

Description:

Statistics is a rapidly growing field with real-world application in many fields. While the methods and examples taught will be those predominantly found in social science disciplines, concepts will have real-world applications in courses in other fields. This course can serve as a foundation for more advanced statistical as well as provide a baseline knowledge for knowing and understanding statistics in a practical sense. This course will have a conceptual component, covered in lecture, and a practical component, covered in recitations through the usage of the open-source statistical program R, and occasionally Microsoft Excel.

In the lecture component of the class, concepts taught will include the calculation, interpretation, and presentation of: 1) descriptive statistics such as measures of central tendency, variability, frequency tables, and correlation 2) Inferential statistics, including discussion of sampling distributions, of the hypothesis testing about means, proportions, t-tests, chi-square tests, ANOVA, and F-tests. Ordinary least squares (OLS) regression as well as multivariate linear regression and the interpretation of regression output will also be covered. Advanced topics such as binomial logistic regression may be covered at the end of the course, depending on time and scheduling.

R is a free, open-source statistical software that can be used in the data science lab as well as on personal computers. This is not a programming or computer science class. All generation of coding and commands will be handled predominantly by the instructors. By the end of the course, students will have a basic understanding of R and how to use it as a tool for statistics. R and RStudio will be used as an efficient way to generate descriptive and inferential statistics, graphics, tables, and other output necessary for a research paper or report. Data mining techniques, function writing, coding optimization and other advanced topics will not be covered.

No prior programming experience is necessary!!

Goals of the Course:

1. Develop a conceptual and theoretical understanding of statistics and their usage in answering questions about social phenomena.
 - a. Taught in lectures on Tuesday and Thursday.
 - b. Reinforced with biweekly timed Canvas quizzes (open notes)
2. Gain an understanding of how to use R to conduct data analysis and statistical operations at a basic level
 - a. Taught in recitations on Monday
 - b. Reinforced with bi-weekly R assignments
3. Design a research proposal to a question that can be answered quantitatively and execute the proposal with statistical computing skills learned in R
 - a. Discussed in lecture and recitations
 - b. Reinforced with Paper Checkpoints
 - c. Assessed with a completed final paper.

Extremely Tentative Course Schedule

Week	Date	Class Topic	Recitation Topic	Assignments
1	1/18 <i>Recitation:</i> 1/22	Introduction	Introduction and downloading R and R Studio	
2	1/23 & 1/25 <i>Recitation:</i> 1/29	Why Statistics Organization and Presentation of Data Variable Types	Basic R Orientation	Quiz 1 due 1/30
3	1/30 & 2/1 <i>Recitation:</i> 2/5	Central Tendency	Downloading Survey Data Variable types Descriptive Statistics with Continuous Variables	R Assignment 1 and Paper Checkpoint 1 Due 2/12
4	2/6 & 2/8 <i>Recitation:</i> 2/12	Variability	Missing Data Recoding Variables More Descriptive and Summary Statistics	Quiz 2
5	2/13 & 2/15 <i>Recitation:</i> 2/19	Normal Distribution	Data Visualization Standardizing variables Normal Distribution Simulation	R Assignment 2
6	2/20 & 2/22 <i>Recitation:</i> 2/26	Sampling Distribution	More Data Visualization Sampling Distribution Simulation	Quiz 3
7	2/27 & 2/29 <i>Recitation:</i> 3/11	Estimation	Constructing Confidence Intervals Introduction to R Markdown	R Assignment 3 Paper Checkpoint 2
	3/5 & 3/7	SPRING BREAK		
8	3/12 & 3/14 <i>Recitation:</i> 3/18	Hypothesis Testing	More R Markdown T- Distribution in R <i>For Loops?</i>	Quiz 4
9	3/19 & 3/21 <i>Recitation:</i> 3/25	Bivariate Tables	Multivariate Tables Multivariate Data Visualization	R Assignment 4 Paper Checkpoint 3
10	3/26 & 3/28 <i>Recitation:</i> 4/1	Chi-Square Test and Association	Multivariate Tables and Data Visualization Chi-Square Tests	Quiz 5
11	4/2 & 4/4 <i>Recitation:</i> 4/8	ANOVA	ANOVA Tests <i>Functions?</i>	R Assignment 5 Paper Checkpoint 4
12	4/9 & 4/11 <i>Recitation:</i> 4/15	Regression and Correlation	Linear Models Scatterplots	Quiz 6

13	4/16 ONLY <i>Recitation:</i> 4/22	Multiple Regression Part 1	Multiple Regression Results, Categorical Variables	Breathe
14	4/23 & 4/25 <i>Recitation:</i> 4/29	Multiple Regression Part 2, Other Types of Regressions	Categorical Variables in Regression Prediction Coefficient Plots Logistic Regression?	R Assignment 6 and Paper Checkpoint 5
15	4/30	Other Regression Topics	NO RECITATION	FINAL PAPER DUE May 6 at 11:59PM