SEMESTER 1

MAT 101 LINEAR ALGEBRA AND CALCULUS

Course Outcomes: After the completion of the course the student will be able to

Course Outcomes: After the completion of the course the student will be able to

CO 1	solve the consistent system of linear equations and apply orthogonal to a quadratic form
CO 2	find the maxima and minima of multivariable functions
CO 3	find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas using double and triple integrals
CO 4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
CO 5	determine the power series expansion of a given function

	РО	PO 2	PO 3	PO 4	PO 5	PO 6	PO	PO 8	PO 9	PO 10	PO 11	PO 12
	1						7					
CO 1	3	70										
CO 2	3					-					24	
CO 3	3					hill						
CO 4	3											
CO 5	3											

PHT 110 ENGINEERING PHYSICS B

Course Outcomes: After the completion of the course the student will be able to

CO 1	Compute the quantitative aspects of waves and oscillations in engineering systems.
CO 2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
CO 3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
CO 4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
CO 5	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
		J.		17				177		10	11	12
CO 1	3	2					1	1	2			1
CO 2	3	2			1	A Action in which the		1	2		Î	1
CO 3	3	2			N.	(U.)	4 1	1	2			1
CO 4	3				ti.		-	1	2			1
CO 5	3	2						1	2			1

CYT 100 ENGINEERING CHEMISTRY

Course Outcomes: After the completion of the course the student will be able to

CO 1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
CO 2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
CO 3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials.
CO 4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
CO 5	Study various types of water treatment methods to develop skills for treating wastewater.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	1	2	1									
CO 2	1	1		1	2	-		4.4	10			
CO 3	1	1		1	2	1240	10				1	
CO 4	2	1			100	1000	10					
CO 5	1		-	1			3		-		Î	

EST 110 ENGINEERING GRAPHICS

Course Outcomes: After the completion of the course the student will be able to

CO 1	Draw the projection of points and lines located in different quadrants								
CO 2	Prepare multiview orthographic projections of objects by visualizing them in different positions								
CO 3	Draw sectional views and develop surfaces of a given object								
CO 4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.								
CO 5	Convert 3D views to orthographic views								
CO 6	Obtain multiview projections and solid models of objects using CAD tools								

/	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
1	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3							1				
CO 2	3											
CO 3	3	1				1			1			
CO 4	3									1	Y	
CO 5	3				100		4			2		
CO 6	3				3	7.30				3	9	

EST 120 BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
CO 2	Explain different types of buildings, building components, building materials and building construction
CO 3	Describe the importance, objectives and principles of surveying.
CO 4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
CO 5	Discuss the Materials, energy systems, water management and environment for green buildings.
CO 6	Analyse thermodynamic cycles and calculate its efficiency
CO 7	Illustrate the working and features of IC Engines
CO 8	Explain the basic principles of Refrigeration and Air Conditioning
CO 9	Describe the working of hydraulic machines
CO 10	Explain the working of power transmission elements

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3		8	80	-	3	2	2	1.50	- 5	8,50	-
CO2	3	2	9	1	3		929	3	-		790	114
CO3	3	2	12	2	3	-		2	2	্	12:	-

CO4	3	2	-	-	3	-	-	-	2	-	-	-
CO5	3	2	-	-	3	2	3	-	2	-	-	-
CO6	3	2										
CO7	3	1										
CO8	3	1										
CO9	3	2	11.5			-/1	18		1	W		
CO10	3	1			Sec.	31	rsii	==1		411		
CO11	3						(-1)					

EST 130 BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits								
CO 2	Develop and solve models of magnetic circuits								
CO 3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady								
	state								
CO 4	Describe working of a voltage amplifier								
CO 5	Outline the principle of an electronic instrumentation system								
CO 6	Explain the principle of radio and cellular communication								

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
										10	11	12
CO 1	3	1	-	- 7%	-	-	-	-	-/	-	-	2
CO 2	3	1	- 1	-	-	-10	-	-	100	-	-	2
CO 3	3	1	-	-	-	-	-	-	-	-	-	2
CO 4	2	-	-	-	-	-	-	-	-	-	-	-
CO 5	2	-	-	-		-	-	-	-	-	-	2
CO 6	2	-	-	-	-		-	-	-	-	-	2

HUN 101 LIFE SKILLS

Course Outcomes: After the completion of the course the student will be able to

CO 1	Define and Identify different life skills required in personal and professional life
CO 2	Develop an awareness of the self and apply well-defined techniques to cope with emotions
	and stress.
CO 3	Explain the basic mechanics of effective communication and demonstrate these through
	presentations.
CO 4	Take part in group discussions
CO 5	Use appropriate thinking and problem solving techniques to solve new problems
CO 6	Understand the basics of teamwork and leadership

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
						55.				10	11	12
CO 1					15-	2		1	2	2	1	3
CO 2									3			2
CO 3						1			1	3		
CO 4					- 20	14.6	70			3		1
CO 5		3	2	1				-				
CO 6						1			3			

PHL 120 ENGINEERING PHYSICS LAB

Course Outcomes: After the completion of the course the student will be able to

CO 1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
CO 2	Understand the need for precise measurement practices for data recording
CO 3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
CO 4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
CO 5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

-	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	5 3			3	41114		1	2			1
CO 2	3				3		1	1	2			1
CO 3	3				3			1	2			1
CO 4	3				3		1	1	2		1	1
CO 5	3				3	1414		1	2			1

CYL 120 ENGINEERING CHEMISTRY LAB

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
CO 2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
CO 3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
CO 4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
CO 5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
CO 6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
			O SHIP							10	11	12
CO 1	3				2							3
CO 2	3				3	-	A COLUMN					3
соз	3				3	8M19	4- 1			9 1		3
CO 4	3				3		-			8 1		3
CO 5	3				1			130	J.			3
CO 6	3				1							3

ESL 120 CIVIL & MECHANICAL WORKSHOP

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Course Outcome Description
CO 1	Name different devices and tools used for civil engineering measurements
CO 2	Explain the use of various tools and devices for various field measurements
CO 3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
CO 4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
CO 5	Compare different techniques and devices used in civil engineering measurements
CO 6	Identify Basic Mechanical workshop operations in accordance with the material and objects
CO 7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
CO 8	Apply appropriate safety measures with respect to the mechanical workshop trades

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	1	25	1	955	1	1		. 9	2	2	- 20	
CO 2	1	5.6	37.0	(*)	1	1			2	2	-80	:-
CO 3	1	125	0.5	3 2 3	1	1	T 50	2	2	2	1	3.5
CO 4	1	-	1007	1000	1	1	0 -	2	2	2	1	1
CO 5	1	32	540	(\$25),	1	1	122	. 2	2	2		1
CO 6	2											

ESL 130 ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcomes: After the completion of the course the student will be able to

CO 1	Demonstrate safety measures against electric shocks
CO 2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
CO 3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
CO 4	Identify and test various electronic components
CO 5	Draw circuit schematics with EDA tools
CO 6	Assemble and test electronic circuits on boards
CO 7	Work in a team with good interpersonal skills

Ť	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
J.					0	2			17	10	11	12
CO 1	30	300		***	- 3	3	50		100	18	-	1
CO 2	2	3.50		*	•	-5		-5	+	1	*	1
соз	2	0.00		1	-3	1		1	2	2	*	2
CO 4	3	855	7.5	*	-10	-	-	1	-		*	2
CO 5	3	8758			2	-		-	-			2
CO 6	3	(875)	707-1		2	713		-	-	81		1
CO 7	200	1858	1000	2 + s	100	-76	-	-	3	2	1	1 2

SEMESTER 2

MAT 102 VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

Course Outcomes: After the completion of the course the student will be able to

CO 1	Compute the derivatives and line integrals of vector functions and learn their applications
CO 2	Evaluate surface and volume integrals and learn their inter-relations and applications.
CO 3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
CO 4	Compute Laplace transform and apply them to solve ODEs arising in engineering
CO 5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	3	3	3	2	1			1	2		2
CO 2	3	3	3	3	2	1			1	2		2
CO 3	3	3	3	3	2	1	141	AT	1	2		2
CO 4	3	3	3	3	2	1		13	1	2		2
CO 5	3	3	3	3	2	1	and a	10	1	2		2

PHT 110 ENGINEERING PHYSICS B

Course Outcomes: After the completion of the course the student will be able to

CO 1	Compute the quantitative aspects of waves and oscillations in engineering systems.
CO 2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
CO 3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
CO 4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
CO 5	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
1							8			10	11	12
CO 1	3	2					100	1	2		43	1
CO2	3	2			l.			1	2			1
соз	3	2			100	CID	4 60	1	2			1
CO 4	3				100	-	20	1	2			1
CO 5	3	2	13	9		1	8	1	2		18	1

CYT 100 ENGINEERING CHEMISTRY

Course Outcomes: After the completion of the course the student will be able to

CO 1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
CO 2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
CO 3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials.
CO 4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
CO 5	Study various types of water treatment methods to develop skills for treating wastewater.

	PO 1	PO Z	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO 12
					100					10	11	
CO 1	1	2	1							-		
CO 2	1	1		1	2	-						
CO 3	1	1	1	1	2	SVA	1	8 8				
CO 4	2	1	180	140		100	200					
CO 5	1			1	-		3					

EST 100 ENGINEERING MECHANICS

Course Outcomes: After the completion of the course the student will be able to

CO 1	Recall principles and theorems related to rigid body mechanics
CO 2	Identify and describe the components of system of forces acting on the rigid body
CO 3	Apply the conditions of equilibrium to various practical problems involving different force system.
CO 4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
CO 5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Mapping of course outcomes with program outcomes (Minimum requirement)

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12
CO 1	2	2	. • 0	2.5%	199-2	-	-		-51	7	7 8 1	- 8:
CO 2	3	3		858	100	1.5	15.5%		53	175	î e î	- 8
CO 3	3	3			1000	200-	Sec.		-	0.7	9 9	.76
CO 4	3	3		-	-	14-	1.	- 20	-	12	-	20
CO 5	3	3	-29	1328	35.3	-	149	1.40	-23	1.5	- C	92

EST 110 ENGINEERING GRAPHICS

Course Outcomes: After the completion of the course the student will be able to

CO 1	Draw the projection of points and lines located in different quadrants							
CO 2	Prepare multiview orthographic projections of objects by visualizing them in different positions							
CO 3	Draw sectional views and develop surfaces of a given object							
CO 4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.							
CO 5	Convert 3D views to orthographic views							
CO 6	Obtain multiview projections and solid models of objects using CAD tools							

/	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO
1	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3					H 1 3						
CO2	3								1/			
соз	3	1				-		-	1	-		
CO 4	3					E 8		2		1		8
CO 5	3				11/2	-				2		
CO 6	3				3	Cata				3		

EST 120 BASICS OF CIVIL & MECHANICAL ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
CO 2	Explain different types of buildings, building components, building materials and building construction
соз	Describe the importance, objectives and principles of surveying.
CO 4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
CO 5	Discuss the Materials, energy systems, water management and environment for green buildings.
CO 6	Analyse thermodynamic cycles and calculate its efficiency
CO 7	Illustrate the working and features of IC Engines
COS	Explain the basic principles of Refrigeration and Air Conditioning
CO 9	Describe the working of hydraulic machines
CO 10	Explain the working of power transmission elements
CO 11	Describe the basic manufacturing, metal joining and machining processes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	18	15	55	-	3	2	2	878	3.5	Joseph	100
CO2	3	2	32	1	3	SAN	(4)	3	929	35-21	1948	2
соз	3	2			3		-	- 2	2	1000	10020	-
CO4	3	2	-	-	3	-	-	-	2	·	Ť -	Ť-
CO5	3	2	-	-	3	2	3	-	2	-	† -	١.
CO6	3	2										\top
CO7	3	1										\top
CO8	3	1										\top
CO9	3	2	11.	A P	13			CA.	100	N		T
CO10	3	1	-		10	1	-5	31	1			
0011	3		100		713	- 1			1	100		\top

EST 130 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits						
CO 2	Develop and solve models of magnetic circuits						
CO 3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state						
CO 4	Describe working of a voltage amplifier						
CO 5	Outline the principle of an electronic instrumentation system						
CO 6	Explain the principle of radio and cellular communication						

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	1		-		-	-	2.7	-3	-3	20	2
CO 2	3	1	-	-	8-	-	1.5		16.	-8	1.5	2
CO 3	3	1	-	2	-	-	20	12	-	-	1 -2	2
CO 4	2		-	-		-	-	+2	-	-22	20	-
CO 5	2					-				-2	- S-7:5	2
CO 6	2	-	-	-	100			-	-2	-3		2

HUN 102 PROFESSIONAL COMMUNICATION

Course Outcomes: After the completion of the course the student will be able to

CO 1	Develop vocabulary and language skills relevant to engineering as a profession									
CO 2	Analyze, interpret and effectively summarize a variety of textual content									
CO 3	Create effective technical presentations									
CO 4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus									
CO 5	Identify drawbacks in listening patterns and apply listening techniques for specific needs									
CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions									

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
		18			1,000	-	-			10	11	12
CO 1						T-TV	2			3	Ŷ.	2
CO2					1	12.2				1		3
CO 3						1		110	1	3		
CO 4								11110		3	1	1
CO 5		1				1	-		2	3	53	
CO 6	1					1	1 6		1	3	3	

EST 102 PROGRAMING IN C

Course Outcomes: After the completion of the course the student will be able to

CO 1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
CO 2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
соз	Write readable C programs with arrays, structure or union for storing the data to be processed
CO 4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
CO 5	Write readable C programs which use pointers for array processing and parameter passing

readable* - readability of a program means the following:

- 1. Logic used is easy to follow
- 2. Standards to be followed for indentation and formatting
- 3. Meaningful names are given to variables
- 4. Concise comments are provided wherever needed

	PO1	PO2	РОЗ	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	0	0	0	0		0				0	0	0
CO2	0	0	0	0	0					0		0
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CO4	0	0	0	0	0	52	H	1		0	0	Ø
CO5	0	0			0		150			0		Ø
CO6	0	0			0					0		0

PHL 120 ENGINEERING PHYSICS LAB

Course Outcomes: After the completion of the course the student will be able to

CO 1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
CO 2	Understand the need for precise measurement practices for data recording
CO 3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
CO 4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
CO 5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3				3	11119		1	2			1
CO2	3				3		4	1	2			1
соз	3				3			1	2		1	1
CO 4	3				3		1	1	2			1
CO 5	3		- 3		3	MIV	2	1	2			1

CYL 120 ENGINEERING CHEMISTRY LAB

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
CO 2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
CO 3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
CO 4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
CO 5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
CO 6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
	000000		i de marine							10	11	12
CO 1	3				2				1 0			3
CO 2	3				3	-	100					3
CO 3	3				3	8/110	4- 1		1	9 1		3
CO 4	3			8	3					8 1		3
CO 5	3				1							3
CO 6	3				1							3

ESL 120 CIVIL & MECHANICAL WORKSHOP

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Course Outcome Description
CO 1	Name different devices and tools used for civil engineering measurements
CO2	Explain the use of various tools and devices for various field measurements
CO 3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
CO 4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
CO 5	Compare different techniques and devices used in civil engineering measurements
CO 6	Identify Basic Mechanical workshop operations in accordance with the material and objects
CO 7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
COS	Apply appropriate safety measures with respect to the mechanical workshop trades

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	1	+3	*	8	1	1		- 1	2	2	[2 - [-
CO 2	1	1.50	77	80	1	1	125	838	2	2	i ya Y	13
CO 3	1			-	1	1		2	2	2	1	-
CO 4	1	28	. 2	U 00	1	1	_ W_]	2	2	2	1	1
CO 5	1	1.0	- 22	2	1	1	32	349	2	2		1
CO 6	2		,									
CO 7	2											
CO 8	2											

ESL 130 ELECTRICAL & ELECTRONICS WORKSHOP

Course Outcomes: After the completion of the course the student will be able to

Demonstrate safety measures against electric shocks
Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
Identify and test various electronic components
Draw circuit schematics with EDA tools
Assemble and test electronic circuits on boards
Work in a team with good interpersonal skills

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	-	-51	-		-	3	15	V:	1		-	1
CO 2	2	-	7.	-	-	-		-		1	-	
соз	2	*	-	1	100	1		1	2	2	-	2
CO 4	3	-	-		-	-	1-	1	-	25	ः	2
CO 5	3		70	-	2	-	1-	-	-	58	·-	2
CO 6	3		31	-	2	1(3)	/	-		25	ं ः	1
CO 7		-	80			-		-	3	2	-	2

SEMESTER 3

CET201 MECHANICS OF SOLIDS

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Recall the fundamental terms and theorems associated with mechanics of linear elastic deformable bodies.	Remembering
CO2	Explain the behavior and response of various structural elements under various loading conditions.	Understanding
CO3	Apply the principles of solid mechanics to calculate internal stresses/strains, stress resultants and strain energies in structural elements subjected to axial/transverse loadsand bending/twisting moments.	Applying
CO4	Choose appropriate principles or formula to find the elastic constants of materials making use of the information available.	Applying
CO5	Perform stress transformations, identify principal planes/ stresses and maximum shear stress at a point in a structural member.	Applying
CO6	Analyse the given structural member to calculate the safe load or proportion the cross section to carry the load safely.	Analysing

Mapping of course outcomes with program outcomes (Minimum requirement)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	-	-	-
CO2	2	1	_	_	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-		-	-		-	-
CO5	3	2	4.			17	14-4	8.74	1,171		-	-
CO6	3	3	1	4 5	-		1 -		A4-1	. N	-	-

CET 203 Fluid Mechanics and Hydraulics

Course Outcomes: After the completion of the course the student will be able to

CO1	Recall the relevant principles of hydrostatics and hydraulics of pipes and open channels
CO2	Identify or describe the type, characteristics or properties of fluid flow
CO3	Estimate the fluid pressure, perform the stability check of bodies under hydrostatic condition
CO4	Compute discharge through pipes or estimate the forces on pipe bends by applying hydraulic principles of continuity, energy and/or momentum
CO5	Analyze or compute the flow through open channels, perform the design of prismatic channels

	and		POl	PO2	PO3	PO4	PO5	PO6	PO7	POS	PO9	PO10	PO11	PO12
203	Fluid Mechanics	CO1	2	2			-							
1 20	rau]	CO2	2	2	- 9	1	Est	d.	3					
CET	Me	CO3	3	3		-	W.	1						
	Bi H	CO4	3	3			,	1						
	Ē	CO5	3	3	2		L.	-	1		10.00			

CET205 SURVEYING & GEOMATICS

Course Outcomes: After the completion of the course the student will be able to

CO 1	Apply surveying techniques and principles of leveling for the preparation of contour maps, computation of area-volume and sketching mass diagram
CO 2	Apply the principles of surveying for triangulation
CO 3	Apply different methods of traverse surveying and traverse balancing
CO 4	Identify the possible errors in surveying and apply the corrections in field measurements
CO 5	Apply the basic knowledge of setting out of different types of curves
CO 6	Employ surveying techniques using advanced surveying equipments

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
COl	3	3		2	2	100			8			
CO 2	3	3		2								
CO3	3	3			17.5		1	1	2			
CO 4	3	2			75	File	1					
CO 5	3	2	1	1	1			1	2			
CO 6	3			2	2	1200	10	1				2

EST 200 DESIGN AND ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the different concepts and principles involved in design engineering.
CO 2	Apply design thinking while learning and practicing engineering.
CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	1				79 3	1			1	1	1
CO 2		2				1		1				2
CO 3			2			1	1		2	2		1

HUT 200 Professional Ethics

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the core values that shape the ethical behaviour of a professional.
CO 2	Adopt a good character and follow an ethical life.
CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.
CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1	PO1 2
CO 1			1	7/			1 3	2			2	
CO 2								2			2	
CO3					00		1 1	3		4	2	
CO 4		9 1		- 1	1	. 17	3 8	3	- 1		2	
CO 5			_20		100	-30		3			2	

MCN201 SUSTAINABLE ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
CO 2	Explain the different types of environmental pollution problems and their sustainable solutions
CO 3	Discuss the environmental regulations and standards
CO 4	Outline the concepts related to conventional and non-conventional energy
CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1			11			2	3				1	2
CO 2	- 8		- 3			2	3				18	2
CO3		100				2	3					2
CO 4		1 10.				2	3					2
CO 5			1			2	3	-1				2

CEL 201 CIVIL ENGINEERING PLANNING AND DRAFTING LAB

Course Outcomes: After the completion of the course the student will be able to

Course Outcome (CO)	Course Outcome Description	CO assessment strategy				
CO 1	Illustrate ability to organise civil engineering drawings systematically and professionally	Assessment of the overall organisation of the drawing, labels and templates used.				
CO 2	Prepare building drawings as per the specified guidelines.	Application of guidelines for functional planning of building unit.				
CO3	Assess a complete building drawing to include all necessary information	Level of incorporation of Guidelines specified by NBC, meeting the requirement of building rules specified by local bodies of administration.				
CO 4	Create a digital formof the building plan using any drafting software	Evaluation of the printouts of prepared building plan				

Mapping of course outcomes (COs) with program outcomes (POs)

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
COl	3	-		19-51		19:	-	2	3	3	-	-
CO 2	3	855		3:30		- 10	-	2	3	3	-	-
CO3	3	102	-	- 121		-82 8		2	3	3	(S	2.
CO 4	3	243	1.00	19 2 55		- 28	93	2	2	3	1 8	1.53

CEL 203 SURVEY LAB

Course Outcomes: After the completion of the course the student will be able to

CO 1	Use conventional surveying tools such as chain/tape and compass for plotting and area determination.
CO 2	Apply levelling principles in field
CO 3	Solve triangulation problems using theodolite
CO 4	Employ total station for field surveying
CO 5	Demonstrate the use of distomat and handheld GPS

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3		T P					1	2			
CO 2	3	8 8		1				1	2	4		
CO 3	3		2 2	1		E 12.	Mile I	1	2			
CO 4	3			1	3			1	2			2
CO 5	3		- 5		3	12.	- 1	1				2

SEMESTER 4

CET202 Engineering Geology

Course Outcomes: After the completion of the course the student will be able to

CO1	Recall the fundamental concepts of surface processes, subsurface process, minerals, rocks, groundwater and geological factors in civil engineering constructions.
CO2	Identify and describe the surface processes, subsurface process, earth materials, groundwater and geological factors in civil engineering constructions.
CO3	Apply the basic concepts of surface and subsurface processes, minerals, rocks, groundwater and geological characteristics in civil engineering constructions.
CO4	Analyze and classify geological processes, earth materials and groundwater.
CO5	Evaluation of geological factors in civil engineering constructions.

Mapping of course outcomes with program outcomes (Minimum requirement)

	POl	PO2	PO3	PO4	PO5	PO6	PO7	POS	PO9	PO10	PO11	PO12
COl	2					1	2	1				
CO2	3			1								
CO3	3			100				3	0			
CO4	3	2			le.							
CO5	3	1	3			3	3	2			7	2

CET 204 GEOTECHNICAL ENGINEERING - I

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the fundamental concepts of basic and engineering properties of soil
CO 2	Describe the laboratory testing methods for determining soil parameters
CO 3	Solve the basic properties of soil by applying functional relationships
CO 4	Calculate the engineering properties of soil by applying the laboratory test results and the fundamental concepts of soil mechanics
CO 5	Analyze the soil properties to identify and classify the soil

Mapping of course outcomes with program outcomes (Minimum requirement)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3		200	3+	A+s		-	-	-	-	. 6	-
CO 2	3		-	323	20	1/2	100	-2	-2	2	9	ğ
CO 3	2	3	-	- 1	-	std.	17	20	-	-	-	
CO 4	2	3	120	323	20	12	1,82	-2	-2	2	9	ğ
CO 5	2	3		-	-3	-	B. 1	18	-		-	-

CET206 TRANSPORTATION ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

	Description
CO No.	At the end of the course, students will be able to:
CO 1	Apply the basic principles of Highway planning and design highway geometric elements
CO 2	Apply standard code specifications in judging the quality of highway materials; designing of flexible pavements
CO 3	Explain phenomena in road traffic by collection, analysis and interpretation of traffic data through surveys; creative design of traffic control facilities
CO 4	Understand about railway systems, tunnel, harbour and docks
CO 5	Express basics of airport engineering and design airport elements

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	3	3	3	1		1	3	1		2		1
CO 2	3	1	3	1		1	1	1		1		1
CO 3	3	2	2	1					1	2		2
CO 4	2						2	1				2
CO 5	3	3	3			3		2				

EST 200 DESIGN AND ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the different concepts and principles involved in design engineering.
CO 2	Apply design thinking while learning and practicing engineering.
CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

/	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	1				79 1	1			1		
CO 2		2				1		1	T .			2
CO 3			2			1	1		2	2		1

HUT 200 Professional Ethics

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the core values that shape the ethical behaviour of a professional.
CO 2	Adopt a good character and follow an ethical life.
CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.
CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1	PO1
CO 1			1	7/6	6		1 8	2		2	2	
CO 2				1				2			2	
CO3				- T	().			3	_	-	2	
CO 4		ÿ - 1		- 1	1		1 0	3	- 1		2	
CO 5			_,21		100			3			2	

MCN202 CONSTITUTION OF INDIA

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the background of the present constitution of India and features
CO 2	Utilize the fundamental rights and duties.
CO 3	Understand the working of the union executive, parliament and judiciary.
CO 4	Understand the working of the state executive, legislature and judiciary.
CO 5	Utilize the special provisions and statutory institutions.
CO 6	Show national and patriotic spirit as responsible citizens of the country

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1					7/	2	2	2		2		1
CO 2					1	3	3	3		3		100
CO 3					1	3	2	3		3		
CO 4						3	2	3		3		
CO 5				18.		3	2	3		3		
CO 6					1	3	3	3	1	2		

CEL 202 MATERIAL TESTING LAB-I

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Course Outcome Description
CO 1	The understand the behaviour of engineering materials under various forms and stages of loading.
CO 2	Characterize the elastic properties of various materials.
CO3	Evaluate the strength and stiffness properties of engineering materials under various loading conditions.

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO	PO	PO
	- 53	-82-5				-/-				10	11	12
CO 1	3	2	2	2	1	3	15	-	2	2	-	2
CO2	3	2	2	2	1	3	-	-	2	2	-	2
CO 3	3	2	2	2	1	3	12		2	2	1 -	2

CEL 204 FLUID MECHANICS LAB

Course Outcomes: After the completion of the course the student will be able to

Course Outcome (CO)	Course Outcome Description
CO 1	Apply fundamental knowledge of Fluid Mechanics to corresponding experiments
CO 2	Apply theoretical concepts in Fluid Mechanics to respective experiments
CO 3	Analyse experimental data and interpret the results
CO 4	Document the experimentation in prescribed manner

Mapping of course outcomes (COs) with program outcomes (POs)

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
COl	2	2	-		-	-	-	2	3	• 5	-8	3.0
CO 2	2	2	-	-	-	347.	-3/	2	3	-0	1 8	·
CO3	3	3	-	2	-	200	-	2	3	3	8 -0	5.00
CO 4	1	32	-	12		-	-	2	2	3	1 -8	-

SEMESTER 5

CET301 STRUCTURAL ANALYSIS - I

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Apply the principles of solid mechanics to analyse trusses.	Applying
CO2	Apply various methods to determine deflections in statically determinate structures.	Applying
CO3	Identify the problems with static indeterminacy and tackling such problems by means of the method of consistent deformations and energy principles.	Understanding, Analysing, Applying
CO4	Apply specific methods such as slope deflection and moment distribution methods of structural analysis for typical structures with different characteristics.	Understanding, Applying
CO5	Apply suitable methods of analysis for various types of structures including cables, suspension bridges and arches.	Understanding, Applying
CO6	Analyse the effects of moving loads on structures using influence lines.	Understanding, Analysing, Applying

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

CET303 DESIGN OF CONCRETE STRUCTURES

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Recall the fundamental concepts of limit state design and code provisions for design of concrete members under bending, shear, compression and torsion.	Remembering Understanding
CO2	Analyse reinforced concrete sections to determine the ultimate capacity in bending, shear and compression.	Applying
CO3	Design and detailbeams, slab, stairs and footings using IS code provisions.	Applying
CO4	Design and detail columns using IS code and SP 16 design charts.	Applying
COS	Explain the criteria for earthquake resistant design of structures andductile detailing of concrete structures subjected to seismic forces.	Understanding

/	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COI	1	-	1	-	v - 7	11-4	-	-	-		-	2:
CO2	3	3		-	-	-		22	-	-27	-	29
CO3	3	- "	3	-	-	-	-	2	-		-	-52
CO4	3	- 7	3	-		-		2	- 1		-	-1
CO5	1	-	1	-		-	-51	1-	-	-5.7	-	-3

CET 305 GEOTECHNICAL ENGINEERING - II

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand soil exploration methods
CO 2	Explain the basic concepts, theories and methods of analysis in foundation engineering
CO 3	Calculate bearing capacity, pile capacity, foundation settlement and earth pressure
CO 4	Analyze shallow and deep foundations
CO 5	Solve the field problems related to geotechnical engineering

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	-	-	3	2	-	-	-	-	-	-	-
CO 2	3	1-		-			-	1-	-	53	-5	-
CO 3	2	3	-		Es1	d-	7-	ं	3.5	74	-	-
CO 4	2	2	3	1640	-	-	2	12	-	49	2	12
CO 5	3	3	-	6-0	-	-	-	-	6-5	- 51	-	-

CET 307 HYDROLOGY AND WATER RESOURCES ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

CO1	Describe and estimate the different components of hydrologic cycle by processing hydro-
COI	meteorological data
CO2	Determine the crop water requirements for the design of irrigation canals by recollecting
CO2	he principles of irrigation engineering
CO3	Perform the estimation of streamflow and/or describe the river behavior and control
003	structures
CO4	Describe and apply the principles of reservoir engineering to estimate the capacity of
CO4	reservoirs and their useful life
	Demonstrate the principles of groundwater engineering and apply them for computing the
CO5	yield of aquifers and wells
	Esto

CO - PO Mapping

	- ×		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	and	CO1	3	3		1	5		1					
2	Hydrology Water Reso	CO2	3	3					1					
E	dro er F	CO3	3	2					1					
	Hy Vat	CO4	3	3					1					
		CO5	3	3					1					

CET309 CONSTRUCTION TECHNOLOGY AND MANAGEMENT

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Describe the properties of materials used in construction	Understand
CO2	Explain the properties of concrete and its determination	Understand
CO3	Describe the various elements of building construction	Understand
CO4	Explain the technologies for construction	Understand
CO5	Describe the procedure for planning and executing public works	Understand
CO6	Apply scheduling techniques in project planning and control	Application

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					1	1	1	0	1		1
CO2	3					1		1	8 8	1		1
CO3	3					1				1		1
CO4	3					2	1			1		1
CO5	3	2				1	5			1	3	1
CO6	3	3	3		1				2	1	3	1

MCN 301 DISASTER MANAGEMENT

Course Outcomes: After the completion of the course the student will be able to

CO1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
CO3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
CO4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)
CO5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
CO6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO1 0	PO1 1	PO1 2
CO1		2				2				2		2
CO2	2	3	2		2	2	3			3		2
CO3	2	3	2	2	2	2	3			3		2
CO4	3	3	3		2	2	3					2
CO5	3	3			2	2	3					2
CO6	3					2	3	3				2

CEL331 MATERIAL TESTING LAB II

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Course Outcome Description
CO 1	To describe the basic properties of various construction materials
CO 2	Characterize the physical and mechanical properties of various construction materials.
CO3	Interpret the quality of various construction materials as per IS Codal provisions.

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	1000000	PO 12
CO 1	3	2	2	2	1	3	12	2	2	2	-	2
CO 2	3	2	2	2	1	3	12	12	2	2	122	2
CO3	3	2	2	2	1	3	12	1/2	2	2	124	2

CEL 333 GEOTECHNICAL ENGINEERING LAB

Course Outcomes: After the completion of the course the student will be able to

	LINIIVLD X LIV
CO1	Identify and classify soil based on standard geotechnical experimental methods.
CO2	Perform and analyze permeability tests.
CO3	Interpret engineering behavior of soils based on test results.
CO4	Perform laboratory compaction, CBR and in-place density test for fill quality control in
	the field.
CO5	Evaluate the strength of soil by performing various tests viz. direct shear test, unconfined
	compressive strength test and triaxial shear test.
CO6	Evaluate settlement characteristics of soils.

Mapping of course outcomes (COs) with program outcomes (POs)

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COl	3				1				2_	2		
CO2	3				2				2	2		
CO3	3	2							2	2		
CO4	3				1				2	2		
CO5	3				2				2	2		
CO6	3	1			2	1			2	2		

SEMESTER 6

CET302 STRUCTURAL ANALYSIS - II

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Understand the principles of plastic theory and its applications in structural analysis.	Understanding, Applying
CO2	Examine the type of structure and decide on the method of analysis.	Analysing, Applying
CO3	Apply approximate methods of analysis for framed structures to ascertain stress resultants approximately but quickly.	Analysing, Applying
CO4	Apply the force method to analyse framed structures.	Understanding,Analysing Applying
CO5	Apply the displacement methods to analyse framed structures.	Understanding, Analysing, Applying
CO6	Remember basic dynamics, understand the basic principles of structural dynamics and apply the same to simple structures.	Remembering, Understanding, Applying

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

CET 304 ENVIRONMENTAL ENGINEERING

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	To appreciate the role of environmental engineering in improving the quality of environment	Understanding
CO2	To plan for collection and conveyance of water and waste water	Applying
CO3	To enhance natural water purification processes in an engineered environment	Analysing
CO4	To decide on appropriate technology for water and waste water treatment	Evaluating

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	-		-		24	2	2	-	949		742)(4)
CO 2	3	1949	3		84	-	-	-	18 14 6)		9949	1943
CO3	3	1945	3	20	24	-	400	-	3340		3843	3543
CO4	3	1445	3	-27	136	-	223	-	88-6	·	3543	3843

CET306 DESIGN OF HYDRAULIC STRUCTURES

Course Outcomes: After the completion of the course the student will be able to

CO1	Elucidate the causes of failure, principles of design of different components of hydraulic structures
CO2	Describe the features of canal structures and perform the design of alluvial canals
CO3	Perform the hydraulic design of minor irrigation structures such as cross drainage works, canal falls, cross regulator
CO4	Prepare the scaled drawings of different minor irrigation structures
CO5	Describe the design principles and features of dams and perform the stability analysis of gravity dams

CO - PO Mapping

1 - Slight (Low), 2 - Moderate (Medium), 3 - Substantial (High)

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
OF LIC RES	CO1	3	2				10	1	-				
885	CO2		2	3		01	1						
DESIG HYDR STRUC	CO3	3	3	3		1 1							
DES HYD] STRU	CO4										3		
0,	CO5	3	2			1 1	1	1					

HUT 300 Industrial Economics & Foreign Trade

Course Outcomes: After the completion of the course the student will be able to

CO1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
соз	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
CO4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	POll	PO12
CO1	2										3	
CO2	2	2			2	2	3				3	
CO3	2	2	1								3	
CO4	2	2	1			1					3	
CO5	2	2	1								3	

CET308 COMPREHENSIVE COURSE WORK

Course Outcomes: After the completion of the course the student will be able to

CO1	Learn to prepare for a competitive examination
CO2	Comprehend the questions in Civil Engineering field and answer them with confidence
CO3	Communicate effectively with faculty in scholarly environments
CO4	Analyze the comprehensive knowledge gained in basic courses in the field of Civil Engineering

		P	P	P	P	P	P	P	P	P	PO	PO	PO	PS	PS	PS
rk rk		0	0	0	0	0	0	0	0	0	10	11	12	01	O2	O3
CET 308 Comprehensiv Course Work	CO1	3	1	1			2					Ļ		1	1	
CET	CO2	3	1				2				3	1				
Comp	CO3	3	1			1	2				3				1	
	CO4	3	3			1	2									

CEL332 TRANSPORTATION ENGINEERING LAB

Course Outcomes: After the completion of the course the student will be able to

CO 1	Analyse the suitability of soil as a pavement subgrade material
CO 2	Assess the suitability of aggregates as a pavement construction material
CO 3	Characterize bitumen based on its properties so as to recommend it as a pavement construction material.
CO 4	Design bituminous mixes for pavement layers
CO 5	Assess functional adequacy of pavements based on roughness of pavement surface.

Mapping of Course Outcome with Programme Outcome

PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
3			2				1	2			
3			2				1	2			
3			2		Cete		1	2			2
3			2		98	4	1	2			2
3		-2	2	3			1	2		9	2
	3 3 3	3 3 3 3	3 3 3 3	3 2 3 2 3 2	3 2 3 2 3 2 3 2	3 2 3 2 3 2 3 2	3 2 3 3 2 3 3 2 3 3 2 3 3 2 3 3 2 3 3 2 3 3 3 2 3 3 3 2 3 3 3 3 2 3	3 2 1 3 2 1 3 2 1 3 2 1	3 2 1 2 3 2 1 2 3 2 1 2 3 2 1 2 3 2 1 2	3 2 1 2 3 2 1 2 3 2 1 2 3 2 1 2 3 2 1 2	3 2 1 2 3 2 1 2 3 2 1 2

CEL 334 CIVIL ENGINEERING SOFTWARE LAB

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description										
CO1	To undertake analysis and design of multi-storeyed framed structure, schedule given set of project activities using a software.										
CO2	To prepare design details of different structural components, implementation plan for a project.										
CO3	To prepare a technical document on engineering activities like surveying, structural design and project planning.										

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 2	PO Z	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	2	2	2	1	3	-	-	2	2	-	2
CO 2	3	2	2	2	1	3	-	-	2	2	-	2
CO 3	3	2	2	2	1	3	-	-	2	2	-	2

SEMESTER 7

CET401 DESIGN OF STEEL STRUCTURES

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO 1	Explain the behavior and properties of structural steel members to resist various structural forces and actions and apply the relevant codes of practice	Understanding and analyzing
CO 2	Analyses the behavior of structural steel members and undertake design at both serviceability and ultimate limit states	Analysing and applying
CO 3	Explain the theoretical and practical aspects of Design of composite Steel Structure along with the planning and design aspects	Understanding and applying
CO 4	Apply a diverse knowledge of Design of Steel engineering practices applied to real life problems	Applying
COS	Demonstrate experience in the implementation of design of structures on engineering concepts which are applied in field Structural Engineering	Applying

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	-	-	-	-	-	-	-	-	-	-	-
CO 2	2	3	2	-	-	-	-	-	-	-	-	-
CO 3	2	3	2	-	-	-	-	-	-	-	-	-
CO 4	2	3	3	-	-	-	-	-	-	-	-	-
CO5	2	3	3	-	-	-	-	-	-	-	-	-

CEL411 ENVIRONMENTAL ENGINEERING LAB

Course Outcomes: After the completion of the course the student will be able to

Course outcome	Description
CO1	Analyse various physico-chemical and biological parameters of water
CO2	Compare the quality of water with drinking water standards and recommend its suitability for drinking purposes

	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO12
COl	3	3	3	1	-	E3.T	3	-	-	-	-	3
CO2	3	3	3	1	-	3	3	-	-	-/	-	3

CEQ413 SEMINAR

Course Outcomes: After the completion of the course the student will be able to

CO1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
CO2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
CO3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
CO4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
CO5	Prepare a technical report (Cognitive knowledge level: Create).

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COl	2	2	1	1		2	1					3
CO2	3	3	2	3		2	1					3
CO3	3	2			3			1		2		3
CO4	3				2			1		3		3
COS	3	3	3	3	2	2		2		3		3

CED415 PROJECT PHASE I

Course Outcomes: After successful completion of the course the student will be able to

CO1	Model and solve real world problems by applying knowledge across domains
-01	(Cognitive knowledge level: Apply).
CO2	Develop products, processes or technologies for sustainable and socially relevant
CO2	applications (Cognitive knowledge level: Apply).
CO3	Function effectively as an individual and as a leader in diverse teams and to
(0)	comprehend and execute designated tasks (Cognitive knowledge level: Apply).
CO4	Plan and execute tasks utilizing available resources within timelines, following
CO4	ethical and professional norms (Cognitive knowledge level: Apply).
COS	Identify technology/research gaps and propose innovative/creative solutions
(0)	(Cognitive knowledge level: Analyze).
CO6	Organize and communicate technical and scientific findings effectively in written
1000	and oral forms (Cognitive knowledge level: Apply).

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

CED481 MINI PROJECT

Course Outcomes: After successful completion of the course the student will be able to

COl	Identify and synthesize problems and propose solutions to them.
CO2	Prepare work plan and liaison with the team in completing as per schedule.
CO3	Validate the above solutions by theoretical calculations and through experimental
CO4	Write technical reports and develop proper communication skills.
CO5	Present the data and defend ideas.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COl	3	3	3	3					3	3		2
CO2	3			3				3	3	3	3	
CO3	3	3	3	3	3					3		
CO4					3			3	3	3		1
CO5	3	3	3	3				3		3	3	1

^{*1-}slight/low mapping, 2- moderate/medium mapping, 3-substantial/high mapping

SEMESTER 8

CET402 QUANTITY SURVEYING AND VALUATION

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Define basic terms related to estimation, quantity surveying and contract document	Remembering
CO2	Interpret the item of work from drawings and explain its general specification and unit of measurement.	Understanding
CO3	Make use of given data from CPWD DAR/DSR for calculating the unit rate of different items of work associated with building construction	Applying
CO4	Develop detailed measurement (including BBS) and BoQ of a various work like buildings, earthwork for road, sanitary and water supply work	Applying
CO5	Explain various basic terms related to valuation of land and building	Understanding
CO6	Develop valuation of buildings using different methods of valuation.	Applying

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO11	PO1
COl	2	-	-	-	-	- ,	-	-	-	-	-	-
CO2	2	-	-	-		-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO6	3	2	-	-	-	-	-	-	-	-	-	-

CET456 REPAIR AND REHABILITATION OF BUILDINGS

Course Outcomes: After the completion of the course the student will be able to

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Recall the basics ideas and theories associated with Concrete technology and Masonry structures.	Remembering
CO2	Understand the need and methodology of repair and rehabilitation of structures, the various mechanisms used, and tools for diagnosis of structures	Understanding
CO3	Identifying the criterions for repairing / maintenance and the types and properties of repair materials used in site. Learn various techniques for repairing dam- aged and corroded structures	Understanding
CO4	Proposing wholesum solutions for maintenance/re- habilitation and applying methodologies for repair- ing structures or demolishing structures.	Applying
CO5	Analyse and asses the damage to structures using various tests	Analysing

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COT	1											
CO2	3	2		2								
CO3	3	Λ^2	T 3	\ D	3	T 2	11-	ΛТ	ΛК	Л		
CO4	3	T.	14	Æ.	3	_2_	1	J.L.	MV	1		
CO5	3	2	2	1	2	TC	2		A.)		

CET458 SUSTAINABLE CONSTRUCTION

Course Outcomes: After completion of the course the student will be able to:

CO 1	Explain the fundamental concepts of sustainability
CO 2	Describe the properties and uses of sustainable building materials
CO 3	Identify suitable construction techniques and practices for sustainable buildings
CO 4	Discuss the standards and guidelines for sustainable buildings
CO 5	Comment on the role of BIM and automation in sustainable construction

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	-	-	-	-	2	3	-	-/	-	-	2
CO 2	2	- \	-	1	-	2	3	-	-	-	-	2
CO 3	2	-	1	. '	20	2	3	-	-	-	-	2
CO 4	2	-	-	1	-	2	3	-	-	-	-	2
CO 5	2	-	-	,		2	3	-	-	-	-	2

CET464 AIRQUALITY MANAGEMENT

Course outcome : After the course, the student will able to:

CO1	Explain the sources of air pollution and different types of air pollutant.
CO2	Describe the effect of air pollutants on vegetation, animals, materials and human health.
CO3	Discuss the different methods of ambient air quality monitoring system which supports an air quality management program.
CO4	Explain the meteorological aspects of air pollutant dispersion.
CO5	Describe the various air pollution control strategies that can be undertaken to meet the air quality goals.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			//	E	s 2 d	2					
CO2	3					2	1	//				
CO3	3					2	2					
CO4	3					3	2	//				
CO5	3				2	2 4	2					

CED416 PROJECT PHASE II

Course Outcomes: After successful completion of the course the student will be able to

CO1	Model and solve real world problems by applying knowledge across domains									
COI	(Cognitive knowledge level: Apply).									
CO2	Develop products, processes or technologies for sustainable and socially relevant									
1002	applications (Cognitive knowledge leve <mark>l: Apply</mark>).									
CO3	Function effectively as an individual and as a leader in diverse teams and to									
1003	comprehend and execute designated tasks (Cognitive knowledge level: Apply).									
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical									
1004	and professional norms (Cognitive knowledge level: Apply).									
COS	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).									
1005	(Cognitive knowledge level: Analyze).									
C06	Organize and communicate technical and scientific findings effectively in written and									
1000	oral forms (Cognitive knowledge level: Apply).									

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

MINORS - CED482 MINI PROJECT

COl	Identify and synthesize problems and propose solutions to them.								
CO2	Prepare work plan and liaison with the team in completing as per schedule.								
соз	Validate the above solutions by theoretical calculations and through experimental								
CO4	Write technical reports and develop proper communication skills.								
CO5	Present the data and defend ideas.								

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
COl	3	3	3	3					3	3		2
CO2	3			3				3	3	3	3	
CO3	3	3	3	3	3					3		
CO4					3			3	3	3		1
CO5	3	3	3	3				3		3	3	1

^{*1-}slight/low mapping, 2- moderate/medium mapping, 3-substantial/high mapping

HONOURS - CED496 MINI PROJECT

COl	Identify and synthesize problems and propose solutions to them.									
CO2	Prepare work plan and liaison with the team in completing as per schedule.									
CO3	Validate the above solutions by theoretical calculations and through experimental									
CO4	Write technical reports and develop proper communication skills.									
CO5	Present the data and defend ideas.									

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

^{*1-}slight/low mapping, 2- moderate/medium mapping, 3-substantial/high mapping