LESSON PLAN

SUBJECT: ENGG. MATHEMATICS I

BRANCH: COMMON

SEMESTER: 1ST (2022-23)

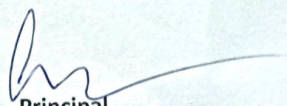NAME OF THE FACULTY: MANAS KUMAR MAHALIK

NIRMALYA GOBINDA DAS

GOVERNMENT POLYTECHNIC, BHADRAK

HOD, Math& Sc   Academic Coordinator   Principal
Govt. Polytechnic, Bhadrak

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

Discipline: All	Semester: 1st	Name of the teaching faculty: Manas Kumar Mahalik		
Subject: Engg. Mathematics I(Th-3)	No. of days/week class allotted: 6	Semester from date25/10/2022 To date:31/01/2023 No. of weeks: 14		
Week	Class Day	Theory Topics		
1st	1st	**1: Matrices and Determinants:** 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.		
	2nd	Types of matrices (continues):Diagonal matrix, Scalar matrix, Unit matrix or Identity matrix, Singular matrix, Regular matrix, Equality of two matrices with examples.		
	3rd	Transpose of a matrix with example, Algebra of matrices: Addition and subtraction of matrices with examples.		
	4th	Properties of matrix addition with example		
	5th	Multiplication of matrices by a scalar: Definition and properties with examples		
	6th (Tutorial class)	Solving problems on matrix addition , subtraction and multiplication of matrices by a scalar		
2nd	1st	**Matrix multiplication:** Definition, prefactor, postfactor with examples		
	2nd	**Matrix multiplication** (continues): some more examples on matrix multiplication, Properties of matrix multiplication with examples		
	3rd	Determinants: Definition, Minors and cofactors, Expansion of Determinant of second and third order with examples		
	4th	Properties of determinants with examples		
	5th	Properties of determinants with examples(continues)		
	6th (Tutorial class)	Solving problems on minor, cofactor and evaluation of determinants without expanding.		
3rd	1st	Cramer's Rule: Theory, Solving linear simultaneous equations by Cramer's rule(emphasis on two variables)		
	2nd	Solving some more linear simultaneous equations by Cramer's rule		
	3rd	Adjoint of a matrix : Definition and examples, Inverse of a matrix:Definition and examples(second and third order)		
	4th	Some more Examples on Inverse of a matrix		
	5th	Solution of simultaneous equations by inverse matrix method: Theory and example		
	6th (Tutorial class)	Solving problems on inverse of matrix, adjoint of a matrix		
4th	1st	Solution of simultaneous equations by inverse matrix method: solving some more problems of two variables		
	2nd	Solving some important problems on determinant		
	3rd	Solving some important problems on Cramer's rule.		
	4th	**2. Trigonometry:**(Trigonometric functions and their signs, domains and ranges):trigonometric ratios and common angle measures		

	5th	ASTC rule, domains and ranges of trigonometric functions
	6th (Tutorial class)	Discussion on ASTC rule and trigonometric ratios
5th	1st	Fundamental trigonometric identities, even and odd trigonometric functions
	2nd	Compound angles: addition theorem($\sin(\alpha+\beta)$,$\cos(\alpha+\beta)$,$\tan(\alpha+\beta)$,$\tan(\alpha+\beta+\gamma)$) and deductions
	3rd	Multiple and sub multiple arguments with examples
	4th	Problems on Multiple and sub multiple arguments
	5th	Writing trigonometric ratios in acute angles
	6th (Tutorial class)	Problem discussion on compound angles and trigonometric ratios
6th	1st	Periodicity of trigonometric functions, maxmimum value of trigonometric expressions
	2nd	.Inverse trigonometric functions: definition and graphs
	3rd	Useful formulae of inverse trigonometric functions
	4th	Simple identities of inverse trigonometric functions
	5th	Solving problems using inverse trigonometric identities
	6th (Tutorial class)	Revision of inverse trigonometric functions
7th	1st	**3.Coordinate geometry in two dimensions:** Geometry in two dimensions: introduction, coordinate plane and axes, fundamental concepts
	2nd	Internal division and external division of straight lines, internal division formula and external division formula and solving related problems
	3rd	Distance formula with example, area of a triangle formula and problem solving
	4th	**Slope:** Definition , slope of a line joining two distinct points(non vertical line) properties
	5th	Condition of perpendicularity and parallelism with examples
	6th (Tutorial class)	Problems on distance formula, division formula and slope
8th	1st	Locus and its equation: definition, equation of a straight line: slope intercept form , slope point form with examples
	2nd	Equation of a straight line in: two point form, intercept form with examples
	3rd	Equation of a straight line in: perpendicular form, general form of a straight line and deduction into different forms
	4th	Solving problems on different forms of straight line
	5th	Case of parallel lines: equation of a line passing through a point and parallel to a line
	6th (Tutorial class)	Problems on case of parallel lines
9th	1st	Case of perpendicular lines: equation of a line passing through a point and perpendicular to a line with example
	2nd	Pont of intersection of two lines, family of lines
	3rd	Equation of a line passing through the intersection of two lines with examples
	4th	Distance of a point from a line and related problem solving
	5th	Revision of straight lines
	6th (Tutorial class)	Problem solving from family of straight lines
10th	1st	**4. Circle:** Definition of a circle, Equation of circle with given

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

Manas Kumar Mahala

Mahala 24/10/22

Signature of subject Lecturer

24/10/22

Signature of HOD, Math& Sc.

ENGG. MATHEMATICS I

WINTER 2022