CLASS SESSIONS: Tuesdays and Thursdays, 9:30 – 11:00 am ET

INSTRUCTOR
Charly Fowler, crf2147@cumc.columbia.edu
Office Hours: Tuesday 1:00 PM – 2:00 PM in ARB 627

TEACHING ASSISTANT
Baoyi Feng, bf2506@cumc.columbia.edu
Recitation: Tuesdays and Thursdays, 11:30 am – 1:00 pm ET
Office hours: Friday 1:00 PM – 2:00 PM in ARB 657

COURSE DESCRIPTION
Biostatistics is essential to ensure that findings and practices in public health and biomedicine supported by reliable evidence. This course aims to cover a variety of tools for the collection, analysis, and presentation of data in all areas of public health. A key to these skills is assessing the impact of change and variability on the interpretation of research findings and subsequent recommendations for public health practice and policy. Topics covered include: methods for describing discrete and continuous data; hypothesis testing including ANOVA and t-test; general principles of study design; regression models; some sophisticated tools widely used in statistics.

COURSE LEARNING OBJECTIVES
Students who successfully complete this course will be able to:
- Describe the role biostatistics serves in public health and biomedical research
- Apply numerical, tabular, and graphical descriptive techniques to summarize data
- Understand the key concepts of probability and inference
- Translate the research objectives into clear, testable statistical hypotheses
- Use R for analysis and interpret the results appropriately

RECOMMENDED TEXTS
There are no texts required for the course. Lecture notes will be uploaded on CANVAS prior to each class session. The recommended textbook for this course is:

Douglas A. Wolfe & Grant Schneider, **Intuitive Introductory Statistics**, Springer, 2018.

ASSESSMENT AND GRADING POLICY
Student grades will be based on:
Class (Recitation) Participation 20%
Biostatistics Homework Assignments 20%
Biostatistics Final Exam 20%
R Homework Assignments/Exams 40%

COURSE SCHEDULE
Please see the "Intro to Biostatistics" folder on CANVAS to download the readings, exams, and lecture slides.

Date	Topics	Readings/Assignments
Tue, June 6 Lect: 532B Rct: 532B	Key Definitions - Population vs. sample - Parameter vs. statistic Study Design	Chapter 3
Wed, June 7 Lect: 532B Rct: 532B	Types of Data - Qualitative vs. quantitative Descriptive Statistics - Measures of location - Measures of dispersion	Chapter 1 HW 1 due June 17
Tues, June 13 Lect: 532B Rct: 532B	Probability - Venn Diagrams - Conditional Probability - Independence	Chapter 4
Thurs, June 15 Lect: 532B Rct: 532B	Probability Distribution - PDF/PMF - CDF Normal Distribution - Standard Normal - Z-table	Chapter 4 HW 2 due June 25
Tues, June 20 Lect: 532B Rct: 532B	Central Limit Theorem Point and Interval Estimation	Chapter 5, 6
Wed, June 21 Lect: 532B Rct: 532B	Introduction to Hypothesis Testing - Null vs. alternative hypothesis - Type I and II error - Power - P-Value	Chapter 6 HW 3 due July 1
Tues, June 27 Lect: 532B Rct: 532B	Testing for Continuous Outcomes - One sample T-test - Two sample T-test	Chapter 7, 9
Thurs, June 29 Lect: 532B Rct: 532B	Testing for Continuous Outcomes - Paired t-test - ANOVA Correlation Coefficient	Chapter 8, 12, 2
Tues, July 6	Categorical Data Analysis - One-sample proportion test	Chapter 10 HW 4 due July 11

Lect: 532B Rct: 532B	· Two-sample proportion test · Chi-squared test	
Thurs, July 11 Lect: 532B Rct: 532B	Linear Regression · Assumptions · Least Squares Estimator · Inference for coefficients	Chapter 11; Review
Tues, July 13 Lect: 532B Rct: 532B	Final exam	
Thurs, July 18 Lect: 532B Rct: 532B	Extra Topics	
Tues, July 20 Lect: 532B Rct: 532B	Guest Lecture- Michael Joseph	
Thurs, July 25	Hackathon	
Tues, July 27	Research Symposium	