

SEMESTER - II

COURSE 3: THEORETICAL DISCRETE DISTRIBUTIONS

Theory

Credits: 3

3 hrs/week

Course Outcomes

After successful completion of the course students will be able to:

1. To deal with the data by the basic discrete distributions such as Uniform and Binomial distributions.
2. To acquaint the Poisson distribution applications.
3. To learn about the Negative Binomial distribution and its applications towards the real life problems.
4. To familiar with dealing the data by Geometric and Hyper Geometric distributions.

Unit – 1: Uniform, Bernoulli and Binomial distributions

Discrete Uniform distribution – definitions, mean, variance. Bernoulli distribution – definitions, mean, variance and its mgf. Binomial distribution – Definition, moments, M.G.F, C.F, C.G.F, P.G.F, additive property if exists, skewness, kurtosis and problems. First two moments obtained through mgf, recurrence relation for probabilities, limiting case of Binomial Distribution to Normal distribution.

Unit – 2: Poisson Distribution

Poisson distribution - Definition, moments, M.G.F, C.F, C.G.F, P.G.F, additive property if exists, skewness, kurtosis and problems. First two moments obtained through mgf, recurrence relation for probabilities. Poisson distribution as a limiting case of Binomial distribution, limiting case of Poisson Distribution to Normal distribution.

Unit – 3: Negative Binomial Distribution

Negative Binomial Distribution - Definition, moments, M.G.F, C.F, C.G.F, P.G.F, additive property if exists, skewness, kurtosis and problems. First two moments obtained through mgf, recurrence relation for probabilities. Limiting case of Negative Binomial Distribution to Normal distribution.

Unit – 4: Geometric Distribution

Geometric Distribution – Definition, moments, M.G.F, C.F, C.G.F, P.G.F, additive property if exists, skewness, kurtosis and problems. First two moments obtained through mgf, Lack of memory property. Recurrence relation for probabilities.

Unit – 5: Hyper Geometric Distribution

Hyper Geometric Distribution – Definition, mean and variance, problems. Recurrence relation for probabilities. Limiting case of Hyper Geometric distribution to Binomial distribution.

Text Books

1. S. C. Gupta & V. K. Kapoor: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. K. Rohatgi & Ehsanes Saleh: An Introduction to Probability and Statistics, John Wiley & Sons.

References

1. O. P. Gupta: Mathematical Statistics, Kedar nath Ram nath & Co.
2. P. N. Arora & S. Arora: Quantitative Aptitude Statistics – Vol II, S. Chand & Company Ltd.

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.

SEMESTER - II

COURSE 3: THEORETICAL DISCRETE DISTRIBUTIONS

Practical

Credits: 1

2 hrs/week

List of Experiments:

1. Fitting of Binomial distribution – Direct method.
2. Fitting of Binomial distribution – Recurrence relation Method.
3. Fitting of Poisson distribution – Direct method.
4. Fitting of Poisson distribution – Recurrence relation Method.
5. Fitting of Negative Binomial distribution – Direct method.
6. Fitting of Negative Binomial distribution – Recurrence relation Method.
7. Fitting of Geometric distribution – Direct method.
8. Fitting of Geometric distribution – Recurrence relation Method.
9. Fitting of Hyper Geometric distribution.