COURSE 8: INFERENTIAL STATISTICS

Theory	Credits: 3	3 hrs/week

Course Objective:

This course enables students to gain knowledge in sampling, hypothesis testing and non parametric methods.

Course Outcomes:

After going through this course, the students will get

CO1: a fundamental understanding of Parametric models for developing relevant inferences on associated parameters,

CO2: knowledge of point and interval estimation procedures and different methods of point estimation,

CO3: using Neyman Pearson Lemma and finding Uniformly Most Powerful Test,

CO4:various basic concepts on sampling distributions and large sample tests based on normal distribution,

CO5 : small sample tests based on chi-square, Student's and Snedecor's F distributions

Unit I

Theory of Estimation: Parameter, Statistic, Standard Error of the statistic, concept of bias and mean square error of an estimate, Criteria of good estimator - unbiasedness, consistency, efficiency, and sufficiency. Methods of estimation- Maximum Likelihood estimator(MLE) and Method of Moments(MME).Concepts of confidence interval and confidence coefficient, confidence intervals for the parameters of univariate normal,

Unit II

Testing of Hypothesis : Statistical hypotheses, critical region, size and power of a test, most powerful test, two types of errors. Neyman Pearson lemma(WITHOUT PROOF) and its applications, uniformly most powerful unbiased test . One and two tailed tests. Procedure for testing of hypothesis, Tests of significance of large samples - Single proportion and difference of proportions, single mean and difference of means.

Unit III

Exact Sampling distributions : Student's t-distribution, Chi-square distribution, Snedecor's Fdistribution – definitions, properties and applications. Tests of significance for small samples: Student's t-distribution - single mean, difference of means and paired t-test. Chi-square distribution-test for goodness of fit and independence of attributes.

Unit IV

F-distribution – definition, properties and applications – F-test for equality of two population variances. ANOVA one way and two-way classifications

Unit V

Non-parametric methods- definition, advantages and disadvantages. One sample test- Sign test, Run test, Wilcoxon-signed rank test. Two independent sample tests: Median test, Wilcoxon- Mann Whitney U - test, Kruskal Wallis test - Simple Problems Note: Without proofs of named theorems and more importance to applications.

TEXT BOOK:

S.C. Gupta, (2019), Seventh Edition, Fundamentals of Statistics, Mumbai: Himalaya Publishing House.

REFERENCE BOOKS

1. Sharma, J. K. (2013), Business statistics, New Delhi: Pearson Education

2. Levine, D.M., Berenson, M. L. & Stephan, D. (2012), Statistics for managers using Microsoft Excel, New Delhi: Prentice Hall India Pvt.

3. Aczel, A. D. &Sounderpandian, J. (2011), Complete Business Statistics, New Delhi: Tata McGraw Hill.

4. Anderson, D., Sweeney, D., Williams, T., Camm, J., & Cochran, J. (2013), Statistics for Business and Economics, New Delhi: Cengage Learning.

5. Davis, G., &Pecar, B. (2014), Business Statistics using Excel, New Delhi: Oxford University Press.

Websites of Interest:

http://onlinestatbook.com/rvls/index.html

Co-Curricular Activities in the class:

1. Pictionary

2. Case Studies on topics in field of statistics

3. Snap test and Open Book test

4. Architectural – To be build the procedures

5. Extempore – Random concept to students

6. Interactive Sessions

7. Teaching through real world examples

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COURSE 8: INFERENTIAL STATISTICS

Practical	Credits: 1	2 hrs/week

Course Objective:

This course enables students to gain hands-on practical experience of SPSS for analysing data by implementing sample tests, ANOVA and nonparametric tests..

Course Outcome:

Upon successful completion of this course, students should have the knowledge and skills to:

CO1: Apply the various statistical methods for real life problems PO2

CO2 Apply the SPSS techniques and give the interpretations. PO2

List of Practicals using SPSS

1. Large Sample Tests: Test of significance of (a) Single Mean (b) Difference of means

2. Large Sample Tests: Test of significance of (a) Single Proportion (b) Difference of Proportions

3. Small Sample Tests: t-Test for significance of (a) Single mean (b) Difference of means- samples are independent (c) Difference of means- samples are dependent

4. Chi square Test of (a) Independence 2x2 Cross tabulation, (b) Goodness of fit

5 Test for several means ANOVA (a) One-way (b) Two- way classification,

6 Non Parametric Tests (a) Mann Whitney U test, (b) Wilcoxon Signed ranks test, (c) Kruskal Wallis Test, (d) Friedman test Note: Training shall be in SPSS and derive the results. The SPSS output shall be exported to MS word for writing inference.

Reference Manual: Practical Manual -Prepared by the Department Faculty Members

Websites of Interest: http://www.statsci.org/datasets.html

Scheme of Valuation for Practical Paper (i) Continuous evaluation 10 Marks (ii) External Evaluation: 40 marks

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