



GOVT. POLYTECHNIC, KORAPUT
DEPARTMENT OF ELECTRICAL ENGG.
LESSON PLAN (ENGG. MATHEMATICS III)

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| Discipline: Electrical Engg. | Semester: 3 rd | Name of the teaching faculty: DEBI PRASAD TRIPATHY |
| Subject: Engg. Mathematics III Th 1 | No. of days/week class allotted: 4 | Semester from date: 01/09/2020 To date: 19/03/2021 No. of weeks: 18 |
| Week | Class Day | Theory Topics |
| 1 st | 1 st | 1. Complex Numbers: Real and imaginary numbers, definition of a complex number, conjugate of complex numbers, modulus of a complex number with examples |
| | 2 nd | Amplitude of a complex number, geometrical representation of a complex number with example |
| | 3 rd | Properties of complex numbers with examples |
| | 4 th | Determination of three cuberoots of unity and their properties |
| 2 nd | 1 st | De-Moivre's theorem and problem solving |
| | 2 nd | Solving Problems on amplitude of a complex number and De-moivre's theorem |
| | 3 rd | 2. MATRICES :Recap Definition of Matrix, row, column, order of a matrix, Types of matrices: a) Row matrix, b) column matrix, c) square matrix, d) unit matrix |
| | 4 th | Determination of rank of a matrix by elementary transformation, example |
| 3 rd | 1 st | Some more example of finding rank of a matrix by elementary transformation method, Consistency of linear system of equations, Rouche's Theorem, Procedure to test the consistency of linear system of equations of n unknowns. |
| | 2 nd | Examples on consistency test and solving system of equations, Solving system of linear homogeneous equations |
| | 3 rd | Solving problems, finding rank of a matrix |
| | 4 th | 3. Linear Differential Equations: Definitions: i) Linear differential equation, ii) Linear differential equation with constant coefficients iii) Homogeneous and non-homogeneous linear differential equation with constant coefficients, Operator D, Concept of C.F. and P.I. |
| 4 th | 1 st | General solution $y=CF+PI$. Rules for finding the CF: Case 1:- If roots are real and different, Case 2: if roots are real and repeated, some examples on these two cases |
| | 2 nd | Case 3: If one pair of roots be imaginary, Case 4: If two points of imaginary roots are equal, some examples on these two cases. |
| | 3 rd | Inverse operator, Rules for finding the Particular Integral (PI): Case 1: When $X=e^{(ax)}$, Case 2: when $X=\sin(ax+b)$ or $\cos(ax+b)$, some examples on these two cases |
| | 4 th | Solving problems on CF and PI |
| 5 th | 1 st | Case 3: when $X=x^m$, Case 4: when $X=e^{(ax)}V$, some |



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| | | examples on these two cases |
| | 2 nd | Working rule to find the Complete solution $y=CF+PI$, Examples |
| | 3 rd | Partial differential equation, formation of pde by eliminating arbitrary constants and arbitrary functions. |
| | 4 th | Examples on formation of pdes |
| 6 th | 1 st | Linear pde of 1 st order, working rule to solve $Pp+Qq=R$, examples |
| | 2 nd | More problems on ODE and PDE. |
| | 3 rd | 4. Laplace Transforms: Definition of Gamma function, reduction formula, example |
| | 4 th | Prove $\Gamma(\frac{1}{2}) = \sqrt{\pi}$, Short problems on reduction formula |
| 7 th | 1 st | Definition of Laplace transform of a function, inverse laplace transform, existence of laplace transform |
| | 2 nd | Derivation of laplace transform of standard functions: $k, t^n,$ $\sin ax, \cos ax, \sinh ax, \cosh ax.$ |
| | 3 rd | Properties of LT: i) Linearity property ii) First shifting property, and problems on these properties. |
| | 4 th | Change of scale property, examples on it |
| 8 th | 1 st | Formulation of LT of derivatives and integrals, some problems to solve |
| | 2 nd | Formulation of LT multiplication by t^n , division by t , examples |
| | 3 rd | Solving problems to find LT |
| | 4 th | Derivation of formula of inverse LT and problems on Inverse LT. |
| 9 th | 1 st | Some more problems on ILT. |
| | 2 nd | 5. Fourier series: Definition of periodic function with example. Fourier series , Euler's formulae. |
| | 3 rd | Establishment of some formulae: $\int_{\alpha}^{\alpha+2\pi} \cos nx \, dx, \int_{\alpha}^{\alpha+2\pi} \sin nx \, dx,$ $\int_{\alpha}^{\alpha+2\pi} \cos mx \cos nx \, dx, \int_{\alpha}^{\alpha+2\pi} \cos^2 nx \, dx$ |
| | 4 th | Dirichlet's condition for fourier expansion, example |
| 10 th | 1 st | Periodic function satisfying Dirichlet's condition as a fourier series with example |
| | 2 nd | Even function and its fourier series in $0 \leq x \leq 2\pi$ and $-\pi \leq x \leq \pi.$ with example |
| | 3 rd | Odd function and its fourier series in $0 \leq x \leq 2\pi$ and $-\pi \leq x \leq \pi.$ with example |
| | 4 th | Problems on even and odd function and fourier series expansion |
| 11 th | 1 st | f.s . of continuous function in $0 \leq x \leq 2\pi$ and $-\pi \leq x \leq \pi.$ |
| | 2 nd | f.s. of functions having points of discontinuity in $0 \leq x \leq 2\pi$ and $-\pi \leq x \leq \pi.$ |
| | 3 rd | 6. Numerical methods Limitation of analytical methods and need of numerical method, iteration formula |



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| | 4 th | |
| 12 th | 1 st | Bisection method and problem solving by this method |
| | 2 nd | Solution by Newton-Raphson method |
| | 3 rd | Problems on Bisection method and Newton-Raphson method |
| | 4 th | 7. Finite difference and interpolation Finite difference , forward and backward difference table |
| 13 th | 1 st | Definition of shift operator, relation between operators Newton's forward difference interpolation for equal intervals with examples |
| | 2 nd | Newton's backward difference interpolation for equal intervals with examples |
| | 3 rd | Lagrange's interpolation for unequal intervals with examples |
| | 4 th | Solving problems on Lagrange's interpolation |
| 14 th | 1 st | Problems on Lagrange's interpolation and Newton's forward difference interpolation |
| | 2 nd | Newton -Cote's formula, Trapezoidal rule with example |
| | 3 rd | Simpson's 1/3 rd rule with example |
| | 4 th | Problems on Trapezoidal rule and Simpson's 1/3 rd rule |
| 15 th | 1 st | Revision: Discussion of important questions of 2 marks |
| | 2 nd | Revision: Discussion of important questions of 5 marks |
| | 3 rd | Revision: Discussion of important questions of 10 marks |
| | 4 th | Revision: Discussion of previous year questions |
| 16 th | | Revision |
| 17 th | | Revision |
| 18 th | | Revision |

Debi Prasad Tripathi

SIGNATURE OF SUBJECT LECTURER

SIGNATURE OF HOD, ELECTRICAL.