BRANCH	Subject	Subject Code
B.Sc. (MATHS)-Major)	**Probability and Statistics**	**MAM1-161**

Course Learning Outcomes: - This course will enable the students to:

1. Describe and calculate the mean deviation, standard deviation, range, quartiles and percentiles.
2. Understand and use the terminology of probability.
3. Determine whether two events are mutually exclusive and independent.
4. Calculate probabilities using the addition, and multiplication rules.
5. Recognize and understand discrete and continuous probability distribution functions, binomial, uniform and exponential probability distribution.
6. Calculate and interpret the correlation coefficient.
7 Understand the basic concepts of linear regression and correlation
8. Interpret the Student's t probability distribution, chi-square goodness-of-fit, F and Z test.

Unit – I

1.1 **Indian Contributions in Statistics:**

- 1.1.1 P. C. Mahalanobis
- 1.1.2 C. Radhakrishna Rao
- 1.1.3 Samanta Chandra Sekhar Harichandan
- 1.1.4 J. K. Ghose
- 1.1.5 P. Maiti

1.2 Theory of Probability:

- 1.2.1 Event and Sample space
- 1.2.2 Probability of an event
- 1.2.3 Addition and multiplication theorem of probability
- 1.2.4 Inverse probability
- 1.2.5 Baye's theorem
- 1.2.6 Continuous probability
- 1.2.7 Probability density function and its applications
- 1.2.8 Standard deviation of various continuous probability distributions
- 1.2.9 Mathematical expectation
- 1.2.10 Expectation of sum and product of random variables

Unit – II

Dispersion and Distribution:

2.1 Measures of dispersion

- 2.1.1 Range and interquartile range
- 2.1.2 Mean deviation and Standard deviation
- 2.1.3 Moments, Skewness and kurtosis

2.2 Moment generating function

2.3 Theoretical distribution with their properties and uses
- 2.3.1 Binomial
- 2.3.2 Poisson
- 2.3.3 Rectangular
- 2.3.4 Exponential

Unit - III

Curve fitting and Correlation:

3.1 Methods of least squares
3.2 Curve fitting
3.3 Correlation and regression
3.4 Partial and multiple correlations (up to three variables only)

Unit – IV

Sampling:

4.1 Sampling of large samples
4.2 Null and alternative hypothesis
4.3 Errors of first and second kinds
4.4 Level of significance and critical region
4.5 Tests of significance based on chi-square, t. F and Z distribution

Test Books:-

1. H. C. Saxena and J. N. Kapoor : Mathematical Statistics
2. E. Rukmangadachari ; Probability and Statistics
3. M. Ray, Har Swarup Sharma , S. S. Chaudhary ; Mathematical Statistics