

Regular Course Statistics

1st Semester

Core 1.2: Descriptive Statistics and Probability Theory

Concepts of a statistical population and sample from a population, quantitative and qualitative data, nominal, ordinal and time-series data, discrete and continuous data. Presentation of data by tables and by diagrams, frequency distributions for discrete and continuous data, graphical representation of a frequency distribution by histogram and frequency polygon, cumulative frequency distributions (inclusive and exclusive methods). Measures of location (or central tendency) and dispersion, moments, measures of skewness and kurtosis, cumulants. Bivariate data: Scatter diagram, principle of least-square (concept only). Correlation and regression. Karl Pearson coefficient of correlation, Lines of regression, Spearman's rank correlation coefficient. Random experiment, sample point and sample space, event, algebra of events, Definition of Probability - classical, relative frequency and axiomatic approaches to probability, merits and demerits of these approaches (only general ideas to be given). Addition theorem, Theorem on conditional probability, independent events.

Books Recommended

1. J.E. Freund, *Mathematical Statistics with Applications*, 7th Ed., Pearson Education, 2009.
2. A.M. Goon, M.K. Gupta and B. Dasgupta, *Fundamentals of Statistics*, Vol. I, 8th Ed., World Press, Kolkatta, 2005.
3. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 11th Ed., Sultan Chand and Sons, 2007.
4. R.V. Hogg, A.T. Craig and J.W. Mckean, *Introduction to Mathematical Statistics*, 6th Ed., Pearson Education, 2005.
5. A.M. Mood, F.A. Graybill and D.C. Boes, *Introduction to the Theory of Statistics*, 3rd Ed., Tata McGraw Hill Publication, 2007.