



# Statistics in Education

## Course Syllabus

### Course Description

The fundamental principles and procedures of statistical analysis are introduced in this course. Basic concepts including probability, random variables, and sampling distributions are covered before moving on to more complex concepts like hypothesis testing, confidence intervals, and multi-group analysis. Students will learn how to examine educational data using statistical software and come to meaningful conclusions. The significance of successfully evaluating and conveying statistical results, both orally and in writing, will also be emphasized in the course. The use of statistical analysis in education and educational administration will be demonstrated to students through case studies and practical exercises. By the end of the course, students will be able to critically assess statistical arguments and data-based claims and have a thorough introduction to statistical theory and its applications in an educational setting.

This course enhances classroom teaching effectiveness and supports improved student outcomes by introducing new knowledge in foundational and applied statistical analysis in educational settings, including probability, hypothesis testing, correlation and regression, and the use of statistical software (JASP) to interpret and communicate educational data effectively.

\*Please note, this course requires downloading and installing the free JASP software.

### Course Objectives

At the end of this course you should be able to:

1. Have a basic understanding of probability, sampling, and the normal distribution in statistical theory.
2. Have a basic understanding of p-values, test statistics, and how they relate to null hypothesis testing.
3. Use the JASP statistical program to conduct descriptive analyses and make basic graphs.
4. Have a solid understanding of correlation and regression, and be able to conduct both analyses using the JASP statistical software.
5. Have a firm understanding of the methods of group comparison, including t-tests, one-way ANOVAs, and factorial ANOVAs.
6. Be able to conduct group comparison analyses in JASP, including t-tests, one-way ANOVAs, and factorial ANOVAs.
7. Understand the history of educational assessment in America and the role that statistics plays in educational assessment.
8. Implement statistics components for students of any age level, and understand what additional resources are available for statistics education.

### Modules

- Module 1: Probability and Sampling, Quiz 1



- Module 2: Hypothesis Testing & Statistical Theory, Quiz 2
- Module 3: Statistical Analyses - Introduction to JASP, Quiz 3
- Module 4: Correlation and Regression, Quiz 4
- Module 5: Group Comparisons, Quiz 5
- Module 6: Group Comparisons in JASP, Quiz 6
- Module 7: Statistics in Educational Assessment, Quiz 7
- Module 8: Statistics in the Classroom, Quiz 8

### **Grading**

Each quiz must be passed at an 80% or higher (three attempts allowed).

### **Format**

This is a self-paced, asynchronous (no required live meetings) course. Throughout the PD course, you will find it helpful to take notes along the way to assist with the quizzes. Within each module, you will find reflection assessments that are not graded but will help in your journey through the course. There is an interactive forum in the course to help you connect with peers and instructors, share ideas, and collaborate on best practices throughout your learning journey.