

PADMASHREE KRUTARTHA ACHARYA INSTITUTE OF  
ENGINEERING & TECHNOLOGY, BARGARH



*PROGRESS REGISTER*  
Session-2022-2023

Discipline: Mechanical Engg.

Semester: 2nd      Section-D      Subject: Engg. Mathematics-II

Name of the Teaching Faculty: Mr. Rajaram Sahu

Subject: Eng. Mathematics-II No. of Days/per week class allotted 02

Semester From Date: 20.3.2023 To Date: 24.6.2023 No. of Weeks: 14

Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
20.3.2023	Vector	Definition of vector, Scalar	Vector, Scalar, Examples Representation	<u>Rahul</u>
21.3.2023	Vector	Types of vector	Null, Parallel, collinear	<u>Rahul</u>
22.3.2023	Vector	Types of vector	co-initial, like, unlike vector	<u>Rahul</u>
23.3.2023	Vector	Representation of a vector by a line	Direction, Magnitude	<u>Rahul</u>
24.3.2023	Vector	Vector operation	Parallelogram law of vector addition, subtraction	<u>Rahul</u>
25.3.2023	Vector	Vector operation	Multiplication of a vector by scalar, Parallel vector properties	<u>Rahul</u>
27.3.2023	Vector	Position vector	Vector with position vector, component vectors	<u>Rahul</u>
28.3.2023	Vector	Component vector	Magnitude unit vector, Example	<u>Rahul</u>
29.3.2023	Vector	Algebraic operations in component vector	Addition, Subtraction, scalar multiplication	<u>Rahul</u>
31.3.2023	Vector	Scalar product	Dot product, angle between two vectors	<u>Rahul</u>
3.4.2023	Vector	Scalar product	Parallel and perpendicular condition of vectors	<u>Rahul</u>

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Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
4.4.2023	Vector	Geometrical meaning of dot product	Meaning, scalar & vector projection	<u>Reahm</u>
5.4.2023	Vector	Vector Product	Cross product angle between two vectors	<u>Reahm</u>
6.4.2023	Vector	vector Product	Parallel and perpendicular condition	<u>Reahm</u>
8.4.2023	Vector	Geometrical meaning of cross product	Explaining Examples	<u>Reahm</u>
10.4.2023	Vector	vector Product	Area of a triangle, parallelogram	<u>Reahm</u>
11.4.2023	<del>Differentiable</del> Limit and continuity	Definition of function	Relation, Type of relation, many-one relation, Defn of function	<u>Reahm</u>
12.4.2023	Limit and Continuity	Types of function	Constant, identity, Absolute Value function	<u>Reahm</u>
13.4.2023	Limit and continuity	Types of function	The greatest integer func, Trigonometric func, Exponential func	<u>Reahm</u>
15.4.2023	Limit and Continuity	Types of function	Logarithmic function, Examples, Properties	<u>Reahm</u>
17.4.2023	Limit and continuity	Limit	Introduction of limit, Definition, Existence of	<u>Reahm</u>
18.4.2023	Limit and continuity	Methods of Evaluation of limit	$\lim_{x \rightarrow 0} \frac{a^x - a^y}{x - y} = n \cdot a^{x-1}$ $\lim_{x \rightarrow 0} \frac{a^x - 1}{x}$	<u>Reahm</u>

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Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
19.4.2022	Limit and Continuity	Methods of limit	$\lim_{x \rightarrow 0} e^x - 1 = x$ $\lim_{x \rightarrow 0} (1+x)^n = 1$ $\lim_{x \rightarrow 0} \frac{1}{x} = \infty$	<u>Reahm</u>
20.4.2022	Limit and Continuity	Methods of evaluation of limit	$\lim_{x \rightarrow 0} \frac{\log(1+x)}{x} = 1$ $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ $\lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$	<u>Reahm</u>
21.4.2022	Limit and Continuity	Continuity	Continuity of a function at a point.	<u>Reahm</u>
24.4.2022	Limit and Continuity	Continuity	Continuity of polynomial function.	<u>Reahm</u>
25.4.2022	Limit and Continuity	Continuity	Continuity of trigonometric function.	<u>Reahm</u>
26.4.2022	Limit and Continuity	Continuity	Continuity of modulus and greatest integer function.	<u>Reahm</u>
27.4.2022	Derivatives	Derivative of a function at a point.	Definition of derivative of constant, $x, x^2, \sin x, \cos x$ function.	<u>Reahm</u>
28.4.2022	Derivatives	Derivative of standard function	$x^n, a^x, e^x, \log_a x$ , examples.	<u>Reahm</u>
29.4.2022	Derivatives	Derivative of standard function	$\sin x, \cos x, \tan x, \cot x, \sec x, \csc x$	<u>Reahm</u>
1.5.2022	Derivatives	Derivative of standard function	Derivative of inverse trigonometric function.	<u>Reahm</u>
2.5.2022	Derivatives	Derivative of algebraic function.	Derivative of polynomial function.	<u>Reahm</u>

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Date	Topics to be covered as per Lesson Plan	Topics actually covered	Points/contents Discussed (in brief)	Signature of Teacher
3.5.2022	Derivatives	Algebra of Derivatives	Addition of two, several functions, subtraction	<u>Reahm</u>
4.5.2022	Derivatives	Algebra of Derivatives	Product rule	<u>Reahm</u>
6.5.2022	Derivatives	Algebra of Derivatives	Division Rule	<u>Reahm</u>
8.5.2022	Derivative	Chain Rule	Derivatives of composite function	<u>Reahm</u>
9.5.2022	Derivatives	Chain rule	Derivative of algebraic function	<u>Reahm</u>
10.5.2022	Derivatives	Chain rule	Derivative of mixed algebraic & trigonometric function	<u>Reahm</u>
11.5.2022	Derivative	Method of differentiation	Derivative of parametric function	<u>Reahm</u>
12.5.2022	Derivative	Method of differentiation	Derivative of implicit function	<u>Reahm</u>
13.5.2022	Derivative	Method of differentiation	Derivative of Logarithmic function	<u>Reahm</u>
15.5.2022	Derivatives	Method of differentiation	Derivative of a function w.r. to other function	<u>Reahm</u>
16.5.2022	Derivatives	Applications of Derivative	1st order and 2nd order derivative	<u>Reahm</u>

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17.5.2023	Derivatives	Partial differentiation	partial derivative of $z$ w.r.t $x, y, z$	<u>Reahy</u>
18.5.2023	Derivatives	Partial differentiation	partial derivative of 2nd order	<u>Reahy</u>
20.5.2023	Integration	Definition of integration	$\int f(x) dx$ Integrand, integrating constant	<u>Reahy</u>
22.5.2023	Integration	Integral of standard function	$\int dx, \int x^n dx, \int \sin x dx, \int \cos x dx, \int \sec x dx, \int \csc x dx$	<u>Reahy</u>
23.5.2023	Integration	Integrals of standard function	$\int \sec x \tan x dx, \int \csc x \cot x dx, \int e^x dx, \int \frac{1}{x} dx$ Examples	<u>Reahy</u>
24.5.2023	Integration	Integrals of standard function	$\int \frac{dx}{\sqrt{1-x^2}}, \int \frac{dx}{x^2+1}, \int \frac{dx}{x\sqrt{x^2-1}}$ , Problem	<u>Reahy</u>
25.5.2023	Integration	Method of integration	Integration by substitution $\int f(g(x))g'(x) dx$ Problems	<u>Reahy</u>
26.5.2023	Integration	Method of integration	Integration by substitution $\int f'(u) du$ $\int \frac{f'(u)}{f(u)} du$ Exercise	<u>Reahy</u>
27.5.2023	Integration	Method of integration	ILATE Rule Integration by parts, Ex	<u>Reahy</u>
29.5.2023	Integration	Integrals by trigonometric substitution	$\int \frac{dx}{x^2+a^2}, \int \frac{dx}{\sqrt{x^2+a^2}}, \int \frac{dx}{\sqrt{x^2-a^2}}$ , Problems	<u>Reahy</u>
30.5.2023	Integration	Integrals by trigonometric substitution	$\int \frac{dx}{x^2-a^2}, \int \frac{dx}{a^2-x^2}, \int \frac{dx}{\sqrt{x^2-a^2}}$ , Problems	<u>Reahy</u>

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31.5.2023	Integration	Integrals by trigonometric substitution	$\int \frac{dx}{\sqrt{x^2-a^2}} = \int \frac{1}{\sqrt{u^2-1}} du$ $\int \sqrt{a^2+x^2} dx$ , $\int \sqrt{a^2-x^2} dx$ , Eu	<u>Reahy</u>
1.6.2023	Integration	Definite integral	Definition, lower and upper limit, Process of Evaluation	<u>Reahy</u>
2.6.2023	Integration	Properties of definite integral	$\int_a^b f(x) dx = \int_a^b f(a-x) dx$ $\int_a^b f(x) dx = -\int_b^a f(x) dx$ Problems	<u>Reahy</u>
3.6.2023	Integration	Properties of definite integrals	$\int_a^b f(x) dx = \int_a^c f(x) dx + \int_c^b f(x) dx$ $\int_a^a f(x) dx = 0$ if $f$ is odd $= 2 \int_a^b f(x) dx$ , $b$ is even Problems	<u>Reahy</u>
5.6.2023	Integration	Properties of definite integrals	$\int_0^{2a} f(x) dx = 0$ if $f(2a-x) = -f(x)$ $= 2 \int_0^a f(x) dx$ , $f(2a-x) = f(x)$	<u>Reahy</u>
6.6.2023	Integration	Application of definite integrals	Area between curve and x-axis	<u>Reahy</u>
7.6.2023	Integration	Application of definite integrals	Area between curve and y-axis	<u>Reahy</u>
8.6.2023	Integration	Application of definite integrals	Area between two curves	<u>Reahy</u>
9.6.2023	Integration	Application of definite integrals	Area of a circle with centre at origin	<u>Reahy</u>
10.6.2023	Differential Equations	Definition Types of differential equation	Ordinary, Partial diff eqn Formation of diff. eqn	<u>Reahy</u>
11.6.2023	Differential equation	order, degree	Definition, examples.	<u>Reahy</u>

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12.6.2023	Differential equation	Solution of differential equation.	General, particular, singular	<u>Rahm</u>
13.6.2023	Differential equation	Variable separable Method	Sol <sup>n</sup> of 1st order 1st degree differential equation	<u>Rahm</u>
16.6.2023	Differential equation	Initial value problem	Particular solution, problems	<u>Rahm</u>
17.6.2023	Differential equation	Linear, Non-linear differential equation	Definitions, Examples	<u>Rahm</u>
19.6.2023	Differential equation	General sol <sup>n</sup> of linear equation	Integrating factor, formulae, 1st order and 1st degree eqn	<u>Rahm</u>
21.6.2023	Differential equation	Initial value problem of linear eqn	1st order and 1st degree differential equation	<u>Rahm</u>
22.6.2023	Differential equation	Bernoulli equation	Reduction to 1st order linear equation.	<u>Rahm</u>
23.6.2023	Differential equation	Bernoulli equation	General solution, particular solution	<u>Rahm</u>
24.6.2023	Differential equation	2nd order and 1st degree differential equation	General and particular solution, problems	<u>Rahm</u>