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

B.TECH (F.T)- 2021R

Sem	Course Code	Title of the Course	COs	POS										PSO		
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
SEM 1	21147S11	Professional English - I	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	-
			To read and infer the denotative and connotative meanings of technical texts	3	3	3	3	1	3	3	3	3	3	3	3	-
			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	-
			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**	**-**
	21148S12	Matrices and Calculus	Use the matrix algebra methods for solving practical problems	3	3	1	1	0	0	0	0	2	0	2	3	-
			Apply differential calculus tools in solving various application problems.	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-

Code	Course	Course Outcome													
		Apply multiple integral ideas in solving areas, volumes and other practical problems.	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	-
21149S13	Engineering Physics	Understand the importance of mechanics.	1	1	1	1	1	3	3	3	1	3	-	3	-
		Express their knowledge in electromagnetic waves.	1	1	1	1	1	3	3	3	1	3	-	3	-
		Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	2	3	2	3	2	3	3	3	2	3	3	3	-
		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	-
		AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
21149S14	Engineering Chemistry	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	-
		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	-
		AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
21150S15	Problem Solving and Python Programming	Develop algorithmic solutions to simple computational problems	3	3	1	1	0	0	0	0	2	0	2	3	-
		Read, write, execute by hand simple Python programs.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Structure simple Python programs for solving problems.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Decompose a Python program into functions.	3	3	1	1	0	0	0	0	2	0	2	3	-

SEM	Code	Course	CO Statement													
			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	-
	21150L16	Problem Solving and Python Programming Laboratory	Develop algorithmic solutions to 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	-
			Implement programs in Python using conditionals and loops for solving problems.	1	1	1	1	1	3	3	3	1	3	-	3	-
			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	-
			AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
	21150L17	Physics and Chemistry Laboratory	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	-	-	-	-	-	-
			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**	**-**
SEM 2	21147S21	Professional English - II	To compare and contrast products and ideas in technical texts.	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-
			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	-

Course Code	Course	CO													
		AVg	3	3	1	1	0	0	0	0	2	0	2	3	-
21148S22	Statistics and NumericalMethods	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	-	-	-	-	-	-
		Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	3	1	-	-	-	-	-	-	-	-	-	-	-
		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	-
		AVg	**2.8**	**1.3**	**1.6**	**1**	-	**1.5**	**1.8**	**-**		-	-	**1.5**	-
21149S23E	Physics for Civil Engineering	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	-
		understand the concepts of sound absorption, noise insulation and lighting designs	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21154S24	Engineering Graphics	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	-
		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	-

	Code	Course	Course Outcome													
			AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
	21153S25C	Basic Electrical,Electronics and Instrument Engineering	Compute the electric circuit parameters for simple problems	1	1	1	1	1	3	3	3	1	3	-	3	-
			Explain the concepts of domestics wiring and protective devices	1	1	1	1	1	3	3	3	1	3	-	3	-
			Explain the working principle and applications of electrical machines	2	3	2	3	2	3	3	3	2	3	3	3	-
			Analyze the characteristics of analog electronic devices	2	3	2	3	2	3	3	3	2	3	3	3	-
			Explain the types and operating principles of sensors and transducers	2	3	3	3	-	3	3	3	2	3	-	3	-
			AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
	21154L21	Engineering Practices Laboratory	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	-
			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	-
	21153L22D	Basic Electrical, Electronics And Instrumentation Engineering Laboratory	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	-	-	-	-	-	-	-
			Analyze experimentally the load characteristics of electrical machines	3	3	2	2	2	1	-	-	-	-	-	1	-
			Analyze the characteristics of basic electronic devices	3	3	1	1	2	1	-	-	-	-	-	-	-
			Use LVDT to measure displacement	3	3	1	1	2	1	-	-	-	-	-	-	-
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
SEM 3	21148S31D	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	-

Course Code	Topic	Course Outcome													
	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	-	3	-
		AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
21154S32	Engineering Mechanics	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	-
		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	-
		AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
21155C33	Fluid Mechanics	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	-	-	-	-	-	-
		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	-

Course Code	Course	CO													
		AVg	**2.8**	**1.3**	**1.6**	**1**	**-**	**1.5**	**1.8**	**-**		**-**	**-**	**1.5**	**-**
21155C34	Construction Materials andTechnology	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	-
		Identify and estimate the activity in the construction.	2	3	2	3	2	3	3	3	2	3	3	3	-
		Develop the knowledge on accidents and their causes.	2	3	2	3	2	3	3	3	2	3	3	3	-
		Plan, assess, analyze and manage the construction project sites.	2	3	3	3	-	3	3	3	2	3	-	3	-
		AVg	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
21155C35	Water Supply & Wastewater Engineering	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	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
		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	1	1	2	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	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21155C36	Surveying and Levelling	Measuring Horizontal angle and vertical angle using different instruments	3	3	2	1	2	1	-	-	-	-	-	-	-
		Methods of Levelling and setting Levels with different instruments	3	3	2	2	2	1	-	-	-	-	-	1	-
		Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth	3	3	1	1	2	1	-	-	-	-	-	-	-
		Concept and principle of modern	3	3	1	1	2	1	-	-	-	-	-	-	-

SEM	Code	Subject	CO													
			surveying.													
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
	21155L37	Surveying and Levelling Laboratory	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	-
			Able to use theodolite for various surveying operations	3	3	1	1	0	0	0	0	2	0	2	3	-
			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 Analysis Laboratory	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	-
			Examine the conditions for the growth of micro-organisms	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155L39	Professional Development	Make effective presentations	1	1	1	1	1	3	3	3	1	3	-	3	-
			Participate confidently in Group Discussions.	1	1	1	1	1	3	3	3	1	3	-	3	-
			Attend job interviews and be successful in them.	2	3	2	3	2	3	3	3	2	3	3	3	-
			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	-
SEM 4	21155C41	Applied Hydraulic Engineering	Apply their knowledge of fluid mechanics in addressing problems in open channels.	**1.6**	**2.2**	**1.8**	**2.2**	**1.5**	**3**	**3**	**3**	**1.6**	**3**	**3**	**3**	**-**
			Able to identify a effective section for flow in different cross sections.	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-
			Understand the principles, working and application of turbines.	3	3	1	1	0	0	0	0	2	0	2	3	-
			Understand the principles, working and application of pumps.	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	-
	21155C42	Strength of Materials	Understand the concepts of stress and strain, principal stresses and principal planes.	3	2	2	1	-	1	1	-	-	-	-	1	-
			Determine Shear force and bending moment in beams and understand concept of theory of simple bending.	2	-	-	1	-	2	2	-	-	-	-	-	-

Course Code	Course	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
		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	-	-	-	-	2	-
		AVg	**2.8**	**1.3**	**1.6**	**1**	**-**	**1.5**	**1.8**	**-**		**-**	**-**	**1.5**	**-**
21155C43	Concrete Technology	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	-
		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	-
21155C44	Soil Mechanics Laboratory	Classify the soil and assess the engineering properties, based on index properties.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand the stress concepts in soils	3	3	1	1	0	0	0	0	2	0	2	3	-
		Understand and identify the settlement in soils.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21155C45	Highway and Railway Engineering`	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
		Gain knowledge on Highway construction materials, properties, testing methods	2	2	-	2	2	-	-	-	-	-	1	-	3
		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	Environmental Sciences and Sustainabilit	carry out scoping and screening of developmental projects for environmental and social assessments	3	3	2	1	2	1	-	-	-	-	-	-	-

		y	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	-	-	-	-	-	-	-
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
	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	21155C51	Design of Reinforced Cement Concrete Elements	Understand the various design methodologies for the design of RC elements.	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-
			design the various types of slabs and staircase by limit state method.	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-
	21155C52	Structural Analysis I	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	0	0	2	0	2	3	-
			Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	3	3	1	1	0	0	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	-

Course Code	Course	Outcome												
		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	-
21155C53	Foundation Engineering	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	-
		Determine the load carrying capacity, settlement of pile foundation.	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	-
		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	-
21155E54 A	Airports and Harbours	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	-	-	-	-	-	-
		Analyze and design the elements for orientation of runways and passenger facility systems.	3	1	-	-	-	-	-	-	-	-	-	-	-
		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	-
		AVg	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-
21155E54 B	Concrete Structures	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	-
		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	-
		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	-	-	-	-	-	-

Course Code	Course Name	Course Outcome													
		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	-
		AVg	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-
21155E55A	Steel Structures	Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths	3	2	2	1	-	1	1	-	-	-	-	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	-	-	-	-	-	-
		Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, columns, column bases and beams	3	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	-
		AVg	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-
21155E55C	Rehabilitation/ Heritage Restoration	Know the importance of inspection and maintenance	3	2	2	1	-	1	1	-	-	-	-	1	-
		Study the Impacts of cracks, corrosion and climate on structures.	2	-	-	1	-	2	2	-	-	-	-	-	-
		Know about various special concretes	3	1	-	-	-	-	-	-	-	-	-	-	-
		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	-
		AVg	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-
21155E56A	Water Quality and	Know about the principles of water quality modelling	3	2	2	1	-	1	1	-	-	-	-	1	-

Code	Course	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO
	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	-
		AVg	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-
21155E56 B	Prefabricated Structures	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	-
		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	-
21155E56 C	Total Station and GPS Surveying	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	-	-	-	-	-	-	-	-	-	-	-
		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	-
		AVg	2.8	1.3	1.6	1	-	1.5	1.8	-		-	-	1.5	-
21147MC 51A	Introduction to Women and Gender Studies	Gender and Representation in Alternative Media.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-

Course Code	Course Name	CO													
		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	-
21147MC 51C	Film Appreciation	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	-
		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	-
21147MC 51D	Disaster Management	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	-
		To develop disaster response skills by adopting relevant tools and technology.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21155L58	Highway Engineering Laboratory	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	-
		Determine the Optimum Binder Content Using Marshall Method.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21155L59	Survey Camp	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	-
		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	-
		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 Applications (CSE)	Design portable IoT using Arduino/Raspberry Pi /open platform	3	3	1	1	0	0	0	0	2	0	2	3	-
			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 61B	Augmented and Virtual Reality (CSE)	Know the working principle of AR/VR related Sensor devices	3	1	-	-	-	-	-	-	-	-	-	-	-
			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	-	-	-	-	2	-
			AVg	**2.8**	**1.3**	**1.6**	**1**	**-**	**1.5**	**1.8**	**-**		**-**	**-**	**1.5**	**-**
SEM 6			Understand the concepts of various design philosophies	3	3	1	1	0	0	0	0	2	0	2	3	-
			Design common bolted and welded connections for steel structures	3	3	1	1	0	0	0	0	2	0	2	3	-
	21155C62	Design of Steel Structural Elements	Design tension members and understand the effect of shear lag.	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-	-	-	-	-	-	-
			Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.	3	3	2	1	2	1	-	-	-	-	-	-	-
	21155C63	Structural 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	-	-	-	-	-	-	-

Course Code	Course Name	Course Outcome												
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21155C64	Hydrology and Water Resource Engineering	Define the hydrological processes and their integrated behaviour in catchments	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
		Explain the concept of hydrological extremes and its management strategies	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21155E65 A	Prestressed Concrete Structures	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	-	-	-	-	-	-	-
		Design the anchorage zone for post-tensioned members and estimate the deflection in beams.	3	3	2	2	2	1	-	-	-	-	-	1	-
		• 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	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21155E65 B	Water Resources Systems Engineering	Define the economic aspects and analysis of water resources systems for comprehensive and integrated planning of a water resources project.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Apply the concept of linear programming for optimisation of water resources problems.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Explain the concept of dynamic programming and apply in water resource system.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	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	-	-	-	-	-	-	-

Course Code	Course Name	Course Outcome														
		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	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21155E66 A	Pile Foundation	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	1	1	0	0	0	0	2	0	2	3	-
		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	-
21155E66 B	Urban Planning and Development	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	-
		Understand the different types of plan, their strategies and their preparation process.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21155E66 C	Construction Equipment and Machinery	Develop knowledge on planning of equipment and selection of equipment	3	3	2	1	1	1	-	-	-	-	-	-	-
		Explain the knowledge on fundamentals of earth work operations, earth moving operations and types of earth work equipment	3	3	2	1	2	1	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-

Course Code	Subject	Course Outcome													
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21155E67 A	Advanced Construction Techniques	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	-
		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	-
21155E67 B	Traffic Engineering and Management	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	-
		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	-
21155E67 C	Dynamics and Earthquake Resistant Structures	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	-	-	-	-	-	-	-
		Explain the elements of engineering seismology, characteristics of earthquake and seismic instrumentation.	3	3	2	1	2	1	-	-	-	-	-	-	-
		Explain the behavior of various types of structures under earthquake	3	3	2	2	2	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	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-

Course Code	Course Name	Course Outcome												
21147MC61A	Well Being with Traditional Practices	Learn the importance of different components of health	3	3	1	1	0	0	0	0	2	0	2	3	-
		Gain confidence to lead a healthy life	3	3	1	1	0	0	0	0	2	0	2	3	-
		Learn new techniques to prevent lifestyle health disorders	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21147MC61B	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	-
21147MC61C	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	-
21147MC61D	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	-
21147MC61E	Safety In Engineering Industries	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	-
		Know about the safety Activities of the Working Place.	3	3	2	2	2	1	-	-	-	-	-	1	-
		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	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21155L69	Building Drawing and Detailing Laboratory	Draft the plan, elevation and sectional view of the load bearing and framed buildings	3	3	2	1	1	1	-	-	-	-	-	-	-
		Draw the structural detailing of RCC elements	3	3	2	1	2	1	-	-	-	-	-	-	-
		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	-	-	-	-	-	-	-

SEM	Code	Course	CO													
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
	21147S71	Human Values and Ethics	Identify the importance of democratic, secular and scientific values in harmonious functioning of social life	3	3	2	1	1	1	-	-	-	-	-	-	-
			Practice democratic and scientific values in both their personal and professional life.	3	3	2	1	2	1	-	-	-	-	-	-	-
			Find rational solutions to social problems.	3	3	2	2	2	1	-	-	-	-	-	1	-
			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	-	-	-	-	-	-	-
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
SEM 7	21150OE 72A	Data Science Fundamentals (CSE)	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	-	-	-	-	-	-	-
			Understand different types of machine learning approaches.	3	3	2	2	2	1	-	-	-	-	-	1	-
			Perform data visualization using tools	3	3	1	1	2	1	-	-	-	-	-	-	-
			Handle large volumes of data in practical scenarios.	3	3	1	1	2	1	-	-	-	-	-	-	-
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
	21150OE 72B	Artificial Intelligence and Machine Learning Fundamentals	Understand the basic concepts of AR and VR	3	3	1	1	0	0	0	0	2	0	2	3	-
			Understand the tools and technologies related to AR/VR	3	3	1	1	0	0	0	0	2	0	2	3	-
			Know the working principle of AR/VR related Sensor devices	3	3	1	1	0	0	0	0	2	0	2	3	-
			Design of various models using modeling techniques	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-
	21147OE 73A	English for Competitive Examinations	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	-
			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	-

Course Code	Course Name	Course Outcome												
		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	-
21153OE 73A	Renewable Energy Technologies	Discuss the Indian and global energy scenario.	3	3	2	1	1	1	-	-	-	-	-	-	-
		Describe the various solar energy technologies and its applications.	3	3	2	1	2	1	-	-	-	-	-	-	-
		Explain the various wind energy technologies.	3	3	2	2	2	1	-	-	-	-	-	1	-
		Explore the various bio-energy technologies.	3	3	1	1	2	1	-	-	-	-	-	-	-
		Discuss the ocean and geothermal technologies	3	3	1	1	2	1	-	-	-	-	-	-	-
		AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
21153OE 73B	Electric and Hybrid Vehicle	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	-
		Select suitable electric motor for applications in hybrid and electric vehicles.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21154OE 73A	Introduction to nonDestructive testing	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	-	-	-	-	-	-	-
		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	-
		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	-	-	-	-	-	-	-

Subject Code	Subject Name	Course Outcome												
			3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
		AVg													
21154OE 73B	Industrial Management	Understand the basic concepts of industrial management	3	3	1	1	0	0	0	0	2	0	2	3	-
		Identify the group conflicts and its causes.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Perform swot analysis	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21152OE 73A	Biomedical Instrumentation	Students will learn about various kinds of biomolecules and their physiological role.	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21152OE 73B	Fundamentals of Electronic Devices and Circuits	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	-
		Analyze frequency response of BJT and MOSFET amplifiers	3	3	1	1	0	0	0	0	2	0	2	3	-
		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	-
21154OE 74A	Additive Manufacturing	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	-
		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	-

Course Code	Course	Course Outcome													
		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	-
21153OE 74A	Sensors	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	-	-	-	-	-	-	-
		Analyze and select suitable sensor for force, magnetic field, speed, position and direction measurement.	3	3	2	2	2	1	-	-	-	-	-	1	-
		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	-	-	-	-	-	-	-
		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	-
21153OE 74B	Electrical, Electronic and Magnetic materials	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	-	-	-	-	-	-	-
		Evaluate semiconductor materials and technologies.	3	3	2	2	2	1	-	-	-	-	-	1	-
		Select suitable materials for electrical engineering applications.	3	3	1	1	2	1	-	-	-	-	-	-	-
		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 77B	Medical Informatics	Explain the structure and functional capabilities of Hospital Information System.	3	3	1	1	0	0	0	0	2	0	2	3	-
		Describe the need of computers in medical imaging and automated clinical laboratory.	3	3	1	1	0	0	0	0	2	0	2	3	-

	Code	Course	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO
			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													
	21155C75	Estimation , Costing & Valuation Engineering	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	-	-	-	-	-	-	-
			Understand types of specifications, principles for report preparation, tender notices types.	3	3	2	2	2	1	-	-	-	-	-	1	-
			Gain knowledge on types of contracts	3	3	1	1	2	1	-	-	-	-	-	-	-
			Evaluate valuation for building and land.	3	3	1	1	2	1	-	-	-	-	-	-	-
			AVg	3	3	1.6	1.2	1.8	1	-	-	-	-	-	1	-
	21149S46	Environmental Sciences and Sustainability	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	-
			explain different methodologies for environmental impact prediction and assessment	3	3	1	1	0	0	0	0	2	0	2	3	-
			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	-
	21160S77	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	-
			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	-

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

B.TECH (F.T)- 2022R

Sem	Course Code	Title of the Course	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	22148S11P	Transforms & 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			✓				✓			
			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.			✓							
	22155C12P	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.	✓									
			Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements.	✓									
			Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and study the various theories of failure	✓									

SEM	Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
	22155C13P	Fluid Mechanics I	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.	✓			✓	✓							
			Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.	✓											
			Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.		✓										
			Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.	✓											
			Explain the concept of boundary layer and its application to find the drag force excreted by the fluid on the flat solid surface.			✓	✓								✓
	22155C14P	Plane and Geodetic Surveying	Introduce the rudiments of various surveying and its principles.	✓			✓	✓	✓						
			Imparts knowledge in computation of levels of terrain and ground features												
			Imparts concepts of Theodolite Surveying for complex surveying operations												
			Understand the procedure for establishing horizontal and vertical control												
			Imparts the knowledge on modern surveying instruments					✓							✓
	22155C15P	Irrigation Engineering	Explain the concept of flood, drought and reservoirs	✓	✓		✓	✓	✓		✓	✓			
			to understand and explain the hydraulic structures.	✓											
			Draw the components of irrigation canal network to design the canal and to familiarize	✓											
			Apply the concepts of groundwater for water resources management	✓											
			explain the concepts of irrigation water management from the bottom-up approach.	✓											
SEM 2	22148S21P	Numerical Methods	demonstrate the understandings of common numerical methods for nonlinear equations,system of linear equations and eigenvalue problems;			✓			✓						
			understand the interpolation theory			✓									
			understand the concepts of numerical methods for ordinary differential equations			✓									✓
			demonstrate the understandings of common numerical methods for elliptic equations												

Code	Course	Course Outcome												
		understand the concepts of numerical methods for time dependent partial differential equations							✓					
22155C22P	Strength of Materials II	Understand the concepts of stress and strain, principal stresses and principal planes	✓	✓										
		Determine Shear force and bending moment in beams		✓										✓
		understand concept of theory of simple bending	✓	✓										
		Calculate the deflection of beams by different methods	✓	✓										
		Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements	✓	✓										
22155C23P	Fluid Mechanics II	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application	✓	✓	✓	✓	✓							
		Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles grades	✓											
		Derive the relationship among the sequent depths of steady rapidly varied flow		✓										
		Design turbines and explain the working principle				✓								
		Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps	✓				✓							
22155C24P	Concrete Technology	Understand the requirements of cement, aggregates and water for concrete	✓											
		Select suitable admixtures for enhancing the properties of concrete												
		Design concrete mixes as per IS method of mix design												
		Determine the properties of concrete at fresh and hardened state.												
		Know the importance of special concretes for specific requirements	✓											
22155C25P	Soil Mechanics	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems							✓		✓			

SEM	Code	Subject	Course Outcome	1	2	3	4	5	6	7	8	9	10	11
			Show the basic understanding of flow through soil medium and its impact of engineering solution	✓										✓
			Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation						✓		✓			
			Show the understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear soils strength of soils.											
			Demonstrate an ability to design both finite and infinite slopes, component and process as per needs and specifications	✓					✓					✓
SEM 3	22148S31P	Probability & Statistics	To introduce the basic concepts of two dimensional random variables.	✓										
			To introduce the basic concepts of two dimensional random variables.	✓										
			To acquaint the knowledge of testing of hypothesis for small and large samples which play an important role in real life problems.	✓										
			To introduce the basic concepts of classification of design of esperiments which plays vwery important roles in the field of agriculture and statistical quality control.	✓										
	22155C32P	Design of Reinforced Concrete Structures-I	Know the various design concepts and design RC rectangular beams by working stress and limit state methods	✓	✓		✓		✓			✓		
			Understand the design of flanged beams, design for shear and torsion, and anchorage and development length	✓										
			Design a RC slabs and staircase and draw the reinforcement detailing	✓										
			Design short columns for axial, uni-axial and bi-axial eccentric loadings											✓
			Design wall footings, isolated footings and combined rectangular footing	✓										
	22155C33P	Structural Analysis I	Analyze the pin-jointed plane and space frames	✓			✓		✓			✓		
			Analyse the continuous beams and rigid frames by slope defection method				✓		✓			✓		
			Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway	✓	✓									✓
			Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method	✓										

Sem	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
			Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames	✔											
	22155C34P	Construction Materials And Practice	Identify the good quality brick, stone and blocks for construction	✔	✔	✔	✔					✔			
			Recognize the market forms of timber, steel, aluminum and applications of various composite materials		✔	✔									
			Identify the best construction and service practices such as thermal insulations and air conditioning of the building	✔			✔					✔			
			Select various equipments for construction works conditioning of building	✔											
			Understand the construction planning and scheduling techniques	✔											
	22155L35P	Soil Mechanics laboratory	Conduct tests to determine the index properties of soils	✔		✔			✔			✔			
			Determine the insitu density and compaction characteristics.			✔									
			Conduct tests to determine the compressibility, permeability and shear strength of soils	✔					✔			✔			
			Understand the various tests on Geosynthetics												
SEM 4	22155C41P	Design of Reinforced Concrete Structures-II	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	✔											
	22155C42P	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 three hinged, two hinged and fixed arches					✔		✔		✔	✔		
			Analyse the suspension bridges with stiffening girders	✔											
			AnalysHYDe rigid frames by approximate methods for gravity and horizontal loads							✔		✔			
	22155C43P	Environmental Engineering	An ability to estimate sewage generation and design sewer system including sewage pumping stations	✔	✔	✔	✔	✔							✔

SEM	Course Code	Course Name	Course Outcome												
			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.				✓	✓							
	22155E44BP	Water Resource Engineering	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									✓	✓		
			The students will know the basics of groundwater and hydraulics of subsurface flows	✓	✓										
	22155L45P	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	✓	✓							✓	✓		
SEM 5	22155C51P	Design of Steel Structures	Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connections, and determine their design strengths	✓	✓	✓	✓	✓							✓
			Select the most suitable section shape and size for tension and compression members and beams according to specific design criteria		✓	✓									✓
			Apply the principles, procedures and current code requirements to the analysis and design of steel tension members, columns, column bases and beams	✓	✓										
			Identify and compute the design loads on Industrial structures, and gantry girder						✓	✓					
			Find out ultimate load of steel beams and portal frames using plastic analysis	✓		✓									
	22155C52P	Foundation Engineering	Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation	✓	✓	✓	✓	✓						✓	✓
			Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications	✓		✓	✓								

Course Code	Course Name	Course Outcome												
						✓							✓	✓
		Graduate will demonstrate an ability to design combined footings and raft foundations, its component or process as per the needs and specifications													
		Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications.	✓	✓											
		Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications.		✓	✓								✓	✓
22155C53P	Waste Water Engineering	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission		✓	✓	✓	✓					✓		
		Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations						✓						
		Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and treatment process biological treatment process	✓						✓					
		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							✓		✓			
		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			✓	✓					✓			
22155E54BP	Transportation Engineering	Understand the fundamentals of ITS and its benefits	✓			✓								
		Gain knowledge on data collection using sensors and its applications		✓										
		Acquainted with the knowledge of ITS in Traffic Management	✓											
		Application of ITS in Transportation Planning												
		Able to gain knowledge on application of ITS in Logistics	✓											
22155L55P	Computer Aided Building Drawing Laboratory	Draft the plan, elevation and sectional view of the load bearing and framed buildings	✓											
		Draw the structural detailing of RCC elements												
		Draw the structural detailing of RCC water tanks, footings and retaining walls	✓											
		Draw the structural detailing of steel	✓				✓							

SEM	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11
			structures											
			Draft the structural detailing of Industrial structures					✔						
SEM 6	22155C61P	Estimation & Cost Evaluation	Gain knowledge on types of contracts	✔	✔	✔	✔	✔						✔
			Understand types of specifications, principles for report preparation, tender notices types				✔	✔						
			Rate Analysis for all Building works, canals, and Roads and Cost Estimate		✔									✔
			Estimate the quantities for buildings											✔
			Evaluate valuation for building and land	✔										
	22155C62P	Ground Water Hydrology	Define and list out the key drivers of hydrological processes and their integrated behaviour in catchments	✔	✔	✔	✔	✔				✔	✔	
			Apply the knowledge of hydrological processes to address basin characteristics, runoff and hydrograph				✔	✔				✔		
	2155C63P	Construction Project Management	To understand the overall and detailed planning of formwork	✔	✔		✔							
			To impart knowledge on formwork materials, accessories, pressures and labour requirement				✔							
			To develop the conceptual understanding of design, construction and erection of formwork	✔	✔									
			To impart the knowledge about different types of form work used for special structures											
			To understand the errors in design and judge the formwork failures through case studies				✔							
	22155E64CP	Airport & Harbours	Gain an insight on the planning and site selection of Airport Planning and design		✔	✔	✔	✔			✔			
			Knowledge on Design of various Airport components				✔							
			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				✔							
			Knowledge on various Environmental Regulations and Acts		✔	✔								
	22155L65P	Concrete &Transportation Engineering Laboratory	Characterize Pavement Aggregate through relevant test	✔	✔		✔							
			Ascertain the Quality of Bitumen				✔							
			Determine the Optimum Binder Content Using Marshall Method	✔	✔									
			Evaluate the Consistency and Properties of Bitumen											

SEM	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
			Determine the Bitumen Content in the Bituminous Mixes					✓							
SEM 7	22155S71P	Total Quality Management	Ability to apply TQM concepts in a selected enterprise	✓	✓				✓	✓					
			Ability to apply TQM principles in a selected enterprise												
			Ability to understand Six Sigma and apply Traditional tools, New tools, Benchmarking and FMEA	✓	✓										
			Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR						✓	✓					
			Ability to apply QMS and EMS in any organization												
	22155C72P	Housing, Planning & Management	To get maximum benefit from building and its services in terms of quality, timely completion and cost-effectiveness		✓		✓			✓		✓			
			To compile different aspects of Building Construction, Planning and Drawing of residential buildings & Public Building		✓					✓		✓			
	22155C73P	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.						✓						
	22155E74DP	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.			✓	✓								
	22155P75P	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.	✓	✓		✓								

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

M.TECH (F.T)- 2020R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	22248S11E	Advanced Engineering Mathematics	Application of Laplace and Fourier transforms to the initial value, initial–boundary value and boundary value problems in Partial Differential Equations			✓							
			Maximizing and minimizing the functions that occur in various branches of Engineering Disciplines.			✓				✓			
			Competently use tensor analysis as a tool in the field of applied sciences and related fields.			✓							
	22255C12	Quality Control &Assurance in Construction	To study the various aspects of quality control and asurance aspects of pharamaceutical	✓									✓
			Understanding of important parameters such as cgmp.qc tests,documentation,quality certifications,GLP and regulatory	✓									
			Scope of quality certifications applicable to pharamaceutical industries	✓									
			Responsible of QA & QC	✓									
	22255C13	Theory of Plasticity and Elasticity	Derive and write the fundamental equations of elasticity describing the linear behavior of elements and develop constitutive models based on material behavior	✓			✓	✓					
			Demonstrate the application of plane stress and plane strain in a given situation in both cartesian and polar coordinate systems	✓									

Code	Title	Course Outcome	1	2	3	4	5	6	7	8	9	10
		Solve torsion problems in circular and non-circular cross-sections		✓								
		Analyse beams resting on elastic foundations	✓									
		Solve analytically the simple boundary value problems with elasto-plastic and strain hardening properties			✓	✓						✓
22255C14	Structural Dynamics	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems	✓			✓	✓	✓				
		Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration										
		Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration										
		Explain the causes and effects of an earthquake										
		Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice				✓						✓
22255C15	Experimental Techniques	Do the mix proportion using IS and ACI codal provisions	✓	✓		✓	✓	✓		✓	✓	
		Test the concrete in a non-destructive manner using rebound hammer	✓									
		Know the permeability characteristics of concrete	✓									
		Observe the effect of mineral and chemical admixture in concrete	✓									
		Study the flow characteristics of self-compacting concrete	✓									
22255E16A	Prestressed Concrete Design	Identify the various methods of prestressing and estimate the loss	✓			✓	✓	✓				
		Design the beams for flexure, shear, bond and torsion	✓									
		Design the continuous beams and composite beams	✓									✓
		Design the water tank, piles and masts	✓									
		Analyze and design the prestressed concrete bridge	✓									

SEM	Code	Course	Course Outcome											
	22255L17	Core Practical (Computer Programming Lab)	Read, understand and trace the execution of programs written in C language	✓			✓	✓	✓					
			Write the C code for a given algorithm	✓										
			Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor	✓										
SEM 2	22255C21	Management Information System	Relate the basic concepts and technologies used in the field of management information systems			✓				✓				
			Compare the processes of developing and implementing information systems			✓								
			Outline the role of the ethical, social, and security issues of information systems			✓								✓
			Translate the role of information systems in organizations, the strategic management processes with the implications for the management											
			Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization							✓				
	22255C22	Finite Element Analysis	Formulate a finite element problem using basic mathematical principles	✓	✓									
			Explain the various types of elements and select the appropriate element for modelling		✓									✓
			Analyse a frame using truss element	✓	✓									
			Formulate and analyse the two- and three-dimensional solid finite element problems	✓	✓									
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM	✓	✓									
	22255C23	Advanced Concrete Structural Design	Explain the structural behaviour of flexural members and columns	✓	✓	✓	✓	✓						
			Design the compression members and construct interaction diagrams	✓										
			Design the special elements like corbels, deep beams and grid floors		✓									

Code	Course	Outcome	1	2	3	4	5	6	7	8	9	10	11	12
		Design flat slab and spandrel beams			✓									
		Predict the moment curvature behavior and design and detail concrete elements based on ductility	✓				✓							
22255E24 B	Advanced Concrete Technology	Develop knowledge on various materials needed for concrete manufacture	✓											
		Apply the rules to do mix designs for concrete by various methods	✓											
22255E25 C	Elements of Earthquake Engineering	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems							✓		✓			
		Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration	✓											✓
		Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration free and forced vibration							✓		✓			
		Explain the causes and effects of an earthquake	✓						✓					✓
22255L26	Core practical(Software Lab – Finite Element Analysis-ANSYS)	Formulate a finite element problem using basic mathematical principles	✓	✓		✓	✓	✓		✓				
		Analyse a frame using truss element		✓										
		Formulate and analyse the two- and three-dimensional solid finite element problems	✓				✓							
		Analyse shells, thick and thin plates and explain the dynamic analysis using FEM				✓				✓	✓			
		Explain the various types of elements and select the appropriate element for	✓											
222TECW R	Technical writing / Seminars	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.	✓		✓									

Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
SEM 3														
22255C31	Advanced Steel Structures	Design the steel members such as purlins, gable wind girders subjected to combined	✓											
		Explain and design different types of steel connections such as welded and bolted flexible as well as moment resisting connections	✓											
		Analyze and design industrial structures such as trusses and portal frames subjected to wind and seismic forces	✓											
		Explain the effect of axial force and shear force on steel structures and analyse continuous beams and frames using plastic theory	✓											
		Evaluate the behaviour and design of compression and flexural Cold-formed Steel members	✓											
22255E32C	A seismic Design of Structures	Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration	✓	✓		✓		✓			✓			
		Explain the causes and effects of an earthquake												✓
		Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice	✓											
22255E33A	Prefabricated Structures	commendations of IS codes of practice	✓			✓		✓			✓			
		Detail the different types of connection				✓		✓			✓			
		Design for stripping forces during manufacture	✓	✓										✓
		Determine the forces in shear walls	✓											
		Identify the different roof trusses used in industrial buildings	✓											
22255E34A	Offshore Structures	Develop the concept of wave theories	✓	✓	✓	✓					✓			
		Apply the knowledge of wave forces and offshore structures		✓	✓									
		Explain the modeling for offshore structure and its foundation	✓			✓					✓			

Sem	Course Code	Course Name	Course Outcome										
			Analyse offshore structures by means of static and dynamic methods	✔									
			Design of jacket towers, mooring cables and pipelines	✔									
	22255P35	Project Work Phase-I	Apply the knowledge gained from theoretical and practical courses in solving	✔		✔			✔		✔		
			Recognize the importance of literature review			✔							
			Develop a clear outline and methodology for the project	✔					✔		✔		
			Identify the potential research gap and list parameters to work with										
			Report and present the findings of the work conducted										
SEM 4	22255P41	Project Work Phase-II	Discover potential research areas in the field of Structural Engineering.	✔									
			Apply the knowledge gained from theoretical and practical courses to be creative	✔									
			Represent data acquired in graphical and reader-friendly formats	✔									
			Derive detailed conclusions from work carried out	✔									
			Report and present the findings of the work conducted	✔									

DEPARTMENT OF CIVIL ENGINEERING
1.1.1   - CO-PO-PSO MAPPING
M.TECH (P.T)- 2022R

Sem	Course Code	Title of the Course	COs	POS									
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
SEM 1	22248S11EP	Advanced Engineering Mathematics	Application of Laplace and Fourier transforms to the initial value, initial–boundary value and boundary value problems in Partial Differential Equations			✓							
			Maximizing and minimizing the functions that occur in various branches of Engineering Disciplines.			✓				✓			
			Competently use tensor analysis as a tool in the field of applied sciences and related fields.			✓							
	22255C12P	Quality Control &Assurance in Construction	To study the various aspects of quality control and asurance aspects of pharamaceutical	✓									✓
			Understanding of important parameters such as cgmp.qc tests,documentation,quality certifications,GLP and regulatory	✓									
			Scope of quality certifications applicable to pharamaceutical industries	✓									
			Responsible of QA & QC	✓									
	22255C13P	Theory of Plasticity and Elasticity	Derive and write the fundamental equations of elasticity describing the linear behavior of elements and develop constitutive models based on material behavior	✓			✓	✓					
			Demonstrate the application of plane stress and plane strain in a given situation in both cartesian and polar coordinate systems	✓									
			Solve torsion problems in circular and non-circular cross-sections		✓								

SEM	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10	11	12
			Analyse beams resting on elastic foundations	✓											
			Solve analytically the simple boundary value problems with elasto-plastic and strain hardening properties			✓	✓								✓
	22255L14P	Computer Programming Lab	Read, understand and trace the execution of programs written in C language	✓			✓	✓	✓						
			Write the C code for a given algorithm												
			Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor												
SEM 2	22255C21P	Management Information System	Relate the basic concepts and technologies used in the field of management information systems			✓					✓				
			Compare the processes of developing and implementing information systems			✓									
			Outline the role of the ethical, social, and security issues of information systems			✓									✓
			Translate the role of information systems in organizations, the strategic management processes with the implications for the management												
			Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization								✓				
	22255C22P	Finite Element Analysis	Formulate a finite element problem using basic mathematical principles	✓	✓										
			Explain the various types of elements and select the appropriate element for modelling		✓										✓
			Analyse a frame using truss element	✓	✓										
			Formulate and analyse the two- and three-dimensional solid finite element problems	✓	✓										
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM	✓	✓										

Sem	Course Code	Course	Course Outcome	1	2	3	4	5	6	7	8	9	10
	22255E23BP	Advanced Concrete Technology	Explain the structural behaviour of flexural members and columns	✓	✓	✓	✓	✓					
			Design the compression members and construct interaction diagrams	✓									
			Design the special elements like corbels, deep beams and grid floors		✓								
			Design flat slab and spandrel beams			✓							
			Predict the moment curvature behavior and design and detail concrete elements based on ductility	✓						✓			
	22255L24P	Software Lab – ANSYS	Formulate a finite element problem using basic mathematical principles	✓									
			Analyse a frame using truss element										
			Formulate and analyse the two- and three-dimensional solid finite element problems										
			Analyse shells, thick and thin plates and explain the dynamic analysis using FEM										
			Explain the various types of elements and select the appropriate element for	✓									
	222TECWRP	Technical Writing / Seminars	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.	✓									✓
SEM 3	22255C31P	Structural Dynamics	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems	✓									
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration	✓									
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration	✓									
			Explain the causes and effects of an earthquake	✓									

SEM	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10
			Design masonry and RC structures for the earthquake forces as per their commendations of IS codes of practice	✔									
	22255C32P	Maintenance and Rehabilitation of Structures	To learn various distress and damages to concrete and masonry structures	✔	✔		✔		✔		✔		
			To understand the importance of maintenance of structures	✔									
			To study the various types and properties of repair materials	✔									
			To asses the damage to structures using various tests										✔
			To learn the importance and methods of substrate preparation	✔									
	22255E33AP	Prestressed Concrete Design	Identify the various methods of prestressing and estimate the loss	✔			✔		✔		✔		
			Design the beams for flexure, shear, bond and torsion				✔		✔		✔		
			Design the continuous beams and composite beams	✔	✔								✔
			Design the water tank, piles and masts	✔									
			Analyze and design the prestressed concrete bridge	✔									
SEM 4	22255C41P	Advanced Concrete Structural design	Explain the structural behaviour of flexural members and columns	✔									
			Design the compression members and construct interaction diagrams	✔									
			Design the special elements like corbels, deep beams and grid floors	✔									
			Design flat slab and spandrel beams	✔									
			Predict the moment curvature behavior and design and detail concrete elements based on ductility	✔									
	22255C42P	Advanced Steel Structures	Design the steel members such as purlins, gable wind girders subjected to combined	✔			✔		✔		✔	✔	
			Explain and design different types of steel connections such as welded and bolted flexible as well as moment resisting connections										
			Analyze and design industrial structures such as trusses and portal frames subjected to wind and seismic forces				✔		✔		✔	✔	

Sem	Course Code	Course Name	Course Outcome	1	2	3	4	5	6	7	8	9	10
			Explain the effect of axial force and shear force on steel structures and analyse continuous beams and frames using plastic theory	✔									
			Evaluate the behaviour and design of compression and flexural Cold-formed Steel members						✔		✔		
	22255E43CP	Elements Of Earthquake Engineering	Do vibration analysis of system/structures with a single degree of freedom and can explain the method of damping the systems	✔	✔	✔	✔	✔					✔
			Do the dynamic analysis of system/structures with Multi degrees of freedom under free and forced vibration	✔	✔	✔							
			Derive a mathematical model of a continuous system and do a dynamic analysis under free and forced vibration free and forced vibration	✔	✔								
			Explain the causes and effects of an earthquake				✔	✔					
													✔
	22255P44P	Project Work Phase I	Apply the knowledge gained from theoretical and practical courses in solving	✔	✔		✔			✔	✔	✔	✔
			Recognize the importance of literature review							✔	✔		
			Develop a clear outline and methodology for the project	✔	✔								
			Identify the potential research gap and list parameters to work with				✔					✔	✔
			Report and present the findings of the work conducted	✔	✔								
SEM 5	22255E51AP	Experimental Stress Analysis	Explain the measurement of strain under static and dynamic loads	✔	✔	✔	✔	✔					✔
			Describe the Mechanical, optical, pneumatic and electrical strain gauges for strain measurement		✔	✔							✔
			Create awareness about the fixing of gauges and temperature effects in bonded gauges and measure of stress in stress gauges	✔	✔								
			Analysis of measuring circuits and strains of different strain gauge rosettes				✔	✔					
			Describe the measurements by using transducers and exciters.	✔		✔							

SEM	Code	Course	Course Outcome										
	22255E52AP	Prefabricated Structures	commendations of IS codes of practice	✔	✔	✔	✔	✔				✔	✔
			Detail the different types of connection	✔		✔	✔						
			Design for stripping forces during manufacture				✔					✔	✔
			Determine the forces in shear walls	✔	✔								
			Identify the different roof trusses used in industrial buildings		✔	✔						✔	✔
	22255E53AP	Offshore Structures	Develop the concept of wave theories			✔	✔	✔	✔		✔		
			Apply the knowledge of wave forces and offshore structures						✔				
			Explain the modeling for offshore structure and its foundation	✔						✔			
			Analyse offshore structures by means of static and dynamic methods							✔		✔	
			Design of jacket towers, mooring cables and pipelines			✔	✔				✔		
SEM 6	22255P61P	Project Work Phase II	Discover potential research areas in the field of Structural Engineering.	✔	✔	✔	✔	✔					✔
			Apply the knowledge gained from theoretical and practical courses to be creative			✔	✔						
			Represent data acquired in graphical and reader-friendly formats		✔								✔
			Derive detailed conclusions from work carried out										✔
			Report and present the findings of the work conducted	✔									