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| **MA3501** | **Engineering Mathematics -III** | **L-T-P: 3-0-0; Total 42 Lectures** |

**Prerequisite:** Engineering Mathematics-I and Engineering Mathematics-II

Course Objective: The objective of this course is to provide the students the exposure of partial differential equations, which one often needs to solve in Electronics Engineering, Numerical methods, and Probability and Statistics which is the backbone of Communication Theory.

Course Outcome: After successful completion of this course students will be able to

1. Solve Laplace equation, Poission’s equation, Wave equation etc.

2. Solve the nonlinear algebraic equations and differential equation, and numerical Integration

3. Understand the probability and statistics theory with its applications to various problems related to the Electronics Communication Engineering.

1. **Partial Differential Equations:** Fourier Series, Fourier Cosine series, Fourier Sine series, Fourier integrals. Introduction to PDE, basic concepts, second order semi linear PDE (Canonical form), D’ Alembert’s formula and Duhamel’s principle for one dimensional wave equation, Laplace’s and Poisson’s equations, Maximum principle with application, Fourier Method for IBV problem for wave and heat equation, rectangular region, Fourier method for Laplace’s equation in three dimensions. **17 lectures**
2. **Numerical Methods:** Definitions and sources of errors, Solution of nonlinear equations, Bisection methods, Newton’s Methods and its variants, fixed point iterations and rate of convergence. IVP problems Taylor’s series method, Euler and modified Euler methods, Runge-kutta methods, Multi-step methods and stability and rate of convergence; Integration: Trapezoidal rule, Simpson’s1/3 rule, Gauss-Quadrature **. 15 lectures**
3. **Probability and Statistics:** Random Variables**,** Probability Distributions, binomial, Poisson, exponential and normal; Joint and conditional probability; Correlation and regression analysis.

10 **lectures**

**References:**

1. Advanced Engineering Mathematics, R.K. Jain and S.R.K. Iyengar, Narosa Publishing House.
2. Integral Transform and their Applications, L. Debnath and D. Bhatta, Taylor and Francis.
3. Ian N. Sneddon, Elements of Partial Differential Equations – McGraw Hill.
4. S. M. Ross, Introduction to Probability and Statistics for Engineers – John Wiley and Sons, New York.
5. E. Kreyszig, Advanced Engineering Mathematics – John Wiley and Sons, New York
6. A friendly Introduction to Numerical Analysis, Brain Bradie, Pearson.