

BOSTON COLLEGE
Dept. of Economics

Course:	EC 1151 02: Statistics	Professor: Paul Cichello
Lecture Location:	Merkert 127	Office: Maloney Hall, Room 342
Lecture Time:	T Th 10:30 – 11:45 AM	Phone: X 2-0107 (better to email)
		E-mail: paul.cichello@bc.edu

Teaching Assistants:

Benjamin Ferri (ferrib@bc.edu) Lia Yin (yinlb@bc.edu)

Course overview

The purpose of this course is to become familiar with statistical concepts that allow us to better understand the world we live in. Whether your goal is to run your own business, to manage a group of employees or an investment portfolio, to be a high-powered consultant, to be a researcher or to improve the world at a non-profit, the tools and concepts learned in this course will help you get there. They will also help you avoid some big mistakes.

There will be a fair amount of technical notation, many mathematical concepts (most learned long ago but used little since), and various statistical formulas used along the way. These, of course, are demanding and, to some, annoying. Yet, they are required for you to have the ability to apply this statistical knowledge to new settings where you will encounter them. The intuition behind the math/formulas will be explained and explored in the lectures, but intuition alone can often lead us astray when it comes to random events. This is well documented in the literature and we will help you avoid some common pitfalls.

This course will build your “statistical intuition.” You will be expected to solve statistical problems for the correct answer, explain the general principle behind the problem using technical notation, and to be able to *convincingly* explain why a particular method works to someone who has relatively limited statistical knowledge.

Office Hours/Optional Sections*

Professor Cichello	M 10 am-noon, F 1-2:30 pm (Mal 342), or by appointment.		
Benjamin	T* 7 – 8 pm	(Cushing 209)	W 5:30-7 pm (Maloney 340G)
Lia	T 12:30 – 2 pm	(Maloney 335D)	Th* 7-8 pm (Campion 300)

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): Newbold, Carlson, Thorne. (Custom version of Newbold for ECON 1151 at Boston College.)

If you buy your textbook outside of the BC Bookstore, you will be able to buy access to MyStatLab for approximately \$100. (You can buy the standard version of Statistics for Business and Economics with MyStatLab (8th edition): Newbold, Carlson, Thorne. Our “custom version” just omits some chapters to lower the price. The chapters/page numbers are identical to the standard version of the textbook.)

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 STATA- a statistical software package- 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. Your quiz grade will be determined as follows:

$$\text{Quiz grade} = \text{MIN}\left\{\frac{1}{n} \sum_{i=1}^n s_i, 1\right\} * 100 \text{ where } s_i \text{ is the score on quiz } i \text{ (of } n \text{ quizzes).}$$

Participation

Your participation grade is determined in equal parts by:

- attending class (measured by I>clicker 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.

Classroom Technology

Canvas: Class handouts, problem sets, problem set solutions, announcements and other material will be posted on the course website on *Canvas*.

I>Clicker: We will be using I>Clicker in the classroom (see Participation Grade). You must register your I>Clicker on AGORA (even if you have registered it for a previous course). You can buy an I>clicker from the bookstore (if you do not already have one). If you purchase a second hand clicker and encounter a surcharge when trying to register it, don't pay. Just email me the 8-digit alphanumeric code and I can register you manually.

Notes on Class Structure

1. Lecture handouts will be posted on *Canvas* prior to class. It is the responsibility of the student to download these lecture notes and bring them to class. I will post my slides after class.
2. I will often post additional post-class handouts that will help you walk you through some of the material we have covered in class. A thorough understanding of these handouts is critical for you to perform well in this class.
3. A number of lectures will include links to short video clips. The purpose of these clips can vary by video, but the most common purposes are to: i) clarify confusing terminology; ii) give extra assistance on how to start complicated problems; and iii) help students recognize how various topics in the course are linked. These videos are optional but can help students solidify their understanding of the starting points from which we build our analysis. Note: You can adjust the speed when you play it if it is going too slowly.
4. I will also have a question or two on MyStatLab corresponding to the topic covered each day. These post-class questions are optional but give you a chance to walk through a basic problem on the topic covered. (Exam questions may be considerably more difficult. See ungraded problem sets.)

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.

Note on the flu and other illnesses

If you are out sick, please email me a note from the medical center/doctor. I can adjust your participation score accordingly. You should get notes from a classmate and keep up with the homework to the extent possible. You should also expect to come to office hours to review any questions you have when you feel better. Please feel free to ask me for an extension on problem sets if you cannot keep up due to the illness. Also, please be pro-active in contacting me when it comes to missing exams. (See Examination Make-up Policy section above.)

Tentative Schedule

<u>Date</u>	<u>Topic</u>	<u>Chapter</u>
8/28	How to Fast Track Your Career Introductions; Summation Notation	1.1-1.4 Ch 1 DW*
8/30	The SI Jinx & why alumni can't get their kids into BC! Regression to Mean How did you choose where to apply to college? How much do you think you will make after college? Descriptive Statistics: Measures of Central Tendency; Percentiles; and Histograms; (Weighted Means)	1.5; 1.6; 6.1; 2.1; (2.3)
9/4	Re-centering (and re-scaling) your world Variance, Standard deviation; z-scores	2.2; 2.4
9/6	Why do Colleges care about SAT scores? Why does BC pay the football coach so much? Are we in danger of the 3rd thing??? Covariance and Correlation Who is going to the Homecoming Concert? Probability Basics; Conditional Probabilities	2.4; 3.1-3.3
9/11	Who is going to the Homecoming Concert? Was Race a Factor in Voting in Boston's 2013 Mayoral Race? Conditional Probabilities; Independence; Venn Diagrams	3.1-3.4 3.4-3.5
9/13	Should we screen for breast cancer? Statistical Independence; Bayes Rule	3.4, 3.5
9/18	How do casinos make money? Why do insurance companies exist? Why do the rich get richer? Expected Values and Variances of Discrete Random Variables and Linear Functions of Discrete Random Vars.	4.1-4.3 Ch. 5 NS*
9/20	What if all beer tastes the same? Binomial Random Variables How to Manage Risk Joint Distributions and Discrete Random Variables	4.4; 4.7; (4.5; 4.6) pp. 68-71 NS*
9/25	Avoiding common statistical traps: Missing Airplanes, The SI Jinx, Convicting on DNA evidence, In OJ's defense, Short Breaks Cause Cancer Selection Bias, Regression to Mean, Multiple Tests, Improper Conditioning, Correlation \neq Causation (3 rd thing)	Ch 6 NS*
9/27	Are you Happy? Understanding Responses in the age of the internet....The World is Normal? (lots of examples) Continuous Random Variables: Uniform Distribution, The Standard Normal Distribution	5.1, 5.2, 5.3, 5.6 Ch. 8 DW*
10/2	First Midterm	
10/4	The World is Normal Probabilities for all other Normal Distributions	5.3
	Fall Break	

10/11	Italian Fest! Business application w/ Normal distributions Return to Schlitz Marketing Campaign? Binomial as Normal	5.3, 5.4
10/16	Where are we anyway? Distribution of Sample Means from a Normal Distribution How to catch cheaters and shysters! From schools to sports to Wall Street to business Central Limit Theorem and Distribution of Sample Means	6.1, 6.2
10/18	Political Polls (Coakley vs. Baker) and Gambling Proportions	6.3
10/23	Food Shares in SA/Assessing claims (on the internet) Hypothesis Testing; Two-tailed and one-tailed tests; Normal distribution with known variance	9.1, 9.2
10/25	Taking the Pulse of South Africa Estimation: Single Population; Normal Distributions, Confidence Intervals	7.1, 7.2
10/30	Food Shares in SA/Assessing claims, pt. 2 Hypothesis testing: Normal distribution with unknown variance; t-distributions	7.3; 9.3
11/1	Sex education in Ecuador Hypothesis testing: large sample or proportions	7.4; 9.4
11/6	What's up with my Soda? Distribution of Sample Variances of a Normal distribution (χ^2 distribution); Confidence Interval and Hyp. Testing	6.4; 7.5; 9.6; 10.4
11/8	Second Midterm	
11/13	Sex Education in Ecuador pt. 2 Multiple populations: Distribution and Hypothesis Testing	Ch.8; Ch. 10.1-10.3
11/15	Catching cheaters at low cost: Consulting Problem Power of a test	7.7; 7.8; 9.5; 10.5
11/20	More than Correlation: Identifying Meaningful Impacts Overview of Linear Models; Linear Regression Models	11.1-11.3
	Thanksgiving Break	
11/27	The Return of Inference! (and Covariance) Least Squares Model, R-squared and Standard errors	11.4-11.5
11/29	It's a Non-linear world: Viral growth and standard economic theory Log functional forms	handout
12/4	Gender Discrimination in Thailand? Dummy Variables and Regression as a conditional mean	Handout; 12.1, 12.3, 12.8
12/6	What about here at home? Addressing that 3rd thing Multiple Regression, partial derivatives, and quadratic functional forms	12.4; 12.7
12/13	FINAL EXAM: 9:00 am – noon	

DW* refers to Leonard Mlodinow's The Drunkard's Walk: How Randomness Rules Our Lives.

NS* refers to Charles Wheelan's Naked Statistics.

Chapters from DW* and NS* will be made available on Canvas.