



GOVERNMENT POLYTECHNIC KORAPUT

DEPARTMENT OF ELECTRICAL

Vision:-

To create competent and industry ready Electrical diploma engineers with professional and social values to meet future challenges.

Mission:-

- To prepare diploma holders through “qualitative competency based education system” to compete with national requirement along with core values
- To produce dynamic Electrical Engineers to serve the society and industry .
- To develop leadership qualities, communication skills, critical thinking and attitude for Lifelong learning.

Program educational objectives:-

PEO1:	Apply technical knowledge and skills learned in the field of Electrical Engineering to excel in professional and/or higher education.
PEO2:	To provide students an excellent academic environment and make them aware the needs of Society and Industry to become a successful Professional/Entrepreneur.
PEO3:	To engage in lifelong learning, career enhancement to adopt emerging technologies

Course outcomes:-

Co1	Apply complex number concept in electricity , Quadratic equation , Imaginary numbers in signal processing, Radar & even biology (Brain Waves)
Co2	Apply Matrices in Engineering fields such as Electrical Circuits and Linear programming.
Co3	Transform Engineering problems to mathematical models with the help of differential equations and familiarize with the methods of solving by Analytical methods, Transform method and operator method and Numerical methods.
Co4	Solve algebraic equations by iterative Methods easily programmable in computers and develop interpolating polynomials through method of differences by analyzing data.



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LESSON PLAN

Discipline:	Semester:	Name of the Teaching Faculty:
Electrical Engg.	3rd	DEBI PRASAD TRIPATHY (Lect. in Mathematics)
Subject:	No of Days/per week class allotted:	Semester From Date: 15.09.2022 to Date: 22.12.2022
Engg. Math-III	4P	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)



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TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
01	Complex Numbers	06
02	Matrices	04
03	Differential Equations	10
04	Laplace Transform	12
05	Fourier series	12
06	Numerical Methods	04
07	Finite difference and Interpolation	12
Total		60



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	3 rd	2. <u>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 Rouché's theorem for consistency of a system of linear equations in unknowns.
	2 nd	Solve equations in three unknowns testing consistency.
	3 rd	3. <u>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 ($f(x) = xV$)



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	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 $e^{at} f(t), t^n f(t), \int_0^t f(t) dt$ 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)



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9TH	1 st	5. <u>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	6. <u>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	7. <u>FINITE DIFFERENCE & INTERPOLATION</u> Formation of Forward (Δ) and Backward(∇) Difference table.



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	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

Debi Prasad Tripathy
Signature of faculty

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