

# MAT 101 LINEAR ALGEBRA AND CALCULUS

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

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

[illegible]

## 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

**Mapping of course outcomes with program outcomes**

	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	2						1	2			1
CO 2	3	2						1	2			1
CO 3	3	2						1	2			1
CO 4	3							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.

### Mapping of course outcomes with program outcomes

	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							
CO 3	1	1		1	2							
CO 4	2	1										
CO 5	1			1			3					

## 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

**Mapping of course outcomes with program outcomes**

	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	3											
CO 3	3	1										
CO 4	3									1		
CO 5	3									2		
CO 6	3				3					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
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
CO 11	Describe the basic manufacturing, metal joining and machining processes

### Mapping of course outcomes with program outcomes

	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	-	-	-	-	3	2	2	-	-	-	-
CO2	3	2	-	1	3	-	-	3	-	-	-	-
CO3	3	2	-	-	3	-	-	-	2	-	-	-

[illegible]



# 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

### Mapping of course outcomes with program outcomes

[illegible]

## 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

**Mapping of course outcomes with program outcomes**

	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	2	2	1	3
CO 2									3			2
CO 3						1			1	3		
CO 4										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

### Mapping of course outcomes with program outcomes

	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			1	2			1
CO 2	3				3			1	2			1
CO 3	3				3			1	2			1
CO 4	3				3			1	2			1
CO 5	3				3			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

**Mapping of course outcomes with program outcomes**

	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				2							3
CO 2	3				3							3
CO 3	3				3							3
CO 4	3				3							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
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

Mapping of course outcomes with program outcomes:

[illegible][illegible]

## 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

### Mapping of course outcomes with program outcomes

	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
CO 2	2	-	-	-	-	-	-	-	-	1	-	-
CO 3	2	-	-	1	-	1	-	1	2	2	-	2
CO 4	3	-	-	-	-	-	-	-	-	-	-	2
CO 5	3	-	-	-	2	-	-	-	-	-	-	2
CO 6	3	-	-	-	2	-	-	-	-	-	-	1
CO 7	-	-	-	-	-	-	-	-	3	2	-	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

#### Mapping of course outcomes with program outcomes

	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			1	2		2
CO 4	3	3	3	3	2	1			1	2		2
CO 5	3	3	3	3	2	1			1	2		2



## PHT 110 ENGINEERING PHYSICS B

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

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**Mapping of course outcomes with program outcomes**

	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	2						1	2			1
CO 2	3	2						1	2			1
CO 3	3	2						1	2			1
CO 4	3							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

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	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							
CO 3	1	1		1	2							
CO 4	2	1										
CO 5	1			1			3					



principles and theorems related to rigid body mechanics

and describe the components of system of forces acting on the rigid body

the conditions of equilibrium to various practical problems involving

appropriate theorems, principles or formulae to solve problems of mech

problems involving rigid bodies, applying the properties of distributed area

[illegible][illegible]

**Mapping of course outcomes with program outcomes (Minimum requirement)**

[illegible]

## 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
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**Mapping of course outcomes with program outcomes**

	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	3											
CO 3	3	1										
CO 4	3									1		
CO 5	3									2		
CO 6	3				3					3		

## EST 120 BASICS OF CIVIL & MECHANICAL ENGINEERING

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CO 1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
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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
CO 11	Describe the basic manufacturing, metal joining and machining processes

#### Mapping of course outcomes with program outcomes

[illegible]

# EST 130 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

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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

### Mapping of course outcomes with program outcomes

[illegible]

## 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

**Mapping of course outcomes with program outcomes**

	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		2
CO 2										1		3
CO 3						1			1	3		
CO 4										3		1
CO 5		1							2	3		
CO 6	1					1			1	3		



## EST 102 PROGRAMING IN C

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

<b>CO 1</b>	Analyze a computational problem and develop an algorithm/flowchart to find its solution
<b>CO 2</b>	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
<b>CO 3</b>	Write readable C programs with arrays, structure or union for storing the data to be processed
<b>CO 4</b>	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
<b>CO 5</b>	Write readable C programs which use pointers for array processing and parameter passing
<b>CO 6</b>	Develop readable C programs with files for reading input and storing output
readable* - readability of a program means the following: <ol style="list-style-type: none"> <li>1. Logic used is easy to follow</li> <li>2. Standards to be followed for indentation and formatting</li> <li>3. Meaningful names are given to variables</li> <li>4. Concise comments are provided wherever needed</li> </ol>	

### Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	✓	✓	✓	✓		✓				✓	✓	✓
<b>CO2</b>	✓	✓	✓	✓	✓					✓		✓
<b>CO3</b>	✓	✓	✓	✓	✓					✓		✓
<b>CO4</b>	✓	✓	✓	✓	✓					✓	✓	✓
<b>CO5</b>	✓	✓			✓					✓		✓
<b>CO6</b>	✓	✓			✓					✓		✓

## 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

**Mapping of course outcomes with program outcomes**

	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			1	2			1
CO 2	3				3			1	2			1
CO 3	3				3			1	2			1
CO 4	3				3			1	2			1
CO 5	3				3			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
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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

**Mapping of course outcomes with program outcomes**

	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				2							3
CO 2	3				3							3
CO 3	3				3							3
CO 4	3				3							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
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

**Mapping of course outcomes with program outcomes:**

[illegible]

## 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

### Mapping of course outcomes with program outcomes

	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
CO 2	2	-	-	-	-	-	-	-	-	1	-	-
CO 3	2	-	-	1	-	1	-	1	2	2	-	2
CO 4	3	-	-	-	-	-	-	-	-	-	-	2
CO 5	3	-	-	-	2	-	-	-	-	-	-	2
CO 6	3	-	-	-	2	-	-	-	-	-	-	1
CO 7	-	-	-	-	-	-	-	-	3	2	-	2







## CET205 SURVEYING & GEOMATICS

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

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

### Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>CO 1</b>	3	3		2	2							
<b>CO 2</b>	3	3		2								
<b>CO 3</b>	3	3						1	2			
<b>CO 4</b>	3	2										
<b>CO 5</b>	3	2	1	1				1	2			
<b>CO 6</b>	3			2	2			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.

### Mapping of course outcomes with program outcomes

	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					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

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

### Mapping of course outcomes with program outcomes

	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO1 0</b>	<b>PO1 1</b>	<b>PO1 2</b>
<b>CO 1</b>								2			2	
<b>CO 2</b>								2			2	
<b>CO 3</b>								3			2	
<b>CO 4</b>								3			2	
<b>CO 5</b>								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

**Mapping of course outcomes with program outcomes**

	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	3					2
CO 2						2	3					2
CO 3						2	3					2
CO 4						2	3					2
CO 5						2	3					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 form of 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
CO 1	3	-	-	-	-	-	-	2	3	3	-	-
CO 2	3	-	-	-	-	-	-	2	3	3	-	-
CO 3	3	-	-	-	-	-	-	2	3	3	-	-
CO 4	3	-	-	-	-	-	-	2	2	3	-	-

## CEL 203 SURVEY LAB

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

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

### Mapping of course outcomes with program outcomes

	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>CO 1</b>	3							1	2			
<b>CO 2</b>	3			1				1	2			
<b>CO 3</b>	3			1				1	2			
<b>CO 4</b>	3			1	3			1	2			2
<b>CO 5</b>	3				3			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)

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

[illegible]



## CET206 TRANSPORTATION ENGINEERING

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

	Description
<b>CO No.</b>	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

### Mapping of course outcomes with program outcomes

	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.

### Mapping of course outcomes with program outcomes

	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					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.

### Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2
CO 1								2			2	
CO 2								2			2	
CO 3								3			2	
CO 4								3			2	
CO 5								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

### Mapping of course outcomes with program outcomes

	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	2		2		
CO 2						3	3	3		3		
CO 3						3	2	3		3		
CO 4						3	2	3		3		
CO 5						3	2	3		3		
CO 6						3	3	3		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.

### Mapping of course outcomes with program outcomes:

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
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

## 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
CO 1	2	2	-	-	-	-	-	2	3	-	-	-
CO 2	2	2	-	-	-	-	-	2	3	-	-	-
CO 3	3	3	-	2	-	-	-	2	3	3	-	-
CO 4	1	-	-	-	-	-	-	2	2	3	-	-

## 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

**Mapping of course outcomes with program outcomes (Minimum requirement)**

[illegible]





## 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

**Mapping of course outcomes with program outcomes (Minimum requirement)**

[illegible]

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

### CO - PO Mapping

CET307 Hydrology and Water Resources		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	CO1	3	3		1			1					
	CO2	3	3					1					
	CO3	3	2					1					
	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

**Mapping of course outcomes with program outcomes**(Minimum requirement)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					1	1	1		1		1
CO2	3					1		1		1		1
CO3	3					1				1		1
CO4	3					2	1			1		1
CO5	3	2				1				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: <b>Understand</b> ).
CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: <b>Understand</b> ).
CO3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: <b>Understand</b> ).
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: <b>Apply</b> )
CO5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: <b>Understand</b> ).
CO6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: <b>Understand</b> ).

### Mapping of course outcomes with program outcomes

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

### Mapping of course outcomes with program outcomes:

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
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



## CEL 333 GEOTECHNICAL ENGINEERING LAB

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

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
CO1	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				2	2		





## 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)

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







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

## CEL 334 CIVIL ENGINEERING SOFTWARE LAB

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

Course Outcome	Course Outcome Description
CO1	To undertake analysis and design of multi-storeyed framed structure, schedule a 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.

Mapping of course outcomes with program outcomes:

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
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



## 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

**Mapping of course outcomes with program outcomes:**

	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO12
CO1	3	3	3	1	-	3	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: <b>Apply</b> ).
CO2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: <b>Analyze</b> ).
CO3	Prepare a presentation about an academic document (Cognitive knowledge level: <b>Create</b> ).
CO4	Give a presentation about an academic document (Cognitive knowledge level: <b>Apply</b> ).
CO5	Prepare a technical report (Cognitive knowledge level: <b>Create</b> ).

**Mapping of course outcomes with program outcomes:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO1</b>	2	2	1	1		2	1					3
<b>CO2</b>	3	3	2	3		2	1					3
<b>CO3</b>	3	2			3			1		2		3
<b>CO4</b>	3				2			1		3		3
<b>CO5</b>	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 (Cognitive knowledge level: <b>Apply</b> ).
CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: <b>Apply</b> ).
CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: <b>Apply</b> ).
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: <b>Apply</b> ).
CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: <b>Analyze</b> ).
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: <b>Apply</b> ).

### Mapping of course outcomes with program outcomes

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



## CED481 MINI PROJECT

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

<b>CO1</b>	Identify and synthesize problems and propose solutions to them.
<b>CO2</b>	Prepare work plan and liaison with the team in completing as per schedule.
<b>CO3</b>	Validate the above solutions by theoretical calculations and through experimental
<b>CO4</b>	Write technical reports and develop proper communication skills.
<b>CO5</b>	Present the data and defend ideas.

### Mapping of course outcomes with program outcomes

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

**Mapping of course outcomes with program outcomes (Minimum requirement)**

[illegible]

## 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

**Mapping of course outcomes with program outcomes (Minimum requirement)**

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

## 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

**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	2	-	-	-	-	2	3	-	-	-	-	2
CO 2	2	-	-	-	-	2	3	-	-	-	-	2
CO 3	2	-	-	-	-	2	3	-	-	-	-	2
CO 4	2	-	-	-	-	2	3	-	-	-	-	2
CO 5	2	-	-	-	-	2	3	-	-	-	-	2

## CET464 AIRQUALITY MANAGEMENT

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

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

**Mapping of course outcomes with program outcomes**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
<b>CO1</b>	3					2	2					
<b>CO2</b>	3					2	1					
<b>CO3</b>	3					2	2					
<b>CO4</b>	3					3	2					
<b>CO5</b>	3					2	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 (Cognitive knowledge level: <b>Apply</b> ).
CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: <b>Apply</b> ).
CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: <b>Apply</b> ).
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: <b>Apply</b> ).
CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: <b>Analyze</b> ).
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: <b>Apply</b> ).

### Mapping of course outcomes with program outcomes

	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

<b>CO1</b>	Identify and synthesize problems and propose solutions to them.
<b>CO2</b>	Prepare work plan and liaison with the team in completing as per schedule.
<b>CO3</b>	Validate the above solutions by theoretical calculations and through experimental
<b>CO4</b>	Write technical reports and develop proper communication skills.
<b>CO5</b>	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
<b>CO1</b>	3	3	3	3					3	3		2
<b>CO2</b>	3			3				3	3	3	3	
<b>CO3</b>	3	3	3	3	3					3		
<b>CO4</b>					3			3	3	3		1
<b>CO5</b>	3	3	3	3				3		3	3	1

\*1-slight/low mapping, 2- moderate/medium mapping, 3-substantial/high mapping

## HONOURS - CED496 MINI PROJECT

<b>CO1</b>	Identify and synthesize problems and propose solutions to them.
<b>CO2</b>	Prepare work plan and liaison with the team in completing as per schedule.
<b>CO3</b>	Validate the above solutions by theoretical calculations and through experimental
<b>CO4</b>	Write technical reports and develop proper communication skills.
<b>CO5</b>	Present the data and defend ideas.

**Mapping of course outcomes with program outcomes**

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

\*1-slight/low mapping, 2- moderate/medium mapping, 3-substantial/high mapping