

GOVERNMENT POLYTECHNIC, ANGUL

LESSON PLAN

Discipline: Electrical Engg.	Semester: 3rd	Name of the Teaching Faculty: Nayan Kumar Pradhan (Lect. In Mathematics)(PTGF)
Subject: Engg. Math- III	No of Days/per week class allotted: 4P	Semester From Date: 01.08.2023 to Date: 30.11.2023 No. of Weeks: 14
Week	Class Day	Theory Topics
1ST	1st	1. <u>COMPLEX NUMBER</u> Real and Imaginary numbers. Arrival of complex number. Introduction of i (iota) and its properties. Representation of complex number. Conjugate of a complex number and its properties.
	2nd	Modulus and amplitude of a complex number and its properties. Geometrical representation of a complex number.
	3rd	Properties of complex numbers. Determination of three cube roots of unity and their properties.
	4th	Problem Solving on previous class.
2ND	1st	De Moivre's theorem and its application.
	2nd	Square roots of a complex number. Problem based on whole topic.
	3rd	2. <u>MATRICES</u> Define rank of a matrix with examples.
	4th	Perform elementary row transformations to determine the rank of a matrix.

3RD	1st	State Rouche's theorem for consistency of a system of linear equations in n unknowns.
	2nd	Solve equations in three unknowns testing consistency.
	3rd	<u>3. LINEAR DIFFERENTIAL EQUATIONS</u> Homogeneous and Non-Homogeneous Linear Differential Equations with constant coefficients with examples. Find general solution of linear Differential Equations in terms of C.F. and P.I. Define
	4th	Derive rules for finding C.F. And P.I. in terms of operator D, excluding $1/(f(D)) x^n$.
4th	1st	Derive rules for finding C.F. And P.I. in terms of operator D, excluding $1/(f(D)) x^n$.
	2nd	Derive rules for finding C.F. And P.I. in terms of operator D, excluding $1/(f(D)) x^n$.
	3rd	Define partial differential equation (P.D.E) . partial differential equations by eliminating arbitrary constants and arbitrary functions. Form
	4th	Solve partial differential equations of the form $Pp+Qq=R$.
5th	1st	Problem based on whole topic.
	2nd	<u>4. LAPLACE TRANSFORMS</u> Gamma Function. Properties of Gamma Function with examples. Definition:
	3rd	Define Laplace Transform of a function $f(t)$ and Inverse Laplace Transform . of standard functions and explain existence conditions of L.T. Derive L.T.
	4th	Derive L.T. of standard functions and explain existence conditions of L.T.
6th	1st	Problem Solving on previous class.
	2nd	Explain linear, shifting property of L.T.
	3rd	Formulate L.T. of derivatives, integrals, multiplication by t^n and division by t .
	4th	Derive formulae of inverse L.T. and explain method of partial fractions .
7th	1st	CLASS TEST
	2nd	Explain method of partial fractions and problem on it.
	3rd	Problem based on whole topic.
	4th	Problem based on whole topic.

8th	1st	INTERNAL EXAMINATION
	2nd	INTERNAL EXAMINATION
	3rd	5. FOURIER SERIES Define Periodic Functions with graphs. Even/Odd Functions. Dirichlet Function.
	4th	Define Fourier Series and its notations. Euler formula for Fourier Series.
9th	1st	State Dirichlet's condition for the Fourier expansion of a function and it's convergence.
	2nd	Problem Solving on previous class.
	3rd	Express periodic function $f(x)$ satisfying Dirichlet's conditions as a Fourier series.
	4th	Define Even and Odd functions and find Fourier Series in $(0 \leq x \leq 2\pi$ and $-\pi \leq x \leq \pi)$.
10th	1st	Obtain F.S of continuous functions and functions having points of discontinuity in $(0 \leq x \leq 2\pi$ and $-\pi \leq x \leq \pi)$.
	2nd	Problem Solving on previous class.
	3rd	Problem based on whole topic.
	4th	6. NUMERICAL METHODS Appraise limitation of analytical methods of solution of Algebraic Equations.
11th	1st	Derive Iterative formula for finding the solutions of Algebraic Equations by : I- Bisection
	2nd	II- Newton- Raphson method
	3rd	Problem based on whole topic.
	4th	7. FINITE DIFFERENCE & INTERPOLATION Explain finite difference and form table of forward (Δ) and backward (∇) difference.
12th	1st	Define shift Operator (E) and establish relation among the operators.
	2nd	Derive Newton's forward and backward interpolation formula for equal intervals.
	3rd	Problem Solving on previous class.
	4th	Problem Solving on previous class.

13th	1st	State Lagrange's interpretation formula for unequal intervals.
	2nd	Explain numerical integration and state: (i) Newton's Cote's formula. Solving problems.
	3rd	(ii) Trapezoidal rule. Solving problems.
	4th	(iii) Simpson's 1/3rd rule. Solving problems.
14th	1st	Problem based on whole topic.
	2nd	CLASS TEST
	3rd	Previous year question paper discussion.
	4th	Previous year question paper discussion.