

BOSTON COLLEGE
DEPARTMENT OF ECONOMICS

EC1151.01, Fall 2018
Mon & Wed 3-4:15pm
Fulton 230

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Maloney 316

STATISTICS
Updated 8/27/2018

Everywhere we look, we encounter statistics. Understanding statistics is essential for economics and business, but also for your role as a consumer of news, politics, popular culture, and... well, consumer goods. Statistics can be informative, fascinating, surprising, and world-simplifying, but they can also be used to confuse, manipulate, and exasperate. This course will review the use – and misuse – of statistics and help you develop the tools required to fulfill your obligations as both an economics major and an informed citizen of the world.

Not surprisingly, this course is math-heavy, which you may find demanding and, at times, daunting. It will be important to recognize, understand, and be able to use technical notation, but it's worth remembering that the notation is actually there to make our lives easier.

The course is also laden with statistical formulas, and I have good and less-good news about that. The good news: you will not have to memorize formulas, as those will be provided for you in the exams. The less-good news: because you are capable of so much more than just plugging numbers into a formula, exam grading will rely almost entirely on your ability to correctly deploy and, maybe more importantly, interpret statistical measures and concepts.

Therefore, this course is at least as much an analytics course as it is a math course, and exams will involve a fair amount of writing. For each problem set and exam question, you should be able to explain why the statistical technique is appropriate, the intuition behind it, and what the answer really means, in your own words, as if you are talking to someone with limited statistical knowledge. Because the world is full of people with limited statistical knowledge.

Office Hours and Optional Sections

Professor Rutledge
Fri 11am-12pm (section – Fulton 135)
Tues 8-9am (Maloney 316)
Wed 4:30-5:30pm (Maloney 316)

TA: Xiaoying Lan (lanx@bc.edu)
Wednesday 7-8pm (section – Campion 300)
Thursday 1-3pm (Maloney 340C)

Also, you can feel free to consult Prof. Cichello's TAs:

Benjamin Ferri (ferrib@bc.edu)
Tuesday 7-8pm (section – Cushing 209)
Wednesday 5:30-7pm (Maloney 340G)

Liang (Lia) Yin (yinlb@bc.edu)
Thursday 7-8pm (section – Campion 300)
Tuesday 12:30-2pm (Maloney 335D)

Additionally, the Connors Family Learning Center (in O'Neill) has tutors available for you to consult.

Textbook

Statistics for Business and Economics with MyStatLab (8th edition) by Newbold, Carlson, Thorne. We've made a custom version for ECON 1151 at Boston College that omits some chapters to lower the price, so it may be cheaper to buy it at the bookstore than online.

A required part of the course (for problem sets, as well as practice problems) is MyStatLab, which comes with the textbook. If you buy your textbook outside of the BC Bookstore, you will be able to buy access to MyStatLab for approximately \$100.

The course also requires the purchase or rental of an iClicker. Please make sure to bring it to every class, and that it is registered under your BCID.

Grading

Your course grade will be determined using the following grading scheme:

| | |
|--|------|
| Lab (including lab assignments): | 15 % |
| Participation (including graded problem sets): | 8 % |
| 10 Minute Quizzes: | 9 % |
| Midterm 1: | 17 % |
| Midterm 2 (cumulative): | 17 % |
| Final Exam (cumulative): | 34 % |

Mandatory Lab Sections

In addition to lecture, you will attend a lab once a week. The lab work and assignments will be incorporated into your final course grade. In the lab, you will learn how to use the statistical software package STATA and apply the concepts learned in lecture. Details on how to access STATA will be presented in lab.

Problem Sets

Problem sets from class will consist of two portions: a graded portion, which is more mechanical, and an ungraded portion, which includes more conceptual questions.

- The graded portion will be completed online (and automatically graded) using MyStatLab.
- The ungraded portion will include conceptual questions (or parts of questions) that are more reflective of the difficulty of the exam questions. You will not turn these in. Solution sets will be made available. I strongly encourage you to work together with a study partner on these more conceptual questions.

10 Minute Quizzes

There will be five to eight 10-minute quizzes throughout the semester. These are meant to test your understanding of the basic terms and methods discussed in the previous week's lectures. I will be clear about what topics might be tested on the quiz. Each quiz will have 1 question (worth 1 pt.) that will be straight-forward and 1 question (worth .5 pts.) that may be slightly tougher and/or refer to material from previous weeks.

Participation

Your participation grade is determined in equal parts by:

- Class attendance (measured by iClicker responses);
- Completing graded problem sets on MyStatLab (described previously); and
- Your performance on these graded problem sets.

Exams

Exams will be closed book. I will provide a formula cheat sheet as well as any statistical tables you will need. I will post those cheat sheet/tables in advance.

Examination Make-up Policy

The following policy will be strictly enforced:

- 1) You must obtain my approval before the exam or you will be penalized.
- 2) There will be no make-up exams for either midterm. If you miss a midterm exam, the weight assigned to that exam will be distributed over the remaining exams.

Academic Integrity

Cheating on any exam will result in

- 1) An automatic failure in the course and
- 2) Reporting the incident to the College of Arts and Sciences as required by the University.

See <http://www.bc.edu/publications/ucatalog/policy.shtml#integrity> for a full discussion of the university's policies and procedures regarding academic integrity.

Accommodations for Learning Disabilities

If you have a learning disability, you are strongly encouraged to request accommodations for this course. Exams are lengthy and have some time pressure. Please register with either Kathy Duggan (dugganka@bc.edu) Director, the Connors Family Learning Center (learning disabilities and ADHD) or Rory Stein (rory.stein@bc.edu), Assistant Dean for Students with Disabilities (all other disabilities). Advance notice and appropriate documentation are required for accommodations.

SYLLABUS

| <u>Date</u> | <u>Topic</u> | <u>Chapter</u> |
|-------------|---|---------------------|
| 8/27 | Introduction; Where Do Data Come From?; The Use and Misuse of Statistics | 1.1-1.6 |
| 8/29 | Summation notation; means and medians; outliers | 2.1; 1.5; 2.3 |
| 9/5 | Percentiles; variance and standard deviation; z-scores | 2.2 |
| 9/10 | Covariance and correlation; regression to the mean; correlation vs. causation | 2.4 |
| 9/12 | Venn diagrams; joint and conditional probability | 3.1-3.4 |
| 9/17 | Statistical independence; Bayes Rule | 3.3; 3.5 |
| 9/19 | Discrete random variables; expected value | 4.1-4.3 |
| 9/24 | Binomial distributions | 4.4-4.7 |
| 9/26 | Continuous random variables; uniform distribution | 5.1-5.3; 5.6 |
| 10/1 | Catch-up and review | |
| 10/3 | First Midterm | |
| 10/8 | NO CLASS – FALL BREAK | |
| 10/10 | Normal distribution I | 5.3 |
| 10/15 | Normal distribution II | 5.3-5.4 |
| 10/17 | Central Limit Theorem; distribution of sample means | 6.1-6.2 |
| 10/22 | Hypothesis testing I | 7.1-7.4; 9.1-9.4 |
| 10/24 | Hypothesis testing II | 7.1-7.4; 9.1-9.4 |
| 10/29 | Hypothesis testing III | 7.1-7.4; 9.1-9.4 |
| 10/31 | Hypothesis testing for comparing proportions and sample variances | 6.4; 7.5; 9.6; 10.4 |
| 11/5 | Catch-up and review | |
| 11/7 | Second Midterm | |
| 11/12 | Multiple populations hypothesis testing | 8.1-8.3; 10.1-10.3 |
| 11/14 | Power of a test | 7.7-7.8; 9.5; 10.5 |
| 11/19 | Linear regression models | 11.1-11.3 |
| 11/21 | NO CLASS – THANKSGIVING BREAK | |
| 11/26 | Standard errors and R-squared | 11.4-11.5 |
| 11/28 | Regression as conditional mean | 12.1-12.3; 12.8 |
| 12/3 | Dummy variables; log functional forms | 12.4; 12.7 |
| 12/5 | Multiple regression; partial derivatives; quadratic functional forms | 12.4; 12.7 |
| 12/10 | Catch-up and review | |
| 12/18 | FINAL EXAM: 12:30 pm – 3:30 pm | |

This syllabus is subject to change, as the quantity of classroom discussion can be somewhat unpredictable. Slides and readings will be posted to the course's Canvas site well in advance of each class.