

GOVERNMENT POLYTECHNIC, KORAPUT

LESSON PLAN

Discipline: Electrical Engg.	Semester: 3rd	Name of the Teaching Faculty: DEBI PRASAD TRIPATHY (Lect. in Mathematics)
Subject: Engg. Math-III	No of Days/per week class allotted: 4P	Semester From Date: 01/10/2021 No. of Weeks: 15
Week	Class Day	Theory Topics
1ST	1 st	1. <u>COMPLEX NUMBER</u> Arrival of complex number. Introduction of i (iota) and its properties. Representation of complex number. Conjugate of a complex number and its properties.
	2 nd	Modulus, Amplitude of a complex number and its properties. Representation of a Complex Number.
	3 rd	Cube roots of Unity and its properties
	4 th	Square roots of a complex Number
2ND	1 st	De Moivre's Theorem and its application
	2 nd	Solve problems on TBE(Text Book Exercise)

	3 rd	<u>2. MATRICES</u> Define rank of a matrix with examples.
	4 th	Perform elementary row transformations to determine the rank of a matrix.
3RD	1 st	State Rouche's theorem for consistency of a system of linear equations in unknowns.
	2 nd	Solve equations in three unknowns testing consistency.
	3 rd	<u>3. LINEAR DIFFERENTIAL EQUATIONS</u> 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)
	4 th	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	1 st	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 $F(a) = 0$)
	2 nd	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 $F(-a^2) = 0$)
	3 rd	Case-VI ($f(x) = e^{ax}V$, V is function of x) Case-VII ($f(x) = xV$)

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

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

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