# STAT 214: Data Analysis Using Statistical Software (Spring 2024)

## Professor

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Office hours in Hunter East 908: Mon 3.30-4.30pm, Wed 10.30-11.30am, or by appointment.

## Course description

This is a course in statistical data analysis. Upon completion of the course you will learn about simple linear regression (inference, model diagnostics), multiple linear regression models, variable selection, model selection, experimental design, and analysis of variance.

Prerequisites: STAT 21300 or MATH 12400 or MATH 12500 or MATH 12550 and STAT 11300 with grade of C or better in each course.

## Course learning outcomes

Upon successful completion of the course, students will be able to:

1. Grasp the basics of descriptive and inferential statistics from an applied perspective;
2. Make sound decisions for an analysis;
3. Understand and use appropriate statistical notation and terminology;
4. Summarize an analysis appropriately.

## Lectures

Mon and Wed, 5.30-6.45pm, in Hunter North 306
Lectures may not be recorded.

## Class Attendance Policy

You are expected to attend all lectures.

## Textbook

Mendenhall and Sincich, A Second Course in Statistics: Regression Analysis (8th edition), Pearson, 2020, ISBN-13: 9780137515264

I will assign problems and reading from the textbook throughout the semester. **Earlier editions of the book are different, and should not be used.**

## Necessary software

This class requires you to use the statistical software packages called R (The R Project for Statistical Computing; https://www.r-project.org/) and RStudio (https://posit.co/). These software packages are available as Free Software with versions compatible with current Mac OS and Windows operating systems. More details will be given in lectures.

## Grading Policy

| Attendance | Homework | Midterm 1 | Midterm 2 | Final project |
|---|---|---|---|---|
| 5% | 20% | 25% | 25% | 25% |

Grades will be recorded on the class website.

**Attendance** will be recorded and graded.

**Homework** will be due at the beginning of class on the day it is due (5.30pm). No late homework will be accepted. You are encouraged to work together on the homework, but do not copy any part of a homework. Each student must produce his/her own homework to be handed in. Feel free to ask me for help after you have tried the questions. All homework must be submitted online in a format to be given for when the homework is posted.

**Midterm 1** will be held in class on Wed Mar 13. The midterm will be closed book/closed notes. There is no make-up exam. A basic calculator is allowed – tablets, laptops, cellphones, and other communication devices are not. The midterm covers the material up to and including Mon Mar 11. Further details will be given in advance of the exam.

**Midterm 2** will be held in class on Mon Apr 15. The midterm will be closed book/closed notes. There is no make-up exam. A basic calculator is allowed – tablets, laptops, cellphones, and other communication devices are not. The midterm covers the material up to and including Wed Apr 10. Further details will be given in advance of the exam.

**Final project**: In groups, you will be responsible for producing a project report on a statistical data analysis. The report will be due by 5.30pm on Wed May 22 (during finals week). Further details will be given after Midterm 2.

## Tentative schedule

Further detail will be added on the class website.

| Week | Date | Topic |
|---|---|---|
| 1 | Mon Jan 29 | Review of one sample methods; Introduction to R |
| | Wed Jan 31 | Review of two sample methods; Introduction to R |
| 2 | Mon Feb 5 | Introduction to regression analysis |
| | Wed Feb 7 | Simple linear regression |
| 3 | Mon Feb 12 | **No lecture** |
| | Mon Feb 14 | Simple linear regression |
| 4 | Mon Feb 19 | **No lecture** |
| | Wed Feb 21 | Simple linear regression |
| | Thu Feb 22 | Simple linear regression |
| 5 | Mon Feb 26 | Multiple regression models |
| | Wed Feb 28 | Multiple regression models |
| 6 | Mon Mar 4 | Multiple regression models |
| | Wed Mar 6 | Multiple regression models |
| 7 | Mon Mar 11 | Multiple regression models |
| | Wed Mar 13 | **Midterm 1** |
| 8 | Mon Mar 18 | Multiple regression models |
| | Wed Mar 20 | Multiple regression models |
| 9 | Mon Mar 25 | Multiple regression models |
| | Wed Mar 27 | Multiple regression models |
| 10 | Mon Apr 1 | Multiple regression models |
| | Wed Apr 3 | Multiple regression models |
| 11 | Mon Apr 8 | Multiple regression models |
| | Wed Apr 10 | Introduction to design of experiments |
| 12 | Mon Apr 15 | **Midterm 2** |
| | Wed Apr 17 | Analysis of variance |
| | Mon Apr 22 | **No lecture (Spring break)** |
| | Wed Apr 24 | **No lecture (Spring break)** |
| 13 | Mon Apr 29 | **No lectures (Spring break)** |
| | Wed May 1 | Analysis of variance |
| 14 | Mon May 6 | Analysis of variance |
| | Wed May 8 | Analysis of variance |
| 15 | Mon May 13 | Time series modeling |
| | Wed May 15 | Time series modeling |

The **final project report** is due at 5.30pm, Wed May 22.

## Hunter College Policy on Academic Integrity

"Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures."

## American Disability Act (ADA) Policy

"In compliance with the American Disability Act of 1990 and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: 212-772-4857 or 212-650-3230."

## Hunter College Policy on Sexual Misconduct

"In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).

b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link: https://www.cuny.edu/about/administration/offices/legal-affairs/policies-resources/reporting-of-alleged-miscounduct/"

## Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice. Official announcements will always be those made in class or on the class website.