

GOVERNMENT DEGREE COLLEGE, BARAMULLA

SEMESTER 4th

MAJOR / MINOR COURSE

Subject: Statistics

Course Title: Testing of Hypothesis-I

Course Code: STSC1422M

Credits: Theory: 04; Practical: 02

Contact Hours: Th64 , Pr 64

Course Objectives: To study useful sampling distributions and their properties. To make informative decision using statistical tests. To introduce the Basic concepts of Non parametric tests.

Course Outcome: After completing the course, students will have:

Ability to set the hypothesis and notion of test statistics. Ability to distinguish between parametric and non-parametric tests. Ability to set the Large sample test and small test.

THEORY (4 Credits)

Unit I: Sampling Distributions: 16 Hrs

Sample, statistic, population and its types, real and hypothetical, parameter, Statement of Central Limit Theorem, sampling distribution and standard error of single sample mean of normal population and difference between two sample means, standard error of sample proportion and difference of two sample proportions.

Unit II: Statistical hypothesis: 16 Hrs

Simple and composite, null hypothesis, alternative hypothesis. Level of significance, P value, critical region, acceptance region, power of test, Type I and Type II error and their probability. Best critical region, Most powerful test, with illustrations. Confidence Intervals.

Unit III: Large sample tests: 16 Hrs

Procedure for testing of significance. z- Statistic, z-test for single proportion, difference of proportions. z- test for single mean, z-test for difference of means. Confidence interval.

Unit IV: Nonparametric Tests: 16 Hrs

Introduction and Concept, Parametric versus non-parametric tests, advantages and disadvantages of non-parametric tests. Kolmogrov Smirnov test for one sample, Sign tests- one sample.

Practical (2 Credits)

1. Large sample tests for single means with confidence interval
2. Large sample tests for difference of means with confidence interval
3. Large sample test for single proportions with confidence interval
4. Large sample test for difference of proportions with confidence interval
5. Test of significance based on Kolmogrov -Smirnov test.
6. Test of Significance based on Sign test.

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Book recommended

1. Freund J.E(2001):Mathematical Statistics,Prentice Hall of India.
2. Goon A.M Gupta M.K., Das Gupta, B.(1991):Fundamentals of Statistics, Vol.-I World Press Calcutta.
3. Hodges J.L and Lehman E.L(1964):Basic concepts of probability and Statistics, Holden Day.
4. Mood A.M, Graybill F.A and Boes D.C(1974):Introducing to the Theory of Statistics
5. S.C Gupta and V.K Kapoor(2007):Fundamentals of Mathematical Statistics. 11th edition (reprint) Sultan Chand and sons.
6. S.P Gupta : Statistical Methods, Sultan Chand and sons.
7. Bhat B.R. Sri Venkatramana T and Rao Madhava K.S. (1967):Statistics: A Beginner's Text, Vol. II, New Age International (P) Ltd.
8. Rohatgi V.K(1967):An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons.

GOVERNMENT DEGREE COLLEGE, BARAMULLA

SEMESTER 4th

MAJOR / MINOR COURSE

Subject: Statistics

Course Title: Testing of Hypothesis-II

Course Code: STSC2422M

Credits: Theory: 04; Practical: 02

Contact Hours: Th 64 Hr, Pr 64Hr

Course Objectives: To study useful sampling distributions and their properties. To make informative decision using statistical tests.

Learning Outcome: After completing the course, students will have:

Ability to apply tests like Chi square test, t-test and F test for different types of data. Ability to distinguish between parametric and non-parametric tests. Ability to apply non-parametric tests.

Unit I: Chi square Tests:

16 Hrs

Chi square statistic, assumptions, applications, condition for validity of chi square test. Chi square test for variance, chi square test for goodness of fit, chi square test for independence of attributes. Contingency table, Yates correction. Fisher exact test.

Unit II: t-test:

16 Hrs

t-statistic, assumptions, test of significance for single sample mean, difference of means, and related confidence intervals. Paired t-test, t-test for sample correlation coefficient with confidence interval.

Unit III: F-distribution:

16 Hrs

Assumptions, applications and properties, F-statistics or variance ratio test. Assumptions, Test of significance for the variance of two populations. z-test for testing standard deviations. z-transformations its applications.

Unit IV: Non parametric tests:

16 Hrs

Run test, Median test, test of randomness, Mann-Whitney U test. Kruskal-Wallis test, Wald-Wolf test.

Practical (2 Credits)

1. Tests of significance based on Chi-Square test.
2. Tests of significance based on t-test.
3. Tests of significance based on paired t-test
4. Tests of significance based on F-statistic.
5. Chi-square test of goodness of fit
6. Chi-square test for independence of attributes in contingency tables.
7. Test of significance based on Run test test.
8. Test of Significance based on median test and Mann-Whitney U test.
9. Test of significance based on Kruskal-Wallis test and Wald-Wolf test.

Books Recommended:

1. Freund J.E. (2001): Mathematical Statistics, Prentice Hall of India.
2. Goon A.M., Gupta M.K., Das Gupta, B. (1991): Fundamentals of Statistics, Vol. - I World Press

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Calcutta.

3. Hodges J.L and Lehman E.L (1964): Basic concepts of probability and Statistics, Holden Day.
4. Mood A.M, Graybill F.A and Boes D.C (1974): Introducing to the Theory of Statistics
5. S.C Gupta and V.K Kapoor (2007): Fundamentals of Mathematical Statistics. 11th edition (reprint) Sultan Chand and sons.
6. Bhat B.R. Srivenkatramana T and Rao Madhava K.S. (1967): Statistics: A Beginner's Text, Vol. II, New Age International (P) Ltd.
7. Rohatgi V.K (1967): An Introduction to probability Theory and Mathematical Statistics, John Wiley & Sons.

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SEMESTER 4th

MAJOR COURSE

Subject: Statistics

Course Title: Distributions and Convergence

Course Code: STSC3422M

Credits: Theory: 04; Practical: 02

Contact Hours: Th 64 Hr, Pr 64Hr

Course Objectives: To learn necessary mathematical concepts and tools to strengthen understanding of statistical theory.

To gain mathematical knowledge and build foundation for further study of Statistical inference.

To study different sampling distributions and their properties.

Course Outcome:After completing the course, students will have:

Ability to study differentiation and Integration

Ability to study derivations of chi square distribution and Normal distribution

Ability to learn convergence in probability and other related results.

Unit I: Calculus:

16 Hrs

Increment in variable, derivative, Differential co-efficient,

Differentiation of some basic functions of the form x^n , \sqrt{x} , $(ax + b)^n$, $\log x$, e^x , $x e^x$. Differentiation of sum and product of two variables, simple illustrations. Integration of basic functions of the form x^n , $\frac{1}{x}$, $(ax + b)^n$, e^x , $x e^x$.

Unit II: Convergence:

16 Hrs

Chebysheves inequality, Basic concept of convergence, convergence in probability and other related results. Chebyshevstheorm of convergence. Concept of law of large numbers, weak and strong law of large numbers.

UnitIII:Normal distribution:

16 Hrs

p.d.f of Normal Distribution, M.G.F, Mean, Median, Mode, Variance, reproductive property. Illustrations on z values. Beta distribution 1st and 2nd Kind (m.g.f, Mean and Variance).

Unit IV: Chi square distribution:

16 Hrs

p.d.f of Chisquare distribution, moment generating function, mean and variance of chi square distribution. t-distribution, its p.d.f, Important properties (without proof).

Practical (2 Credits)

1. Fitting of Normal distribution.
2. Beta 1st and 2nd kind Distribution.
3. Chi square distribution.
4. Chebychevs inequality.

Books Recommended.

1. Freund J.E (2001): Mathematical Statistics, Prentice Hall of India.

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2. Goon A.M Gupta M.K., Das Gupta, B. (1991): Fundamentals of Statistics, Vol. - I World Press Calcutta.
2. Hodges J.L and Lehman E.L (1964): Basic concepts of probability and Statistics, Holden Day.
3. Mood A.M, Graybill F.A and Boes D.C (1974): Introducing to the Theory of Statistics, McGraw Hills.
4. S.C Gupta and V.K Kapoor (2007): Fundamentals of Mathematical Statistics. 11th edition (reprint) Sultan Chand and sons.
5. Auzeem Chopra and Kochar: Differential Calculus, Kapoor Sons, Srinagar.
6. Bhat B.R. Srivenkatramana T and Rao Madhava K.S. (1967): Statistics: A Beginner's Text, Vol. II, New Age International (P) Ltd.
7. Rohatgi V.K (1967): An Introduction to probability Theory and Mathematical Statistics, John Wiley & Sons.