

LL0 8180: Applied Statistics

Course Description

Introductory course designed to familiarize doctoral students with the principles and procedures of applied statistical analysis. Topics include descriptive statistics, basic probability theory, hypothesis testing and confidence interval estimation. Statistical techniques such as t-tests, correlation, regression, analysis of variance, and chi-square are covered. Emphasis is placed on providing students with a conceptual understanding of statistics, applying appropriate statistical techniques to analyze data, and interpreting results. R is used throughout the course.

Course Goals

1. Students should be able to describe and explain concepts and techniques in descriptive and inferential statistics.
2. Students should be able to demonstrate conceptual and mathematical understanding of sampling distributions, standard error, central limit theorem and p-value.
3. Students should be able to use R to perform appropriate statistical analysis on datasets.
4. Students should be able to conduct appropriate hypothesis tests and, when appropriate, construct confidence intervals for a given research design and/or datasets.
5. Students should be able to interpret statistics to describe clearly what they tell us about the research results.

Textbook

Privitera, G. J. (2017). *Statistics for the behavioral sciences* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Assessment

Weekly Quizzes	40%
Assignments	45%
Live session and async participation	15%

Instructor/Course Policies

Quizzes: There will be weekly quizzes consisting of 10 multiple choice and true/false questions. The questions will be based on each week's async material. The time limit for each quiz is 45 minutes. There will be a 5 minute "grace period" for you to submit the quiz after the 45 minutes. If the quiz is not submitted by exactly the end of the 5 minute grace period (at or before 50 minutes) then a 0 will be assigned. Late quizzes will not be accepted unless there is an extreme and verifiable circumstance approved by the instructor prior to the due date. You may only use the course textbook and your own notes from async/live session for the quizzes. You may not discuss the quiz questions with anyone other than the instructor or use internet resources when taking quizzes. The lowest quiz grade will be dropped.

Assignments: There will be regular homework assignments due. Late assignments will not be accepted unless there is an extreme and verifiable circumstance approved by the instructor prior to

the due date. It is acceptable to discuss the problems with your classmates, instructor, or tutor; however, you must submit your own write-up (using your own words and understanding of the material) and not copy answers from anyone else. The lowest assignment grade will be dropped.

R: The course includes a practical computing component. The primary software package that will be used is R and it will be taught in live session.

Calculators: Handheld calculators may be used in all work including examinations; however, cell phones may not be used as calculators.

Extra Credit: There are no additional extra credit opportunities for this course.

Disability Services: For students working with disability services, please see me as soon as possible to discuss any alternate arrangements for testing. Students who need reasonable accommodations for disabilities should contact Equal Opportunity, Affirmative Action, and Disability Services at 615-322-4705.

Confidentiality: All faculty must report allegations of sexual misconduct and intimate partner violence to the Title IX Coordinator.

Honor Code: All work submitted in this course is subject to the provisions of the Vanderbilt Honor Code. Details can be found at <http://www.vanderbilt.edu/academicintegrity/honor-codes-councils/>. It is the responsibility of the student to read and understand the Vanderbilt Honor Code.

Note: The course policies and schedule in this syllabus are subject to change at the discretion of the instructor. Students will be made aware of changes in a timely and clear manner.

Topics

Week 1: Basic Terms; Organizing and Graphing Data; Introduction to R (Chapters 1 and 2)

Week 2: Percentiles, Central Tendency, and Variability (Chapters 2, 3, and 4)

Week 3: Basic Probability; Normal Distribution; z-Scores (Chapters 5 and 6)

Week 4: Sampling Distribution (Chapter 7)

Week 5: Hypothesis Testing: One-Sample z-Test (Chapter 8)

Week 6: Power and Effect Size; One-Sample t-Test (Chapters 8 and 9)

Week 7: Two-Sample t-Tests (Chapters 9 and 10)

Week 8: Confidence Intervals (Chapter 11)

Week 9: One-Way ANOVA (Chapter 12)

Week 10: Two-Way ANOVA (Chapter 14)

Week 11: Correlation (Chapter 15)

Week 12: Simple Linear Regression (Chapter 16)

Week 13: Multiple Linear Regression (Chapter 16)

Week 14: Chi-Square (Chapter 17)