VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY
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NAAC Accredited with 'A' Grade, ISO 9001:2008 Certified,
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DEPARTMENT OF CIVIL ENGINEERING

R16 GRAND CO-PO-PSO MATRIX

R16101 ENGLISH-I

CO1	An ability to read and comprehend English stories and texts
CO2	ability to improve listening skills particularly related to technical English and to improve life skills
CO3	An ability to critically respond in English to a real life situations and to speak in English without inhibition and grammar
CO4	An ability to improve essential grammar necessary for English communication and to write effectively using appropriate format
CO5	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
CO6	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
CO1						2		2	3	3		3	2	
CO2						2		2	3	3		3	3	2
CO3						2		2	3	3		3		
CO4						2		2	3	3		3		2
CO5						2		2	3	3		3	3	
CO6						2		2	3	3		3	2	1

R16102 MATHEMATICS-I

CO1	Able to solve first order ordinary Differential equations and their applications.
CO2	Able to solve higher order ordinary differential equations
CO3	Able to learn Laplace transforms and solve initial value problems in ordinary differential equations using Laplace transforms.
CO4	Able to learn Partial differentiation
CO5	Able to Solve first order partial differential equations
CO6	Able to Solve higher order partial differential equations.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1						3					
CO2	3	3	3						3					
CO3	2	3	3						2					
CO4	3	3	2						3					
CO5	3	3	3						2					
CO6	3	2	1						2					

R16104 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
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

R16105 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
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

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

R16106 ENVIRONMENTAL STUDIES

CO3	Able to learn The biodiversity of India and the threats to biodiversity ,and Apply conservation practices
CO4	Able to learn Various attributes of the pollution and their impacts
CO5	Able to Understand Social issues both rural and urban environment
CO6	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

R16110 ENGG.MECHANICS

CO1	Able to explain the concepts of force and friction, direction and its application.
CO2	Able to explain the application of free body diagrams. Solution to problems using
CO3	graphical methods and law of triangle of forces.
CO4	Able to explain the concepts of centre of gravity.
CO5	Able to explain the concepts, moment of inertia and polar moment of inertia including
CO6	transfer methods and their applications.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

R16111 ENGLISH COMMUNICATION SKILLS LAB-I

CO1	Ability to analysis a topic of discussion & reading to it.
CO2	Ability to participate in discussion & influence them.
CO3	Ability to communicate ideas effectively.
CO4	Ability to present opinions coherently within a stipulated time.
CO5	Ability to speak clearly & coordinate with them.
CO6	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	

E	CO6						2		2	3	3		3	2	1

R16115 — ENGG.CHEMISTRY LABORATORY

CO1	Able to understand water quality analysis.
CO2	Able to understand significance of potentiometric &conductometric titrations.
CO3	Able to analyze redoxometric titrations.
CO4	Able to do quality analysis of cool drinks.
CO5	Able to estimate amount of vitamin-c present in capsules.
CO6	Able to determine concentration of unknown solutions by colorimeter.

	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

R16116 — C.PROGRAMMING LAB

CO1	Able to Design solutions to the various problems in the field of computerscience.
CO2	Able to Implement the concepts of arrays and strings.
CO3	Ability to Analyze the concepts of modular programming and develop solutions.
CO4	Able to Implement Programs with pointers and comprehend the dynamic memory allocation functions.
CO5	Able to Develop programs that perform operations using derived data types
CO6	Able to Implement programs for data transfers between files

	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

ENGLISH-II

CO1	An ability to read and comprehend English stories and texts
CO2	ability to improve listening skills particularly related to technical English and to improve life skills
CO3	An ability to critically respond in English to a real life situations and to speak in English without inhibition and grammar
CO4	An ability to improve essential grammar necessary for English communication and to write effectively using appropriate format

R16201

CO5	An ability to expand vocabulary range and use it effectively and respond to real life situations
CO6	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
CO1						2		2	3	3		3	2	
CO2						2		2	3	3		3	3	2
CO3						2		2	3	3		3		
CO4						2		2	3	3		3		2
CO5						2		2	3	3		3	3	
CO6						2		2	3	3		3	2	1

R16202 MATHEMATICS-III

CO1	An Ability to Solve the system of linear equations and Analyse their applications.
CO2	An Ability to Compute an Eigen values and eigen vectors
CO3	Evaluate double and Triple integrals and Apply to find surface area and volumes of solids.
CO4	Able to Compare definite integral with special functions
CO5	Able to Differentiate the scalar and vector functions.
CO6	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
CO1	3	2	1						3				2	
CO2	3	3	3						3				3	2
CO3	2	3	3						2					
CO4	3	3	2						3					2
CO5	3	3	3						2				3	
CO6	3	2	1						2				2	1

R16203 GG. PHYSICS

CO1	Able to Design an instrument to enhance the resolution for its operation and Application in physical Optics.
CO2	Able to Understand the concepts of Lasers as Non-linear coherent sources and the structure property relationship for materials.
CO3	Able to Understand the concepts of Magnetic, Dielectric and Superconducting properties and their Applications in various fields.
CO4	Able to Know the Designing aspects of Buildings using the concepts of acoustics and the Computation of velocity of EM waves.
CO5	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.

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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
CO1	3	3	3	2	2			3					3	2
CO2	2	2	2	3	2			3					3	2
CO3	3	2	2	2	3			3						2
CO4	2	2	3	3	3			2					3	2
CO5	3	2	3	2	2			3					1	1
CO6	3	3	2	2	1			3					2	1

R16207

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
CO1	3	2	1						3				2	
CO2	3	3	3						3				3	2
CO3	2	3	3						2					
CO4	3	3	2						3					2
CO5	3	3	3						2				3	
CO6	3	2	1						2				2	1

R16208

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
CO1	1			1	1			3			1	1	2	1

P	CO2	2			2	1			2			3	2	1	2
	CO3	1			3	1			2			1	1	2	1
	CO4	2			1	2			2			1	1		2
	CO5	2			1	1			3			1	1		1
	CO6	1			1	2			3			1	1	1	2

R16209 — ENGG. DRAWING

CO1	Able to understand different scales used in industry and draw various curves.
CO2	Able to recognize principles of projections to draw orthographic projections.
CO3	Able to interpret the projection principles to draw projections of straight lines.
CO4	Able to understand the various ways to draw projection of planes.
CO5	Able to draw projections of solids by applying principles of orthographic projections and isometric projections
CO6	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
CO1	3	3	2						1			1	1	
CO2	3	2	2						1			1	1	2
CO3	3	2	2						1			1	1	2
CO4	2	2	2						1			1	2	2
CO5	2	2	3						1			1	3	1
CO6	2	2	3						1			1	1	1

R16213 — ENGLISH-COMMUNICATION SKILLS LAB-II

CO1	Ability to analysis a topic of discussion & reading to it.
CO2	Ability to participate in discussion & influence them.
CO3	Ability to communicate ideas effectively.
CO4	Ability to present opinions coherently within a stipulated time.
CO5	Ability to speak clearly & coordinate with them.
CO6	Ability to improve upon English language pronunciation.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						2		2	3	3		3	2	
CO2						2		2	3	3		3	3	2
CO3						2		2	3	3		3		
CO4						2		2	3	3		3		2
CO5						2		2	3	3		3	3	
CO6						2		2	3	3		3	2	1

CO1	Able to under stand basic knowledge fphysics &experimental experience like sound, acceleration &time.

R16214 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
CO1	3	3	3	2	2			3					3	2
CO2	2	2	2	3	2			3					3	2
CO3	3	2	2	2	3			3						2
CO4	2	2	3	3	3			2					3	2
CO5	3	2	3	2	2			3					1	1
CO6	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
CO1	3	3				2		2				3	2	
CO2	3	3				2		2				3	3	2
CO3	3	3				2		2				3		
CO4	3	3				2		2				3		2
CO5	3	3				2		2				3	3	
CO6	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 ENGIN

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	PSO2
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.

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STRENGTH

CO6	Analyze stresses across section of thick cylinders.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2								1			1	
CO2	2	2								2			2	2
CO3	3	2								1			2	
CO4	3	2								2			2	
CO5	2	2											2	
CO6	2	2								2			2	

RT21014

BUILDING MATERIALS AND CONSTRUCTION

CO1	Know the knowledge of basic building materials and their importance.
CO2	To Understand the course pattern in masonry construction including stone masonry and brick masonry.
CO3	To know the importance of lime and cement, their usage and different types used in various constructions.
CO4	To learn the importance of various building components.
CO5	To know the different types of damp proofing materials, plastering, pointing, paints and varnis
CO6	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
CO1	2	2	1										2	
CO2	2	1												
CO3	2	1												
CO4	2												1	
CO5	2					2								
CO6	2	1												

RT21015

URVEYING

CO1	To demonstrate the basic surveying skills
CO2	To use various surveying instruments.
CO3	To perform different methods of surveying
CO4	To apply geometric and trigonometric principles to basic surveying calculations.
CO5	To compute various data required for various methods of surveying.
CO6	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
CO1	2													2
CO2	2			2	2									2
CO3	3			2										2
CO4	3			2										2
CO5	3			2	3				1	2				3
CO6	3				2									2

RT21016 FLUID MECHANICS

CO1	To understand the influence of the fluid properties in static condition and dynamic motion.
CO2	To estimate hydrostatic forces on submersible hydraulic structures.
CO3	To understand and apply fundamental principles and equations like Eulers, Bernoulis and Momentum equations in analysis of fluid flows.
CO4	To understand behavior of fluids in Laminar and Turbulent conditions.
CO5	To measure the quantity of flow in pipes and tanks.
CO6	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
CO1	3	2											2	
CO2	3	2											2	
CO3	3	2											2	
CO4	3	2	2										2	
CO5	3	2											2	
CO6	3	2											2	

RT21017 SURVEYING FIELD WORK- 1

CO1	Student should be able find the Elevations, Areas and volumes
CO2	Student should be able to follow the Principles of surveying for data collection and drawing techn
CO3	Student should be able to know the various surveying methods for various civil engineering projects
CO4	Student should be able to draw 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

CO1	Able to conduct experiments, acquire data, analyze and interpret data

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 experimtens.
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

	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		
CO4						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	PSO2
C01	2	2	3							1			2	1
C02	2	2	2							1			2	2
C03	3	2	3										2	2
CO4	3	2	3							1			2	
C05	2	1								1			2	
C06	2	2								1			2	2

RT22012 AULICS 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.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

HYDR														
	CO1	2	2	2									2	1
	CO2	2											2	2
	CO3				2	2							2	
	CO4	2	2										2	
	CO5	2	2	2									2	
	CO6		2										2	

RT22015 — CONCRETE TECHNOLOGY

CO1	Understand the basic ingredients of concrete and their role in the production of concrete.
CO2	Test fresh concrete properties.
CO3	Test hardened concrete properties.
CO4	Understand the behavior of concrete in various environments.
CO5	Design concrete mix by BIS method.
CO6	Familiarize the basic concepts of special concrete and their production & applications.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2	2			2				2	1		1
CO2	3	2	2	2							1	2	2	2
CO3	3	2	2	2							1	1	2	2
CO4	2	2	1	2										
CO5	3	3	3				1				2	2	2	2
CO6	3		2				1				1	1	1	

RT22016 — STRUCTURUAL ANALYSIS- 1

CO1	The student will be able to estimate the bending moment, shear force and deflections in Propped Cantilever beams.
CO2	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.
CO3	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.
CO4	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.
CO5	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.
CO6	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

CO1	3	2		1									2	
CO2	3	2		1									2	
CO3	3	2		1									2	
CO4	3	2		1									2	
CO5	3	2		1									2	
CO6	3	2		1									2	

RT22017 FM & HM LAB

CO1	Measure discharge in pipes
CO2	Efficiency of turbines
CO3	Efficiency of pumps
CO4	Measure discharge in Notches

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

RT22018 CT LAB

CO1	Outline the importance of testing of cement and its properties. Prove good understanding of concepts and their applications in the lab.
CO2	Make conventional and Portland cement mixtures and evaluate their fresh and hardened properties by determining the initial and final setting times of Portland cement.
CO3	Conduct lab experiments for determining the properties and the behavior of construction materials for the use in civil engineering construction
CO4	Evaluate hardened properties of cement. Write the formal technical report & convey engineering message efficiently.
CO5	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.
CO6	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
CO1	1	2		3					1	1		2	1	1
CO2	1	2		3	1					1		2	1	1
CO3		2		3	1					2		1	1	1
CO4	2	2	1	3	1					1		1	1	1
CO5	2	3		3	2				2	2		2	2	2
CO6	2	2		3	3					2		1	2	2

CO1	Student should be able find the Elevations, Areas and volumes by indirect methods

RT22019

SURVEYING FIELD WORK- 2

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												

T31012

UAL 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.
CO5	Comment on the behavior of continuous beams with respect to different conditions and analyze using Kani's methods

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CO6	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
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

RT31013

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES

CO1	Understand the basic concepts, design method and applications of design of reinforced concrete structures
CO2	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.
CO3	Analyse & design the sections for shear and torsion in simply supported, continuous beam & ability to prepare detailing charts with relevant IS code requirements.
CO4	Design of compression members under various loadings with relevant IS code provisions.
CO5	Apply the fundamental concepts, techniques in analysis and design of footing.
CO6	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
CO1	3	3	2	2	1						1	2	3	2
CO2	3	3	3	3	1					2	3	1	3	2
CO3	3	3	3	3	2					2	3	1	3	2
CO4	3	3	3	3	2					2	3	1	3	2
CO5	3	3	3	3	1					2	3	1	3	2
CO6	3	3	3	3	1					2	3	1	3	2

NG - 1

CO1	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.
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.

RT31011 GEOTECHNICAL ENGINEERI

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	
CO4	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	
CO4				2										2
C05	2	3		1									2	2
C06	1													

URCES

CO1	Understand the use and application of different fuel types and characteristics.
CO2	Understand the solar photo-voltaic conversion and working principles.
CO3	Understand Bio-mass form of energy, it's performance characteristics and about different types of Bio-mass plants.
CO4	Enable students to understand the basic principles of hydrogen energy and thermo-chemical production.

RT31016 ALTERNATIVE ENERGY SO

CO5	Know the various factors to be considered in hydrogen fuel usage and it's performance. Design factors and study of future possibilities of electric vehicles.
CO6	Understand the different types of turbines and design of turbochargers for automobiles.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1					1							1	
CO2	2					2	1						1	1
CO3	2	2		2		1		1						2
CO4	1	1		1		1				1				
CO5	1	1		1		1				1			1	2
CO6	1						1						1	2

RT31017 GEOTECHNICAL ENGINEERING LAB

CO1	Determine differential free swell index of soil, Grain size distribution and classify them and specific gravity of soil.
CO2	Determine Atterberg limits of soil.
CO3	Determine Compaction characteristics of soil for both laboratory and Field point of view.
CO4	Determine shear strength parameters of soil.
CO5	Determine CBR value of soil.
CO6	Determine permeability and Consolidation of soil.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2		2					2	2			1	
CO2	2	1		1						1				
CO3	2	1		2						2			2	1
CO4	2	2		2						2			2	1
CO5	2	2		2						1			2	1
CO6	2	2		2						2			2	1

RT31018 ENGINEERING GEOLOGY LAB

CO1	Identify Mega-scopic minerals & their properties.
CO2	Identify Mega-scopic rocks & their properties
CO3	Identify the site parameters such as contour, slope & aspect for
CO4	Know the occurrence of materials using the strike & dip problems.

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

CO4	3	2		3	1					3			2	2

RT31019 GROUND WATER DEVELOPMENT

CO1	Estimate aquifer parameters and yield of wells
CO2	Analyse radial flow towards wells in confined and unconfined aquifers
CO3	Design wells and understand the construction practices.
CO4	Interpret geophysical exploration data for scientific source finding of aquifers.
CO5	Determine the process of artificial recharge for increasing groundwater potential
CO6	Apply appropriate measures for groundwater management

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3											1	
C02	3	2	2										1	
C03	3	3	2											
CO4	3	3	2											
C05	3	3												
C06	3	2	1											

RT32013 DESIGN AND DRAWING OF STEEL STRUCTURES

CO1	Analyze and design simple fillet / butt welded connections and moment resistant fillet welded connections. Gain basic knowledge of bolted and riveted connections.
CO2	Analyze and design laterally supported / unsupported beams with detailing.
CO3	Design tension / compression members. Carryout analysis, design and detailing of various components of Tubular Roof Trusses subjected to dead, live and wind loads as per relevant IS codes.
CO4	Design Laced / Battened Built – up Columns and Column Splices with detailing.
CO5	Analyze and design slab base / gusseted base column foundations with detailing
CO6	Carryout analysis, design and detailing of Plate Girder and Gantry Girder.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	3										2	3	2
C02	2	3								2			2	2
C03	2	3	3							2			3	2
CO4	2	3	2							2			2	2
C05	2	3	2							2			2	2
C06	2	3	3							2		2	3	2

CO1	Recognize the importance of site investigation and ground exploration.
CO2	Analyze infinite and finite slopes and their stability and estimation of earth pressures.

RT32012 GEOTECHNICAL ENGINEERING- 2

CO3	Understand types of shallow foundations and able to compute bearing capacities.
CO4	Compute the magnitude of foundation settlement and design based on settlement.
CO5	Analyze and design the piles on different soils.
CO6	Understand types of wells, components and able to Design and construction of wells.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	2	2								1				2
C02	2	2								1			2	
C03	2	2								1			2	2
CO4	3	2											2	1
C05	2	2								2			2	2
C06	2	2								2			2	

RT32014 WATER RESOURCES ENGINEERING -1

CO1	Be able to quantify the major sources of precipitation and Develop Intensity – Duration-Frequency curve & Depth – Area Duration curves and carry out rainfall frequency analysis
CO2	Be able to quantify various abstractions and apply the concepts to several practical areas of engineering hydrology
CO3	Be able to quantify the runoff and Develop Unit Hydrographs and Synthetic Unit Hydrograph
CO4	Be able to estimate flood magnitude and carry out flood routing
CO5	Be able to determine aquifer parameters and yield of wells
CO6	Be able to model hydrologic processes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C01	3	3											1	
C02	3	2	2										1	
C03	3	3	2											
CO4	3	3	2											
C05	3	3												
C06	3	2	1											

G- 1

CO1	Plan and design the water and distribution networks and sewerage systems.
CO2	Identify the water source and select proper intake structure.
CO3	Characterization of water.

RT32011 ENVIRONMENTAL ENGINEERIN

CO4	Select the appropriate appurtenances in the water supply.
CO5	Selection of suitable treatment flow for raw water treatments
CO6	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
CO1	3	2											2	
CO2	2	3	3										2	2
CO3	1	3												
CO4	1	2	3				1						2	
CO5	2	3											2	
CO6	2	2	3		2								2	2

RT32015 TRANSPORTATION ENGINEERING- 2

CO1	Understand the Function of various components of railway track
CO2	Apply existing technologies to design, construction, and maintenance of railway physical facilities.
CO3	Understand the classification of signals and preparation of traffic management plans.
CO4	Apply design principles of airport geometrics and pavements.
CO5	Design flexible, rigid pavement and sub-surface drainage.
CO6	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
CO1	2													
CO2	3	3	2										3	2
CO3	3		3	2	3	2		2	2				2	2
CO4	2	2	2	2	2		2						2	2
CO5	2	3	3	2	2								3	2
CO6	2				2									

2016 ENT METHOD

CO1	Solve simple boundary value problems using Numerical technique of Finite element method
CO2	Develop finite element formulation of one and two dimensional problems and solve them
CO3	Assemble Stiffness matrices, Apply boundary conditions and solve for the displacements
CO4	Compute Stresses and Strains and interpret the result.
CO5	Understand the application of Iso-Parametric formulation

RT3

FINITE ELEME

CO6	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
CO4	2	2		2									2	1
C05	2	2		2									2	1
C06	2	2		2									1	1

RT32017

COMPUTER AIDED ENGINEERING DRAWING LAB

CO1	Will be able to draw various views like Auxiliary Views: Sections and Sectional Views of Right Regular Solids
CO2	Will be able to draw Isometric views for simple and compounds solids, and projection of
CO3	Will be able to draw perspective view of plane figures and simple solids
CO4	Will be able to use the draw and modify commands in Auto CAD to create 2D and 3D wire frame modelling
CO5	Will be able to use the different view ports option in the Auto CAD software
CO6	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	PSO1	PSO2
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

NSPORTATION ENGINEERING LAB

CO1	Characterize the pavement materials
CO2	Perform quality control tests on pavements and pavement materials
CO3	Conduct traffic studies for estimating traffic flow characteristics
CO4	Estimate earth work from longitudinal and cross-section details
CO5	Design grade intersections

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

TRA														
CO3	2	2		2	1	2								
CO4	2	1		2	2	1								2
CO5	2	2		3	2	1								1

RT32019 — **MANAGEMENT SCIENCE**

CO1	Should be able to Understanding basics of management & organization.
CO2	Should be able to Remembering principles of management and applying the concepts to improve productivity
CO3	Should be able to Analyze the functions of HRM and marketing
CO4	Should be able to Applying PERT & CPM techniques to solve project management problems.
CO5	Should be able to Evaluating SWOT Analysis for formulating and implementing strategies.
CO6	Should be able to Creating awareness about modern or contemporary management practices.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1											1	1
CO2	1	1	1					1	1	1	1		1	1
CO3	1	1			1								1	1
CO4		1	2		2				1	1	1		1	1
CO5	1	1			1			1	2	1	1		1	2
CO6	1	1											1	2

RT41011 — **ENVIRONMENTAL ENGINEERING- 2**

CO1	Able to proposal of system of sanitation and type of sewerage system for different towns/cities.
CO2	Plan and layout of sewerage system.
CO3	Select appropriate sewer appurtenances in sewerage system.
CO4	Characterization of sewage generated from various sources.
CO5	Propose suitable sewage treatment units for the treatment of sewage and layout of sewage treatment plant.
CO6	Characterization, handling and treatment of sewage sludge and its disposal.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1											3	
CO2	2	2				2	2							2
CO3	2	2					2							
CO4	1	2		2										3
CO5		3	2			1	1						2	
CO6	2	2					1						3	

CO1	Be able to understand the various terminology and requirements for prestressed concrete

RT41012 PRESTRESSED CONCRETE

CO2	Understand different methods of prestressing and analysing the section under loading condition
CO3	Estimate the effective prestress including the short and long term losses
CO4	Analyze and design of prestressed concrete beams under flexure
CO5	Analyze and design of prestressed concrete members under shear and torsion
CO6	Be able to understand the transfer of presterss pre-tensioning and post tensioning members

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1										1		2
CO2	3									2			2	1
CO3	3	3		1						1			2	1
CO4	3	3	2	1	2			1	1	3	1	1	1	2
CO5	3	3	2	1	2			1	1	3	1	1	1	2
CO6	3	2	1	1	2			1	1		1	1	1	2

RT41013 CONSTRUCTION TECHNOLOGY AND MANAGEMENT

CO1	To appreciate the importance of construction planning.
CO2	To understand the concepts of CPM & PERT.
CO3	To understand the functioning of Earth moving equipments.
CO4	To understand the types of Earth moving equipments.
CO5	To know the methods of production of aggregate products and concreting.
CO6	To apply the knowledge to project management & construction techniques.

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

IEERING -2

CO1	Be able to estimate irrigation water requirements
CO2	Design irrigation canals and canal network
CO3	Be able to learn Design principals of different irrigation canal structures
CO4	Be able to determine storage capacity and life of reservoir

RT41014 WATER RESOURCES ENGIN

CO5	Analyse stability of gravity and earth dams
CO6	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
CO1	3	2	2										2	1
CO2	3	2	2	2		1						1	2	2
CO3	3	2	3	2		1						1	2	2
CO4	2	2	2	2		1						1	2	1
CO5	3	2	1	1									3	3
CO6	3	2	1	1									2	2

RT41015 RS&GIS

CO1	Understand the fundamental concepts of remote sensing and be familiar with ground, air and satellite based sensor platforms.
CO2	Interpretation of satellite images visually and with help of digital image processing techniques.
CO3	Understand the basic components of GIS.
CO4	Create and input spatial data for GIS application.
CO5	Apply RS and GIS concepts in different fields of civil engineering.
CO6	Apply RS and GIS concepts in water resources engineering.

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

RT41016 MMSA

CO1	To identify the structure is determinate or indeterminate
CO2	To identify suitable element stiffness matrix for a structural problem
CO3	To perform analysis of continues beams using the stiffness method.
CO4	To perform analysis multiple degree of freedom two dimensional problems using the stiffness method.
CO5	To find technique for reducing bandwidth for global stiffness method
CO6	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
CO1	3	2											1	

CO2	3	3	1		1								2	
CO3	3	3		2						2		1	1	
CO4	3	3		2						2		1	1	
CO5	2	2		2	2								1	
CO6	2	3		2						2		1	1	

RT41017 ENVIRONMENTAL ENGINEERING LAB

CO1	Estimation of some important characteristics of water and wastewater in the laboratory
CO2	Draw some conclusion and decide whether the water is potable or not.
CO3	Decide whether the water body is polluted or not with reference to the state
CO4	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
CO1	3	2		2	2									2
CO2	2	2		3		2				2		2		2
CO3	2	2		2		2				2		2		2
CO4	2			2	2									2

RT41018 GIS & CAD LAB

CO1	Work comfortably on GIS software
CO2	Digitize & create thematic map and extract important features
CO3	To analyse and design of 2D and 3D frames.
CO4	To analyse and design retaining wall and simple towers

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				2				2					
CO2	3				2				2				1	
CO3	3	1	1	3	3					3			3	3
CO4	3	1	1	3	3					3			3	3

RT41019 SHWM

CO1	Understand the basic concepts of solid waste management system.
CO2	Design the collection system of solid waste of a town.
CO3	Design treatment of municipal solid waste and landfill.
CO4	Know the criteria for selection of landfill.
CO5	Characterize the solid waste and design a composting facility.
CO6	Know the method of treatment and disposal of Hazardous wastes.

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

RT42021 ESTIMATING, SPECIFICATIONS AND CONTRACTS

CO1	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
CO2	Be able to analyze the rate for various items of work
CO3	Be able to estimate the earthwork for road, canal works and quantity of reinforcement and provide bar bending schedules
CO4	Be able to understand in detail about the contracts
CO5	Should be in a position to perform valuation of a building
CO6	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

CO1	Prepare EMP, EIS, and EIA report
CO2	Identify the risks and impacts of a project and selection of appropriate methodology
CO3	Evaluation of the EIA report and Estimate the cost benefit ratio of a project

RT42022 EIA&M

CO4	Know the role of stakeholder and public hearing in the preparation of EIA
CO5	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
CO6	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

CO1	Understand the fundamentals of engineering seismology.
CO2	Acquaint with the principles in structural dynamics.
CO3	Understand the SDOF systems.
CO4	Compute equivalent lateral seismic loads.
CO5	To suggest ductile design for beams and columns.
CO6	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

CO1	Student will be able to know various distress and damage to concrete and masonry structures and their preventive measures including cracks.
CO2	Student will be able to Carry out analysis using various NDT methods and evaluate structures.
CO3	Student will be able to investigate failures and also the causes of failures in structures and repair of cracks.
CO4	Student will be able to recognize the types and properties of repair materials etc, and their influence on concrete

RT42024 **RRS**

CO5	Student will be able to assessing damage to structures and various repair techniques including equipments and precautions.
CO6	Student will be able to know various case studies regarding rehabilitation of various civil engineering structures.

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

RT42025 **PROJECT**

CO1	Apply all levels of engineering knowledge in solving the Engineering problems.
CO2	Apply appropriate techniques, resources & modern engineering tools.
CO3	Work together with team spirit.
CO4	Recognize the need for further knowledge & lifelong learning.
CO5	The skill to prepare a Project report.

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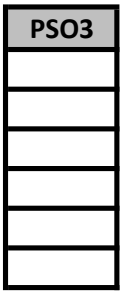
C05	2	2			2		2		3	3	2	1	2	2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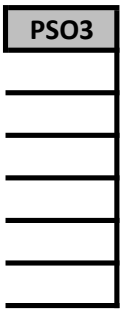
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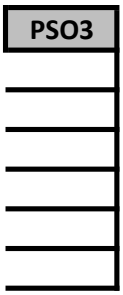
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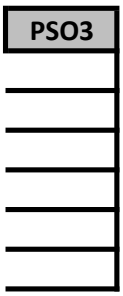
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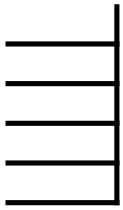


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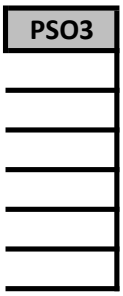
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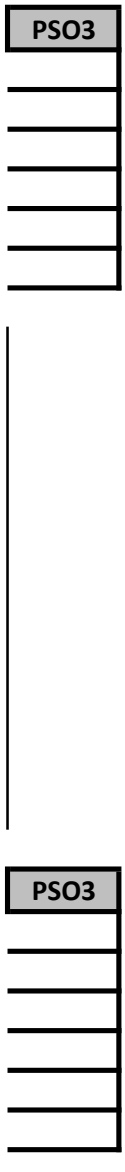
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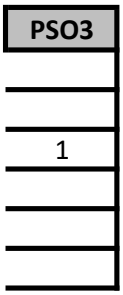
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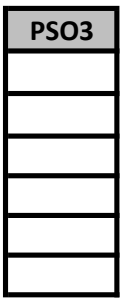
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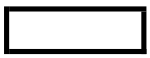

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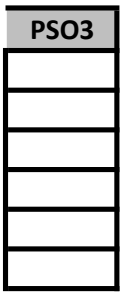
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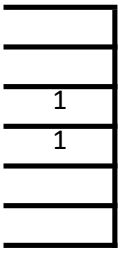

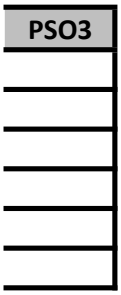

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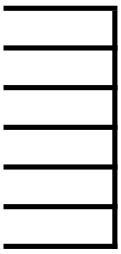

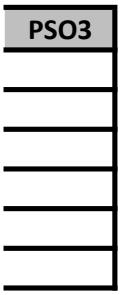
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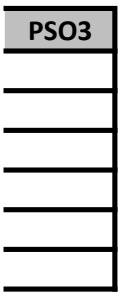
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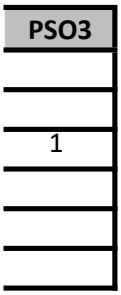
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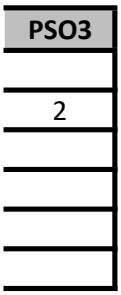
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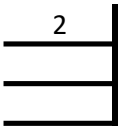
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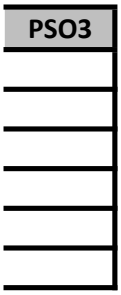
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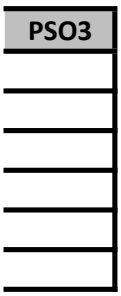
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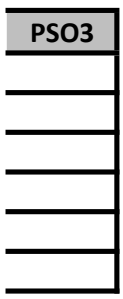
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