CAS MA 113 (SB1) Elementary Statistics

Summer II 2019

Instructor: Wan-Chi Hsin

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Lectures: Mon, Tue, Wed, Thur 11:00 am − 1:00 pm in EPC 207

Office Hours: Tuesday and Thursday 2:00 pm − 4:00 pm in MCS B46B

Course Description: This course will introduce students to the basic concepts and tools of statistics and probability. We will focus on Descriptive Statistics (organizing and summarizing data, describing the relation between two variables), Probability and Probability Distributions, and Inferential Statistics (Estimating a Population Parameter, Hypothesis Tests Regarding a Parameter, Constructing Confidence Intervals).

Graphing calculator is recommended.

Text: "STATISTICS: Informed Decisions Using Data" by Michael Sullivan, **Fifth** Edition, Pearson, 2017.

The textbook MUST be 5th edition but we do NOT need any codes or cd's or extras.

Course Website: Course information including syllabus, homework questions and announcements will be available at `http://math.bu.edu/people/whsin/ma113-2019sum2.html`.
BlackBoard (`http://learn.bu.edu`) will only be used for lecture notes, grades, and class-wide email messages.

Homework Assignments: Homework will be assigned weakly and it will be collected in class. The due date of each homework will be announced. **No late homework will be accepted**. Everyone is expected to write and turn in his or her own work. Solving the problems assigned for homework is fundamental to succeed in this class. Include your name and homework number on the first page of your homework and staple pages together. All work must be shown to receive full credit of the homework.

Quizzes: Weekly quizzes will be given on **Mondays and Wednesdays** at the beginning of class unless otherwise stated. Quizzes will be based on lectures and homework problems, so it is important that you spend time on completing the homework and understand the material. The lowest quiz grade will be dropped.

Exam Dates: There will be three in-class exams, including two midterm exams and one final exam. The dates for the exams are as follows.

Midterm1:	Friday, July 12
Midterm2:	Thursday, July 25
Final Exam:	Thursday, August 8

Make-up Policy: I will not accept any make-up work unless for a truly exceptional and documented reason. Quizzes and exams cannot be made up. **Do not make arrangements to leave before the final exam.**

Grading: Course grades will be assigned as follows:

20%   Homework assignments
15%   Quizzes
40%   Exams (20% Midterm 1; 20% Midterm 2)
25%   Final examination

Absence: You are expected to attend class. Any material covered in lecture may be included as questions on examinations. If you anticipate missing an exam for religious, medical, or family emergency reasons, let me know BEFORE the class, as early as possible.

Important dates:

Thursday, July 4   Independence Day Holiday, Classes Suspended
Tuesday, July 9   Last Day to Drop Standard Courses (without a "W" grade)
Friday, July 12   Substitute Thursday Schedule of Classes
Wednesday, July 24   Last Day to Drop Standard Courses (with a "W" grade)

Academic Conduct:
Students are expected to be familiar with the code of academic conduct, found at

>   http://www.bu.edu/academics/files/2011/08/AcademicConductCode.pdf

During examinations, no collaboration is allowed! Anyone violating this by talking, looking at someone else's paper, beaming something via a palm pilot, etc. will be reported to the Dean's Office without fail. Penalties for violating the Academic Conduct Code may include suspension or expulsion from the University.

Special Needs: If you have any special needs, whether a physical handicap or learning disability or family emergency that arises during the course of the semester, please don't hesitate to let me know. I will deal with each situation on a case-by-case basis.

Extra help: You are encouraged to take advantage of the office hours. Visit the Math Tutoring Room (MCS B24) for free tutoring provided by math and/or statistics graduate students.

Course Outline (tentative):

1. **Data Collection:** Introduction and overview - Fundamental elements of statistics, types of data, collecting data. Sampling methods.

   Read 1.1 - 1.3

2. **Organizing and Summarizing Data:** Descriptive statistics - Methods for describing sets of data: graphical methods; organizing and summarizing qualitative and quantitative data.

   Read 2.1 - 2.2

3. **Numerically Summarizing Data:** Descriptive statistics - Methods for describing sets of data: numerical methods, numerical measures of central tendency, variability and position; five-number summary, box plots; methods of detecting outliers.

   Read 3.1, 3.2, 3.4, 3.5

4. **Describing the Relation between Two Variables:** Scatter diagrams, correlation; least-squares regression.

   Read: 4.1 - 4.3

5. **Probability:** Introduction to probability - elementary probability, events, sample spaces, and probability, the additive and multiplicative rules, conditional probability.

   Read: 5.1 - 5.6

6. **Discrete Probability Distributions:** Probability distributions for discrete random variables, expected values, the binomial distribution.

   Read 6.1 - 6.2

7. **The Normal Probability Distribution:** Probability distributions for continuous random variables. Definition, properties and applications of the normal distribution, assessing normality.

   Read 7.1 - 7.2

8. **Sampling Distributions:** Properties and distributions of the sample mean and sample proportion; the central limit theorem.

   Read 8.1 - 8.2

9. **Estimating the Value of a Parameter:** Inferences based on a single sample. Estimation with confidence intervals: confidence intervals for population mean, proportion, and standard deviation, sample size calculations.

   Read 9.1 - 9.3

10. **Hypothesis Tests Regarding a Parameter:** Inferences based on a single sample. One-sample hypothesis testing about population mean and proportion, P-values.

    Read 10.1 - 10.4