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20MC111 PROBABILITY AND STATISTICS

Course Description and Objectives:

This course deals with descriptive statistics, correlation, regression, and their applications, probability, theoretical distributions and testing of hypothesis. It also enables the student to understand and apply statistical techniques, curve fitting, correlation and regression, probability and also to make the student familiar with discrete, continuous distributions and testing of hypothesis.

Course Outcomes:

The student will be able to:

- Distinguish between quantitative and categorical data and represent the data in graphical and tabular forms.
- Calculate and interpret measures for the centre and spread of a data set.
- Decide how and when to use the normal model.
- Calculate and interpret correlation coefficient and regression lines.
- Understand the rules of probability and apply them.
- Compute probabilities using theoretical distributions.
- Test hypothesis for population parameters.

Syllabus

UNIT – 1

9 Hours

DESCRIPTIVE STATISTICS: Basic Definitions, Frequencies, Graphical Representation, Histogram, Ogive curves, Measures of Central tendency, Arithmetic mean, Median, Mode, Mean deviation, Standard Deviation, Symmetry and Skewness, Karl Pearson's Coefficient of skewness.

UNIT – 2

9 Hours

CURVE FITTING, CORRELATION AND REGRESSION: Least squares method, Curve fitting (straight line and parabola only), Covariance, Correlation, Types, Pearson's Coefficient of correlation, Rank correlation, Spearman's rank correlation, Regression, Regression lines.

UNIT – 3

9 Hours

PROBABILITY: Introduction, Definition (Classical and Axiomatic approach), Addition theorem, Conditional probability, Multiplication theorem, Total probability, Bayes theorem.

UNIT – 4

9 Hours

DISTRIBUTIONS: Random variables, Discrete and Continuous variables, Introduction to Distributions.

BINOMIAL DISTRIBUTION: Definition, Mean and Standard deviation, Recurrence relation, Applications, Fitting of binomial distribution.

POISSON DISTRIBUTION: Definition, Mean and Standard deviation, Recurrence relation, Poisson Distribution is an approximation of Binomial distribution, Applications, Fitting of Poisson distribution.

NORMAL DISTRIBUTION: Definition, Normal curve, Mean and Standard deviation, Median, Mode, Normal Distribution applications.

UNIT – 5

9 Hours

TESTING OF HYPOTHESIS: Population and Sampling, Parameters and Statistics, Types of sampling, Test of hypothesis and test of significance: Null hypothesis, Errors, Level of significance, Confidence Limits, Testing large samples, Sample distribution of proportion, t-distribution for small sample, Difference between means of small sample, Chi square test for goodness of fit, Chi-square test for test of independence.

Text Books:

1. Miller and Freund, “Probability and Statistics for Engineers”, 8th edition, Pearson publishers, 2013.
2. H. K. Dass and Er. Rajanish Verma, “Higher Engineering Mathematics”, S. Chand & Co., 3rd edition, 2014.

Reference Book:

S.C. Gupta and V.K. Kapoor, “Fundamentals of Mathematical Statistics”, Sultan Chand & Co., New Delhi, 2005.