

Academic Lesson Plan for Engg. Mathematics (Winter-2023)

Discipline: Civil, Elect, A.A.,ETC,Mech., I.T.	Semester: 1st	Name of the teaching faculty: Sri Kishore kumar Adek Miss Sushree Swadhinpriya Mohapatra Sri Niranjana Behera
Subject: Engg. Mathematics	No. of days/per week Class Allotted: 6	Semester from: 16/08/2023-11/12/2023
		No. of weeks: 16
Week	Class day	Theory Topics
1st	1st	What is matrix, definition, row matrix, column matrix, null matrix Examples base this theory.
	2nd	Unit matrix, singular matrix and non-singular matrix with examples.
	3rd	Addition, subtraction of matrix with examples.
	4th	Multiplication of a scalar matrix, matrix multiplication with examples.
2nd	1st	What is determinant, definition, how to find determinant with examples.
	2nd	All properties of determinant.
	3rd	Examples bases on properties.
	4th	Definition of minors and cofactors and examples base on it .
	5th	What is adjoint matrix with examples.
	6th	Properties of adjoint matrix with more examples on adjoint matrix .
3rd	1st	Doubts clear and quiz.
	2nd	What is Cramer's rule. Theory base on Cramer's rule.
	3rd	Examples on Cramer's rule.
	4th	Properties and examples.
	5th	Doubts and quiz.
4th	1st	What is simultaneous equation .How to convert into matrix form, with examples.
	2nd	How to solve simultaneous equation with examples.
	3rd	Introduction to measurement of different angles and trigonometric ratios

	4th	Doubts and quiz.
	5th	Class test on above.
5th	1st	Introduction to measurement of different angles and trigonometric ratios.
	2 nd	Trigonometric functions and Identity-1
	3 rd	Quadrants and Signs of T-ratios, Limits of T – ratios and ASTC rules
	4 th	Introduction to measurement of different angles and trigonometric ratios.
	5th	Theorem-1,2,3: (Addition Theorems)
	6th	Prove that $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ = 0$ and similar problems Prove that If $A+B+C=\pi$ $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \sin B \sin C$ and more problems
6th	1st	Transformation of a Product into a Sum or Difference, and Vice-versa
	2nd	Compound, Multiple and Sub Multiple Angles Multiple and Sub Multiple Arguments
	3rd	Find $\sin 18^\circ, \cos 36^\circ, \sin 22\frac{1}{2}^\circ, \cos 22\frac{1}{2}^\circ$ Prove that $\cos \frac{\pi}{16} = \sqrt{2 + \sqrt{2 + \sqrt{2}}}$
	4th	INVERSE TRIGONOMETRIC FUNCTIONS
7 th	1st	Properties of Inverse Trigonometric Functions 1. Self adjusting property
	2nd	2. Reciprocal Property 3. Conversion property
	3rd	Problems on inverse trigonometry
	4th	Doubts and quiz
	5th	Introduction to 2D, and some fundamental concepts, coordinate system, Representation of any point (x, y) on the cartesian plane
8th	1st	Distance formula , section formula ,Midpoint formula and examples
	2nd	Centroid Formula, Incentre of a triangle and solved problems
	3rd	Area of Triangle, collinearity of three points, examples
	4th	Slope or Gradient of a line, slope of a line joining two points and some examples
9th	1st	Condition of perpendicularity and parallelism, problems
	2nd	Intercepts of a line on the axes, Different forms of straight line((i)Slope intercept form (ii) one point form) and examples
	3rd	(iii)Two point form,(iv)intercept form and problems

	4th	(v)Normal form/Perpendicular form and some solved problems
	5th	Problems on all of the above, Transformation of general equation in different standard forms and examples
10th	1st	Equation of a line passing through a point (i)parallel to a line(ii)perpendicular to a line and examples
	2nd	Intersection of two lines, concurrency , perpendicular distance ,Distance between two parallel lines and problems
	3rd	Doubt clearing and quiz
	4th	Introduction to Circle and its equation in centre Radius form
	5th	some particular cases and examples
11th	1st	General Equation circle and examples
	2nd	Equation of circle passing through three points and examples
	3rd	Equation of a circle with given end points of a diameter and some problems
	4th	Some problems and exercise
	5th	More problems on circle
	6th	Introduction to 3-D,Distance formula and examples
12th	1st	Section formula, Direction cosines ,Direction ratios and Examples
	2nd	Direction Ratios and Direction cosines and examples
	3rd	Projection of the line segment on another line. Angle between two line. Condition of parallelism and perpendicular
	4th	Problems on the above and exercise
	5th	Section formula, Direction cosines ,Direction ratios and Examples
	6th	Equation of plane in general form and examples
13th	1st	Problems on above, exercises
	2nd	Equation of plane passing through a point and whose normal has given directional cosines
	3rd	(i)Equation of plane passing through three given points and coplanar conditions for four points and examples
	4th	(ii)Equation of plane parallel to a given line (iii)Equation of plane passing through intersection of two given planes and examples
	5th	Equations of plane in different form (i) Normal form and examples
	6th	(ii)intercept form and examples on the above

14th	1st	Angle between two intersecting lines and some special case and examples
	2nd	Perpendicular distance of a point from the line and some problems
	3rd	Doubt clearing and quiz
	4 th	Introduction to sphere
	5 th	Equation of sphere having centre at (a, b, c) and radius r and some problems
	6th	General form of sphere and some problems on it
15th	1st	Equation of sphere when end points of diameter are given and examples
	2nd	Equation of sphere passing through four given point and some problems
	3 rd	More problems on sphere and exercise problems
	4 th	Doubt clearing and quiz
	5th	Revision classes
	6th	Revision classes
16th	1 st	Revision classes
	2 nd	Previous year semester question discuss
	3 rd	Previous year semester question discuss
	4th	Class test according to semester question pattern
	6th	Doubt clearing and quiz

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Signature of Faculty