

## Semester - III

# Probability and Statistics-I

*Course No. MM-CP-305*  
*Duration of Examination: 3 hrs*

*Maximum Marks: 100*  
*(a) External Exam: 80*  
*(b) Internal Exam: 20*

### Unit I

Set functions, the probability set functions, its properties, probability density function, the distribution function and its properties. Mathematical Expectations, some special mathematical expectations, Chebyshev's Inequality.

### Unit II

Conditional probability, Marginal and conditional distributions, conditional means and variances, Baye's theorem, the correlation coefficient, stochastic independence, various criteria of stochastic independence.

### Unit III

Some special distributions. The Binomial, Trinomial and Multinomial distributaries, Negative Binomial distribution, The Poisson distributions, the gamma and Chi-Square distribution, the normal distribution, the bivariate normal distribution.

### Unit IV

Distributions of functions of random variables, Sampling theory, Change of variables method, the t and F distributions, Distributions of Order Statistics, transformations of variables of the discrete type, transformations of the variables of the continuous type, , Extensions of the change of variable technique, Moment Generating function technique , the distribution Function method and the m.g.f method, the distribution of  $X$  and  $nS^2/\sigma^2$

### Books Recommended

1. Hogg and Craig : An Introduction to the Mathematical Statistics
2. Mood and Grayball : An Introduction to the Mathematical Statistics

### References:

1. C. R. Rao : Linear Statistical Inference and its Applications
2. V. K. Rohatgi: An Introduction to Probability and Statistics.