LESSON PLAN

MATHEMATICS-I

PREPARED BY
JITENDRA KUMAR MALIK
(LECTURER(STAGE-II) IN MATHEMATICS)

GOVERNMENT POLYTECHNIC BARGARH

DEPARTMENT OF MATHEMATICS & SCIENCE

GOVERNMENT POLYTECHNIC BARGARH

VISION

To be a reputed polytechnic institute imparting quality technical education to produce diploma engineers with dynamic personalities and innovative competencies in the state of Odisha.

MISSION

- To offer the best and advanced lab facilities adhering to the curriculum to make future engineers.
- To engage highly qualified and competent faculties to make the student acquire the skillful knowledge required.
- To develop an excellent teaching learning environment leading to create the best institute.

SYLLABUS

NAME OF THE C0URSE: MATHEMATICS-I			
COURSE CODE	TH-3	SEMESTER	1ST
TOTAL PERIOD	60	TIMING OF END EXAMINATION	3 Hours
THEORY PERIOD	4P/Week	CLASS TEST (IA)	30
MAXIMUM MARKS	100	END SEMESTER EXAMINATION	70

COURSE CONTENTS:

UNIT - I: Trigonometry

Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and theirapplications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x.

UNIT-II: Differential Calculus

Definition of function; Concept of limits. Four standard limits

$\lim_{x\to a}\frac{sinx}{x}$, $\lim_{x\to a}\frac{x^n-a^n}{x-a}$, $\lim_{x\to a}\frac{a^x-1}{x}$, $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$, $\lim_{x\to 0}(1+x)^{\frac{1}{x}}$.

Differentiation by definition of x^n, sinx, cosx, tanx, e^x and $\log_a x$ .Differentiation of sum,product and quotient of functions. Differentiation of function of a function. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

UNIT - III: Algebra

Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number Addition, Subtraction, Multiplication and Division of a complex number.

De-moivre's theorem, its application.

Partial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction.

Permutations and Combinations: Value of ${}^nP_r$ and ${}^nC_r$.

Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems

References:

- ✓ Mathematics-I by Dr. Deepak Singh (Download from https://ekumbh.aicte-india.org/dbook.php)
- ✓ B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
- ✓ G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
- ✓ Reena Garg, Engineering Mathematics, Khanna Publishing House, New Delhi (Revised Ed. 2018)
- ✓ V. Sundaram, R. Balasubramanian, K.A. Lakshminarayanan, Engineering Mathematics, 6/e., Vikas Publishing House.
- ✓ Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

COURSE OUT COME: -

AFTER COMPLETION OF THE COURSE, THE STUDENTS WILL BE ABLE TO

1. Acquire necessary background in Trigonometry to appreciate the importance of the geometric study as well as for the calculation and the mathematical analysis of engineering problems.
2. Find the effects of changing conditions on a system in probability and calculus.
3. Apply Complex numbers to physical phenomena.
4. Decompose rational function to partial fraction for computing the anti- derivative of a function.

Discipline: Basic Sc. & Humanities	Semester: 1 ST SESSION-WINTER	Name of the Teaching faculty: Jitendra Kumar Malik, Lecturer(STAGE-II) in Mathematics
Subject: Mathematics-I(TH3)	No of Days/weeks-04 Total Class allotted-60	
Week	**Class Day**	**Theory Topics.**
1ST	1ST	Concept of angles, measurement of angles in degree with examples.
	2ND	Grades and radians and their conversion.
	3RD	Trigonometric ratio.
	4TH	Solving of Problems.
2 ND	1ST	Solving of Problems.
	2ND	Sum, difference formulae and their applications
	3RD	Solving of Problems.
	4TH	Solving of Problems.
3 RD	1ST	Product formulae, Trigonometric ratios of multiple and submultiple angles
	2ND	Solving of Problems.
	3RD	Solving of Problems.
	4TH	Graphs of sinx, cosx, tanx, and e^x
4TH	1ST	Definition of functions, limits, examples
	2ND	Four standard limits and its applications, examples
	3RD	Definition of differentiation, 1st principle of methods, Examples.
	4TH	Solving Problems
5TH	1ST	Differentiation of sum, product and quotients of functions with examples.
	2ND	Differentiation of function of function with example.
	3RD	Differentiation of trigonometric and inverse trigonometric functions with example
	4TH	Solving Problems.
6 TH	1ST	Logarithmic differentiation with example.
	2ND	Exponential differentiation with example.
	3RD	Solving problems.
	4TH	Solving Problems on differentiation.
7 TH	1ST	Definition of complex numbers, conjugate of a complex numbers.
	2ND	Solving problems.
	3RD	Modules and amplitude of complex numbers, polar form of a complex number.
	4TH	Problems
8 TH	1ST	De-moivre's Theorem its application.
	2ND	Solving problems.
	3RD	Definition of fraction, polynomial, polynomial fraction, types of fractions with example.
	4TH	To resolve proper fraction in to partial fraction with denominator containing non-repeated linear factor.
9 TH	1ST	To resolve proper fraction in to partial fraction with denominator containing repeated linear factor.
	2ND	To resolve proper fraction in to partial fraction with denominator containing irreducible non-repeated quadratic factor.
	3RD	To resolve improper fraction into partial fraction.
	4TH	Solving problems.
10TH	1ST	Permutation and combination(definition and properties)
	2ND	Value of p (n, r) and c(n, r).
	3RD	Solving problems.
	4TH	Binomial theorems for positive integer index and its example.

11TH	1ST	Solving problems.
	2ND	Binomial theorems for any index and its example.
	3RD	Solving problems.
	4TH	First and second binomial approximation with applications to engineering problems.
12TH	1ST	Solving problems.
	2ND	Solving problems of trigonometry.
	3RD	Solving problems of trigonometry.
	4TH	Solving problems of trigonometry.
13 TH	1ST	Solving problems of trigonometry.
	2ND	Solving problems of limit and derivative.
	3RD	Solving problems of limit and derivative.
	4TH	Solving problems of limit and derivative.
14 TH	1ST	Solving problems f limit and derivative.
	2ND	Solving problems of complex number.
	3RD	Solving problems of complex number.
	4TH	Solving problems of partial fraction.
15TH	1ST	Solving problems of partial fraction.
	2ND	Solving problems of p(n, r) and c(n, r) and binomial theorem.
	3RD	Solving problems of p(n, r) and c(n, r) and binomial theorem.
	4TH	Solving problems of p(n, r) and c(n, r) and binomial theorem.

12/08/2024
Signature of the faculty

12/08/24
Signature of the HOD