



R13 GRAND CO-PO-PSO MATRIX

R13101	ENGLISH-I	C01	An ability to read and comprehend English stories and texts												
		C02	ability to improve listening skills particularly related to technical English and to improve life skills												
		C03	An ability to critically respond in English to a real life situations and to speak in English without inhibition and grammar												
		C04	An ability to improve essential grammar necessary for English communication and to write effectively using appropriate format												
		C05	An ability to expand vocabulary range and use it effectively and respond to real life situations and An ability to transfer verbal information into nonverbal information and vice versa												
		C06	An ability to improve life skills and core skills necessary for effective communication												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01						2		2	3	3		3	2	
	C02						2		2	3	3		3	3	2
	C03						2		2	3	3		3		
	C04						2		2	3	3		3		2
	C05						2		2	3	3		3	3	
	C06						2		2	3	3		3	2	1

R13102	MATHEMATICS-I	C01	Able to solve first order ordinary Differential equations and their applications.												
		C02	Able to solve higher order ordinary differential equations												
		C03	Able to learn Laplace transforms and solve initial value problems in ordinary differential equations using Laplace transforms.												
		C04	Able to learn Partial differentiation												
		C05	Able to Solve first order partial differential equations												
		C06	Able to Solve higher order partial differential equations.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	3	2	1						3					
	C02	3	3	3						3					
	C03	2	3	3						2					
	C04	3	3	2						3					
	C05	3	3	3						2					
	C06	3	2	1						2					

R13104	ENGG.CHEMISTRY	CO1	Able to know about water used in industries (boilers etc.)and for drinking purposes and Apply modern methods of softening of hard water to avoid boiler troubles ,construction and working of lime soda process													
		CO2	Understanding the principles, Construction and working of galvanic cells, electrode potentials, concentration cells , rechargeable batteries and Analyze various types of fuel cells													
		CO3	Apply the knowledge of electro chemistry to corrosion, distinguish various types of corrosions and able to solve corrosion problems													
		CO4	Able to explain about synthesis, physical and mechanical properties, compounding and reframing & fabrication of polymers, plastics and elastomers and Applications of fibre reinforced polymers along with conducting polymers													
		CO5	Recognize specific characteristic properties of fuels including calorific value determination , Ranking and Analysis of coal by proximate and ultimate method													
		CO6	Use of advanced materials i.e.nano materials,liquid crystals, super conductors and Illustrate the applications of cleaner and greener synthetic methods adapt in industries for healthy living													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3		3		1			3	3	3	1	3	2	
		CO2	3		3		2			3	3	3	2	3	3	2
CO3	2		3		2			3	3	2	2	2				
CO4	3		2		1			3	3	1	2	3		2		
CO5	3		3		1			3	3	2	1	3	3			
CO6	3		3		1			3	2	1	2	3	2	1		

R13105	COMPUTER PROGRAMMING	CO1	Able to Design algorithmic solutions to problems and implementing algorithms inC.													
		CO2	Able to Illustrate branching, iteration and data representation using arrays.													
		CO3	Able to Implement modular programming and recursive solution formulation.													
		CO4	Able to Comprehend pointers and dynamic memory allocation.													
		CO5	Able to Implement user defined data types like structures and unions in C.													
		CO6	Able to Comprehend file operations.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	1	1	3	1	1								3	3
		CO2	2	2	2	2									3	2
CO3	2	2	3	2	2								3	2		
CO4	2	2	2	3	2								3	3		
CO5	1	2	3	2	2								3	2		
CO6	1	2	3	2	2								3	2		

	CO1	Able to Understand The concepts of the ecosystem												
	CO2	Able to Understand The natural resources and their importance												

R13106	ENVIRONMENTAL STUDIES	C03	Able to learn The biodiversity of India and the threats to biodiversity ,and Apply conservation practices													
		C04	Able to learn Various attributes of the pollution and their impacts													
		C05	Able to Understand Social issues both rural and urban environment													
		C06	Able to Understand About environmental Impact assessment and Evaluate the stages involved in EIA													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	3			3	2		3	3			3	2	2	
		C02	2			2	2		2	2			3	2	3	2
	C03	3			3	2		2	2			3	3			
	C04	2			3	2		2	2			3	3		2	
	C05	3			1	3		3	3			3	2	3		
	C06	3			3	3		3	3			2	2	2	1	

R13110	ENGG.MECHANICS	C01	Able to explain the concepts of force and friction, direction and its application.												
		C02	Able to explain the application of free body diagrams. Solution to problems using												
		C03	graphical methods and law of triangle of forces.												
		C04	Able to explain the concepts of centre of gravity.												
		C05	Able to explain the concepts, moment of inertia and polar moment of inertia including												
		C06	transfer methods and their applications.												
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
	C01	3	2	1						2				2	
	C02	2	2	1						2				3	2
	C03	2	1	1						2					
	C04	2	1	2						2					2
	C05	2	2	1						1				3	
	C06	3	2	1						1				2	1

R13111	ENGLISH COMMUNICATION SKILLS LAB-I	C01	Ability to analysis a topic of discussion & reading to it.												
		C02	Ability to participate in discussion & influence them.												
		C03	Ability to communicate ideas effectively.												
		C04	Ability to present opinions coherently within a stipulated time.												
		C05	Ability to speak clearly & coordinate with them.												
		C06	Ability to improve upon English language pronunciation.												
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
	C01						2		2	3	3		3	2	
	C02						2		2	3	3		3	3	2
	C03						2		2	3	3		3		
	C04						2		2	3	3		3		2
	C05						2		2	3	3		3	3	

E	C06					2		2	3	3		3	2	1
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R13115 ENGG. CHEMISTRY LABORATORY	C01	Able to understand water quality analysis.													
	C02	Able to understand significance of potentiometric & conductometric titrations.													
	C03	Able to analyze redoxometric titrations.													
	C04	Able to do quality analysis of cool drinks.													
	C05	Able to estimate amount of vitamin-c present in capsules.													
	C06	Able to determine concentration of unknown solutions by colorimeter.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	3		3		1			3	3	3	1	3	2	
	C02	3		3		2			3	3	3	2	3	3	2
	C03	2		3		2			3	3	2	2	2		
	C04	3		2		1			3	3	1	2	3		2
	C05	3		3		1			3	3	2	1	3	3	
	C06	3		3		1			3	2	1	2	3	2	1

R13116 C. PROGRAMMING LAB	C01	Able to Design solutions to the various problems in the field of computerscience.													
	C02	Able to Implement the concepts of arrays and strings.													
	C03	Ability to Analyze the concepts of modular programming and develop solutions.													
	C04	Able to Implement Programs with pointers and comprehend the dynamic memory allocation functions.													
	C05	Able to Develop programs that perform operations using derived data types													
	C06	Able to Implement programs for data transfers between files													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	1	1	3	1	1								3	3
	C02	2	2	2	2									3	2
	C03	2	2	3	2	2								3	2
	C04	2	2	2	3	2								3	3
	C05	1	2	3	2	2								3	2
	C06	1	2	3	2	2								3	2

ENGLISH-II	C01	An ability to read and comprehend English stories and texts												
	C02	ability to improve listening skills particularly related to technical English and to improve life skills												
	C03	An ability to critically respond in English to a real life situations and to speak in English without inhibition and grammar												
	C04	An ability to improve essential grammar necessary for English communication and to write effectively using appropriate format												

R13201	C05	An ability to expand vocabulary range and use it effectively and respond to real life situations													
	C06	An ability to improve life skills and core skills necessary for effective communication													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01						2		2	3	3		3	2	
	C02						2		2	3	3		3	3	2
	C03						2		2	3	3		3		
	C04						2		2	3	3		3		2
	C05						2		2	3	3		3	3	
	C06						2		2	3	3		3	2	1

R13202	MATHEMATICS-III	C01	An Ability to Solve the system of linear equations and Analyse their applications.													
		C02	An Ability to Compute an Eigen values and eigen vectors													
		C03	Evaluate double and Triple integrals and Apply to find surface area and volumes of solids.													
		C04	Able to Compare definite integral with special functions													
		C05	Able to Differentiate the scalar and vector functions.													
		C06	Able to Understand line, surface and volume integrals and Establish vector integral theorems.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
	C01	3	2	1						3				2		
	C02	3	3	3						3				3	2	
	C03	2	3	3						2						
	C04	3	3	2						3					2	
	C05	3	3	3						2				3		
	C06	3	2	1						2				2	1	

R13203	GG. PHYSICS	C01	Able to Design an instrument to enhance the resolution for its operation and Application in physical Optics.													
		C02	Able to Understand the concepts of Lasers as Non-linear coherent sources and the structure property relationship for materials.													
		C03	Able to Understand the concepts of Magnetic, Dielectric and Superconducting properties and their Applications in various fields.													
		C04	Able to Know the Designing aspects of Buildings using the concepts of acoustics and the Computation of velocity of EM waves.													
		C05	Able to Understand the Classical and Quantum aspects of sub-atomic world dominated by electron and its presence and the formation of energy bands in solids using Band- Theory.													

EN	CO6	Able to Know the Classification of Semiconductors and Apply their concepts in electronic transport Mechanism for LEDs, Photo conductors and solar cells.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	3	3	3	2	2			3					3	2
	C02	2	2	2	3	2			3					3	2
	C03	3	2	2	2	3			3						2
	C04	2	2	3	3	3			2					3	2
	C05	3	2	3	2	2			3					1	1
C06	3	3	2	2	1			3					2	1	

R13207	MATHEMATICS-II (MM)	CO1	Appropriate Numerical methods to find roots of algebraic & transcendental equations													
		CO2	Able to Understand the interpolation and extrapolation techniques													
		CO3	Able to Apply different numerical methods to Solve differential equations.													
		CO4	Interpret Fourier series analysis which is central to many applications in engineering apart													
		CO5	Able to Apply Fourier transforms to Evaluate improper integrals													
		CO6	Able to Solve the discrete model problems using Z-transforms													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
	C01	3	2	1						3				2		
	C02	3	3	3						3				3	2	
	C03	2	3	3						2						
	C04	3	3	2						3					2	
	C05	3	3	3						2				3		
C06	3	2	1						2				2	1		

R13208	PROFESSIONAL ETHICS & HUMAN VALUES	CO1	Able to introduce the basic philosophy of morals, values and ethics to the students that is relevant to resolving moral issues in engineering													
		CO2	Able to impart reasoning and analytical skills needed to apply ethical concepts to engineering decisions													
		CO3	Able to identify the moral issues involved in both management and engineering areas, and to provide an understanding of the interface between social, technological and natural environments													
		CO4	Able to understand the unethical errors committed by the engineers in the implementation of the engineering projects.													
		CO5	Able to minimize the occupational crimes in the corporate sector by the budding engineers and make them uncorrupted.													
		CO6	Able to Focus on intellectual property rights and ethical engineering.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
	C01	1			1	1			3			1	1	2	1	

P	C02	2			2	1			2			3	2	1	2
	C03	1			3	1			2			1	1	2	1
	C04	2			1	2			2			1	1		2
	C05	2			1	1			3			1	1		1
	C06	1			1	2			3			1	1	1	2

R13209	ENGG. DRAWING	C01	Able to understand different scales used in industry and draw various curves.													
		C02	Able to recognize principles of projections to draw orthographic projections.													
		C03	Able to interpret the projection principles to draw projections of straight lines.													
		C04	Able to understand the various ways to draw projection of planes.													
		C05	Able to draw projections of solids by applying principles of orthographic projections and isometric projections													
		C06	Able to convert isometric views into orthographic views and orthographic views to isometric views													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	3	3	2						1			1	1		
	C02	3	2	2						1			1	1	2	
	C03	3	2	2						1			1	1	2	
	C04	2	2	2						1			1	2	2	
	C05	2	2	3						1			1	3	1	
	C06	2	2	3						1			1	1	1	

R13213	ENGLISH-COMMUNICATION SKILLS LAB-II	C01	Ability to analysis a topic of discussion & reading to it.													
		C02	Ability to participate in discussion & influence them.													
		C03	Ability to communicate ideas effectively.													
		C04	Ability to present opinions coherently within a stipulated time.													
		C05	Ability to speak clearly & coordinate with them.													
		C06	Ability to improve upon English language pronunciation.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01							2		2	3	3		3	2	
	C02							2		2	3	3		3	3	2
	C03							2		2	3	3		3		
	C04							2		2	3	3		3		2
	C05							2		2	3	3		3	3	
	C06							2		2	3	3		3	2	1

	C01	Able to under stand basic knowledge fphysics &experimental experience like sound, acceleration &time.												
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R13214

ENGINEERING PHYSICS LAB

CO2	Able to understand basic electronics & experimental experience of electrical circuits.
CO3	Able to understand electromagnetism and experimental experience.
CO4	Able to understand the light properties & experimental experience of interference & diffraction.
CO5	Able to understand basic electronics & experimental experience of electrical circuits.
CO6	Able to understand electromagnetism and experimental experience.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3	3	2	2			3					3	2
C02	2	2	2	3	2			3					3	2
C03	3	2	2	2	3			3						2
C04	2	2	3	3	3			2					3	2
C05	3	2	3	2	2			3					1	1
C06	3	3	2	2	1			3					2	1

R13216

ENGINEERING WORKSHOP & IT WORKSHOP

CO1	To select suitable carpentry tools to prepare different types of joints.
CO2	To identify tools required in the fitting operation to perform joint preparations.
CO3	To understand the process of making different objects with thin sheets using proper tin smithytools.
CO4	To differentiate single phase, 3 phase wiring connections.
CO5	Identify the basic computer peripheral and gain sufficient knowledge on assembling and disassembling aPC.
CO6	Learn the installation procedure of Windows and Linux OS, Acquire knowledge on basic networking infrastructure and acquire knowledge on basics of internet and worldwide web.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3				2		2				3	2	
C02	3	3				2		2				3	3	2
C03	3	3				2		2				3		
C04	3	3				2		2				3		2
C05	3	3				2		2				3	3	
C06	3	3				2		2				3	2	1

EERING

CO1	Able to analyze the various electrical networks
CO2	Able to understand the operation of DC machines,3-point starter and conduct the swinburne`s and speed control Tests
CO3	Able to analyze the performance of Transformer

RT21011	ELECTRICAL & ELECTRONICS ENGINE	CO4	Able to explain the operation of Alternator and 3-phase induction Motor													
		CO5	Able to analyze the operation of half wave, Full wave rectifiers and OP-AMPs													
		CO6	Able to explain the single stage CE amplifier and concept of feedback amplifier													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		CO1	3	2	2										3	
		CO2	3	2	2	2		1						1	3	2
		CO3	3	2	3	2		1						1	2	3
CO4	2	2	2	2		1						1	2	2		
CO5	3	2	1	1									3	1		
CO6	3	2	1	1									1	1		

RT21012	PROBABILITY & STATISTICS	CO1	Able to Distinguish between random variables pertaining to discrete and continuous distribution system.												
		CO2	Able to Compute moments and moment generating functions of various distributions.												
		CO3	Able to Construct the probability distribution of a random variable, based as real-world situation,												
		CO4	Able to Apply and analyzing hypothesis testing in structure engineering decision and making												
		CO5	Able to Design and construct engineering experiments involving single factor and double factor												
		CO6	Able to Understand the role of statistical tools in quality improvement.												
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO1	3	3	1	2	1										
CO2	3	1	1												
CO3	3	3	3	3									2		
CO4	3	2	2	1										3	
CO5	3	2	2	3										3	
CO6	3	1	1	2											

T21013	OF MATERIALS- 1	CO1	To understand behavior of materials under loading and support conditions.												
		CO2	Identify maximum BM and SF under various loading conditions using BM and SFD.												
		CO3	Analyze bending stresses developed in beams due to various loadings.												
		CO4	Analyze shear stresses and able to draw distribution on various cross sections.												
		CO5	Analyze stresses across section of thin cylinders.												

R	STRENGTH	C06	Analyze stresses across section of thick cylinders.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	1	2								1			1	
		C02	2	2								2			2	2
		C03	3	2								1			2	
		C04	3	2								2			2	
		C05	2	2											2	
		C06	2	2								2			2	

RT21014	BUILDING MATERIALS AND CONSTRUCTION	C01	Know the knowledge of basic building materials and their importance.													
		C02	To Understand the course pattern in masonry construction including stone masonry and brick masonry.													
		C03	To know the importance of lime and cement, their usage and different types used in various constructions.													
		C04	To learn the importance of various building components.													
		C05	To know the different types of damp proofing materials, plastering, pointing, paints and varni:													
		C06	To understand the classification of aggregates, sieve analysis and moisture content usually required in building construction.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	2	2	1										2	
		C02	2	1												
		C03	2	1												
		C04	2												1	
		C05	2					2								
		C06	2	1												

RT21015	SURVEYING	C01	To demonstrate the basic surveying skills												
		C02	To use various surveying instruments.												
		C03	To perform different methods of surveying												
		C04	To apply geometric and trigonometric principles to basic surveying calculations.												
		C05	To compute various data required for various methods of surveying.												
		C06	To understand the different methods for calculation of areas and volumes of an irregular boundaries												

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2													2
C02	2			2	2									2
C03	3			2										2
C04	3			2										2
C05	3			2	3				1	2				3
C06	3				2									2

RT21016

FLUID MECHANICS

C01	To understand the influence of the fluid properties in static condition and dynamic motion.													
C02	To estimate hydrostatic forces on submersible hydraulic structures.													
C03	To understand and apply fundamental principles and equations like Eulers, Bernoulis and Momentum equations in analysis of fluid flows.													
C04	To understand behavior of fluids in Laminar and Turbulent conditions.													
C05	To measure the quantity of flow in pipes and tanks.													
C06	To find the impact of Boundary layer on the moving vehicles and estimate the fluid resistancy to the motion of the vehicles.													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2											2	
C02	3	2											2	
C03	3	2											2	
C04	3	2	2										2	
C05	3	2											2	
C06	3	2											2	

RT21017

SURVEYING FIELD WORK- 1

C01	Student should be able find the Elevations, Areas and volumes													
C02	Student should be able to follow the Principles of surveying for data collection and drawing techn													
C03	Student should be able to know the various surveying methods for various civil engineering projects													
C04	Student should be able to draw prepare plans and maps													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3				2	3		3	3	3	3	2	3	3
C02	2				3	3		3	3	2	3	2	2	3
C03	2				2	3		3	3	2	3	2	3	3
C04	2				2	3		3	3	3	3	2	2	3

C01	Able to conduct experiments, acquire data, analyze and interpret data													
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RT21018

STRENGTH OF MATERIALS LAB

CO2	Able to determine the behaviour of structural elements, such as bars, columns subjected to tension, compression, shear and torsion by means of experiments.
CO3	Able to determine the behaviour of simply supported, cantilever, continuous beams subjected to
CO4	Able to conduct experiments on tests like hardness test, spring test and impact test
CO5	Able to use the electrical resistance strain gauges

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		2	2				2				2	
CO2	3	2	3	2	2				2				2	
CO3	3	2	3	2	2				2				2	
CO4	3			2	2								2	
CO5	3	2		2	2									

RT22011

BUILDING PLANNING AND DRAWING

CO1	Implement various building bye laws during construction.
CO2	Design and planning various residential and commercial buildings.
CO3	Design and planning hospital and public buildings.
CO4	Understand the sign conventions and brick bonds and an ability to use them while construction of a building.
CO5	Planning and Drawing of building components.
CO6	Planning and Drawing of residential and public buildings.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2					2			2
CO2	2	2											2	3
CO3	2	2											2	3
CO4	2				3					2				
CO5	2				3					2			2	2
CO6	3	2	2		3					2			2	3

CO1	Able to Introduce Managerial Economics to engineering students, concepts of demand like law determinants.
CO2	Able to evaluate the student knowledge of production & cost estimation.
CO3	Able to introduce markets, theory of the firm and pricing policies in different markets.

RT22014	MEFA	CO4	Able to know the different forms of business organization and their merits and demerits of both public and private enterprises.												
		CO5	Able to understand the different accounting systems preparation of financial statements.												
		CO6	Able to understand the concepts of capital, capitalization techniques used to evaluate capital budgeting.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01						2		2	3	3		3	2	
	C02						2		2	3	3		3	3	2
	C03						2		2	3	3		3		
C04						2		2	3	3		3		2	
C05						2		2	3	3		3	3		
C06						2		2	3	3		3	2	1	

RT22013	STRENGTH OF MATERIALS- 2	CO1	Analyze Principal stresses and design the sections.												
		CO2	Analyze the stresses and design of shafts and springs.												
		CO3	Analyze the stresses in columns and struts subjected to different loading conditions.												
		CO4	Analyze direct and bending stresses and understand condition to avoid tension.												
		CO5	Understand centroidal principal axes and Analysis of sections in unsymmetrical bending.												
		CO6	Analyze forces in different types of trusses used in construction.												
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
C01	2	2	3							1			2	1	
C02	2	2	2							1			2	2	
C03	3	2	3										2	2	
C04	3	2	3							1			2		
C05	2	1								1			2		
C06	2	2								1			2	2	

RT22012	ICS AND HYDRAULIC MACHINERY	CO1	Student will be able to design and develop the empirical relationships involved in any Physical flow phenomenon in uniform open channel.												
		CO2	Knowledge regarding various theories dealing with the flow phenomenon of fluid in a non Uniform open channel.												
		CO3	Ability to use dimensional analysis in solving fluid problems and plan hydraulic similitude Studies.												
		CO4	Calculate forces and work done by a jet on fixed or moving plate and curved plates												
		CO5	Student will be able to design various components of turbines and study their Characteristics.												
		CO6	Understanding of basics of the hydro-machinery and the components, function and use of Different types of pumps and their characteristics.												

HYDRAUL	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
	C01	2	2	2										2	1
	C02	2												2	2
	C03				2	2								2	
	C04	2	2											2	
	C05	2	2	2										2	
	C06		2											2	

RT22015	CONCRETE TECHNOLOGY	C01	Understand the basic ingredients of concrete and their role in the production of concrete.												
		C02	Test fresh concrete properties.												
		C03	Test hardened concrete properties.												
		C04	Understand the behavior of concrete in various environments.												
		C05	Design concrete mix by BIS method.												
		C06	Familiarize the basic concepts of special concrete and their production & applications.												
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3		2	2			2				2	1		1	
C02	3	2	2	2							1	2	2	2	
C03	3	2	2	2							1	1	2	2	
C04	2	2	1	2											
C05	3	3	3				1				2	2	2	2	
C06	3		2				1				1	1	1		

RT22016	STRUCTURAL ANALYSIS- 1	C01	The student will be able to estimate the bending moment, shear force and deflections in Propped Cantilever beams.
		C02	The student will be able to estimate the bending moment, shear force and deflections in fixed beams. He will also be able to estimate the effects of sinking of supports and rotation of a supports.
		C03	The student will be able to estimate the bending moment, shear force and deflections in Continuous beams of different support conditions using Clapeyron's theorem of three moments. He will also be able to estimate the effect of sinking of supports.
		C04	The student can analyze the continuous beams using the slope deflection method which impart basic concepts for other methods of analysis to be discussed in next level analysis courses.
		C05	The student will be able to determine the shear force and bending moment in linear elastic systems using strain energy theorem. He will also be able to estimate the deflection in simple beams and pin jointed trusses using Castigliano's first theorem.
		C06	The student will be able to evaluate the maximum shear force and maximum bending moment in girders with and without using influence line diagrams. The student will also be able to analyze the Pratt and Warren trusses for moving loads.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2		1									2	
C02	3	2		1									2	
C03	3	2		1									2	
C04	3	2		1									2	
C05	3	2		1									2	
C06	3	2		1									2	

RT22017	FM & HM LAB	C01	Measure discharge in pipes												
		C02	Efficiency of turbines												
		C03	Efficiency of pumps												
		C04	Measure discharge in Notches												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
C01		2		2									2		
C02		2		2										2	
C03		2		2										2	
C04		2		2									2		

RT22018	CT LAB	C01	Outline the importance of testing of cement and its properties. Prove good understanding of concepts and their applications in the lab.												
		C02	Make conventional and Portland cement mixtures and evaluate their fresh and hardened properties by determining the initial and final setting times of Portland cement.												
		C03	Conduct lab experiments for determining the properties and the behavior of construction materials for the use in civil engineering construction												
		C04	Evaluate hardened properties of cement. Write the formal technical report & convey engineering message efficiently.												
		C05	Prepare concrete mixtures and evaluate their fresh and hardened properties. verify the assumptions made in the study of concept of workability and testing of concrete.												
		C06	Describe the properties of hardened concrete. Analyze and interpret laboratory test results. Have experience in writing technical reports and making presentations												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	1	2		3					1	1		2	1	1
	C02	1	2		3	1					1		2	1	1
C03		2		3	1					2		1	1	1	
C04	2	2	1	3	1					1		1	1	1	
C05	2	3		3	2				2	2		2	2	2	
C06	2	2		3	3					2		1	2	2	

RT22019	SURVEYING FIELD WORK- 2	CO1	Student should be able find the Elevations, Areas and volumes by indirect methods													
		CO2	Student should be able to follow the Principles of surveying for data collection and drawing techniques													
		CO3	Student should be able to know the various advanced methods for various civil engineering projec													
		CO4	Student should be able to prepare plans and maps													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	3				2	3		3	3	3	3	2	3	3	
	CO2	2				3	3		3	3	2	3	2	2	3	
	CO3	2				2	3		3	3	2	3	2	3	3	
CO4	2				2	3		3	3	3	3	2	2	3		

RT31014	ENGINEERING GEOLOGY	CO1	Know the importance of geology in civil engineering													
		CO2	Identify and study the minerals and rocks based on their physical properties													
		CO3	Understand the importance of various geological structures													
		CO4	Classify, monitor and measure the earthquake and Landslides													
		CO5	Analyze the ground conditions through geophysical investigations													
		CO6	To select a suitable site for dams, reservoirs and tunnels													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO1	2														
	CO2	3	2		2									2		
CO3	3	2	2		2								2			
CO4	2	3	2	2									2			
CO5	3	3	2	3	2								2			
CO6	2	2														

RT31014	ANALYSIS- 2	CO1	Visualize the effect of loads and/or reactions, support displacements and temperature on the structural response of 3 and 2 hinged arches.												
		CO2	Carryout lateral Load analysis of building frames for loadings using portal and cantilever methods.												
		CO3	Analyze Cable and Suspension Bridge structures												
		CO4	Annotate different types of structures and their potential and analyze those structures using Moment Distribution method.												

RT31012	STRUCTURAL ANAL	C05	Comment on the behavior of continuous beams with respect to different conditions and analyze using Kani's methods													
		C06	Differentiate Determinate and Indeterminate Structures and analyze the continuous beam using force method. Analyze the continuous beam using stiffness method including the support conditions.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	3	2	2										3	
		C02	3	2	2	2		1						1	3	2
		C03	3	2	3	2		1						1	2	3
		C04	2	2	2	2		1						1	2	2
		C05	3	2	1	1									3	1
		C06	3	2	1	1									1	1

RT31013	DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES	C01	Understand the basic concepts, design method and applications of design of reinforced concrete structures													
		C02	Graduates will demonstrate the difference between the singly and doubly reinforced concrete beams and their way of design with suitability of adopting and their advantages and disadvantages one over the other.													
		C03	Analyse & design the sections for shear and torsion in simply supported, continuous beam & ability to prepare detailing charts with relevant IS code requirements.													
		C04	Design of compression members under various loadings with relevant IS code provisions.													
		C05	Apply the fundamental concepts, techniques in analysis and design of footing.													
		C06	Graduates will demonstrate the ability differentiates the one way and two way slab. Their way of design and what are their advantages and disadvantages.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	3	3	2	2	1						1	2	3	2
		C02	3	3	3	3	1					2	3	1	3	2
		C03	3	3	3	3	2					2	3	1	3	2
C04	3	3	3	3	2					2	3	1	3	2		
C05	3	3	3	3	1					2	3	1	3	2		
C06	3	3	3	3	1					2	3	1	3	2		

	C01	The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships and understand the principles of compaction and its control.												
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RT31011

GEOTECHNICAL ENGINEERING - 1

CO2	The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
CO3	The student should be able to permeability and seepage of behaviour of soil for field problems.
CO4	The student should be able to know the different methods of soil stresses distributing in to ground surface.
CO5	The student should be able to compute and analyze the consolidation settlements
CO6	The student should be able to apply and identify shear strength parameters of soil for field conditions.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	2		2										2
C02	2	2		2										2
C03	2	2		2									2	
C04	2	2		2									1	
C05	2	2		2									2	2
C06	2	2		2										2

RT31015

TRANSPORTATION ENGINEERING- 1

CO1	Plan highway network for a given area.
CO2	Determine highway alignment and Design Highway geometrics
CO3	Prepare traffic management plans and Design Intersections
CO4	Judge the suitability of pavement materials
CO5	Design Flexible & Rigid Pavements
CO6	Know the process of Construction & Maintenance of a Highway

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	2			2					2			2	
C02	3	2	2	2						2			2	2
C03	2	2	2		1								2	
C04				2										2
C05	2	3		1									2	2
C06	1													

CO1	Understand the basics of Intellectual Property rights
CO2	Compare and contrast the different forms of intellectual property protection in terms of their key differences and similarities.

C06	3	2	1											
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RT32011	ENVIRONMENTAL ENGINEERING- 1	C01	Plan and design the water and distribution networks and sewerage systems.												
		C02	Identify the water source and select proper intake structure.												
		C03	Characterization of water.												
		C04	Select the appropriate appurtenances in the water supply.												
		C05	Selection of suitable treatment flow for raw water treatments												
		C06	Plan and design the water and distribution networks and sewerage systems.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	3	2											2	
	C02	2	3	3										2	2
	C03	1	3												
	C04	1	2	3				1						2	
	C05	2	3											2	
C06	2	2	3		2								2	2	

RT32015	TRANSPORTATION ENGINEERING- 2	C01	Understand the Function of various components of railway track												
		C02	Apply existing technologies to design, construction, and maintenance of railway physical facilities.												
		C03	Understand the classification of signals and preparation of traffic management plans.												
		C04	Apply design principles of airport geometrics and pavements.												
		C05	Design flexible, rigid pavement and sub-surface drainage.												
		C06	Understand the principles of planning, construction and maintenance of Docks and harbours.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	2													
	C02	3	3	2										3	2
	C03	3		3	2	3	2		2	2				2	2
	C04	2	2	2	2	2		2						2	2
	C05	2	3	3	2	2								3	2
C06	2				2										

OD	C01	Solve simple boundary value problems using Numerical technique of Finite element method												
	C02	Develop finite element formulation of one and two dimensional problems and solve them												
	C03	Assemble Stiffness matrices, Apply boundary conditions and solve for the displacements												
	C04	Compute Stresses and Strains and interpret the result.												

RT32016	FINITE ELEMENT METH	C05	Understand the application of Iso-Parametric formulation													
		C06	Learn finite element modeling techniques.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	3	2		2									3	1
		C02	3	2		2									2	1
		C03	3	2		2									2	1
		C04	2	2		2									2	1
		C05	2	2		2									2	1
		C06	2	2		2									1	1

RT32017	COMPUTER AIDED ENGINEERING DRAWING LAB	C01	Will be able to draw various views like Auxiliary views, Sections and Sectional views of Right Regular Solids													
		C02	Will be able to draw Isometric views for simple and compounds solids, and projection of													
		C03	Will be able to draw perspective view of plane figures and simple solids													
		C04	Will be able to use the draw and modify commands in Auto CAD to create 2D and 3D wire frame modelling													
		C05	Will be able to use the different view ports option in the Auto CAD software													
		C06	Will be able to draw isometric and orthographic projection of isometric projects using Auto CAD													
					PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		C01	1				2				1	2			2	2
		C02	1				2				1	2			2	2
		C03	1				2				1	2			2	2
		C04	1				2				1	2			2	2
		C05	1				2				1	2			2	2
		C06	1				3				1	2			2	2

RT32018	TION ENGINEERING LAB	C01	Characterize the pavement materials													
		C02	Perform quality control tests on pavements and pavement materials													
		C03	Conduct traffic studies for estimating traffic flow characteristics													
		C04	Estimate earth work from longitudinal and cross-section details													
		C05	Design grade intersections													

RT41012	PRESTRESSED CONCRETE	C01	Be able to understand the various terminology and requirements for prestressed concrete												
		C02	Understand different methods of prestressing and analysing the section under loading condition												
		C03	Estimate the effective prestress including the short and long term losses												
		C04	Analyze and design of prestressed concrete beams under flexure												
		C05	Analyze and design of prestressed concrete members under shear and torsion												
		C06	Be able to understand the transfer of prestress pre-tensioning and post tensioning members												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	1											1		2
C02	3									2				2	1
C03	3	3		1							1			2	1
C04	3	3	2	1	2			1	1	3	1	1	1	1	2
C05	3	3	2	1	2			1	1	3	1	1	1	1	2
C06	3	2	1	1	2			1	1		1	1	1	1	2

RT41013	CONSTRUCTION TECHNOLOGY AND MANAGEMENT	C01	To appreciate the importance of construction planning.												
		C02	To understand the concepts of CPM & PERT.												
		C03	To understand the functioning of Earth moving equipments.												
		C04	To understand the types of Earth moving equipments.												
		C05	To know the methods of production of aggregate products and concreting.												
		C06	To apply the knowledge to project management & construction techniques.												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2										3				
C02	2			2	2				2	3	3		2	2	
C03	2				2						2			2	
C04	2				2						2			2	
C05	2				2						2			2	
C06	2										2		2	2	

		C01	Be able to estimate irrigation water requirements
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RT41014 WATER RESOURCES ENGINEERING -2	C02	Design irrigation canals and canal network													
	C03	Be able to learn Design principals of different irrigation canal structures													
	C04	Be able to determine storage capacity and life of reservoir													
	C05	Analyse stability of gravity and earth dams													
	C06	Be able to learn Design principals of ogee spillways and energy dissipation works													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	3	2	2										2	1
	C02	3	2	2	2		1						1	2	2
	C03	3	2	3	2		1						1	2	2
	C04	2	2	2	2		1						1	2	1
	C05	3	2	1	1									3	3
	C06	3	2	1	1									2	2

RT41015 RS&GIS	C01	Understand the fundamental concepts of remote sensing and be familiar with ground, air and satellite based sensor platforms.													
	C02	Interpretation of satellite images visually and with help of digital image processing techniques.													
	C03	Understand the basic components of GIS.													
	C04	Create and input spatial data for GIS application.													
	C05	Apply RS and GIS concepts in different fields of civil engineering.													
	C06	Apply RS and GIS concepts in water resources engineering.													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	C01	2													
	C02	2	3												
	C03	2													
	C04	2													
	C05	3	3			3				2	2				2
	C06	3	3			2				2	2				2

RT41016 MMSA	C01	To identify the structure is determinate or indeterminate												
	C02	To identify suitable element stiffness matrix for a structural problem												
	C03	To perform analysis of continues beams using the stiffness method.												
	C04	To perform analysis multiple degree of freedom two dimensional problems using the stiffness method.												
	C05	To find technique for reducing bandwidth for global stiffness method												
	C06	To perform analysis multiple degree of freedom three dimensional problems using the stiffness method.												

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2											1	
C02	3	3	1		1								2	
C03	3	3		2						2		1	1	
C04	3	3		2						2		1	1	
C05	2	2		2	2								1	
C06	2	3		2						2		1	1	

RT41017

ENVIRONMENTAL ENGINEERING LAB

C01	Estimation of some important characteristics of water and wastewater in the laboratory													
C02	Draw some conclusion and decide whether the water is potable or not.													
C03	Decide whether the water body is polluted or not with reference to the state													
C04	Estimation of the strength of the sewage in terms of BOD and COD													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	2		2	2									2
C02	2	2		3		2				2		2		2
C03	2	2		2		2				2		2		2
C04	2			2	2									2

RT41018

GIS & CAD LAB

C01	Work comfortably on GIS software													
C02	Digitize & create thematic map and extract important features													
C03	To analyse and design of 2D and 3D frames.													
C04	To analyse and design retaining wall and simple towers													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2				2				2					
C02	3				2				2				1	

C03	3	1	1	3	3					3			3	3
C04	3	1	1	3	3					3			3	3

RT42021

ESTIMATING, SPECIFICATIONS AND CONTRACTS	C01	Be able to understand the principle of working out of quantities and apply the concepts in the practical areas and able to estimate the quantities of various items of work
	C02	Be able to analyze the rate for various items of work
	C03	Be able to estimate the earthwork for road, canal works and quantity of reinforcement and provide bar bending schedules
	C04	Be able to understand in detail about the contracts
	C05	Should be in a position to perform valuation of a building
	C06	Be able to estimate the various items of works in a building using both individual wall and centre line methods

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	1			1					1				1
C02	3	1			1			1		2				1
C03	2				1			1		2				1
C04	1				2			1		3	1		1	2
C05	1				2			1		2	1			1
C06	2				2			1		2	1		1	1

C01	Prepare EMP, EIS, and EIA report
C02	Identify the risks and impacts of a project and selection of appropriate methodology

RT42022	EIA&M	C03	Evaluation of the EIA report and Estimate the cost benefit ratio of a project													
		C04	Know the role of stakeholder and public hearing in the preparation of EIA													
		C05	To apply knowledge acquired to the process of environmental impact modeling and prediction as a design tool with application to a number of case studies													
		C06	Perform the screening and scoping of an EIA, based on existing requirements, evaluate the impacts and draw meaningful conclusions from the results of the EIA													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	2	1	1		1				1				1	
		C02	3	1	2		3			1	1			1		1
		C03	2		2	1	2			1					1	2
		C04	1		2	2	1			1		1	1			1
		C05	2	1	1	1	2		1	2	2	2	1	2	2	2
C06	2	1	1	1	2		1	1	2	2	1		1	1		
RT42023	EQRD	C01	Understand the fundamentals of engineering seismology.													
		C02	Acquaint with the principles in structural dynamics.													
		C03	Understand the SDOF systems.													
		C04	Compute equivalent lateral seismic loads.													
		C05	To suggest ductile design for beams and columns.													
		C06	To carry out a seismic design as per IS codal provisions.													
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
		C01	1	2												
		C02	2	2		1										1
		C03	3	3	1	2						2	1		1	1
C04	3	3	1							1			2	2		
C05	2	1	3							3	1	1	2	2		
C06	3	3	3	3	1				1	2	3	1	3	2		
		C01	Student will be able to know various distress and damage to concrete and masonry structures and their preventive measures including cracks.													
		C02	Student will be able to Carry out analysis using various NDT methods and evaluate structures.													
		C03	Student will be able to investigate failures and also the causes of failures in structures and repair of cracks.													
		C04	Student will be able to recognize the types and properties of repair materials etc, and their influence on concrete													

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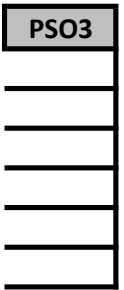
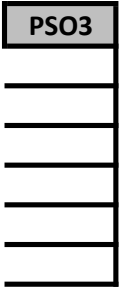
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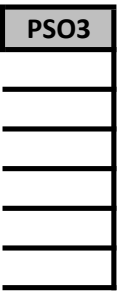
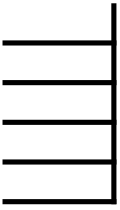
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