Semester III		
APMS200	**Mathematics III**	**L-T-P-CR-CH : 2-1-0-3-3**

Course Objectives

CO1. To explain the basic concepts of probability, statistics and partial differential equation.

CO2. To elaborate the concepts of random variables, probability distributions and their various uses.

CO3. To demonstrate moments, correlation, regression and advance theory of applied statistics.

CO4. To explain different orders of linear and non-linear partial differential equations and their solving procedures.

CO5. To demonstrate the basic applications partial differential equations in engineering Domain.

Learning Outcomes

Upon the completion of the course, the students will be able to:

LO1. Apply the knowledge of binomial, Poisson, and normal distribution for engineering applications.

LO2. Recall different problems related to moments, skewness, kurtosis and correlation, and regression.

LO3. Measure various physical models through discret and continuous distributions.

LO4. Identify the use of different tests of significance to various engineering problems.

LO5. Analyze the techniques of partial differential equations to solve physical and other problems involving functions of several variables

LO6. Determine heat and sound equations, fluid flow, elasticity, electrostatics, electrodynamics, etc., problems using partial differential equation techniques.

SYLLABUS

Module 1: Basic Probability (10 lectures)

Probability definition of probability, conditional probability, Discrete random variables, Independent random variables, sums of independent random variables; Expectation of discrete random variables, moments, variance and its properties, infinite sequences of Bernoulli trial, Probability distributions: Binomial, Poisson - evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution.

Module 2: Continuous Probability Distributions (5 lectures)

Continuous random variables and their properties, distribution functions and densities, normal, exponential, and gamma distribution.

Module 3: Applied Statistics (11 lectures)

Moments, Skewness, Kurtosis, Chebyshev's Inequality, Correlation and regression, method of least squares. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

Module 4: First -order Partial differential equations (4 lectures)

Definition of Partial Differential Equations, First order partial differential equations, solutions of first order linear and non-linear PDEs.

Module 5: Higher order Partial differential equations (15 lectures)

Solution to homogeneous and non-homogeneous linear partial differential equations of second and higher order by the complimentary function and particular integral method. Second-order linear equations and their classification. Method of separation of variables.

Total: (45 lectures)

Text Books

1. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science, 5th edition, 2016.

Reference Books

1. Ordinary and Partial Differential Equations, M.D. Raisinghania, S. Chand, 20th edition, 2020.
2. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, S. Chand, 10th edition, 2017.
3. Advanced Engineering Mathematics, H. K. Dass, S. Chand, 22nd edition, 2018.
4. Higher Engineering Mathematics: B. V. Ramana. McGraw -Hill, 6th edition, 2010.
5. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 44th edition, 2017.