GOVERNMENT POLYTECHNIC, ANGUL

LESSON PLAN

Course Code: TH3	**Name of the Faculty:** Sri Manas Ranjan Sahu
Course Title: Mathematics- I	**Designation:** Lecturer(Stage-I), Mathematics
Number of Credits: 4 (L:4, T:0, P:0)	**Discipline:** All Branch
Number of Week Allotted: 15	**Semester:** 1st
Classes per week: 4	**Semester Start from** 06.08.2025 **to** 04.12.2025

Week	Class	Chapter	Detailed topic to be covered
1st	1st	UNIT - I: Trigonometry	Introduction to Angles
	2nd		Measurement of Angles in Degrees, Gradians (Grades) & Radians. Relation among them. Conversion between degrees, minutes, and seconds.
	3rd		Problem for converting one measurement system to other measurement system.
	4th		Introduction to Trigonometric Ratios. Domain Range and its graphs
2nd	1st		Trigonometical Ratios of Allied Angle.
	2nd		Sum and Difference formula and their application
	3rd		Problem based on the previous classes
	4th		Product to Sum/Difference Transformations
3rd	1st		Applications of Sum and Product Formulas
	2nd		t-ratios of Multiple Angles and Sub-Multiple Angles
	3rd		Problem based on the previous classes
	4th		Problem based on the previous classes
4th	1st		Problem based on the previous classes
	2nd		Problem based on the previous classes
	3rd		Problem based on the previous classes
	4th		Problem based on the previous classes
5th	1st		Graphs of Trigonometric Functions
	2nd		Transformations of Trigonometric Graphs
	3rd		Problem based on the previous classes
	4th		Introduction of Inverse Trigonometry. Some standard formulas
6th	1st		Simple Problem practice from Inverse Trigonometry
	2nd	UNIT-II: Differential Calculus	**Function & Limit** Define Relations and Functions. Define Domain & Range Types of Functions: 1.Constant Function, 2.Identity Function
	3rd		3. Absolute Value function, 4. Greatest integer function, 5. Trigonometric functions 6. Exponential function 7. Logarithmic functions

	4th		Algebraic Functions and Transcendental Functions. Introduction of limits
7th	1st		Existence of Limit. Algebra of Limit, indeterminate forms
	2nd		Evaluation of Limit: 1.Limit of Algebraic Function a. Limit of polynomial function b. Limit of rational function
	3rd		c. Limit of irrational function
	4th		2.Limit of Trigonometric function
8th	1st		3. Limit of exponential function 4. Limit of logarithmic function
	2nd		5. Limit at infinite
	3rd		**Differentiation** 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. $f(x)=a^x,$
	4th		5. $f(x)=\log x$ 6. Derivative of all trigonometric functions like sinx, cosx, tanx, cotx, secx, cosecx, and all inverse trigonometric functions
9th	1st		Algebra of derivative: Sum, Product and Quotient rules with examples
	2nd		Problem practice base on the previous class
	3rd		Derivative of Composite functions (Use of chain rule)
	4th		Problem practice base on the previous class
10th	1st		Method of Differentiations: 1. Parametric functions with examples
	2nd		2. Derivative of Implicit functions with examples
	3rd		3. Derivative using logarithmic function with examples
	4th		4. Derivative of a function w.r.t another functions with examples
11th	1st		Problem practice base on the previous class
	2nd		Problem practice base on the previous class
	3rd		Problem practice base on the previous class
	4th		Problem practice base on the previous class

12th	1st	UNIT - III: Algebra	**Complex Number** Need for Complex Number (To be motivated by inability to solve some quadratic equations). Introduction of $\sqrt{-1}$=i(iota). Definition (Real & Imaginary Part of Complex Number). Representation of Complex Number in Cartesian Form
	2nd		Equality of Complex Number. Algebra of Complex Number: (i) Addition/ Subtraction of complex number, (ii) Multiplication of complex Number (iii) Division of two complex number
	3rd		Conjugate, Modulus and Amplitude of complex number and its properties
	4th		Representation of Complex Number in Polar Form, Exponential Form. Conversion from one form to another. Square Root of a complex number
13th	1st		Cube root of a complex number & its properties
	2nd		De-Movier's Theorem and its application
	3rd		More Problem on De-Movier's Theorem
	4th		**Partial Fraction** Definition of polynomial fraction proper & improper fractions and definition of partial fractions. Case-I(Root of the Denominator are real and non-repeated)
14th	1st		Case-II (Root of the Denominator are real and some are repeated) Case-III (Root of the Denominator are imaginary) Case-IV(Miscellaneous)
	2nd		Problem Practice based on Previous Classes
	3rd		Permutation & Combination Fundamental Principle of Counting 1. Principle of Multiplication 2. Principle of Addition Factorial Notation
	4th		Permutations when all the Objects are Distinct
15th	1st		Combinations, Value of P (n,r) and C (n,r)
	2nd		**Binomial Theorem** Binomial theorem (without proof) for positive integral index (expansion and general form) applications to engineering problems
	3rd		binomial theorem for any index (expansion without proof) applications to engineering problems
	4th		Problem Practice based on Previous Classes

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