

**SEMESTER-II: (CORE COURSE)****GEOG.803: ADVANCED STATISTICAL TECHNIQUES IN GEOGRAPHY AND PLANNING 3(3-0)****Course Objectives**

This course aims at providing the doctoral students with statistical techniques and skills for analyzing quantitative data that may be required for their research. The emphasis is on practical uses of these tools in real databases in order to discover and prove new scientific facts and relationships.

**Learning Outcomes**

On completion of this course, students will be able to:

- Appreciate and understand the role of statistics in the field of geography.
- Develop an ability to apply appropriate statistical methods such as Sampling distribution; estimation; test of hypothesis, analysis of difference and ANOVA; analysis or association; multiple regressions to summarize and analyze data for some of the more routine experimental settings.
- Make sense of data and be able to report the results in appropriate table or statistical terms for inclusion in your thesis or paper.
- Interpret results from various computer packages particularly SPSS and be able to use SPSS to perform appropriate statistical techniques.

**Course Outline**

- 1. An overview of statistics**
- 2. Probability Theory and Random Variables**
  - Probability Concepts
  - Random Variables
  - Normal Distribution
- 3. Sampling and Estimation**
  - Sampling and sampling distribution
  - Estimation
- 4. Hypothesis Testing**
  - Type of hypothesis and general concepts
  - Procedures
  - Interpretations
- 5. Descriptive Statistics**
  - Types of Data, variables, levels of measurement and Visualization
  - Data Matrix and Frequency table
  - Graphs and Shapes of Distribution
  - Measures of Central Tendency and Dispersion
  - Variance and Standard Deviation
  - Z-Score and Example
- 6. Analysis of Difference**
  - Paired t-test
  - Independent t-test
  - ANOVA
- 7. Analysis of Association**



- Correlation, its types and types of correlation coefficients
- Regression, types, procedures and interpretation
- 8. Factor Analysis**
  - Exploratory factor analysis: procedures and interpretations
  - Confirmatory factor analysis: procedures and interpretations
- 9. Data Analysis with SPSS**
  - General description, functions, menus, commands
  - Data entry and file management
  - Data analysis with SPSS

### **Recommended Books**

1. D. Aczel, (2004) “Complete Business Statistics”, 5<sup>th</sup> Edition, McGraw-Hill/Irwin.
2. M.A. Hardy, A.E. Bryman (2004) “Handbook of Data Analysis”, SAGE Publications.
3. W.H. Greene, (2000) “Econometric Analysis”, 4<sup>th</sup> Edition, Prentice Hall.
4. G.A. Churchill, (1999) “Marketing Research: Methodological Foundations”, 7<sup>th</sup> Edition, Harcourt Brace College Publishers.
5. J.F. Hair, B. Black, B. Babin (1998) “Multivariate Data Analysis”, 5<sup>th</sup> Ed. Prentice Hall.
6. R. S. Pindyck, D.L. Rubinfeld (1991) “Econometric Models and Economic Forecasts”, Third Edition. NY: McGraw-Hill.

### **Recommended Journals**

- *Open Journal of Statistics*
- *GCU Publications: Journal of Statistics*
- *Statistics Solutions*
- *Canadian Journal of Statistics (Wiley)*
- *Journal of Probability and Statistics (Hindawi)*