COURSE 6: THEORETICAL CONTINUOUS DISTRIBUTIONS

Theory   Credits: 3   3 hrs/week

I.   Learning Outcomes

After successful completion of the course students will be able to:
1. To deal with the data by the basic continuous distribution such as Uniform Binomial distribution.
2. To acquaint the Exponential distribution applications.
3. To learn about the Gamma and Beta distributions and their applications towards the real life problems.
4. To get familiarity of the most important distributions such as Normal and Standard Normal distribution and their applications in research and various fields.
5. To acquire the knowledge of exact sampling distributions.

II.   Syllabus

Unit – 1: Continuous Uniform distribution
Uniform distribution – Definition, moments, M.G.F, C.F, C.G.F, skewness, kurtosis and Distribution function. Mean Deviation about mean.

Unit – 2: Exponential Distribution
Exponential distribution – Definition, moments, M.G.F, C.F, C.G.F, skewness, kurtosis and Distribution function. Memory less property.

Unit – 3: Gamma and Beta Distributions
Gamma Distribution - Definition, moments, M.G.F, C.F, C.G.F, skewness, kurtosis and additive property. Limiting form of gamma distribution.
Beta Distribution of first and second kind – Definition, mean, variance and harmonic mean.

Unit – 4: Normal Distribution
Normal Distribution – Definition, properties, importance, M.G.F, C.F, C.G.F, additive property, skewness, kurtosis and problems. Obtain mean, median and mode, Even and Odd order moments about mean, linear combination of normal variates, points of inflexion of normal probability curve.

Unit – 5: Standard Normal and Sampling Distributions
Standard Normal Distribution – Definition, mgf, mean and variance, Area property, problems. Student's t- distribution, F – Distribution, χ^2- Distribution: Definitions, properties and their applications.

COURSE 6: THEORETICAL CONTINUOUS DISTRIBUTIONS

Practical   Credits: 1   2 hrs/week

Practical Syllabus
1. Calculation of moments of Uniform distribution.
2. Calculation of skewness and kurtosis of Uniform distribution.
3. Fitting of Exponential distribution.
4. Gamma distribution application oriented problems.
5. Fitting of Normal distribution – Areas method.
6. Fitting of Normal distribution – Ordinates method.
7. Problems related to Standard Normal distribution.

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

III. Text Books/References
1. S. C. Gupta & V. K. Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. O. P. Gupta: Mathematical Statistics, Kedar nath Ram nath & Co.
3. P. N. Arora & S. Arora: Quantitative Aptitude Statistics – Vol II, S. Chand & Company Ltd.
4. K. Rohatgi & Ehsanes Saleh: An Introduction to Probability and Statistics, John Wiley & Sons.

IV. Suggested Co-curricular Activities:
1. Training of students by related industrial experts
2. Assignments including technical assignments if any.
3. Seminars, Group Discussions, Quiz, Debates etc on related topics.
4. Preparation of audio and videos on tools of diagrammatic and graphical representations.
5. Collection of material/figures/photos/author photoes of related topics.
6. Invited lectures and presentations of stalwarts to those topics.
7. Visits/field trips of firms, research organizations etc.