

LESSON PLAN

SUBJECT: ENGG. MATHEMATICS II

BRANCH: ELECTRICAL & COMP. SCIENCE ENGG.

SEMESTER: 2ND (2023-24)

NAME OF THE FACULTY: MANAS KUMAR MAHALIK

(Lecturer in Mathematics)



GOVERNMENT POLYTECHNIC, BHADRAK

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Academic Coordinator

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Principal
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Discipline: Electrical/Comp. Sc. Engg.	Semester: 2 nd	Name of the teaching faculty: Manas Kumar Mahalik
Subject: Engg. Mathematics II Th 3	No. of days/week class allotted: 5+1	Semester from date: 29/01/2024 To date:14/05/2024 No. of weeks: 15
Week	Class Day	Theory Topics
1 st	1 st	Chapter 2: LIMITS and CONTINUITY: a) Definition of a function b) Types of functions i) Constant function, ii) identity function iii) Absolute value function iv) The greatest integer function with examples
	2 nd	v) Trigonometric function with example vi) Exponential function vii) Logarithmic function With examples
	3 rd	c) Introduction of limit: definition, example d) Existence of limit with example
	4 th	e) Methods of evaluation of limit
	5 th	Methods of evaluation of limit continues with some examples
	6 th (Tutorial class)	problems on existence of limit and evaluation of limit
2 nd	1 st	i) $\lim_{x \rightarrow 0} \frac{x^n - a^n}{x - a} = na^{n-1}$ ii) $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \log_e a$ Some problems using these formulae
	2 nd	iii) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$ iv) $\lim_{x \rightarrow 0} (1 + x)^{\frac{1}{x}} = e$ Some problems using these formulae
	3 rd	v) $\lim_{x \rightarrow \infty} (1 + \frac{1}{x})^x = e$ vi) $\lim_{x \rightarrow 0} \frac{\log(1+x)}{x} = 1$ Some problems using these formulae
	4 th	vii) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ viii) $\lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$ Some problems using these formulae
	5 th	f) Definition of continuity of a function at a point,

		Existence of continuity with example
	6 th (Tutorial class)	Problems on limit and continuity
3 rd	1 st	Chapter 3: DERIVATIVES: a) Derivative of a function at a point b) Algebra of derivative
	2 nd	c) Derivative of standard functions: $x^n, a^x, \log_a x, e^x$
	3 rd	Derivative of standard functions continues: $\sin x, \cos x, \tan x$
	4 th	Derivative of standard functions continues: $\cot x, \sec x, \csc x, \sin^{-1} x$
	5 th	Derivative of standard functions continues: $\cos^{-1} x, \tan^{-1} x, \cot^{-1} x$
	6 th (Tutorial class)	Problem solving on trigonometric functions
4 th	1 st	Derivative of standard functions continues: $\sec^{-1} x, \csc^{-1} x,$ d) Derivatives of composite function
	2 nd	Derivatives of composite function(Chain rule) continues with examples
	3 rd	Derivatives of composite function(Chain rule) continues with examples
	4 th	e) Methods of differentiation of i) Parametric function with examples
	5 th	Methods of differentiation of ii) Implicit function with examples
	6 th (Tutorial class)	Solving problems on derivatives of parametric function and implicit function
5 th	1 st	Methods of differentiation of iii) Logarithmic function with example
	2 nd	Methods of differentiation of iv) A function wrt another function with example
	3 rd	f) Applications of derivatives: i) Successive differentiation (up to second order) Some problems on successive differentiation
	4 th	Solving problems on successive differentiation
	5 th	ii) Partial differentiation (function of two variables up to second order)
	6 th (Tutorial class)	Problems on derivative of logarithmic function and successive differentiation.
6 th	1 st	Partial differentiation continues
	2 nd	Some more problems on partial differentiation
	3 rd	Revision of derivative
	4 th	Chapter 4: INTEGRATION: a) Definition of integration as inverse of differentiation b) Integral of standard functions

	5 th	c) Methods of integration: i) Integration by substitution with examples
	6 th (Tutorial class)	Problems on integration by substitution
7 th	1 st	ii) Integration by parts with examples
	2 nd	Problems on integration by parts
	3 rd	d) Integration of the following forms i) $\int \frac{dx}{x^2 + a^2}$ ii) $\int \frac{dx}{x^2 - a^2}$ iii) $\int \frac{dx}{a^2 - x^2}$ iv) $\int \frac{dx}{\sqrt{x^2 + a^2}}$ with examples
	4 th	Integration of the following forms v) $\int \frac{dx}{\sqrt{x^2 - a^2}}$ vi) $\int \frac{dx}{\sqrt{a^2 - x^2}}$ vii) $\int \frac{dx}{x\sqrt{x^2 + a^2}}$ viii) $\int \sqrt{a^2 - x^2} dx$ with examples
	5 th	Integration of the following forms ix) $\int \sqrt{a^2 + x^2} dx$ x) $\int \sqrt{x^2 - a^2} dx$ with problems
	6 th (Tutorial class)	Problems on integration by parts
8 th	1 st	e) Definite integrals and properties i) $\int_0^a f(x) dx = \int_0^a f(a-x) dx$ ii) $\int_a^b f(x) dx = -\int_b^a f(x) dx$ With problems
	2 nd	iii) $\int_a^c f(x) dx = \int_a^b f(x) dx + \int_b^c f(x) dx, a < b < c$ $\int_{-a}^a f(x) dx = 0$, if $f(x) = \text{odd}$ iv) $= 2 \int_0^a f(x) dx$, if $f(x) = \text{even}$ With examples
	3 rd	Solving problems on properties of definite integration
	4 th	f) Application of integration i) Area enclosed by a curve and X-axis and example

	5 th	
	6 th (Tutorial class)	ii) Area of a circle with centre at origin
9 th	1 st	Solving problems on application of integration
		Chapter 5: DIFFERENTIAL EQUATION: Definition, ODE, PDE,
	2 nd	a) Order and degree of a differential equation Determining Order and degree of a differential equation with examples
	3 rd	b) Solution of differential equation Definition i) By method of separation of variable with examples
	4 th	method of separation of variable continues with problem solving
	5 th	Some more problems on separation of variables
	6 th (Tutorial class)	Problems on determination of degree and order of a differential equation
10 th	1 st	ii) Linear equation example
	2 nd	Solving linear equation $\frac{dy}{dx} + Py = Q$, where P, Q are functions of x
	3 rd	Problems on linear differential equation
	4 th	Some more Problems on linear differential equation
	5 th	Revision of differential equation
	6 th (Tutorial class)	Revision of differential equation
11 th	1 st	Chapter 1: VECTOR ALGEBRA: a) Introduction: definition of scalar, vector with examples b) Types of vectors: null vector, parallel vector, collinear vectors with examples
	2 nd	c) Representation of a vector
	3 rd	d) Magnitude and direction of vectors with examples
	4 th	e) Addition and subtraction of vectors with examples
	5 th	Properties of vector addition and position vector
	6 th (Tutorial class)	Problems on magnitude and f) position vector
12 th	1 st	g) scalar product of two vectors with examples
	2 nd	h) Geometrical meaning of dot product
	3 rd	Problems on dot product
	4 th	i) Angle between two vectors with example
	5 th	j) Scalar and vector projection of two vectors with examples
	6 th (Tutorial class)	Problems on Scalar and vector projection of two vectors
13 th	1 st	k) Vector product and geometrical meaning
	2 nd	Problems on vector product

	3 rd	Revision
	4 th	Revision of previous year questions
	5 th	Revision of previous year questions
14 th	1 st	Revision of previous year questions
	2 nd	Revision of previous year questions
	3 rd	Revision of previous year questions
	4 th	Revision of previous year questions
	5 th	Revision of previous year questions
14 th	1 st	Revision of previous year questions
	2 nd	Revision of previous year questions
	3 rd	Revision of previous year questions
	4 th	Revision of previous year questions
	5 th	Revision of previous year questions

Jahalle
24/01/2024

Signature of the Faculty