Course: Educational statistics

Credit hours: 2

Introduction: Educational researchers are facing very demanding research questions now which need to be explored to greater depth as compared to few decades ago. Statistical techniques are a tool for analyzing the results in empirical research, which is increasingly used in present educational research. Understanding of such methods and techniques has become an integral part of conducting educational research. This course is designed to provide understanding of basic statistical concepts as they are used in educational research. It is also intended to develop the sense of selecting appropriate statistical test for appropriate research question. As a result of this course the participants will become better interpreters of educational data by mastering the statistical concept and techniques.

Objectives

At the end the course students will be able to:

1. understand descriptive statistics
2. differentiate different test of statistics
3. use statistical test in educational research
4. interpret result of data analysis
5. explore new techniques in statistics research purpose

Course Content

1. **Introduction to statistics**
   - 1.1 Introduction
   - 1.2 Basic concepts
   - 1.3 Historical development of statistics
   - 1.4 Types of Measurement Scale
2. **Frequency Distributions and Graphs**
   - 2.1 Introduction
   - 2.2 Frequency distributions
   - 2.3 Introduction to graphs
   - 2.4 Graphs for qualitative variables
   - 2.5 Graphs for quantitative variables
   - 2.6 Shapes of distributions
3. **Measures of central tendency**
   - 3.1 Introduction
   - 3.2 Mean
   - 3.3 Median
   - 3.4Mode
4. **Measures of dispersion, skewness, and kurtosis**
   - 4.1 Introduction to measures of dispersion
   - 4.2 Measures of dispersion (Range, Quartile Deviation, Standard Deviation, variance)
   - 4.3 Dispersion and the normal distribution
   - 4.4 Skewness and kurtosis
5. **Correlation**
   - 5.1 Introduction to correlation

5.2 Pearson Product-Moment correlation coefficient
5.3 Spearman Rank correlation
5.4 Other kinds of correlation coefficients

6. Statistical inference: one sample
6.1 Introduction to hypothesis testing
6.2 One-sample t-test for a mean

7. Statistical inference: two samples
7.1 Introduction to hypothesis testing for two samples
7.2 Two- sample t test and confidence interval for means using independent & dependent samples

8. Introduction to the analysis of variance and covariance
8.1 Introduction to analysis of variance
8.2 Basic concepts in ANOVA
8.3 Multiple comparison procedures

9. Statistical inference for frequency data
9.1 Chi-Square test
9.2 Testing Goodness of Fit
9.3 Testing independence

10. Statistical Inference for Ranked Data
10.1 Introduction to Assumption-Free tests
10.2 Mann- Whitney U Test for two independent samples
10.3 Wilcoxon test for dependent samples

Evaluation Criteria

Examination	Type	Marks
Internal Examination	Sessional Work	15%
	Mid-Semester	25%
External Examination	Final Semester	60%

Reference Books

Bartz, A.E (1999). Basic statistical concepts (4th ed.). New Jersy: Printice-Hall

Bluman, A. G. (2009). Elementary statistics: A step by step approach. Boston: McGraw-Hill.

Garrett. & Henry E (1995). *Statistics in psychology and education*. London: Longman

Heiman, G. W. (2011). *Basic statistics for the behavioral sciences.* USA: Wadsworth

Howel, D. C. (2013). *Statistics for psychology*. USA: Wadsworth

Howel, D. C. (2011). Fundamentals of statistics for behavioral sciences. USA: Wadsworth

Kutz, Albert K. (1980). Statistical method in education and psychology. New Delhi, Narosa publishing House.

Larson, R., & Farber, B. (2012). *Elementary statistics: Picturing the world*. Delhi: Prentice Hall.

Mangal, S.K (2002). *Statistics in psychology and education*. New Delhi: Printice-Hall of India Pvt. Ltd.

Weiss, N.A. (2012). *Elementary statistics*. Boston: Addison-Wesley