

B.TECH (F.T)- 2021R

								PO	OS						PSO	
Sem	Course Code	Title of the Course	COs	Р О 1	P O 2	P O 3	Р О 4	Р О 5	P O 6	P O 7	P O 8	P O 9	P O 1 0	P S O 1	P S O 2	P S O 3
			To use appropriate words in a professional context	3	3	3	3	1	3	3	3	3	3	3	3	-
			To gain understanding of basic grammatical structures and use them in right context.	3	3	3	3	1	3	3	3	3	3	3	3	-
		Professional	To read and infer the denotative and connotative meanings of technical texts	3	3	3	3	1	3	3	3	3	3	3	3	-
	21147S11	English - I	To read and interpret information presented in tables, charts and other graphic forms	3	3	3	3	1	3	3	3	3	3	3	3	-
SEM 1			To write definitions, descriptions, narrations and essays on various topics	3	3	3	3	1	3	3	3	3	3	3	3	-
			AVG	3	3	3	3	1	3	3	3	3	3	3	3	-
			Use the matrix algebra methods for solving practical problems	3	3	1	1	0	0	0	0	2	0	2	3	-
	21148S12	Matrices and Calculus	Apply differential calculus tools in solving various application problems.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21140312	Calculus	Able to use differential calculus ideas on several variable functions.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Apply different methods of integration in solving practical problems.	3	3	1	1	0	0	0	0	2	0	2	3	-

			3	3	1	1	0	0	0	0	2	0	2	3	-
		Apply multiple integral ideas in solving areas, volumes and other practical problems.													
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	
		Understand the importance of mechanics.	1	1	1	1	1	3	3	3	1	3	-	3	F
		Express their knowledge in electromagnetic waves.	1	1	1	1	1	3	3	3	1	3	-	3	
21149813		Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	2	3	2	3	2	3	3	3	2	3	3	3	
21149513	Engineering Physics	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	2	3	2	3	2	3	3	3	2	3	3	3	
		Comprehend and apply quantum mechanical principles towards the formation of energy bands.	2	3	3	3	-	3	3	3	2	3	-	3	
			1	2	1	2	1	3	3	3	1	3	3	3	
		AVg	6	· 2	8	· 2	5				6				
		To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	1	1	1	1	1	3	3	3	1	3	-	3	
		identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	1	1	1	1	1	3	3	3	1	3	-	3	
21149814	Engineering Chemistry	To apply the knowledge of phase rule and composites for material selection requirements.	2	3	2	3	2	3	3	3	2	3	3	3	
		To recommend suitable fuels for engineering processes and applications.	2	3	2	3	2	3	3	3	2	3	3	3	
		To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	2	3	3	3	-	3	3	3	2	3	-	3	
			1 •	2.	1 •	2 •	1 •	3	3	3	1 •	3	3	3	
		AVg	6 3	2 3	8	2	5 0	0	0	0	6 2	0	2	3	l
	Problem Solving and	Develop algorithmic solutions to simple computational problems						-	-						
21150815	Python Programmin	Read, write, execute by hand simple Python programs.	3	3	1	1	0	0	0	0	2	0	2	3	
	g	Structure simple Python programs for solving problems.	3	3	1	1	0	0	0	0	2	0	2	3	ļ
		Decompose a Python program into functions.	3	3	1	1	0	0	0	0	2	0	2	3	I

			Represent compound data using Python lists, tuples, and dictionaries.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Read and write data from/to files in Python Programs.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
			Develop algorithmic solutions to	1	1	1	1	1	3	3	3	1	3	-	3	-
			simple computational problems	1	1	1	1	1	3	3	3	1	3	-	3	-
			Develop and execute simple Python programs.	1	1	1	1	1	3	3	3	1	3		3	
	21150L16	Problem Solving and Python	Implement programs in Python using conditionals and loops for solving problems.	1		1						1	5	-	5	-
		Programmin g Laboratory	Deploy functions to decompose a Python program.	2	3	2	3	2	3	3	3	2	3	3	3	-
			Process compound data using Python data structures.	2	3	2	3	2	3	3	3	2	3	3	3	-
			Utilize Python packages in developing software applications.	2	3	3	3	-	3	3	3	2	3	-	3	-
				1	2	1	2	1	3	3	3	1	3	3	3	-
			AVg	6	· 2	8	· 2	5				6				
			Understand the functioning of various physics laboratory equipment.	3	2	2	1	-	1	1	-	-	-	-	1	-
			Use graphical models to analyze laboratory data.	2	-	-	1	-	2	2	-	-	-	-	-	-
	21150L17	Physics and Chemistry Laboratory	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	3	1	-	-	-	-	-	-	-	-	-	-	-
			Access, process and analyze scientific information.	3	1	1	-	-	1	2	-	-	-	-	-	-
			Solve problems individually and collaboratively.	3	1	2	1	-	2	2	-	-	-	-	2	-
			AVg	2 • 8	1 3	1 • 6	1	-	1 • 5	1 • 8	-		-	-	1 • 5	-
			Avg	3	3	1	1	0	0	0	0	2	0	2	3	-
			To compare and contrast products and ideas in technical texts.		-		-	0	0	0	0	-	0		-	
			To identify and report cause and effects in events, industrial processes through technical texts	3	3	1	1	0	0	0	0	2	0	2	3	-
SEM 2	21147S21	Professional English - II	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.	3	3	1	1	0	0	0	0	2	0	2	3	-
			To present their ideas and opinions in a planned and logical manner	3	3	1	1	0	0	0	0	2	0	2	3	-
			To draft effective resumes in the context of job search.	3	3	1	1	0	0	0	0	2	0	2	3	-

		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Apply the concept of testing of hypothesis for small and large samples in real life problems.	3	2	2	1	-	1	1	-	-	-	-	1	-
		Apply the basic concepts of classifications of design of experiments in the field of agriculture.	2	-	-	1	-	2	2	-	-	-	-	-	-
21148S22	Statistics and	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	3	1	1	-	-	-	-	-	-	-	-	-	-
	NumericalM ethods	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	3	1	1	-	-	1	2	-	-	-	-	-	-
		Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	3	1	2	1	-	2	2	-	-	-	-	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg	8	3	6			5	8					5	
		acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation.	3	3	1	1	0	0	0	0	2	0	2	3	-
		gain knowledge on the ventilation and air conditioning of buildings	3	3	1	1	0	0	0	0	2	0	2	3	-
21149S23 E	Physics for Civil	understand the concepts of sound absorption, noise insulation and lighting designs	3	3	1	1	0	0	0	0	2	0	2	3	-
	Engineering	now about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics	3	3	1	1	0	0	0	0	2	0	2	3	-
		get an awareness on natural disasters such as earth quake, cyclone, fire and safety measures	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Use BIS conventions and specifications for engineering drawing.	1	1	1	1	1	3	3	3	1	3	-	3	-
	.	Construct the conic curves, involutes and cycloid.	1	1	1	1	1	3	3	3	1	3	-	3	-
21154S24	Engineering Graphics	Solve practical problems involving projection of lines.	2	3	2	3	2	3	3	3	2	3	3	3	-
		Draw the orthographic, isometric and perspective projections of simple solids.	2	3	2	3	2	3	3	3	2	3	3	3	-
		Draw the development of simple solids.	2	3	3	3	-	3	3	3	2	3	-	3	-

				1	2	1	2	1	3	3	3	1	3	3	3	-
			AVg	6	$\dot{2}$	8	· 2	5				6				
			Compute the electric circuit parameters for simple problems	1	1	1	1	1	3	3	3	1	3	-	3	-
		Dania	Explain the concepts of domestics wiring and protective devices	1	1	1	1	1	3	3	3	1	3	1	3	-
	21153S25 C	Basic Electrical,El ectronics and	Explain the working principle and applications of electrical machines	2	3	2	3	2	3	3	3	2	S	3	3	-
	C	Instrument Engineering	Analyze the characteristics of analog electronic devices	2	3	2	3	2	3	3	3	2	3	3	3	-
		Engineering	Explain the types and operating principles of sensors and transducers	2	3	3	3	-	3	3	3	2	3	-	3	-
				1	2	1	2	1	3	3	3	1	3	3	3	-
			AVg	6	$\frac{1}{2}$	• 8	$\frac{1}{2}$	5				6				
			Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	3	3	1	1	0	0	0	0	2	0	2	3	-
			various electrical joints in common household electrical wire work.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21154L21	Engineering Practices Laboratory	Wire various electrical joints in common household electrical wire work.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Basic	Use experimental methods to verify the Ohm's law and Kirchhoff's Law and to measure three phase power	3	3	2	1	2	1	-	-	-	-	-	-	-
	21153L22	Electrical, Electronics And	Analyze experimentally the load characteristics of electrical machines	3	3	2	2	2	1	-	-	-	-	-	1	-
	D	Instrumentat ion	Analyze the characteristics of basic electronic devices	3	3	1	1	2	1	-	-	-	-	-	-	-
		Engineering Laboratory	Use LVDT to measure displacement	3	3	1	1	2	1	-	-	-	-	-	-	-
				3	3	1	1	1	1	-	-	-	-	-	1	-
			AVg			6	$\dot{2}$	8								
SEM 3	21148S31 D	Transforms and Partial Differential	Understand how to solve the given standard partial differential equations.	1	1	1	1	1	3	3	3	1	3	-	3	-

	Equations	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	1	1	1	1	1	3	3	3	1	3	-	3	
		Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	2	3	2	3	2	3	3	3	2	3	3	3	
		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.	2	3	2	3	2	3	3	3	2	3	3	3	
		Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	2	3	3	3	-	3	3	3	2	3	1	3	
			1	2	1	2	1	3	3	3	1	3	3	3	
		AVg	6	2	8	2	5			_	6				
		Illustrate the vectorial and scalar representation of forces and moments	1	1	1	1	1	3	3	3	1	3	-	3	
		Analyse the rigid body in equilibrium	1	1	1	1	1	3	3	3	1	3	-	3	
	.	Evaluate the properties of distributed forces	2	3	2	3	2	3	3	3	2	3	3	3	Ī
21154S32	Engineering Mechanics	Determine the friction and the effects by the laws of friction	2	3	2	3	2	3	3	3	2	3	3	3	
		Calculate dynamic forces exerted in rigid body	2	3	3	3	-	3	3	3	2	3	-	3	ľ
			1	2	1	2	1	3	3	3	1	3	3	3	Ī
		AVg	6	2	8	· 2	5				6				
		Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.	3	2	2	1	-	1	1	-	-	-	-	1	
		Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.	2	-	-	1	-	2	2	-	-	-	-	-	
21155C33	Fluid Mechanics	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.	3	1	-	-	-	-	-	-	-	-	-	-	
		Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.	3	1	1	-	-	1	2	-	-	-	-	-	
		Explain the concept of boundary layer and its application to find the drag force excreted by the fluid on the flat solid surface.	3	1	2	1	-	2	2	-	-	-	-	2	

			2	1	1	1	-	1	1	-		-	-	1	
		AVg	8	3	6			5	8					5	
		Perform formulations of projects.	1	1	1	1	1	3	3	3	1	3	-	3	
		Analyze project costing.	1	1	1	1	1	3	3	3	1	3	-	3	Ī
		Identify and estimate the activity in the construction.	2	3	2	3	2	3	3	3	2	3	3	3	Î
21155C34	Construction Materials	Develop the knowledge on	2	3	2	3	2	3	3	3	2	3	3	3	Ì
21155€54	andTechnolo gy	accidents and their causes.	2	3	3	3	-	3	3	3	2	3	-	3	Ì
		Plan, assess, analyze and manage the construction project sites.			_									_	
			1	2 •	1 •	2	1 5	3	3	3	1 •	3	3	3	
		AVg	6	2	8	2		1			6			1	+
		Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission	3	3	2	2	2	1	-	-	-	-	-	1	
		Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations	3	3	1	1	2	1	-	-	1	-	-	-	
	W	Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process	3	3	1	1	2	1	-	-	-	-	-	-	
21155C35	Water Supply & Wastewater		3	3	1	1	1 8	1	-	-	1	-	-	1	
	Engineering	AVg Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods.	3	3	6	2	8	1	-	-	1	-	-	-	
		Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage	3	3	1	1	2	1	-	-	-	-	-	-	
			3	3	1	1	1	1	-	-	-	-	1	1	I
		AVg			6	· 2	8								
		Measuring Horizontal angle and vertical angle using different instruments	3	3	2	1	2	1	-	-	-	-	-	-	
21155C36	Surveying and	Methods of Levelling and setting Levels with different instruments	3	3	2	2	2	1	-	-	-	-	-	1	
	Levelling	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth	3	3	1	1	2	1	-	-	-	-	-	-	

			surveying.													
				3	3	1	1	1	1	-	-	-	-	-	1	-
			AVg			6	· 2	8								
			Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments	3	3	1	1	0	0	0	0	2	0	2	3	-
			Able to use levelling instrument for surveying operations	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155L37	Surveying and	Able to use theodolite for various surveying operations	3	3	1	1	0	0	0	0	2	0	2	3	-
	21100100	Levelling Laboratory	Able to carry out necessary surveys for social infrastructures	3	3	1	1	0	0	0	0	2	0	2	3	-
			Quantify the pollutant concentration in water and wastewater	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155L38	Water and Wastewater	Suggest the type of treatment required and amount of dosage required for the treatment	3	3	1	1	0	0	0	0	2	0	2	3	-
		Analysis Laboratory	Examine the conditions for the growth of micro-organisms	3	3	1	1	0	0	0	0	2	0	2	3	-
			Make effective presentations	1	1	1	1	1	3	3	3	1	3	-	3	-
		Professional	Participate confidently in Group Discussions.	1	1	1	1	1	3	3	3	1	3	-	3	-
	21155L39	Developmen	Attend job interviews and be successful in them.	2	3	2	3	2	3	3	3	2	3	3	3	-
		L	Develop adequate Soft Skills required for the workplace	2	3	2	3	2	3	3	3	2	3	3	3	-
			AVg	2	3	3	3	-	3	3	3	2	3	-	3	-
			Apply their knowledge of fluid mechanics in addressing problems	1	2.	1	2.	1	3	3	3	1 •	3	3	3	-
			in open channels. Able to identify a effective section	6 3	2	8	2	5 0	0	0	0	6 2	0	2	3	
			for flow in different cross sections.													-
	21155C41	Applied Hydraulic	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions.	3	3	1	1	0	0	0	0	2	0	2	3	-
SEM		Engineering	Understand the principles, working and application of turbines.	3	3	1	1	0	0	0		2	0	2	3	-
4			Understand the principles, working and application of pumps.	3	3	1	1	0	0	0		2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Strength of	Understand the concepts of stress and strain, principal stresses and principal planes.	3	2	2	1	-	1	1	-	-	-	-	1	-
	21155C42	Materials	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	2	-	-	1	-	2	2	-	-	-	-	-	-

		Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.	3	1	-	-	-	-	-	-	-	-	-	-	-
		Apply basic equation of torsion in design of circular shafts and helical springs, .	3	1	1	-	-	1	2	-	-	-	-	-	-
		Analyze the pin jointed plane and space trusses	3	1	2	1	-	2	2	1	1	1	1	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg	8	3	6	_	0	5	8	0	_	0		5	
		The various requirements of cement, aggregates and water for making concrete	3	3	1	1	0	0	0	0	2	0	2	3	-
		The effect of admixtures on properties of concrete	3	3	1	1	0	0	0	0	2	0	2	3	-
21155C43	Concrete Technology	The concept and procedure of mix design as per IS method	3	3	1	1	0	0	0	0	2	0	2	3	-
		The properties of concrete at fresh and hardened state	3	3	1	1	0	0	0	0	2	0	2	3	-
		The importance and application of special concretes.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Classify the soil and assess the engineering properties, based on index properties.	3	3	1	1	0	0	0	0	2	0	2	3	-
	0.1	Understand the stress concepts in soils	3	3	1	1	0	0	0	0	2	0	2	3	-
21155C44	Soil Mechanics	Understand and identify the settlement in soils.	3	3	1	1	0	0	0	0	2	0	2	3	-
	Laboratory	Determine the shear strength of soil	3	3	1	1	0	0	0	0	2	0	2	3	-
		Analyze both finite and infinite slopes.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Get knowledge on planning and aligning of highway.	3	3	3	3	2	-	-	-	-	-	2	2	3
		Geometric design of highways	3	3	3	3	2	-	-	-	-	-	2	2	3
		Design flexible and rigid pavements.	3	3	3	3	2	-	-	-	-	-	2	-	3
21155C45	Highway and Railway	Gain knowledge on Highway construction materials, properties, testing methods	2	2	-	2	2	-	-	-	-	-	1	-	3
	Engineering	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.	1	2	-	-	1	-	-	-	-	-	1	-	2
		Get to know types of grouts and grouting technique.	2	2	-	-	2	-	-	-	-	-	1	-	2
		AVg	2	3	3	3	2	-	-	-	-	-	2	2	3
21149S46	Environment al Sciences and Sustainabilit	carry out scoping and screening of developmental projects for environmental and social assessments	3	3	2	1	2	1	-	-	-	-	-	-	-

		у	explain different methodologies for environmental impact prediction and assessment	3	3	2	2	2	1	-	-	-	-	-	1	-
			plan environmental impact assessments and environmental management plans	3	3	1	1	2	1	-	-	-	-	-	-	-
			evaluate environmental impact assessment reports	3	3	1	1	2	1	-	-	-	1	1	1	-
				3	3	1	1	1	1	-	-	-	-	-	1	-
			AVg		_	6	2	8								
	21155L47	Hydraulic Engineering Laboratory	Student knows the techniques to characterize various pavement materials through relevant tests.	3	3	2	1	2	1	-	-	-	-	-	-	-
	21155L48	Materials Testing Laboratory	the students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155L49	Soil Mechanics Laboratory	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.	3	3	1	1	0	0	0	0	2	0	2	3	-
SEM 5			Understand the various design methodologies for the design of RC elements.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Design of	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155C51	Reinforced Cement Concrete	design the various types of slabs and staircase by limit state method.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Elements	Design columns for axial, uniaxial and biaxial eccentric loadings.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Design of footing by limit state method.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
			Analyze continuous beams, pin- jointed indeterminate plane frames and rigid plane frames by strain energy method	3	3	1	1	0	0	0	0	2	0	2	3	-
			Analyze the continuous beams and rigid frames by slope defection method.	3	3	1	1	0	0			2	0	2	3	-
	21155C52	Structural Analysis I	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	3	3	1	1	0	0			2	0	2	3	-
			Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.	3	3	1	1	0	0	0	0	2	0	2	3	-

		Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Get knowledge on bearing capacity and testing methods.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Design shallow footings.	3	3	1	1	0	0	0	0	2	0	2	3	-
	Foundation	Determine the load carrying capacity, settlement of pile foundation.	3	3	1	1	0	0	0	0	2	0	2	3	-
21155C53	Engineering	Determine the earth pressure on retaining walls and analysis for stability.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Determine the earth pressure on retaining walls and analysis for stability.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Gain an insight on the planning and site selection of Airport Planning and design.	3	2	2	1	-	1	1	-	-	-	-	1	-
		Knowledge on Design of various Airport components.	2	-	-	1	-	2	2	-	-	-	-	-	-
21155E54	Airports and	Analyze and design the elements for orientation of runways and passenger facility systems.	3	1	-	-	-	-	-	-	-	-	-	-	-
А	Harbours	Understand the various features in Harbours and Ports	3	1	1	-	-	1	2	-	-	-	-	-	-
		Knowledge on various Environmental Regulations and Acts	3	1	2	1	-	2	2	-	-	-	-	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg	• 8	· 3	6			· 5	· 8					· 5	
		Plan a layout of a structure	3	3	1	1	0	0	0	0	2	0	2	3	-
		Calculate loads using IS codes and various computational tools	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E54	Concrete	Analyse the structure for various loads and load combination according to the relevant IS codes	3	3	1	1	0	0	0	0	2	0	2	3	-
В	Structures	Design and Analysis of structures using computer software/tools	3	3	1	1	0	0	0	0	2	0	2	3	-
		Prepare the complete structural drawings using computer software	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E54 C	Groundwater Engineering	Define the groundwater system basic, types of aquifers, aquifer parameters, movement and its potential for confined and unconfined aquifers	3	2	2	1	-	1	1	-	-	-	-	1	-
		Apply the knowledge of groundwater flow in steady and unsteady flow characteristics of	2	-	-	1	-	2	2	-	-	-	-	-	-

		well hydraulics													
		Explain the concept of groundwater model development and data base management for groundwater management	3	1	-	-	-	-	-	-	-	-	-	-	-
		Describe the importance of artificial recharge and groundwater quality concepts	3	1	1	-	-	1	2	-	-	-	-	-	-
		Apply the creative and innovative technique on conservation of groundwater	3	1	2	1	-	2	2	-	-	-	-	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths	8 3	32	6 2	1	-	5 1	8 1	-	-	-	-	5 1	-
		Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria	2	-	-	1	-	2	2	-	-	-	-	-	-
21155E55 A	Steel Structures	Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, columns, column bases and beams	3	1	-	-	1	-	-	-	-	-	-	-	-
		Identify and compute the design loads on Industrial structures, and gantry girder	3	1	1	-	-	1	2	-	-	-	-	-	-
		Find out ultimate load of steel beams and portal frames using plastic analysis	3	1	2	1	-	2	2	-	-	-	-	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg Know the importance of inspection and maintenance	8 3	3 2	6 2	1	-	5 1	8 1	-	-	-	-	5 1	-
		Study the Impacts of cracks, corrosion and climate on structures.	2	-	-	1	-	2	2	-	-	-	-	-	-
	Rehabilitatio	Know about various special concretes	3	1	-	-	-	-	-	-	-	-	-	-	-
21155E55 C	n/ Heritage Restoration	Understand the testing techniques and various protection measures	3	1	1	-	-	1	2	-	-	-	-	-	-
		Know the Repair of structures and Restoration of Heritage structures	3	1	2	1	-	2	2	-	-	-	-	2	-
		AVa	2 8	1	1	1	-	1.5	1 •	-		-	-	1 • 5	-
21155E56 A	Water Quality and	AVg Know about the principles of water quality modelling	8 3	3 2	6 2	1	-	5 1	8 1	-	-	-	-	5 1	-

	Management	Understand the pollutant transport phenomena in surface and groundwater.	2	-	-	1	-	2	2	-	-	-	-	-	-
		Apply the knowledge of surface water quality modelling to predict the water quality of rivers, lakes and estuary.	3	1	-	-	-	-	-	-	-	-	-	-	-
		Predict the groundwater contamination transport	3	1	1	-	-	1	2	-	-	-	-	-	-
		Predict water quality of surface and sub surface water using numerical solution.	3	1	2	1	-	2	2	-	-	-	-	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg	8	3	6			5	8					5	
		Understand concepts about principles of prefabrication, production, transportation, erection	3	3	1	1	0	0	0	0	2	0	2	3	-
		Acquire knowledge about panel systems, slabs, beams, shear walls and columns used in precast construction.	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E56 B	Prefabricate d Structures	Acquire knowledge about design of cross section, joint flexibility.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Acquire knowledge about joints and connection in precast construction.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Acquire knowledge about structural stability.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Learn about the fundamental concept of Total station.	3	2	2	1	-	1	1	-	-	-	-	1	-
		Provide knowledge about electromagnetic waves and its usage in Total station and GNSS.	2	-	-	1	-	2	2	-	-	-	-	-	-
		Gain Knowledge on basic concepts of GNSS	3	1	-	-	-	-	-	-	-	-	-	-	-
21155E56 C	Total Station and GPS Surveying	Understand the measuring and working principle of electro optical and Microwave Total station and GPS	3	1	1	-	-	1	2	-	-	-	-	-	-
		Gain knowledge about Total station and GNSS data processing and Mapping.	3	1	2	1	-	2	2	-	-	-	-	2	-
			2	1	1	1	-	1	1	-		-	-	1	-
		AVg	8	· 3	6			5	8					5	
21147MC	Introduction to Women	Gender and Representation in Alternative Media.	3	3	1	1	0	0	0	0	2	0	2	3	-
51A	and Gender Studies	Gender and social media.	3	3	1	1	0	0	0	0	2	0	2	3	-
21147MC 51B	Elements of Literature	Students will be able to understand the relevance of literature in human life and appreciate its aspects in developing finer sensibilities.	3	3	1	1	0	0	0	0	2	0	2	3	-

		the students will be introduced broadly to the development of film as an art and entertainment form.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		the students will be introduced broadly to the development of film as an art and entertainment form.	3	3	1	1	0	0	0	0	2	0	2	3	-
21147MC 51C	Film Appreciation	The students will be taught as to how to read a film and appreciate the various nuances of a film as a text	3	3	1	1	0	0	0	0	2	0	2	3	-
		The students will be guided to study film joyfully.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	3	3	1	1	0	0	0	0	2	0	2	3	-
		To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction.	3	3	1	1	0	0	0	0	2	0	2	3	-
21147MC	Disaster	To develop disaster response skills by adopting relevant tools and technology.	3	3	1	1	0	0	0	0	2	0	2	3	-
51D	Management	Enhance awareness of institutional processes for Disaster response in the country.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Characterize Pavement Aggregate through relevant test.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Ascertain the Quality of Bitumen.	3	3	1	1	0	0	0	0	2	0	2	3	-
21155L58	Highway Engineering	Determine the Optimum Binder Content Using Marshall Method.	3	3	1	1	0	0	0	0	2	0	2	3	-
	Laboratory	Evaluate the Consistency and Properties of Bitumen.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Determine the Bitumen Content in the Bituminous Mixes	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Interpret the contours.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Work in a teamwork.	3	3	1	1	0	0	0	0	2	0	2	3	-
21155L59	Survey Camp	Mark a road alignment of (L- section, Cross-section) a given gradient connecting any two stations on the map	3	3	1	1	0	0	0	0	2	0	2	3	-
	Ł	Calculate the earth work	3	3	1	1	0	0	0	0	2	0	2	3	-
		Prepare a topographical plan of a given area	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-

	-		Explain the concept of IoT.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Understand the communication models and various protocols for IoT.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21150OE 61A	IoT Concepts and	Design portable IoT using Arduino/Raspberry Pi /open platform	3	3	1	1	0	0	0	0	2	0	2	3	-
	0174	Applications (CSE)	Apply data analytics and use cloud offerings related to IoT.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Analyze applications of IoT in real time scenario.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
			Understand the basic concepts of AR and VR	3	2	2	1	-	1	1	-	-	-	-	1	-
			Understand the tools and technologies related to AR/VR	2	-	-	1	-	2	2	-	-	-	-	-	-
	21150OE	Augmented and Virtual	Know the working principle of AR/VR related Sensor devices	3	1	-	-	-	-	-	-	-	-	-	-	-
	61B	Reality (CSE)	Design of various models using modeling techniques	3	1	1	-	-	1	2	-	-	-	-	-	-
			Develop AR/VR applications in different domains	3	1	2	1	-	2	2	1	-	-	-	2	-
				2	1	1	1	-	1	1	-		-	-	1	-
			AVg	· 8	3	6			5	8					5	
SEM			Understand the concepts of various design philosophies	3	3	1	1	0	0	0	0	2	0	2	3	-
6			Design common bolted and welded connections for steel structures	3	3	1	1	0	0	0	0	2	0	2	3	-
		Design of Steel	Design tension members and understand the effect of shear lag.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155C62	Structural Elements	Understand the design concept of axially loaded columns and column base connections.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Understand specific problems related to the design of laterally restrained and unrestrained steel beams.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
			Draw influence lines for statically determinate structures and calculate critical stress resultants.	3	3	2	1	1	1	-	-	-	-	-	-	-
		Structural	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.	3	3	2	1	2	1	-	-	-	-	-	-	-
	21155C63	Analysis II	Analyse of three hinged, two hinged and fixed arches.	3	3	2	2	2	1	-	-	-	-	-	1	-
			Analyse the suspension bridges with stiffening girders	3	3	1	1	2	1	-	-	-	-	-	-	-
			Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames	3	3	1	1	2	1	-	-	-	-	-	-	-

-			3	3	1	1	1	1	-	-	-	-	-	1	-
		AVg			6	· 2	8								
		Define the hydrological processes and their integrated behaviour in catchments	3	3	1	1	0	0	0	0	2	0	2	3	-
	Hydrology	Apply the knowledge of hydrological processes to address basin characteristics, runoff and hydrograph	3	3	1	1	0	0	0	0	2	0	2	3	-
21155C64	and Water Resource Engineering	Explain the concept of hydrological extremes and its management strategies	3	3	1	1	0	0	0	0	2	0	2	3	-
	Digineering	Describe the principles of storage reservoirs	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand and apply the concepts of groundwater management	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Design a prestressed concrete beam accounting for losses.	3	3	2	1	1	1	-	-	-	-	-	-	-
		Design for flexure and shear	3	3	2	1	2	1	-	-	-	-	-	-	-
21155E65	Prestressed	Design the anchorage zone for post- tensioned members and estimate the deflection in beams.	3	3	2	2	2	1	-	-	-	-	-	1	-
A	Concrete Structures	• Design composite members and continuous beams.	3	3	1	1	2	1	-	-	-	-	-	-	-
		Design water tanks, pipes, poles and sleepers.	3	3	1	1	2	1	-	-	-	-	-	-	-
		437-	3	3	1 6	1 2	1 8	1	-	-	-	-	-	1	-
		AVg Define the economic aspects and	3	3	1	1	0 0	0	0	0	2	0	2	3	-
		analysis of water resources systems for comprehensive and integrated planning of a water resources project.													
		Apply the concept of linear programming for optimisation of water resources problems.	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E65	Water Resources	Explain the concept of dynamic programming and apply in water resource system.	3	3	1	1	0	0	0	0	2	0	2	3	-
В	Systems Engineering	Develop the simulation model based on deterministic and stochastic simulation for reservoir operating policy	3	3	1	1	0	0	0	0	2	0	2	3	-
		Apply advance optimisation techniques like goal programming, heuristic algorithm in the field of water resources planning and management.	3	3	1	1	0	0		0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E65 C	Remote Sensing Concepts	Understand the concepts and laws related to remote sensing	3	3	2	1	1	1	-	-	-	-	-	-	-

			Understand the interaction of electromagnetic radiation with atmosphere and earth material	3	3	2	1	2	1	-	-	-	-	-	-	-
			Acquire knowledge about satellite orbits and different types of satellites	3	3	2	2	2	1	-	-	-	-	-	1	-
			Understand the different types of remote sensors	3	3	1	1	2	1	-	-	-	-	-	-	-
			Gain knowledge about the concepts of interpretation of satellite imagery	3	3	1	1	2	1	-	-	-	1	1	-	-
			A \$7.	3	3	1	1 2	1 8	1	-	-	-	1	1	1	-
-			AVg Apart from vertically loaded piles, the structures are exposed to the peculiar pile subjected to lateral and uplift load with reference to codal provision and case studies.	3	3	6	1	0	0	0	0	2	0	2	3	-
	21155E66 A	Pile Foundation	Understand the design of pile and pile caps, considering the wind and seismic loads.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Explain the importance of caisson foundation and checking the stability of caissons based on codal provisions.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
-			Understand the basic issues and meaning of terminologies in urban planning	3	3	1	1	0	0	0	0	2	0	2	3	-
			Understand the different types of theories of urban planning and city development.	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155E66 B	Urban Planning and Developmen	Understand the different types of plan, their strategies and their preparation process.	3	3	1	1	0	0	0	0	2	0	2	3	-
	2	t	Comprehend the planning standards, evaluate the constraints and the financial mechanism	3	3	1	1	0	0	0	0	2	0	2	3	-
			Knowledge on various town and country planning acts and their functions.	3	3	1	1	0	0	0	0	2	0	2	3	-
-			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
			Develop knowledge on planning of equipment and selection of equipment	3	3	2	1	1	1	-	-	-	-	-	-	-
	21155E66	Construction Equipment	Explain the knowledge on fundamentals of earth work operations, earth moving operations	3	3	2	1	2	1	-	-	-	-	-	-	-
	C	Construction Equipment and Machinery	and types of earth work equipment Develop the knowledge on special construction equipment	3	3	2	2	2	1	-	-	-	-	-	1	-
			Apply the knowledge on asphalt and concrete plants	3	3	1	1	2	1	-	-	-	-	-	-	-
			Apply the knowledge and select the proper materials handling equipment	3	3	1	1	2	1	-	-	-	-	-	-	-

-			3	3	1	1	1	1	-	-	-	-	-	1	-
		AVg			6	· 2	8								
		Understand the modern construction techniques used in the sub structure construction.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Demonstrate knowledge and understanding of the principles and concepts relevant to super structure construction for buildings	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E67 A	Advanced Construction Techniques	Understand the concepts used in the construction of special structures	3	3	1	1	0	0	0	0	2	0	2	3	-
		Knowledge on Various strengthening and repair methods for different cases.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Identify the suitable demolition technique for demolishing a building.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Apply the knowledge of science and engineering fundamentals in conducting traffic surveys, analyze the problems and relating it with standards	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand the principles of traffic flow characteristics and their relationships	3	3	1	1	0	0	0	0	2	0	2	3	-
21155E67 B	Traffic Engineering and Management	Understand various traffic management measures in addressing the demand Pricing and ITS applications	3	3	1	1	0	0	0	0	2	0	2	3	-
		Designing various types of control and regulatory measures to meet an efficient traffic network.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand various type of facilities and plan for Non Motorised Transport	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Develop the equations of motion for SDOF and MDOF system and to evaluate the natural frequencies and mode shapes	3	3	2	1	1	1	-	-	-	-	-	-	-
	Dynamics and	Explain the elements of engineering seismology, characteristics of earthquake and seismic instrumentation.	3	3	2	1	2	1	-	-	-	-	-	-	-
21155E67 C	Earthquake Resistant Structures	Explain the behavior of various types of structures under earthquake	3	3	2	2	2	1	-	-	-	1	-	1	-
		Determine the forces in a structure due to earthquake	3	3	1	1	2	1	-	-	-	-	-	-	-
		Design earthquake resistant building structures	3	3	1	1	2	1	-	-	-	-	-	-	-
			3	3	1 •	1	1	1	-	-	-	-	-	1	-
		AVg			6	2	8								

		Learn the importance of different components of health	3	3	1	1	0	0	0	0	2	0	2	3	-
	Well Being	Gain confidence to lead a healthy life	3	3	1	1	0	0	0	0	2	0	2	3	-
21147MC 61A	with Traditional	Learn new techniques to prevent lifestyle health disorders	3	3	1	1	0	0	0	0	2	0	2	3	-
	Practices	Understand the importance of diet and workouts in maintaining health	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
21147MC 61B	History of Science and Technology in India	The students will learn about history of science and technology in india.	3	3	1	1	0	0	0	0	2	0	2	3	-
21147MC 61C	Political and Economic Thought for a Humane Society	The students will get an understanding of how societies are shaped by philosophy, political and economic system, how they relate to fulfilling human goals & desires with some case studies of how different attempts have been made in the past and how they have fared.	3	3	1	1	0	0	0	0	2	0	2	3	_
21147MC 61D	State, Nation Building And Politics in India	It is expected that this course will make students aware of the theoretical aspect of the state, its organs, its operationalization aspect, the background and philosophy behind the founding of the present political system, broad streams and challenges of national integration and nation-building in India.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand the basic concept of safety.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Obtain knowledge of Statutory Regulations and standards.	3	3	1	1	0	0	0	0	2	0	2	3	-
	Safety In	Know about the safety Activities of the Working Place.	3	3	2	2	2	1	-	-	-	-	-	1	-
21147MC 61E	Engineering Industries	Analyze on the impact of Occupational Exposures and their Remedies	3	3	1	1	2	1	-	-	-	-	-	-	-
		Obtain knowledge of Risk Assessment Techniques.	3	3	1	1	2	1	-	1	-	-	1	-	-
			3	3	1	1	1	1	-	-	-	-	-	1	-
		AVg Draft the plan, elevation and sectional view of the load bearing and framed buildings	3	3	6 2	2	8	1	-	-	-	-	-	-	-
	Building	Draw the structural detailing of RCC elements	3	3	2	1	2	1	-	-	-	-	-	-	-
21155L69	Drawing and Detailing Laboratory	Draw the structural detailing of RCC water tanks, footings and retaining walls	3	3	2	2	2	1	-	-	-	-	-	1	-
		Draw the structural detailing of steel structures	3	3	1	1	2	1	-	-	-	-	-	-	-
		Draft the structural detailing of Industrial structures	3	3	1	1	2	1	-	-	-	-	-	-	-

				3	3	1	1	1	1	-	-	-	-	-	1	-
			AVg			6	$\frac{1}{2}$	8								
			Identify the importance of democratic, secular and scientific values in harmonious functioning of social life	3	3	2	1	1	1	-	-	-	-	-	-	-
		Human	Practice democratic and scientific values in both their personal and professional life.	3	3	2	1	2	1	-	-	-	1	-	1	-
	21147S71	Values and Ethics	Find rational solutions to social problems.	3	3	2	2	2	1	-	-	-	-	-	1	-
		Ethics	Behave in an ethical manner in society	3	3	1	1	2	1	-	-	-	-	-	-	-
			Practice critical thinking and the pursuit of truth.	3	3	1	1	2	1	-	-	-	-	-	-	-
				3	3	1	1	1	1	-	-	-	-	-	1	-
			AVg		_	6	2	8								
			Gain knowledge on data science process	3	3	2	1	1	1	-	-	-	-	-	-	-
			Perform data manipulation functions using Numpy and Pandas.	3	3	2	1	2	1	-	-	-	-	-	-	-
				3	3	2	2	2	1	-	-	-	-	-	1	-
	21150OE 72A	Data Science Fundamental	Understand different types of machine learning approaches.													
	,	s (CSE)	Perform data visualization using tools	3	3	1	1	2	1	-	-	-	-	-	-	-
SEM			Handle large volumes of data in practical scenarios.	3	3	1	1	2	1	-	-	-	-	-	-	-
7				3	3	1	1	1	1	-	-	-	-	-	1	-
			AVg			6	2	8							_	
			Understand the basic concepts of AR and VR	3	3	1	1	0	0	0	0	2	0	2	3	-
		Artificial	Understand the tools and technologies related to AR/VR	3	3	1	1	0	0	0	0	2	0	2	3	-
	21150OE 72B	Intelligence and Machine Learning	Know the working principle of AR/VR related Sensor devices	3	3	1	1	0	0	0	0	2	0	2	3	-
	122	Fundamental	Design of various models using modeling techniques	3	3	1	1	0	0	0	0	2	0	2	3	-
		5	Develop AR/VR applications in different domains	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		English for	expand their vocabulary and gain practical techniques to read and comprehend a wide range of texts with the emphasis required	3	3	1	1	0	0	0	0	2	0	2	3	-
	21147OE 73A	Competitive Examination s	identify errors with precision and write with clarity and coherence	3	3	1	1	0	0	0	0	2	0	2	3	-
			understand the importance of task fulfilment and the usage of task- appropriate vocabulary	3	3	1	1	0	0	0	0	2	0	2	3	-

		communicate effectively in group discussions, presentations and interviews	3	3	1	1	0	0	0	0	2	0	2	3	-
		write topic based essays with precision and accuracy	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Discuss the Indian and global energy scenario.	3	3	2	1	1	1	-	-	-	-	-	-	-
	Demonship	Describe the various solar energy technologies and its applications.	3	3	2	1	2	1	-	-	-	-	-	-	-
21153OE 73A	Renewable Energy	Explain the various wind energy technologies.	3	3	2	2	2	1	-	-	-	-	-	1	-
/3A	Technologie s	Explore the various bio-energy technologies.	3	3	1	1	2	1	-	-	-	-	-	-	-
		Discuss the ocean and geothermal technologies	3	3	1	1	2	1	-	-	-	-	-	-	-
			3	3	1	1	1	1	-	-	-	-	-	1	-
		AVg		_	6	2	8								
		Understand the operation and architecture of electric and hybrid vehicles	3	3	1	1	0	0	0	0	2	0	2	3	-
		Identify various energy source options like battery and fuel cell	3	3	1	1	0	0	0	0	2	0	2	3	-
21153OE 73B	Electric and Hybrid	Select suitable electric motor for applications in hybrid and electric vehicles.	3	3	1	1	0	0	0	0	2	0	2	3	-
	Vehicle	Explain the role of power electronics in hybrid and electric vehicles	3	3	1	1	0	0	0	0	2	0	2	3	-
		Analyze the energy and design requirement for hybrid and electric vehicles.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Realize the importance of NDT in various engineering fields	3	3	2	1	1	1	-	-	-	-	-	-	-
		Have a basic knowledge of surface NDE techniques which enables to carry out various inspection in accordance with the established procedures.	3	3	2	1	2	1	-	-	-	-	-	-	-
21154OE 73A	Introduction to nonDestructi ve testing	Calibrate the instrument and inspect for in-service damage in the components by means of Eddy current testing as well as Thermography testing.	3	3	2	2	2	1	-	-	-	1	-	1	-
		Differentiate various techniques of UT and AET and select appropriate NDT methods for better evaluation.	3	3	1	1	2	1	-	-	-	-	-	-	-
		Interpret the results of Radiography testing and also have the ability to analyse the influence of various parameters on the testing.	3	3	1	1	2	1	-	-	-	-	-	-	-

]			3	3	1	1	1	1	-	-	-	-	-	1	-
		AVg			6	2	8								
		Understand the basic concepts of	3	3	1	1	0	0	0	0	2	0	2	3	-
		industrial management Identify the group conflicts and its	3	3	1	1	0	0	0	0	2	0	2	3	-
21154OE	Industrial	causes. Perform swot analysis	3	3	1	1	0	0	0	0	2	0	2	3	-
73B	Management	Analyze the learning curves	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand the placement and performance appraisal	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
	Biomedical	Students will learn about various kinds of biomolecules and their physiological role.	3	3	1	1	0	0	0	0	2	0	2	3	-
21152OE 73A	Instrumentat ion	Students will gain knowledge about various metabolic disorders and will help them to know the importance of various biomolecules in terms of disease correlation.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Explain the structure and working operation of basic electronic devices.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Design and analyze amplifiers.	3	3	1	1	0	0	0	0	2	0	2	3	-
21152OE	Fundamental s of Electronic	Analyze frequency response of BJT and MOSFET amplifiers	3	3	1	1	0	0	0	0	2	0	2	3	-
73B	Devices and Circuits	Design and analyze feedback amplifiers and oscillator principles.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Design and analyze power amplifiers and supply circuits	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Recognize the development of AM technology and how AM technology propagated into various businesses and developing opportunities.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Acquire knowledge on process vat polymerization and material extrusion processes and its applications.	3	3	1	1	0	0	0	0	2	0	2	3	-
21154OE 74A	Additive Manufacturi ng	Elaborate the process and applications of powder bed fusion and binder jetting.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Evaluate the advantages, limitations, applications of material jetting and directed energy deposition processes.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Acquire knowledge on sheet lamination and direct write technology.	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
21154OE 74B	Industrial safety	Describe, with example, the common work-related diseases and accidents in occupational setting	3	3	1	1	0	0	0	0	2	0	2	3	-

		Name essential members of the Occupational Health team	3	3	1	1	0	0	0	0	2	0	2	3	-
		What roles can a community health practitioners play in an Occupational setting to ensure the protection, promotion and maintenance of the health of the employee	3	3	1	1	0	0	0	0	2	0	2	3	-
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand various sensor effects, sensor characteristics, signal types, calibration methods and obtain transfer function and empirical relation of sensors. They can also analyze the densor response.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Analyze and select suitable sensor for displacement, proximity and range measurement.	3	3	2	1	2	1	-	-	-	-	-	-	-
21153OE	Sensors	Analyze and select suitable sensor for force, magnetic field, speed, position and direction measurement.	3	3	2	2	2	1	-	-	1	-	1	1	-
74A	Jensors	Analyze and Select suitable sensor for light detection, pressure and temperature measurement and also familiar with other miniaturized smart sensors.	3	3	1	1	2	1	-	-	1	-	1	-	-
		Select and design suitable signal conditioning circuit with proper compensation and linearizing element based on sensor output signal.	3	3	1	1	2	1	-	-	-	-	-	-	-
		AVg	3	3	1 6	1 2	1 8	1	-	-	-	-	-	1	-
		Understand various types of dielectric materials, their properties in various conditions.	3	3	2	1	1	1	-	-	-	-	-	-	-
		Evaluate magnetic materials and their behavior	3	3	2	1	2	1	-	-	-	-	-	-	-
	Electrical,	Evaluate semiconductor materials and technologies.	3	3	2	2	2	1	-	-	-	-	-	1	-
21153OE 74B	Electronic and Magnetic materials	Select suitable materials for electrical engineering applications.	3	3	1	1	2	1	-	-	-	-	-	-	-
	materials	Identify right material for optical and optoelectronic applications	3	3	1	1	2	1	-	-	-	-	-	-	-
		AVg	3	3	1 6	1 2	1 8	1	-	-	-	-	-	1	-
21152OE	Medical	Explain the structure and functional capabilities of Hospital Information System.	3	3	1	1	0	0	0	0	2	0	2	3	-
77B	Informatics	Describe the need of computers in medical imaging and automated clinical laboratory.	3	3	1	1	0	0	0	0	2	0	2	3	-

			Articulate the functioning of information storage and retrieval in computerized patient record system.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Apply the suitable decision support system for automated clinical diagnosis.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Discuss the application of virtual reality and telehealth technology in medical industry.	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg													
			Estimate the quantities for buildings,	3	3	2	1	1	1	-	-	-	-	-	-	-
			Rate Analysis for all Building works, canals, and Roads and Cost Estimate.	3	3	2	1	2	1	-	-	-	-	-	-	-
	21155C75	Estimation , Costing & Valuation	Understand types of specifications, principles for report preparation, tender notices types.	3	3	2	2	2	1	-	1	1	1	1	1	-
		Engineering	Gain knowledge on types of contracts	3	3	1	1	2	1	-	-	-	-	-	-	-
			Evaluate valuation for building and land.	3	3	1	1	2	1	-	-	1	-	-	-	-
				3	3	1 •	1	1	1	-	-	-	-	-	1	-
			AVg			6	2	8					-			
			carry out scoping and screening of developmental projects for environmental and social assessments	3	3	1	1	0	0	0	0	2	0	2	3	-
	21149846	Environment al Sciences and	explain different methodologies for environmental impact prediction and assessment	3	3	1	1	0	0	0	0	2	0	2	3	-
	21149540	Sustainabilit y	plan environmental impact assessments and environmental management plans	3	3	1	1	0	0	0	0	2	0	2	3	-
			evaluate environmental impact assessment reports	3	3	1	1	0	0	0	0	2	0	2	3	-
			AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
	21160\$77	Total quality management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	3	3	1	1	0	0	0	0	2	0	2	3	-
		indugement	Development of critical thinking and synergistic research approach.	3	3	1	1	0	0	0	0	2	0	2	3	-
SEM 8	21155PW 81	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.	3	3	1	1	0	0	0	0	2	0	2	3	-



B.TECH (P.T)- 2019R

Se	Course		COs					P	os				
m	Code	Title of the Course		P 0 1	P 0 2	P 0 3	P 0 4	P 0 5	P 0 6	P 0 7	P 0 8	P O 9	P O 10
			Understand how to solve the given standard partial differential equations.	~									
		Transforms and Partial Differential Equations	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	~									
	19148S11P		Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	~									
	19148S11P	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.	~									
I			Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	~									
			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.		~	~							
	19155H12P	Mechanicsof solids I	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										

			Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.	~		~			~	
			Understand and solve the problems related to equation of motion.			~				
	19155H13P	Fluid Mechanics-I	Gain knowledge about dimensional and model analysis.	~				~	~	
			Learn types of flow and losses of flow in pipes.							
			Understand and solve the boundary layer problems.							
			The use of various surveying instruments and mapping	~	~		~	-	~	
			Measuring Horizontal angle and vertical angle using different instruments					~	~	
	19155H14P	Surveying	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.							
			Have knowledge and skills on crop water requirements.	~	~		~			
			Understand the methods and management of irrigation.				~			
	19155H15P	Irrigation Engineering	Gain knowledge on types of Impounding structures	~	~					
			Understand methods of irrigation including canal irrigation.							
			Get knowledge on water management on optimization of water use.				~			
		1	The demote and the basis service and						<u> </u>	
			Understand the basic concepts and techniques of solving algebraic and transcendental equations.	~						
Π	19148S21P	Numerical Methods	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.	~								
		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.	~	~	~						
19155H22P	Strength of Materials	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.									
		Classify the soil and assess the engineering properties, based on index properties. Able to identify a effective section for flow in different cross sections.	~	~		~		✓ ✓	✓ ✓	~	
19155H23P	Fluid Mechanics-II Fluid Mechanics-II Concrete Technology	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.									
		The various requirements of cement, aggregates and water for making concrete	~	~		~		~	~	~	
		The effect of admixtures on properties of concrete				✓					
19155H24P		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.									

			Classify the soil and assess the engineering properties, based on index properties. Understand the stress concepts in	~	~					✓	✓	~	✓
			soils							✓	~		
	19155H25P	Soil Mechanics	Understand and identify the settlement in soils.	~	✓							~	
			Determine the shear strength of soil										✓
			Analyze both finite and infinite slopes.			✓					✓		
		1		1		r		1	r				
	19155H32P	Design of reinforced concrete structures-I	The student shall be in a position to design the basic elements of reinforced concrete structures.	~	~					✓	✓		
			Students will be able to analysis trusses, frames and arches	~	>	~	>	~				~	✓
	19155H33P	Structural Analysis I	Students will be able to analyse structures for moving loads and		✓	~	~	~					
			Students will be able to will be conversant with classical methods of analysis.	<	~	~	~					~	~
			Compare the properties of most common and advanced building materials.	<			~		~			~	
		Construction	understand the typical and potential applications of lime, cement and aggregates				~		~			~	
	19155H34P	Materials and Practices	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.				~			~			
	19155L35P	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.			~		~	~				
		1		1		r		1	r				
	19155H41P	Design of reinforced concrete structures-II	The student shall have a comprehensive design knowledge related to various structural systems.	~		~		~			~		
IV	19155H42P	Structural Analysis II	The student will have the knowledge on advanced methods of analysis of structures including space and cable structures.		~	~	~	~					
	19155H43P	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			~	~					~	
		an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments			~		~					
19155E44AP	Hydrology	ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge	~			~	~					
19155E44BP	Water resources	ability to conduct Spatial analysis of rainfall data and design water storage reservoirs		~	~	~						
1713527701	Engineering	Understand the concept and methods of ground water management.					~		~	✓		
		understand the typical and potential applications of lime, cement and aggregates		~	~	~						-
19155E44CP	Building Technology	Know the production of concrete and also the method of placing and making of concrete elements.	~	~	~							
		understand the applications of timbers and other materials							~	~	~	
19155E44DP	Contract laws and regulations	understand the applications of timbers and other materials								~	~	
		Quantify the pollutant concentration in water and wastewater		~		~			~			
19155L45P	Environmental Engineering Lab	Suggest the type of treatment required and amount of dosage required for the treatment							~			
		Examine the conditions for the growth of micro-organisms		√		1						
			<u> </u>									г
		Understand the concepts of various design philosophies Design common bolted and welded	✓	✓	✓	✓	✓					
		connections for steel structures			✓	✓						I

			Understand the concepts of various design philosophies	✓	✓	✓	✓	✓			✓
		Design of Steel	Design common bolted and welded connections for steel structures			✓	✓				
V	19155H51P	Design of Steel Structural Elements	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.	~]
		Understand the site investigation, methods and sampling.		✓		√			✓		~	
		Get knowledge on bearing capacity and testing methods.									✓	
19155H52P	Foundation	Design shallow footings.		\checkmark					✓			
.,	Engineering	Determine the load carrying capacity, settlement of pile foundation.				√						
		Determine the earth pressure on retaining walls and analysis for stability.							~			
		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.										
19155H53P	Industrial Waste Management	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.					✓			✓		
19155H54AP	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.	~			1			~			
		Design flexible and rigid pavements.		√			√					
		Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.				~			~			
19155E54BP	Transportation Engineering	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.				✓			✓			
19155E54CP	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.	✓			✓					~	ĺ

			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			~			~			~	
			Get knowledge on planning and aligning of highway.			✓			✓				✓
			Geometric design of highways	✓			✓					✓	
			Design flexible and rigid pavements.			✓			✓				
	19155E54DP	Highway Engineering	Gain knowledge on Highway construction materials, properties, testing methods		~			~		~			~
			Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.			~			~			~	
	19155L55P	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.	~		~		~			~		~
	1			1				1					
			Estimate the quantities for buildings,	✓	✓				✓	✓			
			Rate Analysis for all Building works, canals, and Roads and Cost Estimate.										
	19155H61P	Estimation & Cost Evaluation	Understand types of specifications, principles for report preparation, tender notices types.	~	~								
			Gain knowledge on types of contracts						✓	✓			
			Evaluate valuation for building and land.										
VI			The students gain the knowledge needed on hydrologic cycle, hydrometeorology and formation of precipitation.	~	~	~	~				~	~	
	19155H62P	Ground Water Hydrology	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.	~	~								

	19155H63P	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.	~	~	~	~				*	~	
	19155E64AP	Remote Sensing And GIS	Principles of Remote Sensing and GIS Analysis of RS and GIS data and interpreting the data for modeling	✓ ✓	 	✓	✓					✓	✓
	19155E64BP	Railway	applications Understand the methods of route alignment and design elements in Railway Planning and Constructions.	~	~	~		~	~	~	~	~	
		Engineering	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.	~	~								~
	19155E64CP	Airport & Harbours	Analyze and design the elements for orientation of runways and passenger facility systems.	~	~	~	1					~	
			Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.	~	<	<		<	<	~	<	~	
			Understand the advantages of electronic surveying over conventional surveying methods	~	~								~
	19155E64DP	Electronic Surveying	Understand the working principle of GPS, its components, signal structure, and error sources	~	~	~	√					~	
			Understand various GPS surveying methods and processing techniques used in GPS	~	~	~		~	~	~	~	~	
	19155L65P	Concrete &Transportation Engineering Laboratory	Student knows the techniques to characterize various pavement materials through relevant tests.	~	✓	✓	✓					✓	
		1		1									
	19160S71P	Total Quality Management	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	~			√	~			✓		~
VII	19155C72P	Housing, Planning & Management	The students should have a comprehensive knowledge of planning, design, evaluation,construction and financing of housing projects.		~			~	~			~	✓

19155C73P	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.	*			•	✓			*	~	
		an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management	~			~	~			~		~
19155E74AP	Air Pollution 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.	~			~	√			~	~	
19155E74BP	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.	~			~	~			~		~
		To develop an understanding of an appreciation for basic concepts in proportioning and design of bridges in terms of aesthetics, geographical location and functionality.	~			~	✓			<	~	
19155E74CP	Bridge Structures	To help the student develop an intuitive feeling about the sizing of bridge elements, i.e., 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.			~			~	~			~
19155E74DP	Prestressed Concrete Structures	Student shall have a knowledge on methods of prestressing and able to design various prestressed concrete structural elements.		~			~	~			~	✓
19155P75P	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.	1			~	~			✓	~	



M.TECH STRUCTURAL ENGINEERING (P.T)- 2019R

								PO	DS				
Sem	Course Code	Title of the Course	COs	P 0 1	P 0 2	P 0 3	Р О 4	P 0 5	P 0 6	P 0 7	P O 8	Р О 9	P 0 1 0
			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						\checkmark			~	
	19248S11EP	Advanced Engineering Mathematics	formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.	~							~		~
I			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.					~		~		~	
	19255H12P	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						>		~		~
		Construction	To be exposed to means of quality control				~		~				
	19255H13P	Theory of Plasticity and Elasticity	To study the relationship between quality control and assurance	~					~		~		~
	19255L14P	Core Practical (Computer Programming Lab)	To learn design and preparation of structural drawing of concrete and steel structures (STADD- PRO).			~				✓		~	

	19255CRSP	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				✓		✓ ✓	✓ ✓	✓ ,	
	19255H21P	Management Information System	DevelopmentofresearchaptitudeTobring about an exposure toinformation systems in a formalmannerTostudy the development ofinformation systemsTostudy the means of applyinginformation systems models toproject management		< <	~	✓	✓ ✓	~	< < <	✓ 	
	19255H22P	Finite Element Analysis	To introduce system audit and to study its features			\checkmark			\checkmark		~	
	19255E23AP	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			✓	✓	✓	✓	~	✓ 	_
п	19255E23BP	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.			~						
	19255E23CP 19255L24P	Steel,Concrete Composite Structures	To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.	~					~			
		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.		~				~		~	
	192TECWRP	Technical writing / Seminars	To impart knowledge to analyze solve, design and Civil Engineering drawings using FEA - ANSYS				~	~		~		

255CRMP 255CBRP 255H31P	Research Methodology Participation in Bounded Research Structural Dynamics	Experience in scientific writings Practice in various aspects of scientific publications Inculcation of research ethics Hands on exposure to problem solving tools in contemporary research Evolution of research intuitiveness and orientation Emphasis is placed on static problems with linear material and small deformation. Many		✓ ✓		✓ ✓	~	✓ ✓ ✓			
	Bounded Research	scientific publications Inculcation of research ethics Hands on exposure to problem solving tools in contemporary research Evolution of research intuitiveness and orientation Emphasis is placed on static problems with linear material		~			~	✓ ✓		✓	
	Bounded Research	Hands on exposure to problem solving tools in contemporary research Evolution of research intuitiveness and orientation Emphasis is placed on static problems with linear material		~			✓	✓ ✓		✓	
	Bounded Research	solving tools in contemporary research Evolution of research intuitiveness and orientation Emphasis is placed on static problems with linear material		~				✓ ✓		✓	
255H31P	Structural Dynamics	intuitiveness and orientation Emphasis is placed on static problems with linear material						\checkmark			
255H31P	Structural Dynamics	problems with linear material								\checkmark	
255H31P	Structural Dynamics	problems with linear material					1			$ \rightarrow$	
		basic 2-D problems (such as plane strain and plane stress) and 3-D problems.				~		~		~	
255H32P	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.					~				
255E33AP	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.		~		~		~		~	
255E33BP	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.	~			~		~			
255E33CP	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.	~				~		~		
255CSR	Design / Socio - Technical Project	Development of critical thinking and synergistic research approach.	✓				✓	✓		✓	
22	255E33AP 255E33BP 255E33CP	255H32P Rehabilitation of Structures 255E33AP Prestressed Concrete Structures 255E33BP High Rise Structures 255E33CP Computer Aided Structural Design 255CSP Design / Socio -	2:55H32PRehabilitation of Structuresdeflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading.2:55E33APPrestressed Concrete StructuresIntroduction 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.2:55E33BPHigh Rise StructuresThis 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.2:55E33CPComputer Aided Structural DesignThis course covers the design criteria and loading pattern on high rise structures, behavior of structural systems and stability, design and analysis of tall buildings.	2:55H32P Rehabilitation of Structures deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading. 2:55E33AP 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. 2:55E33BP 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. 2:55E33CP 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.	2:55H32P Rehabilitation of Structures deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading. 2:55E33AP Prestressed Concrete Structures Introduction to the governmental quality assurance regulations for public works. 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Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality. 2:55E33BP 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. 2:55E33CP 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.	2:55H32P Rehabilitation of Structures deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading. 2:5E33AP 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. 2:55E33BP 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. 2:55E33CP 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. 2:55CSR Design / Socio - Technical Project Development of critical thinking and synergistic research	2:55H32P Rehabilitation of Structures deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading. 2:5E33AP 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. 2:55E33BP 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. 2:55E33CP Computer Aided Structural Design This course stuctures, behavior of structural systems and stability, design and analysis of tall buildings. 2:55CSR Design / Socio - Technical Project Development of critical thinking and synergistic research	2:55H32P Rehabilitation of Structures deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading. 2:55E33AP 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. 2:55E33BP 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. 2:55E33CP Computer Aided Structural Design This course and stability, design and analysis of tall buildings. 2:55CSR Design / Socio - Technical Project Development of critical thinking and synergistic research	2:55H32P Rehabilitation of Structures deflections developed in any given type of structures when it is subjected to an arbitrary dynamic loading. 2:55E33AP Prestressed Concrete Structures Introduction to the governmental quality assurance regulations for public works. 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Application of quality control concepts, statistical experimental design principles to the construction process to minimize project costs and improve quality. 255E33BP 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. 255E33CP 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.

	19255H41P	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.	~					~		~		
	19255H42P	Advanced Steel Structures	Familiarity with cutting edge research trends		\checkmark					<		\checkmark	
	19255E43AP	Optimization in Structural Design	This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.	~	~								
	19255E43BP	Design of industrial structures	At the end of this course the student shall be able to design someof the strctures used in industries.			~	~		~		~		
IV			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	✓	✓	~	✓						
	19255E43CP	Elements of earthquake Engineering	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.				~	~					
		Project Work Phase-I	This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.		\checkmark								
	19255P44P	Project work Phase-1	Sensitization of social needs for innovation		\checkmark			\checkmark					
			Teamworktowardsinterdisciplinarysynchronousresearch strategy							\checkmark			
	19255E51AP	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.	√									
V	19255E51BP	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.	~			~						
	19255E51CP	Aseismic Design of structures							\checkmark		\checkmark		

	19255E52AP	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.				~					
	19255E52BP	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.		~			~		~		
	19255E52CP	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.	V		~			~		~	
	19255E53AP	Offshore Structures	This course deals about the non –linearities, non-linear equations and non linear static analysis of plates, columns, trusses and frames					~				
	19255E53BP	Stability of Structures	This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures.	\checkmark								
	19255E53CP	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	19255P61P	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.	~	~			~	~		~	



M.TECH STRUCTURAL ENGINEERING(F.T)- 2019R

								PO	DS				
Sem	Course Code	Title of the Course	COs	Р О 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 1 0
			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.							~	✓		
	19248S11E	Advanced Engineering Mathematics	Be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.	\checkmark									
			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.					~		~			~
Ι			To understand the elements of quality planning and the implication			\checkmark			\checkmark				
	19255H12	Quality Control &Assurance in	To become aware of objectives and advantage of quality assurance To be exposed to means of quality			\checkmark			✓		\checkmark		
		Construction	control To study the relationship between quality control and assurance				~		~		\checkmark		
	19255H13	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.	\checkmark						~			\checkmark
	19255H14	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.					\checkmark		\checkmark			\checkmark

	19255H15	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.						√		✓		
	19255E1A	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.		~			~		~			✓
	19255E16B	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.	~					\checkmark			~	
	19255E16C	Computer Aided Structural Design	To learn design and preparation of structural drawing of concrete and steel structures (STADD-PRO).	~					\checkmark	<			\checkmark
	19255L19	Core Practical (Computer Programming Lab)	To impart knowledge to analyze solve, design and Civil Engineering drawings using AutoCAD.			<				<			~
	19255CRS	Research Led	Exposure to various research domains Acquaintance with languages of				~			✓			✓
	17255CK5	Seminar	Development of research aptitude						✓ ✓			✓	
			To bring about an exposure to information systems in a formal manner			~					✓		
	19255H21	Management Information	To study the development of information systems To study the means of applying				\checkmark						
		System	information systems models to project management					\checkmark			\checkmark		
			To introduce system audit and to study its features			\checkmark				\checkmark			\checkmark
п	19255H22	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.				\checkmark				~		
	19255H23	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	~					~			\checkmark	

			structures safely, economically and efficiently.										
	19255E2B	Advanced Concrete Technology	To learn the Performance of concrete as structural material and advanced technologies used in construction by using concrete.				\checkmark						
	19255E2C	Steel,Concrete Composite Structures	This course emphasize about steel & concrete composite member, design concepts of composite box girder bridges and case studies.		~					~	~		
	19255E2A	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.	~	<					<			~
	19255E2C	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.		~								
	19255L26	Core practical(Soft ware Lab – Finite Element Analysis- ANSYS)	To impart knowledge to analyze solve, design and Civil Engineering drawings using FEA - ANSYS			~				~			~
	192TECW R	Technical writing / Seminars						✓					
	19255CRM	Research Methodology	Understanding research questions and tools Experience in scientific writings Practice in various aspects of scientific publications		< 					 			✓
			Inculcation of research ethics	\checkmark				\checkmark		\checkmark			\checkmark
		Participation in	Hands on exposure to problem solving tools in contemporary research						✓				
	19255CBR	Bounded Research	Evolution of research intuitiveness and orientation Familiarity with cutting edge research trends		✓				✓			✓	
III	19255H31	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.		~					✓			✓
	19255E32 A	Experimental Stress Analysis	At the end of the semester students can learn about the strain gauges,	\checkmark									

			strain rosetters, model analysis, calibration of photo elastic materials.									
	19255E32B	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.	~			~			~		~
	19255E33 A	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.					~	~		~	
	19255E33B	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.			~				~		
	19255E33C	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	\checkmark			\checkmark					
	19255E34 A	Offshore Structures	This course includes the details of wave theories, forces in offshore structures and design and analysis of offshore structures.						\checkmark			
	19255E34B	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.	~						~		<
	19255E34C	Mechanics of Composite Materials	This course introduces the properties of materials, strength and elastic behavior of composite lamina and design of composite structures.			\checkmark						
	19255P35	Project Work Phase-I	Sensitization of social needs for innovation		\checkmark			\checkmark		\checkmark		\checkmark
			Team work towards interdisciplinary synchronous research strategy							\checkmark		
	19255CSR	Design / Socio - Technical Project	Development of critical thinking and synergistic research approach.	\checkmark					\checkmark	\checkmark		✓
				1		1					 	
v	19255P41	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.	~		*			~	✓		~