

**GOVT. POLYTECHNIC, KORAPUT**  
**LESSON PLAN (ENGG. MATHEMATICS I)**

Discipline: All	Semester: 1 <sup>st</sup>	Name of the teaching faculty: Sri D P Tripathy, Lect.
Subject: Engg. Mathematics I(Th-3)	No. of days/week class allotted: 6	Semester from date 26/10/2022 To date: 31/01/2023 No. of weeks: 15
COURSE OUTCOMES		<ol style="list-style-type: none"> <li>1. Understand Matrices and solve problems related to it.</li> <li>2. Use Trigonometry to solve related problems.</li> <li>3. Solve Problems based upon Co-ordinate Geometry in 2D (Straight Line &amp; Circle).</li> <li>4. To understand the concepts of Co-ordinate Geometry in 3D and use it to solve Engg. Problems.</li> </ol>
Week	Class Day	Theory Topics
1 <sup>st</sup>	1 <sup>st</sup>	<b>I: Matrices and Determinants:</b> Definition of a matrix, Element of a matrix, Row and column of matrix with examples, Types of matrices: Row matrix, Column matrix, Rectangular matrix, Square matrix, Null matrix or zero matrix with examples.
	2 <sup>nd</sup>	Types of matrices (continues): Diagonal matrix, Scalar matrix, Unit matrix or Identity matrix, Singular matrix, Regular matrix, Equality of two matrices with examples.
	3 <sup>rd</sup>	Transpose of a matrix with example, Algebra of matrices: Addition and subtraction of matrices with examples.
	4 <sup>th</sup>	Properties of matrix addition with example
	5 <sup>th</sup>	Multiplication of matrices by a scalar: Definition and properties with examples
	6 <sup>th</sup> (Tutorial class)	Solving problems on matrix addition, subtraction and multiplication of matrices by a scalar
2 <sup>nd</sup>	1 <sup>st</sup>	<b>Matrix multiplication:</b> Definition, prefactor, postfactor with examples
	2 <sup>nd</sup>	<b>Matrix multiplication</b> (continues): some more examples on matrix multiplication, Properties of matrix multiplication with examples
	3 <sup>rd</sup>	<b>Determinants:</b> Definition, Minors and cofactors, Expansion of Determinant of second and third order with examples
	4 <sup>th</sup>	Properties of determinants with examples
	5 <sup>th</sup>	Properties of determinants with examples(continues)
	6 <sup>th</sup> (Tutorial class)	Solving problems on minor, cofactor and evaluation of determinants without expanding.
3 <sup>rd</sup>	1 <sup>st</sup>	<b>Cramer's Rule:</b> Theory, Solving linear simultaneous equations by Cramer's rule(emphasis on two variables)
	2 <sup>nd</sup>	Solving some more linear simultaneous equations by Cramer's rule
	3 <sup>rd</sup>	<b>Adjoint of a matrix :</b> Definition and examples, <b>Inverse of a matrix:</b> Definition and examples(second and third order)
	4 <sup>th</sup>	Some more Examples on Inverse of a matrix
	5 <sup>th</sup>	Solution of simultaneous equations by inverse matrix method:

**GOVT. POLYTECHNIC, KORAPUT**  
**LESSON PLAN (ENGG. MATHEMATICS I)**

		Theory and example
	6 <sup>th</sup> (Tutorial class)	Solving problems on inverse of matrix, adjoint of a matrix
4 <sup>th</sup>	1 <sup>st</sup>	Solution of simultaneous equations by inverse matrix method: solving some more problems of two variables
	2 <sup>nd</sup>	Solving some important problems on determinant
	3 <sup>rd</sup>	Solving some important problems on Cramer's rule.
	4 <sup>th</sup>	<b>2. Trigonometry:</b> (Trigonometric functions and their signs, domains and ranges):trigonometric ratios and common angle measures
	5 <sup>th</sup>	ASTC rule, domains and ranges of trigonometric functions
	6 <sup>th</sup> (Tutorial class)	Discussion on ASTC rule and trigonometric ratios
5 <sup>th</sup>	1 <sup>st</sup>	Fundamental trigonometric identities, even and odd trigonometric functions
	2 <sup>nd</sup>	Compound angles: addition theorem( $\sin(\alpha + \beta)$ ), $\cos(\alpha + \beta)$ ), $\tan(\alpha + \beta)$ ), $\tan(\alpha + \beta + \gamma)$ ) and deductions
	3 <sup>rd</sup>	Multiple and sub multiple arguments with examples
	4 <sup>th</sup>	Problems on Multiple and sub multiple arguments
	5 <sup>th</sup>	Writing trigonometric ratios in acute angles
	6 <sup>th</sup> (Tutorial class)	Problem discussion on compound angles and trigonometric ratios
6 <sup>th</sup>	1 <sup>st</sup>	Periodicity of trigonometric functions, maximum value of trigonometric expressions
	2 <sup>nd</sup>	.Inverse trigonometric functions: definition and graphs
	3 <sup>rd</sup>	Useful formulae of inverse trigonometric functions
	4 <sup>th</sup>	Simple identities of inverse trigonometric functions
	5 <sup>th</sup>	Solving problems using inverse trigonometric identities
	6 <sup>th</sup> (Tutorial class)	Revision of inverse trigonometric functions
7 <sup>th</sup>	1 <sup>st</sup>	<b>3.Coordinate geometry in two dimensions:</b> Geometry in two dimensions: introduction, coordinate plane and axes, fundamental concepts
	2 <sup>nd</sup>	Internal division and external division of straight lines, internal division formula and external division formula and solving related problems
	3 <sup>rd</sup>	Distance formula with example, area of a triangle formula and problem solving
	4 <sup>th</sup>	<b>Slope:</b> Definition, slope of a line joining two distinct points(non vertical line) properties
	5 <sup>th</sup>	Condition of perpendicularity and parallelism with examples
	6 <sup>th</sup> (Tutorial class)	Problems on distance formula, division formula and slope
8 <sup>th</sup>	1 <sup>st</sup>	Locus and its equation: definition, equation of a straight line: slope intercept form, slope point form with examples
	2 <sup>nd</sup>	Equation of a straight line in: two point form, intercept form with examples
	3 <sup>rd</sup>	Equation of a straight line in: perpendicular form, general form of a straight line and deduction into different forms
	4 <sup>th</sup>	Solving problems on different forms of straight line
	5 <sup>th</sup>	Case of parallel lines: equation of a line passing through a point and parallel to a line



**GOVT. POLYTECHNIC, KORAPUT**  
**LESSON PLAN (ENGG. MATHEMATICS I)**

9 <sup>th</sup>	6 <sup>th</sup> (Tutorial class)	Problems on case of parallel lines
	1 <sup>st</sup>	Case of perpendicular lines: equation of a line passing through a point and perpendicular to a line with example
	2 <sup>nd</sup>	Pont of intersection of two lines, family of lines
	3 <sup>rd</sup>	Equation of a line passing through the intersection of two lines with examples
	4 <sup>th</sup>	Distance of a point from a line and related problem solving
	5 <sup>th</sup>	Revision of straight lines
10 <sup>th</sup>	6 <sup>th</sup> (Tutorial class)	Problem solving from family of straight lines
	1 <sup>st</sup>	<b>4. Circle:</b> Definition of a circle, Equation of circle with given centre and radius with example
	2 <sup>nd</sup>	Problems on equation of circle in centre radius form if the circle touches X-axis, Y-axis or both the axes with examples
	3 <sup>rd</sup>	Equation of a circle in end point of diameter form with examples
	4 <sup>th</sup>	General equation of a circle
	5 <sup>th</sup>	Determining centre and radius of a circle from general form
11 <sup>th</sup>	6 <sup>th</sup> (Tutorial class)	Solving Problems on circle
	1 <sup>st</sup>	Revision of circle problems
	2 <sup>nd</sup>	<b>5. Coordinate geometry in three dimensions:</b> Brief idea of three dimensional coordinate system, Distance formula with examples, section formulae with examples.
	3 <sup>rd</sup>	Solving problems on section formula, direction cosine and direction rasion with examples.
	4 <sup>th</sup>	Finding dcs from drs with examples
	5 <sup>th</sup>	Angle between two lines, condition of perpendicularity and condition of parallelism.
12 <sup>th</sup>	6 <sup>th</sup> (Tutorial class)	Problem solving on Angle between two lines, condition of perpendicularity and condition of parallelism.
	1 <sup>st</sup>	Equation of a plane: General equation of a plane, Equation of a plane passing through a point and having dcs normal to the plane with examples.
	2 <sup>nd</sup>	Angle between two planes with examples
	3 <sup>rd</sup>	Condition of parallelism and condition of perpendicularity of two planes with examples.
	4 <sup>th</sup>	Perpendicular distance of a point from a plane with examples
	5 <sup>th</sup>	Equation of a plane passing through a point and parallel to a plane with examples
13 <sup>th</sup>	6 <sup>th</sup> (Tutorial class)	Problem solving on plane
	1 <sup>st</sup>	Equation of a plane passing through a point and perpendicular to a plane with examples
	2 <sup>nd</sup>	Revision : on topic plane
	3 <sup>rd</sup>	<b>6. SPHERE:</b> Definition, equation of a sphere in centre radius form and general form with examples
	4 <sup>th</sup>	Equation of a sphere in end point of diameter form with examples
14 <sup>th</sup>	5 <sup>th</sup>	Solving problems on sphere
	6 <sup>th</sup> (Tutorial class)	Determining centre and radius of a circle from general form

GOVT. POLYTECHNIC, KORAPUT  
LESSON PLAN (ENGG. MATHEMATICS I)

	1 <sup>st</sup>	Revision: chapter 1
	2 <sup>nd</sup>	Revision: chapter 2
	3 <sup>rd</sup>	Revision: chapter 3
	4 <sup>th</sup>	Revision: chapter 4
	5 <sup>th</sup>	Revision: chapter 5
	6 <sup>th</sup> (Tutorial class)	Revision: chapter 6
15 <sup>th</sup>	1 <sup>st</sup>	Discussion of problems of previous year question paper
	2 <sup>nd</sup>	Discussion of important questions of 2 marks
	3 <sup>rd</sup>	Discussion of important questions of 5 marks
	4 <sup>th</sup>	Discussion of important questions of 10 marks
	5 <sup>th</sup>	Discussion of important questions of 2 marks
	6 <sup>th</sup> (Tutorial class)	Discussion of important questions of 5 marks
16 <sup>th</sup>		Revision
17 <sup>th</sup>		Revision

*Debi Prasad*  
28/10/22  
(HOD Maths & C)

*Debi Prasad Tripathy*

Submitted by

Sri Debi Prasad Tripathy

Lect. Mathematics