GIET (POLYTECHNIC), JAGATPUR,CUTTACK.

LESSON PLAN

Discipline: **Electrical Engg. & ETC Engg.**	**Semester:** **3rd**	**Name of the Teaching Faculty: Prachi Swain (Lect. In Mathematics)**
Subject: **Engg. Math-III**	**No of Days/per week class allotted:** **4P**	**Semester From Date:** **to Date:** **No. of Weeks: 15**
Week	**Class Day**	**Theory Topics**
1ST	1st	**1. COMPLEX NUMBER** 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, Amplitude of a complex number and its properties. Representation of a Complex Number.
	3rd	Cube roots of Unity and its properties
	4th	Square roots of a complex Number
2ND	1st	De Moivre's Theorem and its application
	2nd	Solve problems on TBE(Text Book Exercise)

	3rd	**2. MATRICES** 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 unknowns.
	2nd	Solve equations in three unknowns testing consistency.
	3rd	**3. LINEAR DIFFERENTIAL EQUATIONS** Define Homogeneous & Non-Homogeneous linear Differential Equations with constant coefficients with example. General Solution of LDE in terms of C.F and P.I. Rules for Finding the Complementary Function (y_c). Case-I(Roots of A.E. are real and distinct)
	4th	Case-II(Roots of A.E. are real and repeated) Case-III (Roots of A.E. are imaginary) Case-IV (Combined case of all the above 3 cases)
4TH	1st	Rules For finding Particular integral (y_p) or Complete Solution ($y_c + y_p$). $F(D)y = f(x) \Rightarrow y_p = \frac{f(x)}{F(D)}$. Case-I ($f(x) = x^n$ form) Case-II ($f(x) = e^{ax}$, such that $F(a) \neq 0$.) Case-III ($f(x) = e^{ax}$, such that $F(a) = 0$)
	2nd	Case-IV ($f(x) = \sin(ax+b)$or $\cos(ax+b)$ such that $F(-a^2) \neq 0$) Case-V ($f(x) = \sin(ax+b)$or $\cos(ax+b)$ such that $F(-a^2) = 0$)
	3rd	Case-VI ($f(x) = e^{ax}V, V$ is function of x) Case-VII ($f(x) = xV$)

	4th	Solve problems on TBE(Text Book Exercise)
5TH	1st	Partial Differential Equation (PDE): Order and degree of PDE. Formation of a PDE
	2nd	Formation of PDE
	3rd	Solve Linear Equation of first order: Pp+Qq=R
	4th	Solve problems on TBE(Text Book Exercise)
6TH	1st	**4. LAPLACE TRANSFORMS** Definition: Gamma Function, Properties of Gamma Function with examples
	2nd	Definition of Laplace Transform of $f(t)$. Linear Property. Evaluation of Laplace Transformation of some standard/Elementary Functions ($f(t)=k$ or t^n or e^{at} or e^{-at} or $\sinh at$ or $\cosh at$ or $\sin at$ or $\cos at$)
	3rd	Simple Use Laplace transform of Standard formula.
	4th	Shifting Theorems/ Property Change of Scale Property
7TH	1st	Application of Using Shifting Property
	2nd	Transform of $e^{at}f(t), t^n f(t), \frac{1}{t}f(t)$ with Example
	3rd	Formulate Laplace transform of Derivatives, integrals, multiplication by t^n and division by t with example
	4th	-DO-
8TH	1st	Define: Inverse Laplace Transform (ILT). Formula for standard function
	2nd	ILT by method of partial fraction
	3rd	-Do-
	4th	Solve problems on TBE(Text Book Exercise)

9TH	1st	**5. FOURIER SERIES** Define Periodic Functions with graphs. Even/Odd Functions. Dirichlet Function
	2nd	Define Fourier Series and its notations. Euler formula for Fourier Series
	3rd	Workout Examples
	4th	Dirichlet Condition for the expansion of Fourier series and its convergent
10TH	1st	Problem Solving on previous class
	2nd	Problem Solving on previous class
	3rd	Problem Solving on previous class
	4th	Fourier Series of Even/Odd functions in $(0 \le x \le 2\pi \ and \ -\pi \le x \le \pi)$
11TH	1st	Problem Practice of previous class
	2nd	Fourier Series of Continuous functions and functions having point of discontinuous in $(0 \le x \le 2\pi \ and \ -\pi \le x \le \pi)$
	3rd	Problem Practice of previous class
	4th	Solve problems on TBE(Text Book Exercise) and previous year questions
12TH	1st	**6. NUMERICAL METHODS** Limitation of analytical methods of solution of Algebraic Equation.
	2nd	Derive iterative formula for finding the solutions of Algebraic Equation by I- Bisection Method
	3rd	II- Newton-Raphson Method
	4th	Solve problems on TBE(Text Book Exercise)
13TH	1st	**7. FINITE DIFFERENCE & INTERPOLATION** Formation of Forward (Δ) and Backward(∇) Difference table.

	2nd	Define: Shift operator (E). Relation among the operators
	3rd	Newton's forward and backward interpolation for equal interval
	4th	Problem Solving on previous class
14TH	1st	Problem Solving on previous class
	2nd	Lagrange Interpolation formula for unequal intervals
	3rd	Problem Solving on previous class
	4th	Explain Numerical Integration. 1. Newton's Cote's formula
15TH	1st	Problem Solving on previous class
	2nd	2. Trapezoidal Rule. Solving problems
	3rd	3. Simpson's 1/3rd rule. Solving Problems.
	4th	Problem Solving on previous class