Proposed Undergraduate Course Syllabus

Course Information

Course Title: Introduction to Statistics and Data Analysis

Course Description

This course introduces undergraduate students in the field of social and behavioral sciences to foundational concepts in statistics and data analysis. The purpose of the course is to equip students with essential skills to analyze data from both experimental and non-experimental research designs. Students will learn how to generate research questions, formulate statistical hypotheses, and use statistical software JMP to analyze data. Throughout the course, emphasis will be placed on a conceptual understanding of statistical principles as well as interpreting statistical results to make informed decisions in research.

Textbooks

Howell, D. C. (2012). *Statistical methods for psychology* (8th ed.). Belmont, CA: Wadsworth. ISBN: 9781111835484

Tamhane, A. C., & Dunlop, D. D. (2000). *Statistics and data analysis: From elementary to intermediate.* Upper Saddle River, NJ: Prentice Hall.

Lecture Outline and Readings

Week	Topic	Reading
1	Introduction and Review of Probability	TD ch.1, 2
2	Summarizing and Exploring Data	TD ch.4
3	Standardized Values and the Normal Distribution	HD ch.3
4	Sampling Distribution	TD ch.5
5	Hypothesis Testing	TD ch.6
6	One-Sample T-Test	TD ch.7
7	Independent-Sample T-Test and Paired Sample T-Test	TD ch.8
8	Power	HD ch.8
9	Simple Linear Regression and Correlation	TD ch.10
10	One-Way ANOVA (I)	HD ch.11
11	One-Way ANOVA (II)	HD ch.11
12	Categorical Data and Chi-Square	HD ch.6

**HD = Howell (2012) book

**TD = Tamhane and Dunlop (2000) book

Assignments

Assignments consist of three parts:

1) *Textbook problem sets*: Students will solve a number of selected problems in the Tamhane and Dunlop (2000) or Howell (2012) book after each week's lecture.
2) *Individual project-based assignments*: Students will complete two distinct data-analysis projects using a simple linear regression and one-way ANOVA, respectively. The instructor will pick the datasets and provide them to the students.
3) *Final group project*: Students will work in groups to collect their own data or choose to use secondary data collected by others. They will formulate a meaningful research question and use appropriate statistical methods to analyze their data and answer the research question. They will write up a report and present their findings during the last class.