Department of Mathematics and Statistics

SUMMER 2023

MA 214

Applied Statistics

TIME & LOCATION: Lecture: MTWR 3-5 PM, Room CAS116

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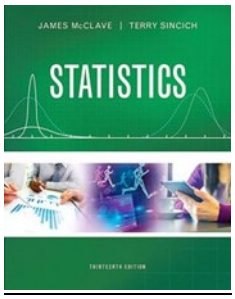
OFFICE HOURS: MTWR 5:00 – 5:30 PM or by appointment

Special notes: We have no class on Monday, May 29 (Memorial Day), and Monday, June 19 (Juneteenth). However, we will have makeup classes on **Friday, June 3, and Friday, June 23.**

TEXTBOOK:



Statistics 13/E
McClave, J.T. and Sincich, T.
Prentice Hall, 2012
ISBN-13: 9780134080215

CLASS NOTES: Class notes and other class materials will be available online at http://learn.bu.edu/ after each section of the course material is covered in the class. You must log in to the BU Blackboard site and navigate the course.

SOFTWARE: We will be using the statistical software JMP for this course. All registered students can download either the Windows or Mac version of the software. Navigate to the link http://www.bu.edu/tech/desktop/site-licensed-software/statistics/, click JMP, and follow the instructions.

COURSE PREREQUISITE: MA213 or equivalent. **You may not take this class concurrently with MA213 (or equivalent).**

COURSE OBJECTIVES: This course introduces basic statistical modeling techniques. The students are expected to have knowledge of descriptive statistics, introductory probability, interval estimation, and hypothesis testing (MA213 or equivalent). In this course, we will take the notion of statistical inference a step further. We will consider two

or more variables in a population and explore underlying relationships between these variables. We will discuss,

a. basic statistical models,
b. how to fit these models to data, and
c. how to evaluate the performances of these models.

We will also discuss implementing some of these techniques using the statistical software JMP.

ASSIGNMENTS:

HOMEWORK: Homework assignments and the due dates will be announced on the Blackboard. You must work on all problems in the assignment but turn in a subset of the problems marked * for grading on the due date. You need to upload a PDF copy of the homework to Dropbox on the course Blackboard site. **No late homework will be accepted. Please do not email your homework to me; it will not be graded. However, I will drop the lowest homework grade**. You need to show your work to receive full credit for your solutions to homework problems. Please turn in the HW neatly. Homework that is difficult to read will not be graded.

EXAMS: **There will be *two midterms and a final*.** All exams are closed books and closed notes. Tentative schedules of the exams and grade distributions are as follows:

EXAMS/HW	**DATE**	**WEIGHT DISTRIBUTION**
MIDTERM 1	Friday, June 2	30%
MIDTERM 2	Thursday, June 15	30%
FINAL	Thursday, June 29	30%
HOMEWORK		10%

NOTE: All exams are required. Makeup exams will be offered only under exceptional circumstances (medical reasons and family emergencies) when the following conditions are met:

a. You must contact me BEFORE the exam to let me know that you will be missing the exam. If I am unavailable, email or leave a message at the math office with your contact information.
b. Be prepared to take the exam at the earliest available time at my convenience. The makeup test may not be the same as the regular exam.

COURSE INFORMATION AND POLICIES

- **Regular attendance. Come to the class prepared and ready to ask a question. Understand that about 25% of the materials covered in this course are not discussed in your textbook, and you will have to rely entirely on my lectures.**
- **No unnecessary conversation during lectures. If you have any questions about the material being covered, I am a much better person to ask than your classmate sitting next to you.**
- **Feel free to interrupt the lectures to ask questions. There is no such thing as a dumb question, but I will expect you to be prepared.**

- **BU HUB: The course satisfies the HUB capacities Quantitative Reasoning II (QR II) and Teamwork/Collaboration. The HUB capacity QR II is satisfied by developing statistical methodologies and data analysis tools throughout the semester. The Teamwork/Collaboration capacity is met by group dissuasion, collaborative efforts, and class engagement via the audience response system during the lectures.**
- **All Boston University students are expected to maintain high intellectual honesty and integrity standards. It is the responsibility of every undergraduate student to be aware of the Academic Conduct Code's contents and abide by its provisions. Regardless of the mode of instruction and assessment method, you are bound by the university code of conduct, and any violation of the same will be subject to disciplinary action. Please read the academic conduct code (https://www.bu.edu/academics/policies/academic-conduct-code/) and be aware of your responsibilities.**

OUTLINE OF THE SYLLABUS:

Review of basic statistical inference. One- and two-sample hypothesis testing procedures.

REGRESSION ANALYSIS: Regression models, simple linear regression, model fitting using least squares approach, estimation and prediction, model assumptions and residual analysis, nonlinear regression, multiple regression, multicollinearity, variable selection.

ANALYSIS OF VARIANCE: One-way and two-way ANOVA models, interaction, F-tests, multiple comparison procedures, implementations of ANOVA models, and model adequacy checks.

CATEGORICAL DATA: Goodness-of-fit procedures, chi-square test, contingency tables, and test for independence. Logistic regression.

NONPARAMETRIC STATISTICS (time permitting): Sign test for single population, Wilcoxon signed-rank test and Wilcoxon rank-sum test for comparing two populations, nonparametric ANOVA and Kruskal-Wallis test