

DSC 10 (IV.2) Statistics in Educational Research

Discipline Specific Core

1. Credit Distribution of the course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
DSC 10 (IV.2)						
Statistics in Educational Research	4	3	0	1	Undergraduate	NIL

2. Learning Objectives

The course will focus on understanding statistical concepts and its relevance in educational research. It explores applications of descriptive and inferential statistics on various datasets. It enables students to apply statistical tools to educational datasets. Students learn to describe, analyse and infer from real educational data for decision-making and scholarly inquiry.

3. Learning Outcomes

- Understand the role and scope of statistics in educational research;
- Organise, summarise, and interpret quantitative data using descriptive statistics;
- Apply appropriate inferential statistical techniques to test research hypotheses;
- Critically analyse and report quantitative findings in educational research.

4. Syllabus

[45 hours]

Unit I Meaning and scope of Statistics - Measurement scales; Parametric and Nonparametric Data; Descriptive and Inferential Analysis. **[9 hours]**

Unit II Descriptive Statistics - Representing data (Frequency distribution; Cumulative distribution and Histogram); Measurement of Central Tendency and its 'interpretation, Measure of dispersion (Variance and Standard Deviation) and its' interpretation; Standard Scores (Z score; T Score, Percentile score and Percentile rank); Normal Probability curve and its' applications. **[12 hours]**

Unit III Regression and Correlation - Measure of correlation: assumptions, computation and interpretation (Product moment correlation and Rank order correlation); Partial correlation; Multi-variate correlation (application and interpretation); Simple and multiple regression analysis. **[12 hours]**

Unit IV Data analysis and interpretation - Describing and interpreting data using case-studies with real time/synthetic educational data. **[12 hours]**

5. Practical **[30 hours]**

- Conduct a comparative analysis of class-size divisions and descriptive measures.
- Prepare an analytical report for an educational data from publicly available datasets (for example: UDISE+; OECD) and design infographics based on the data.
- Collect five small datasets in different educational settings and make a factsheet of nature, variables, measurement scales and choice of descriptive statistics.
- Make a list of variables from 20 educational research studies and describe the features and statistics of variables used by the researchers. Critically analyze the choices made by the researchers.
- Review 10 correlational research studies and identify the correlation feasibility.
- Run a simple linear regression to predict achievement outcomes based on any two dependent variables such as using online resources, previous achievement.
- Prepare 05 case studies using real/simulation data which highlight that statistical results can be misleading.
- Prepare a statistical analysis using Geogebra for a real education dataset.
- Create a Math Aptitude Test and establish its reliability and validity.
- Design an ability grouping interval scale for a normally distributed students group.
- Prepare a usability chart for conditions of correlation analysis.

6. Essential Readings

- Best, J. & Kahn, J. (2012). *Research in Education*, PHI learning Private Limited.
- Garrett, H. E. (2006). *Statistics in Psychology and Education*. Cosmo Publication.
- Creswell, W.J. and Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative and Mixed Methods*. Sage Publications.
- Lanham, M. (2011). *Practical Statistics for Educators*. Rowman & Littlefield, Toronto.

7. Suggestive Readings

- Leppink, J. (2019). *Statistical Methods for Experimental Research in Education and Psychology*. Springer.
- Tanner, E. (2011). *Using Statistics to Make Educational Decisions*. Thousand Oaks, Sage.
- Coladarci, T. & Cobb, C.D. (2013). *Fundamentals of Statistical Reasoning in Education*. Wiley.