

Stat E-100:
Introduction to Quantitative Methods
for the Social Sciences and Humanities
Tentative Syllabus for Fall Semester 2015
(Last Updated July 28, 2015)

Please Note: The syllabus is required reading for the course. You will be expected to understand the policies and assignments discussed in the syllabus.

Overview: This course introduces the basic concepts of data analysis and statistical computing, both increasingly used in the social sciences and the humanities. The emphasis is on the practical application of quantitative reasoning, visualization, and data analysis. The goal is to provide students pragmatic tools for assessing statistical claims and conducting their own basic statistical analyses. Topics covered include basic descriptive measures, measures of association, sampling and sample size estimation, and simple linear regression. Assignments are based on real-world data and problems in a wide range of fields in the social sciences and humanities, including psychology, sociology, education, and public health.

I. Course Mechanics

Instructor: Ethan Fosse (Ph.D., Harvard)

Office Hours and Location: To be determined

Email: efosse@fas.harvard.edu or fosse.ethan@gmail.com

Head Teaching Assistant: Mark Ouchida

Office Hours and Location: To be determined

Course Lectures: Thursdays, 5:30-7:30pm, Maxwell-Dworkin G115

For information on the location of Maxwell-Dworkin G115, please see the following:

<http://imsroombook.fas.harvard.edu/room.php?rm=rm0092>

Weekly Sections: There will be optional weekly sections during which teaching assistants will review topics from the lectures, review additional example problems, and answer questions about the weekly homework assignments. More details will be available as the semester begins.

Teaching Assistant Office Hours: Each teaching assistant will also hold weekly office hours. More details will be available as the semester begins.

Assigned Teaching Assistant: You will be assigned a teaching assistant for the duration of the course after the semester starts. You may attend any section (or all sections) that fit your schedule, but your assigned teaching assistant is your first contact for grading issues, section issues, and questions about the homework or exams.

II. Course Resources

Course Website: The course website will have additional information on the course mechanics, homework assignments, lecture materials, and the teaching staff. It will be updated as the semester starts. The course website may be accessed here (make sure you log in so you can view the website):

<https://canvas.harvard.edu/courses/4131>

Required Textbook: The required textbook is *OpenIntro Statistics, 3rd Edition* by David M. Dietz, Christopher D. Barr, and Mine Cetinkaya-Rundel published in 2015. It is available online for **free** as a pdf or for less than \$10 from Amazon: https://www.openintro.org/stat/textbook.php?stat_book=os

Statistical Software: The course will use R with RStudio. R is the underlying programming language, while RStudio is a graphical user interface that makes working with R much easier. Both are free, open-source, and used widely by biostatisticians. To install R with RStudio, go to the following link and click on the installer for your computer's operational system:

<https://www.rstudio.com/products/rstudio/download/>

III. Grading and Course Requirements for Undergraduates

The course requirements differ slightly for undergraduate and graduate students. The information in this section applies **only** to students enrolled as **undergraduate students**. If you are enrolled as an undergraduate, then your overall grade is based on the following:

- Regularly-assigned **problem sets** that will count for **30%** of your grade
- An in-class **midterm exam** that will count for **30%** of your grade
- An in-class **final exam** that will count for **40%** of your grade

Problem Sets (30%): Problem sets are assigned on a semi-weekly basis. Details on the problem sets will be published on the course website as the semester starts. Late problem sets are not accepted for any reason. Working with other students on the homework is allowed and encouraged but only as long as you hand in your **own work** and do not simply copy the work of someone else.

Midterm Exam (30%): The midterm exam will last 2 hours and will be scheduled during the regularly-scheduled lecture period. The midterm exam will consist of two parts, a set of multiple choice questions and a set of short-answer problems. The midterm exam is closed book, meaning no notes, books, phones, computers, or reading materials are allowed. However, you may bring a multifunction calculator.

Final Exam (40%): The final exam will last 2 hours and will be scheduled during the regularly-scheduled lecture period. Although the final exam is cumulative, it will focus more on concepts covered after the midterm. The final exam will also consist of two parts, a set of multiple choice questions and a set of short-answer problems. The final exam is also closed book, meaning no notes, books, phones, computers, or reading materials are allowed. However, you may bring a multifunction calculator.

IV. Grading and Course Requirements for Graduate Students

The course requirements differ slightly for undergraduate and graduate students. The information in this

section applies **only** to students enrolled as **graduate students**. If you are enrolled as a graduate student, then your overall grade is based on the following:

- Regularly-assigned **problem sets** that will count for **20%** of your grade
- An in-class **midterm exam** that will count for **20%** of your grade
- An in-class **final exam** that will count for **30%** of your grade
- A **final project** that will count for **30%** of your grade

Problem Sets (20%): Problem sets are assigned on a semi-weekly basis. Details on the problem sets will be published on the course website as the semester starts. Late problem sets are not accepted for any reason. Working with other students on the homework is allowed and encouraged but only as long as you hand in your **own work** and do not simply copy the work of someone else.

Midterm Exam (20%): The midterm exam will last 2 hours and will be scheduled during the regularly-scheduled lecture period. The midterm exam will consist of two parts, a set of multiple choice questions and a set of short-answer problems. The midterm exam is closed book, meaning no notes, books, phones, computers, or reading materials are allowed. However, you may bring a multifunction calculator.

Final Exam (30%): The final exam will last 2 hours and will be scheduled during the regularly-scheduled lecture period. Although the final exam is cumulative, it will focus more on concepts covered after the midterm. The final exam will also consist of two parts, a set of multiple choice questions and a set of short-answer problems. The final exam is also closed book, meaning no notes, books, phones, computers, or reading materials are allowed. However, you may bring a multifunction calculator.

Final Project (30%): The final project will consist of a short paper (no more than 10 pages) describing the analysis of a dataset using one the methods discussed in the course. Details on the final project will be given as the semester starts.

V. Tentative Course Schedule

The tentative course schedule is given below. It is subject to change as the semester begins. The due dates for problem sets, assigned textbook readings, and lecture topics are subject to change.

Date	Lecture Topic	Textbook Readings	Problem Sets Due
Sept 3	Introduction to Data	Ch. 1: Pp. 7-13; 15-20	None
Sept 10	Categorical Data	Ch. 1: Pp. 43-48	None
Sept 17	Numerical Data	Ch. 1: Pp. 28-37	Problem Set #1
Sept 24	Basics of Probability	Ch. 2: Pp. 76-87	Problem Set #2
Oct 1	Normal Distribution Model	Ch. 3: Pp. 128-141	Problem Set #3
Oct 8	Sampling Distribution	Ch. 4: Pp. 168-197	Problem Set #4
Oct 15	Tests for Proportions	Ch. 6: Pp. 274-286	Problem Set #5

Oct 22	MIDTERM EXAM	None	None
Oct 29	Test for Means	Ch. 5: Pp. 219-238	None
Nov 5	Chi-Square Tests	Ch.5: Pp. 286-302	Problem Set #6
Nov 12	Correlation Analysis	Ch. 1: Pp. 26-27; Ch. 7: Pp. 338-339	Problem Set #7
Nov 19	Simple Linear Regression	Ch. 7: Pp. 331-338; 340-348	Problem Set #8
Nov 26	Thanksgiving Break	None	None
Dec 3	Inferences for Simple Linear Regression	Ch. 7: Pp. 351-355	Problem Set #9
Dec 10	Course Review	None	Problem Set #10
Dec 17	FINAL EXAM	None	None

VI. Other Course Policies

Collaboration: You may discuss the problem sets with other students, but you must write the final answer yourself. Solutions prepared by copying or paraphrasing someone else's work are not acceptable. All computer output you submit must come from work that you have done yourself.

Academic Integrity: Harvard University expects students to understand and maintain high standards of academic integrity. Breaches of academic integrity are subject to review and may be grounds for disciplinary action. Please review the examples of violations of academic integrity at the following link: <https://www.extension.harvard.edu/resources-policies/student-conduct/academic-integrity>

Students with Disabilities: Harvard University has made a commitment to creating an accessible academic and campus community. If you have a disability, we ensure that you have equal opportunity to participate in, contribute to, and benefit from our academic and residential programs. Additional information may be found here: <https://www.extension.harvard.edu/resources-policies/resources/disability-services-accessibility>