

Engineering Mathematics-II

Lesson Plan (Theory)

Discipline: Civil/Electrical /Mechanical/ CSE Engg.	Semester: 2 nd	Name of the Teaching Faculty: Manas Ranjan Sahu
Subject: Engg. Mathematics-II (Th 3)	No. of days/week class allotted: 5	Semester from date: 29.01.2024 To date: 14.05.2024 No. of weeks: 15
Week	Class Day	Theory Topics
1st	1 st	<u>Chapter-I(Vector Algebra)</u> Introduction of scalar & vector, Representation of vector. Magnitude and direction of a vector, Types of vector- Null Vector, Unit Vector, Parallel Vector, Negative Vector, Co-initial & Co-terminal Vector, Co-planer Vector and Equal Vector
	2 nd	Vector Operation: Triangle law of Vector Addition. Properties of vector addition. Parallelogram law of vector addition. Multiplication of a vector with a scalar.
	3 rd	Position vector of a point. Section formula
	4 th	Problem practice base on the previous class
	5 th	Analytical Problem proof using vector method
2nd	1 st	Component form of vectors: 2D & 3D. addition and scalar multiplication of vectors, magnitude and unit vector in terms of component form
	2 nd	Problem practice base on the previous class
	3 rd	Multiplication of vectors: (i)Scalar Product or Dot Product and its properties
	4 th	Angle between vectors, scalar and vector projection
	5 th	Problem practice base on the previous class
3rd	1 st	(ii)Vector Product or Cross Product and its properties
	2 nd	Geometrical meaning of cross product, Angle between vectors
	3 rd	Area of triangle and parallelogram
	4 th	Prove of some trigonometric Identities using vector method
	5 th	Problem practice base on the previous class
4th	1 st	<u>Chapter-II(Limits and Continuity)</u> Define Relations and Functions. Define Domain & Range Types of Functions: 1.Constant Function,

		2.Identity Function
	2 nd	3. Absolute Value function, 4. Greatest integer function, 5. Trigonometric functions 6. Exponential function 7. Logarithmic functions
	3 rd	Algebraic Functions and Transcendental Functions. Introduction of limits
	4 th	Existence of Limit. Algebra of Limit, indeterminate forms
	5 th	Evaluation of Limit: 1.Limit of Algebraic Function a. Limit of polynomial function b. Limit of rational function
5th	1st	c. Limit of irrational function
	2 nd	2.Limit of Trigonometric function
	3 rd	3. Limit of exponential function
	4 th	4. Limit of logarithmic function
	5 th	5. Limit at infinite
6th	1st	Continuity of a function at a point
	2 nd	Problem practice base on the previous class
	3 rd	<u>Chapter-III(Derivatives)</u> Derivative of a function at a point. Derivative of some standard functions using AB-intio method such as 1.Constant function, 2. $f(x)=x^2, x^3, x^n$, 3. $f(x)=e^x$, 4. $f(x)=a^x$,
	4 th	5. $f(x)=\log x$, 6. Derivative of all trigonometric functions like $\sin x$, $\cos x$, $\tan x$, $\cot x$, $\sec x$, $\csc x$, and all all inverse trigonometric functions
	5 th	Algebra of derivative: Sum, Product and Quotient rules with examples
7th	1st	Problem practice base on the previous class
	2 nd	Derivative of Composite functions(Use of chain rule)
	3 rd	Problem practice base on the previous class
	4 th	Method of Differentiations: 1.Parametric functions with examples
	5 th	2. Derivative of Implicit functions with examples
8th	1st	3. Derivative using logarithmic function with examples
	2 nd	4. Derivative of a function w.r.t another functions with examples
	3 rd	Problem practice base on the previous class
	4 th	Problem practice base on the previous

		class
	5 th	Problem practice base on the previous class
9th	1st	Application of Derivative: Successive differentiation up to 2 nd order
	2 nd	Problem practice base on the previous class
	3 rd	Problem practice base on the previous class
	4 th	Define partial derivative with some example
	5 th	Problem practice base on the previous class
10th	1st	Problem practice base on the previous class
	2 nd	Problem practice base on the previous class
	3 rd	Problem practice base on the previous class
	4 th	Chapter-IV(Integration) a) Definition of integration as inverse of differentiation b) Integral of standard functions (List of formulas) Algebra of Integrations.
	5 th	c)Method of integration: (i) Integration by method of substitutions
11th	1st	ii) Integration by parts with examples
	2 nd	Problem practice base on the previous class
	3 rd	d)Integration of the following types (i) $\int \frac{dx}{x^2 + a^2}$, (ii) $\int \frac{dx}{x^2 - a^2}$ or $\int \frac{dx}{a^2 - x^2}$, (iii) $\int \frac{dx}{\sqrt{x^2 + a^2}}$ with example
	4 th	$\int \frac{dx}{\sqrt{x^2 - a^2}}$, $\int \frac{dx}{\sqrt{a^2 - x^2}}$, $\int \frac{dx}{x\sqrt{x^2 - a^2}}$ with examples
	5 th	$\int \sqrt{a^2 - x^2} dx$, $\int \sqrt{a^2 + x^2} dx$, $\int \sqrt{x^2 - a^2} dx$
12th	1st	Problem practice base on the previous class
	2 nd	Problem practice base on the previous class
	3 rd	Definite integrals and its properties
	4 th	Examples
	5 th	Problem practice base on the previous class
13th	1st	Problem practice base on the previous class
	2 nd	Application of integration i) Area enclosed by a curve and X-axis and example

	3 rd	ii) Area of a circle with centre at origin
	4 th	Chapter-V(Differential Equation) Definition of ODE, PDE, a) Order and degree of a differential equation
	5 th	Determining Order and degree of a differential equation with examples
14th	1 st	b) Solution of differential equation Definition i) By method of separation of variable with examples
	2 nd	method of separation of variable continues with problem solving
	3 rd	Some more problems on separation of variables
	4 th	ii) Linear equation -example
	5 th	Solving linear equation $\frac{dy}{dx} + Py = Qx$ where P, Q are functions of x
15th	1 st	Problems on linear differential equation
	2 nd	Some more Problems on linear differential equation
	3 rd	Revision of differential equation
	4 th	Previous year question discussion
	5 th	Previous year question discussion