	Students will be able to analysis trusses, frames and arches	✓	✓	✓	✓	✓				✓	✓
			Students will be able to analyse structures for moving loads and		✓	✓	✓	✓					
			Students will be able to will be conversant with classical methods of analysis.	✓	✓	✓	✓					✓	✓
	17155H34P	Construction Materials and Practices	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.				✓			✓			
	17155L35P	Soil Mechanics Lab	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.			✓		✓	✓				
IV	17155H41P	Design of reinforced concrete structures-II	The student shall have a comprehensive design knowledge related to various structural systems.	✓		✓		✓			✓		
	17155H42P	Structural Analysis II	The student will have the knowledge on advanced methods of analysis of structures including space and cable structures.		✓	✓	✓	✓					
	17155H43P	Environmental Engineering	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			✓	✓					✓	
	17155E44AP	Hydrology	an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments			✓		✓					✓
			ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge	✓			✓	✓					
	17155E44BP	Water resources Engineering	ability to conduct Spatial analysis of rainfall data and design water storage reservoirs		✓	✓	✓						
			Understand the concept and methods of ground water management.					✓		✓	✓		
	17155E44CP	Building Technology	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							✓	✓	✓	
	17155E44DP	Contract laws and regulations	understand the applications of timbers and other materials					✓	✓				
	17155L45P	Environmental Engineering Lab	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		✓		✓						✓
V	17155H51P	Design of Steel Structural Elements	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.	✓									
	17155H52P	Foundation Engineering	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.							✓			✓
	17155H53P	Industrial Waste Management	understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.	✓			✓			✓			
			Reduction, reuse and recycling of waste.										
			ability to plan and design systems for storage, collection, transport, processing and disposal of municipal solid waste.							✓			✓
			knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.			✓			✓				
			Design and operation of sanitary landfill.					✓			✓		
	17155H54P	Computer Aided Analysis And Design	At the end of the course the student acquires hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.	✓			✓			✓			
	17155E54P	Transportation Engineering	Design flexible and rigid pavements.		✓			✓					
			Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.				✓			✓			
			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.				✓			✓			✓
	17155E54P	Geology	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 harbour			✓			✓			✓	
	17155E54P	Highway Engineering	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.			✓			✓			✓	
	17155L55P	Computer Aided Building Drawing Laboratory	The students will be able to draft the plan, elevation and sectional views of the buildings,industrial structures, framed buildings using computer softwares.	✓		✓		✓			✓		✓
VI	17155H61P	Estimation & Cost Evaluation	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.										
	17155H62P	Ground Water Hydrology	The students gain the knowledge needed on hydrologic cycle, hydrometeorology and formation of precipitation.	✓	✓	✓	✓				✓	✓	
			The students are able to apply the various methods of field measurements and empirical formulae for estimating the various losses of precipitation, stream flow, flood and Flood routing.					✓	✓				
			The students will know the basics of groundwater and hydraulics of subsurface flows.	✓	✓								

	17155H63P	Construction Project Management	The student should be able to plan construction projects, schedule the activities using network diagrams, determine the cost of the project, control the cost of the project by creating cash flows and budgeting and to use the project information as decision making tool.	✓	✓	✓	✓				✓	✓	
	17155E64AP	Remote Sensing And GIS	Principles of Remote Sensing and GIS	✓	✓								✓
			Analysis of RS and GIS data and interpreting the data for modeling applications	✓	✓	✓	✓					✓	
	17155E64BP	Railway Engineering	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.				✓						✓
	17155E64CP	Airport & Harbours	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.	✓	✓	✓		✓	✓	✓	✓	✓	
	17155E64DP	Electronic Surveying	Understand the advantages of electronic surveying over conventional surveying methods	✓	✓								✓
			Understand the working principle of GPS, its components, signal structure, and error sources	✓	✓	✓	✓					✓	
			Understand various GPS surveying methods and processing techniques used in GPS	✓	✓	✓		✓	✓	✓	✓	✓	
	17155L65P	Concrete &Transportation Engineering Laboratory	Student knows the techniques to characterize various pavement materials through relevant tests.	✓	✓	✓	✓					✓	
VII	17160S71P	Total Quality Management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	✓			✓	✓			✓		✓
	17155H72P	Housing, Planning & Management	The students should have a comprehensive knowledge of planning, design, evaluation,construction and financing of housing projects.		✓			✓	✓			✓	✓

	17155H73P	Repair And Rehabilitation of Structures	Students must gained knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.	✓			✓	✓			✓	✓	
	17155E74P	Air Pollution Management	an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management	✓			✓	✓			✓		✓
			ability to identify, formulate and solve air and noise pollution problems		✓			✓	✓			✓	✓
			ability to design stacks and particulate air pollution control devices to meet applicable standards.	✓			✓	✓			✓	✓	
	17155E74P	Pre Fabricated Structures	The student shall be able to design some of the prefabricated elements and also have the knowledge of the construction methods in using these elements.	✓			✓	✓			✓		✓
	17155E74P	Bridge Structures	To develop an understanding of an appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality.	✓			✓	✓			✓	✓	
			To help the student develop an intuitive feeling about the sizing of bridge elements,ie., develop a clear understanding of conceptual design	✓			✓	✓			✓		✓
			To understand the load flow mechanism and identify loads on bridges.		✓			✓	✓			✓	✓
			To carry out a design of bridge starting from conceptual design, selecting suitable bridge,geometry to sizing of its elements.			✓			✓	✓			✓
	17155E74P	Prestressed Concrete Structures	Student shall have a knowledge on methods of prestressing and able to design various prestressed concrete structural elements.		✓			✓	✓			✓	✓
	17155P75P	Project Work	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.	✓			✓	✓			✓	✓	

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DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

M.TECH (F.T)- STRUCTURAL ENGINEERING -2017R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
I	17248S11E	Advanced Engineering Mathematics	The course aim to develop the skills of the students in the areas of boundary value problems and transform techniques. The course will also serve as a prerequisite for post Graduate and specialized studies and research.							✓	✓		
			Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.	✓									
			Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of differences equations.					✓		✓			✓
	17255H12	Quality Control &Assurance in Construction	To understand the elements of quality planning and the implication			✓			✓				
			To become aware of objectives and advantage of quality assurance			✓			✓		✓		
			To be exposed to means of quality control										
			To study the relationship between quality control and assurance				✓		✓		✓		
	17255H13	Theory of Plasticity and Elasticity	Emphasis is placed on static problems with linear material and small deformation. Many basic 2-D problems (such as plane strain and plane stress) and 3-D problems.	✓						✓			✓
	17255H14	Structural Dynamics	This course covers the methods for analyzing the stresses and deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.					✓		✓			✓

	17255H15	Maintenance and Rehabilitation of Structures	Introduction to the governmental quality assurance regulations for public works. Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality.						✓		✓			
	17255E16A	Prestressed Concrete Structures	This course introduces students to the fundamental principles of pre-stressed concrete behavior and design, So that they can act effectively to optimize existing forms of construction and apply fundamental concepts with confidence in unusual and challenging situations.		✓			✓		✓				✓
	17255E16B	High Rise Structures	This course covers the design criteria and loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.	✓					✓			✓		
	17255E16C	Computer Aided Structural Design	To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).	✓					✓	✓				✓
	17255L17	Core Practical (Computer Programming Lab)	To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.			✓				✓				✓
	17255CRS	Research Led Seminar	Exposure to various research domains				✓			✓				✓
			Acquaintance with languages of research						✓					
			Development of research aptitude						✓				✓	
II	17255H21	Management Information System	To bring about an exposure to information systems in a formal manner			✓					✓			
			To study the development of information systems				✓							
			To study the means of applying information systems models to project management					✓			✓			
			To introduce system audit and to study its features			✓				✓				✓
	17255H22	Finite Element Analysis	The finite element method is the most powerful structural analysis tool for the Civil Engineers. The basic formulation and programming technique are introduced. According to the same procedures, the different elements such as truss, beam, plate and shell are easily formulated.				✓				✓			
	17255H23	Advanced Concrete Structural Design	To impart knowledge about the performance of concrete as structural material and the behavior, elastic and inelastic, of reinforced – concrete members and structures, designing structures safely, economically and efficiently.	✓					✓			✓		

	17255E24B	Advanced Concrete Technology	To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.				✓							
	17255E24C	Steel,Concrete Composite Structures	This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.		✓					✓	✓		
	17255E25A	Optimization in Structural Design	The structural analysis is formulated through the principle of optimization. Both the manual calculation and application of the computer are introduced for the analysis of truss and frame structures using optimization techniques.	✓	✓					✓			✓
	17255E25C	Elements of Earthquake Engineering	This course covers the theory and applications related to Earthquake Engineering. The broad subjects discussed in this course include earthquake response of linearly elastic and inelastic buildings, structural dynamics in building codes.		✓								
	17255L26	Core practical(Software Lab – Finite Element Analysis- ANSYS)	To impart knowledge to analyze solve, design and Civil Engineering drawings usingFEA - ANSYS			✓				✓			✓
	172TECWR	Technical writing / Seminars	To impart knowledge to analyze solve, design and Civil Engineering drawings usingFEA - ANSYS					✓					
	17255CRM	Research Methodology	Understanding research questions and tools							✓			
			Experience in scientific writings		✓								
			Practice in various aspects of scientific publications		✓					✓			✓
			Inculcation of research ethics	✓				✓		✓			✓
	17255CBR	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research						✓				
			Evolution of research intuitiveness and orientation		✓				✓			✓	
			Familiarity with cutting edge research trends										
III	17255H31	Advanced Steel Structures	Introduction to steel structure, tensioned member, compressed member, beam, design of beam and column, bolt jointing, welding jointing and other joint design.		✓					✓			✓
	17255E32A	Experimental Stress Analysis	At the end of the semester students can learn about the strain gauges, strain rosetters, model analysis, calibration of photo elastic materials.	✓									
	17255E32B	Soil Structure Interaction	This course deals with the soil-foundation interaction, analysis of beams and finite plates, elastic analysis of pile, load deflection for laterally loaded pile.	✓			✓			✓			

	17255E33A	Prefabricated Structures	This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.					✓	✓			✓		
	17255E33B	Disaster Resistant Structures	This course deals the philosophy of the design of disaster resistant structures such as dams , bridges and emphasize about the rehabilitation , retrofitting and damage assessment of structures.			✓				✓				
	17255E33C	Non Linear Analysis of Structures	This course deals about the non – linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames	✓			✓							
	17255E34A	Offshore Structures	This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures .						✓					
	17255E34B	Stability of Structures	This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.	✓						✓				✓
	17255E34C	Mechanics of Composite Materials	This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.			✓								
	17255P35	Project Work Phase-I	Sensitization of social needs for innovation		✓			✓		✓				✓
			Team work towards interdisciplinary synchronous research strategy							✓				
	17255CSR	Design / Socio - Technical Project	Development of critical thinking and synergistic research approach.	✓					✓	✓				✓
IV	17255P41	Project Work Phase-II	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.	✓		✓			✓	✓				✓

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DEPARTMENT OF CIVIL ENGINEERING
1.1.1 -CO-PO-PSO MAPPING

M.TECH (P.T)- STRUCTURAL ENGINEERING-2017R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
I	17248S11EP	Advanced Engineering Mathematics	The course aim to develop the skills of the students in the areas of boundary value problems and transform techniques. The course will also serve as a prerequisite for post Graduate and specialized studies and research.						✓			✓	
			Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.	✓							✓		✓
			Have learnt the basics of Z – transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of differences equations.					✓		✓		✓	
	17255H12P	Quality Control &Assurance in Construction	To understand the elements of quality planning and the implication			✓			✓				
			To become aware of objectives and advantage of quality assurance						✓		✓		✓
			To be exposed to means of quality control				✓		✓				
	17255H13P	Theory of Plasticity and Elasticity	To study the relationship between quality control and assurance	✓					✓		✓		✓
	17255L14P	Core Practical (Computer Programming Lab)	To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).			✓				✓		✓	

	17255CRSP	Research Led Seminar	To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.				✓		✓		✓			
			Exposure to various research domains						✓	✓		✓		
			Acquaintance with languages of research							✓				
II	17255H21P	Management Information System	Development of research aptitude			✓			✓		✓			
			To bring about an exposure to information systems in a formal manner				✓			✓		✓		
			To study the development of information systems					✓			✓		✓	
			To study the means of applying information systems models to project management			✓			✓		✓			
	17255H22P	Finite Element Analysis	To introduce system audit and to study its features				✓			✓		✓		
	17255E23AP	Failure Analysis of Structures	Ability to design structure to prevent failure from the internal defect that unit within the structure					✓		✓		✓		
			Ability to design structure to prevent fatigue and creep			✓			✓		✓			
			Ability to define different deformation and related theories				✓							
	17255E23BP	Advanced Concrete Technology	To impart knowledge about the performance of concrete as structural material and the behavior, elastic and inelastic, of reinforced – concrete members and structures, designing structures safely, economically and efficiently**.**				✓							
	17255E23CP	Steel,Concrete Composite Structures	To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.		✓					✓				
	17255L24P	Core practical(Software Lab – Finite Element Analysis-ANSYS)	This course covers the theory and applications related to Earthquake Engineering. The broad subjects discussed in this course include earthquake response of linearly elastic and inelastic buildings, structural dynamics in building codes.			✓				✓		✓		
	172TECWRP	Technical writing / Seminars	To impart knowledge to analyze solve, design and Civil Engineering drawings using FEA - ANSYS					✓	✓		✓			
	17255CRMP	Research Methodology	Understanding research questions and tools		✓									
			Experience in scientific writings		✓					✓		✓		
			Practice in various aspects of scientific publications	✓				✓						

	17255CBRP	Participation in Bounded Research	Inculcation of research ethics						✓				
			Hands on exposure to problem solving tools in contemporary research		✓					✓		✓	
			Evolution of research intuitiveness and orientation							✓		✓	
III	17255H31P	Structural Dynamics	Emphasis is placed on static problems with linear material and small deformation. Many basic 2-D problems (such as plane strain and plane stress) and 3-D problems.					✓		✓		✓	
	17255H32P	Maintenance and Rehabilitation of Structures	This course covers the methods for analyzing the stresses and deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.						✓				
	17255E33AP	Prestressed Concrete Structures	Introduction to the governmental quality assurance regulations for public works. Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality.		✓			✓		✓		✓	
	17255E33BP	High Rise Structures	This course introduces students to the fundamental principles of pre-stressed concrete behavior and design, So that they can act effectively to optimize existing forms of construction and apply fundamental concepts with confidence in unusual and challenging situations**.**	✓				✓		✓			
	17255E33CP	Computer Aided Structural Design	This course covers the design criteria and loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.	✓					✓		✓		
	17255CSR	Design / Socio - Technical Project	Development of critical thinking and synergistic research approach.	✓					✓	✓		✓	
IV	17255H41P	Advanced Concrete Structural Design	The finite element method is the most powerful structural analysis tool for the Civil Engineers. The basic formulation and programming technique are introduced. According to the same procedures, the different elements such as truss, beam, plate and shell are easily formulated.	✓					✓		✓		
	17255H42P	Advanced Steel Structures	Familiarity with cutting edge research trends		✓					✓		✓	
	17255E43AP	Optimization in Structural Design	This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.	✓	✓								
	17255E43BP	Design of industrial structures	At the end of this course the student shall be able to design someof the strctures used in industries.			✓	✓		✓		✓		

	17255E43CP	Elements of earthquake Engineering	Students will be trained to identify, formulate and solve complicated problem.	✓	✓								
			Students will be able to understand the role of natural calamity in the damage of structures.			✓	✓						
			Students will be able to develop the skill to analyse data and to apply the same in the practical problems.		✓	✓			✓		✓		
			Students will be able to apply the developed methodologies for the safe and stable design of structures.				✓	✓					
	17255P44P	Project Work Phase-I	This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.		✓								
			Sensitization of social needs for innovation		✓			✓					
			Team work towards interdisciplinary synchronous research strategy							✓			
V	17255E51AP	Experimental Stress Analysis	Introduction to steel structure, tensioned member, compressed member, beam, design of beam and column, bolt jointing, welding jointing and other joint design.	✓									
	17255E51BP	Soil Structure Interaction	At the end of the semester students can learn about the strain gauges, strain rosetters, model analysis, calibration of photo elastic materials.	✓			✓						
	17255E51CP	Aseismic Design of structures							✓		✓		
	17255E52AP	Prefabricated Structures	This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.					✓					
	17255E52BP	Disaster Resistant Structures	This course explains about design principles of Prefabricated Structures, components, application of prefabricated structures. Students can learn the usage of prefabricated structures in wall panels, industrial buildings and shell roofs.			✓			✓		✓		
	17255E52CP	Non Linear Analysis of Structures	This course deals the philosophy of the design of disaster resistant structures such as dams , bridges and emphasize about the rehabilitation , retrofitting and damage assessment of structures.	✓			✓			✓		✓	
	17255E53AP	Offshore Structures	This course deals about the non – linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames						✓				
	17255E53BP	Stability of Structures	This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures .	✓									

	17255E53CP	Mechanics of Composite Materials	This course deals with the concept and characteristics of stability problems and behavior of torsional buckling and lateral buckling in beams and columns.			✓				✓		✓	
VI	17255P61P	Project Work Phase-II	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.	✓		✓			✓	✓		✓	