

DRAFT SYALLBUS FOR AUTONOMY

STATISTICS

SEMESTER I

COURSE : S.STA.1.02

STATISTICAL METHODS (A)

[45 LECTURES]

LEARNING OBJECTIVES :

To study : 1) concept of probability
2.) probability distribution
3.) testing of hypotheses.

Unit 1 : Elementary probability theory.

[15 Lectures]

Random Experiment, Trial, Sample Point & Sample Space.

Events and Operation of events.

Equally likely, Complementary, Mutually exclusive, & Exhaustive Events.

Classical, Empirical and Axiomatic definitions of probability.

Conditional Probability, Independence of n Events. ($n \geq 2$).

Theorems on Addition & Multiplication of Probabilities,

Bayes' Theorem (All theorems with proofs).

Unit 2 : Discrete Random variable:

[15 Lectures]

Univariate distributions :

Random variable. Definition, Properties of Probability Mass Function & Cumulative Distribution Function. Concept of moment generating function and probability generating function. Raw & Central Moments and their relationship (without proof).

Concept of Skewness and Kurtosis.

Expectation and variance of a random variable. Theorems on Expectation and Variance .

Bivariate distribution :

Joint Probability Mass Function of two Discrete Random Variables, Marginal and Conditional Probability Distributions, Independence of Two Random Variables.

Theorems on Expectation, Variance.

Covariance, Correlation coefficient between two random variables

Unit 3 : Standard Discrete Probability Distributions:

[15 Lectures]

Uniform Distribution, Binomial Distribution, Poisson Distribution, Hypergeometric Distribution. Derivation of mean, & variance, Fitting of the distribution.

Poisson and Hypergeometric approximation to Binomial Distribution (statement only)

CIA Internal Tests.

SEMESTER II

COURSE : S.STA.2.02

STATISTICAL METHODS (B)

[45 LECTURES]

LEARNING OBJECTIVES :

To study : 1.) concept of probability
4.) probability distribution
5.) testing of hypotheses.

Unit 1 : Continuous Random variable

(15 L)

Concept and properties of Probability Density Function and Cumulative Probability distribution Function. Expectation and variance of a random variable and its properties. Measures of location, dispersion, skewness and kurtosis. Raw and Central Moments. (Simple illustrations.)

Unit 2 : Some Standard Continuous Probability Distributions. (15 L)

Rectangular Distribution, Exponential Distribution and Normal Distribution. Derivation of mean, median and variance for Rectangular and Exponential distribution. Properties of Normal Distribution and Normal Curve (without proof). Fitting of Normal Distribution.
Normal Approximation to Binomial and Poisson Distributions (without proof).

Unit 3 : Sampling Distribution.

(15 L)

Concept of Statistic, Estimator and its sampling distribution..
Parameter and its estimator. Concept of bias and standard error of an estimator.
Central Limit Theorem (Statement only).
Sampling distribution of sample mean and sample proportion for large samples.
Point and interval estimation of single mean and single proportion, for large sample only.
Statistical tests - Concept of Hypotheses. (Null and Alternative Hypotheses).
Types of Errors, Critical Region, Level of Significance, p-value,
Large Sample Tests using Central Limit Theorem, if necessary.
- For testing specified value of population mean
- For testing specified value in difference of two population means
- For testing specified value of population proportion
- For testing specified value in difference of two population proportions.

CIA Internal Tests.

PRACTICALS

SEM-I

1. Probability
2. Discrete Random Variable
3. Bivariate Probability Distributions.
4. Binomial, Poisson and Hypergeometric Distributions

SEM-II

5. Continuous Random Variables.
6. Uniform, Exponential Distributions.
7. Normal Distribution
8. Testing of Hypotheses
9. Estimation
10. Large Sample Tests.

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Manan Publications
2. Statistical Methods : R.J. Shah – Seth Publications.
3. Basic Statistics : B.L. Agarwal – New Age International Ltd.
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Series, Tata Mcgraw - Hill
5. Probability and Statistical Inference : Hogg R.V, Tanis E.P. – Macmillan
Publishing Co. Inc.
6. Fundamentals of Mathematical Statistics : S. C. Gupta, V.K.Kapoor –
Sultan Chand & Sons.
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8. Fundamentals of Statistics , Volume II, - Goon A.M., Gupta M.K.,
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