GOVERNMENT DEGREE COLLEGE, BARAMULLA

SEMESTER 4th **MAJOR / MINOR COURSE**

Subject: Statistics

Course Title: Testing of Hypothesis-I **Course Code: BST22C401/ STSC1422M**

Credits: Theory: 04; Practical: 02 Contact Hours: Th 64 , 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 -Smirinov test.
6. Test of Significance based on Sign test.

GOVERNMENT DEGREE COLLEGE, BARAMULLA

Book recommended

1. FreundJ.E(2001):MathematicalStatistics,PrenticeHallofIndia.
2. GoonA.MGuptaM.K.,DasGupta,B.(1991):FundamentalsofStatistics,Vol.-IWorldPressCalcutta.
3. Hodges J.LandLehmanE.L(1964):Basic concepts of probabilityandStatistics, Holden Day.
4. MoodA.M,GraybillF.AandBoesD.C(1974):IntroducingtotheTheoryofStatistics
5. S.CGuptaandV.KKapoor(2007):FundamentalsofMathematicalStatistics.11th edition(reprint)SultanChand and sons.
6. S.P Gupta : Statistical Methods,SultanChand and sons.
7 BhatB.R.SrivenkatramanaTandRaoMadhavaK.S. (1967):Statistics:ABeginner'sText,Vol.II,New AgeInternational(P) Ltd.
8 RohatgiV.K(1967):AnIntroductiontoprobabilityTheoryandMathematicalStatistics,JohnWiley&Sons.

GOVERNMENT DEGREE COLLEGE, BARAMULLA

SEMESTER 4th **MAJOR / MINOR COURSE**

Subject: Statistics

Course Title: Testing of Hypothesis-II **Course Code: BST22C402/ 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 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.Kruskallwallis 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 teat 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 Kruskallwallis test and Wald Wolf test.

Books Recommended:

1. FreundJ.E(2001):MathematicalStatistics,PrenticeHallofIndia.
2. GoonA.MGuptaM.K.,DasGupta,B.(1991):FundamentalsofStatistics,Vol.-IWorldPress

Calcutta.

3. Hodges J.LandLehmanE.L(1964):Basic concepts of probabilityandStatistics, Holden Day.
4. MoodA.M,GraybillF.AandBoesD.C(1974):IntroducingtotheTheoryofStatistics
5. S.CGuptaandV.KKapoor(2007):FundamentalsofMathematicalStatistics.11th edition (reprint)SultanChand and sons.
6. BhatB.R.SrivenkatramanaTandRaoMadhavaK.S. (1967):Statistics:ABeginner'sText,Vol.II, New AgeInternational(P) Ltd.
7. RohatgiV.K(1967):AnIntroductiontoprobabilityTheoryandMathematicalStatistics,John Wiley & Sons.

GOVERNMENT DEGREE COLLEGE, BARAMULLA

SEMESTER 4th **MAJOR COURSE**

Subject: Statistics

Course Title: Distributions and Convergence **Course Code: BST22C403/ 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. Chebyshevestheorm 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. FreundJ.E(2001):MathematicalStatistics,PrenticeHallofIndia.

2. GoonA.MGuptaM.K.,DasGupta,B.(1991):FundamentalsofStatistics,Vol.-IWorldPress Calcutta.
2. Hodges J.LandLehmanE.L(1964):Basic concepts of probabilityandStatistics, Holden Day.
3. MoodA.M,GraybillF.AandBoesD.C(1974):IntroducingtotheTheoryofStatistics, McGraw Hills.
4. S.CGuptaandV.KKapoors(2007):FundamentalsofMathematicalStatistics.11th edition (reprint)SultanChand and sons.
5. Auzeem Chopra and Kochar: Differential Calculus, Kapoor Sons, Srinagar.
6 BhatB.R.SrivenkatramanaTandRaoMadhavaK.S. (1967):Statistics:ABeginner'sText,Vol.II,New AgeInternational(P) Ltd.
7. RohatgiV.K(1967):AnIntroductiontoprobabilityTheoryandMathematicalStatistics,JohnWiley &Sons.

GOVERNMENT DEGREE COLLEGE, BARAMULLA

Department of Statistics
Govt. Degree College Baramulla.
(Autonomous)

Sllabus for 3rd Semester (Statistics) NEP Batch 2022 Credits 4+2=6

Paper: Major/Minor Title:Introduction to Statistical MethodsCode:STS322M

Course Objectives: To introduce the basic concepts of Multiple and Partial (Correlation and Regression).
To introduce the basic elements of categorical data.
To introduce basic concepts of computers and its applications in Statistics.

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

- Ability to measure multiple and partial correlation of data and define its significance.
- Ability to measure multiple and partial Regression of data and define its significance
- Ability to predict value of dependent variable in case of straight line and second degree parabola for data set.
- Ability to obtain frequencies and class frequencies

THEORY (4 Credit)

Unit I:Multiple and Partial correlation: 16 Hrs

Concept of multiple correlation and multiple regression and its Importance(upto three variables), Partial correlation and partial regression and its Importance. Yules notation, residual, Properties of residuals without proof, Coefficient of multiple correlation and partial correlation. Multiple correlation in terms of total and partial correlation. Important properties of multiple correlation coefficient(without proof).

Unit II: Curve Fitting: 16 Hrs

Concept of dependent and independent variable, Types of curves, Method of least square for fitting straight line, Fitting of parabola, Fitting of exponential curve $y = ab^x$. Fitting of Power curve of the form $y = ax^b$ and related examples. Free-hand method of curve fitting.

Unit III: Analysis of Categorical Data: 16 Hrs

Level of Measurements, Notations, Classes and class frequencies, order of classes, Relation between class frequencies, Consistency of categorical data, Independence of attributes, Association of attributes, Yule's coefficient of association, Coefficient of colligation.

Unit IV: Introduction to Computers: 16 Hrs

Application of Computers in Statistics, Basics of Excel: Data Entry Built in Functions in Excel (Mathematical and Statistical), Graphical Representation of Data through Excel (Histogram, Bar Diagram, Box Plot, Steam & leaf).

Practical (2Credits)

1. Multiple and Partial Correlation (upto three variables only).
2. Multiple and Partial Regression (upto three variables only).
3. Fitting of 1st degree line to the data set.
4. Fitting 2nd degree parabola to the data set.
5. Predicting value of dependent variable in case of straight line and second degree parabola for data set.
6. Obtaining frequencies and class frequencies.
8. Association of attributes for the data set.
9. Use excel work sheet for different data sets

Books Recommended:

1. Statistics: A Beginners Text Vol. I. New Age International Ltd.
2. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2013). Fundamental of Statistics, Vol I, World Press, Kolkata.
3. Gupta, S.C. and Kapoor, V.K. (2000). Fundamentals of Mathematical Statistics (10th ed.), Sultan Chand and Sons.
4. Das N,G. Statistical Methods Vol I, McGraw Hill Education India.
5. S.P Gupta. Statistical Methods, Sultan Chand and Sons.
6. Pardeep, K. Sinha and Priti Sinha. Computer Fundamentals, BPB Publications (2004)

GOVERNMENT DEGREE COLLEGE, BARAMULLA

Department of Statistics
Govt. Degree College Baramulla.
(Autonomous)

Syllabus for 3rd Semester (Statistics) NEP Batch 2022 Credits 2+2=4Paper: Skill CourseTitle:Applied Statistics-III and SPSSCode:STS322S
THEOREY (2 Credits)

Course Objectives: To introduce the skill of SPSS to study the hypothesis testing.

Course outcomes: To equip students with theoretical and analytical skills with the capability to understand and handle
the dynamic of statistics in the business world.
Students will have ability to express thoughts and ideas effectively in Statistical language.
The students could develop Statistical reasoning to analyze and interpret socio economic data from a variety of sources.
The students will be able to equipped themselves within depth SPSS software for statistical computing.

Unit I: Hypothesis: 16 Hrs

Null hypothesis and alternative hypothesis, critical region, one tail and two tail test,level of significance, p value, procedure for testing of hypothesis. Computational techniques for t test for single mean, difference between two means and paired t test for difference between means.

Unit II: Computational techniques: 16 Hrs

F – Statistics or Variance Ratio Test , One way Analysis of variance (ANOVA), Post hoc test, Computational technique for Chi square test for goodness of fit; independence of attributes and test for specified value of population variance.

Practical: (2 credits)
1. Determination of Critical value for one tail test and two tail test through SPSS.
2. Test of significance of Single and difference of means using SPSS.
3. Test of Significance of paired t test for difference between means through SPSS.
4. Test of significance of Chi square test for goodness of fit.
5. Test of significance of chi square test for independence of attribute through SPSS.

Books Recommended:

1. Handbook of Statistical Analysis using SPSS by sabine Landau and Brians. Everitt published by Chapman and Hall/crc
2. Data Analysis using SPSS, first edition by LokeshJasrai published by Saja Publications India Pvt.Lt.
3. S.P. Gupta: Statistical Methods by Sultan chand and Sons
4. Data Analysis using SPSS by Dr.Lalit Prasad and Dr. Priyanka Mishra , Nirali Publications
5. Link :www.iasri.res.in