



STAT 117 - Introduction to Statistics

Course Information

Semester	: Summer 2020 (July 6, 2020 – August 7, 2020)
Credit	: 4
Teaching Hours	: 50 Hours
Time	: 2 hours/day, Mon-Fri
Professor Name	: Lun Yang
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Course Description

Statistics is the art of using data to make numerical conjectures about problems. Descriptive statistics is the art of summarizing data. Topics include: histograms, the average, the standard deviation, the normal curve, correlation. Much statistical reasoning depends on the theory of probability. Topics include: chance models, expected value, standard error, probability histograms, convergence to the normal curve. Statistical inference is the art of making valid generalizations from samples. Topics include: estimation, measurement error, tests of statistical significance.

This is an introductory course in statistics designed to provide students with the basic concepts of data analysis and statistical computing. Topics covered include basic descriptive measures, measures of association, probability theory, confidence intervals, and hypothesis testing. The main objective is to provide students with pragmatic tools for assessing statistical claims and conducting their own statistical analyses.

Course Learning Outcomes

At the end of this course, students should be able to:

In terms of knowledge:

- Demonstrate their understanding of descriptive statistics by practical application of quantitative reasoning and data visualization
- Demonstrate their knowledge of the basics of inferential statistics by making valid generalizations from sample data

In terms of skills

- Use R and Excel to conduct statistical analysis
- Recognize pitfalls in using statistical methodology

In terms of attitudes, students should develop in this course:

- Critical attitudes, which are necessary for “life-long learning”
- Greater appreciation for the importance of statistical literacy in today’s data rich world



Required Text

For learning statistical concepts, the required textbook is by David M. Dietz, Christopher D. Barr, and Mine Cetinkaya-Rundel (2015). *Open Intro Statistics*, American Institute for Mathematics.

Requirements

1. Plan on spending at minimum of 2 hours of uninterrupted time preparing for each class (and possibly more for the first day of a new topic area) and absolute minimum of 3 hours per week doing homework, reviewing other class materials.
2. It is very important that you familiarize yourself with the entire semester class schedule now, so that you can plan your schedules ahead for weeks when you may have multiple exams or other due dates. Let your instructor know, in advance, if you will miss a class and the reason for missing the class.

NOTE: In order to perform well in this class, extensive preparation is required prior to each class meeting. In addition, over the course of the semester, students are expected to make their best efforts to follow the schedule listed in the syllabus. However, depending on class progress, the syllabus may be adjusted. Any changes of the syllabus will be announced in class.

Course Outline

- Introduction to Statistics
- Parametric Inference
- Maximum Likelihood Estimation
- The Method of Moments
- Parametric Hypothesis Testing
- Testing Goodness of Fit
- Regression
- Bayesian Statistics
- Principal Component Analysis
- Generalized Linear Models

Note: All dates are TENTATIVE and may be changed at a week's notice.

Course Expectations

For our accreditation, it is essential that all Framingham State University credit courses follow the Federal Definition of credit hour: for every one hour of classroom or direct faculty instruction, a minimum of two hours of out-of-class student work is required. Since the summer courses meet for two contact hours daily (10 contact hours of classroom time weekly), the expectation is that students spend 20 hours per week doing out-of-class work. For the five week 4-credit course, this reflects 50 hours of classroom time and 100 hours of out-of-class time since the credit hour is defined as 50 minutes.



Couse Assessment

Exams:

There will be three exams. As the dates for the three exams are specified in the syllabus, it is expected that all students will be at exams AS SCHEDULED. If a student fails to take the exam at the scheduled time, the student will receive a score of zero on that exam. Make-up exams will only be given under extreme circumstances and only if previously arranged with me. All illnesses must be documented. No make-up is permitted for reasons such as being late for the class, leaving class early, forgetting the exam date/time, car broken, traffic jams, work/travel related excuses, and conflicts with other classes/exams. If you know that you will not be able to take an exam at the time scheduled on this syllabus, please drop the course. The only materials that may be brought into a test are pencils, pens, an eraser, and a basic calculator. No books, cell phones, computers, translators, or programmable calculators will be permitted. If you do not bring an approved calculator to the test, you will end up having to do all calculations by hand. I will not supply students with calculators, and calculators cannot be shared under any circumstances. Students will not be permitted to leave the classroom for any reasons once a test has begun. Please plan accordingly.

Professionalism and Class Participation:

Professionalism and class participation grades are based on the contributions, both positive and negative, that you make to the class.

I take attendance periodically. Excellent attendance is necessary, but not sufficient, to guarantee a high participation grade. Your questions, answers, comments, and insights over the course will contribute to this score. My expectation is that you will have read the assigned material prior to the class for which it is assigned. Thorough preparation will enable you to answer questions and join in class discussions.

Negative contributions to the class will have an adverse effect on your participation grade. Any behaviors that disrupt the learning environment will be considered negative contributions. These behaviors include (but are not limited to): chatting in class, eating in class, using cell phone in class, not turning off your cell phone before class, being late for class, poor attendance, leaving class early, moving around the classroom, sleeping in class, surfing the internet, talking to other students while someone else (either the professor or your fellow student) is speaking, and other unprofessional conduct.

Use of electronic equipment for any purposes other than the current topic of class discussion is extremely disruptive to your fellow students and to me. It also diverts your attention from class. There are only two permitted uses of electronic equipment in this class. First, laptop or tablet computers may be used to take notes, to read an e-textbook, to search for course-related data, and to do in-class exercises. They may not be used for any purpose unrelated to this course. Second, cellular phones and pagers may be left in silent mode if you inform me that it is imperative that you be reached during class. They may not be used to send text messages, to surf the internet, or to play games at any time. You will not be allowed to use a cell phone as a calculator. You will



not be allowed to make recordings or take pictures in class without my permission. Any unpermitted uses of electronic equipment will be regarded as a negative contribution.

Academic Integrity:

It is expected that all students will uphold the academic integrity. All work submitted for this course should be completed only by the student being evaluated unless otherwise indicated in the assignment (e.g., group assignment). Students caught cheating or plagiarizing will, at my discretion, fail either the assignment/exam in question or the course, and the incident will be reported to the Dean’s office for University Sanctions.

Plagiarism includes copying someone else’s words and claiming them as your own, paraphrasing someone else’s words and/or ideas and claiming them as your own, or collaborating excessively with another person or persons and claiming the work as solely your own. Plagiarism on any assignment will, at minimum, result in an “F” for the assignment. I reserve the right to pursue further disciplinary action if appropriate.

Grading Criteria

Your grade is based on homework, quizzes, three exams, and class participation.

Exam 1	15%	Homework	45%
Exam 2	15%	Professionalism & Participation	10%
Exam 3	15%	Total	100%

Academic Honesty Policy

Integrity is essential to academic life. Consequently, students who enroll at Framingham State University agree to maintain high standards of academic honesty and scholarly practice. They shall be responsible for familiarizing themselves with the published policies and procedures regarding academic honesty. Academic honesty requires but is not limited to the following practices: appropriately citing all published and unpublished sources, whether quoted, paraphrased, or otherwise expressed, in all of the student’s oral and written, technical and artistic work.

FSU Notice of Non-Discrimination and Diversity

Framingham State University is committed to a policy of non-discrimination, equal opportunity, diversity, and affirmative action. The University is dedicated to providing educational, working, and living environments that value the diverse backgrounds of all people. Furthermore, the Massachusetts Civil Rights Act ("MCRA," M.G.L. c. 12, §§ 11H, 11I, 11J) protects the rights of all residents of and visitors to Massachusetts to be free from bias-motivated threats, intimidation, and coercion that interfere with their civil rights. The MCRA protects the right to attend school, live peacefully, and enjoy other basic rights.



Grading

A	95%
A ⁻	90%

B ⁺	86%
B	84%
B ⁻	80%

C ⁺	77%
C	73%
C ⁻	70%

D ⁺	67%
D	63%
D ⁻	60%

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** This syllabus may be amended during the semester.*