

UNIVERSITY OF COLORADO AT BOULDER
DEPARTMENT OF ECONOMICS
ECON 3818-030 - INTRODUCTION TO STATISTICS WITH COMPUTER APPLICATIONS
INSTRUCTOR - PAULO SARAIVA
SPRING 2013

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Class Meetings: MWF 3pm - 3:50pm, HUMN 1B80

Office Hours: MW 4pm - 5:15pm.

Recitation Sections:

Section	Location	Meetings
031	ECON 117	M 1pm - 1:50pm
032	ECON 16	M 2pm - 2:50pm
033	ECON 2	R 5pm - 5:50pm

There will be no recitation on the first two week of class.

General:

Economics 3818 is a one-semester course in statistics, required of economics majors. We will study basic probability and probability distributions, especially the normal distribution; and estimation and inferential statistics. This course will use R (if you do not wish to use R you may use Excel, however, Excel will not be covered in class).

Evaluation:

Evaluation	Points
Two Midterm Exams	25 points each (Feb 15th and Mar 20th)
Final Exam	40 points (May 4th, 4:30pm - 7pm)
Problem Sets	10 points

Midterm dates are subject to change. I will substitute your lowest midterm grade by the average of your recitation and lowest midterm grade, provided that this improves your final grade. Letter grade will be assigned as follows, according to overall course score:

<60	60-67	67-70	70-73	73-77	77-80	80-83	83-87	87-90	90-93	93+
F	D	D+	C-	C	C+	B-	B	B+	A-	A

Problem sets are to be posted on Desire2Learn.

Attendance:

Attendance is not mandatory, however, it is highly recommended. I will not follow the textbook as closely as in some other courses, therefore it is important to come to class and participate in order to get a good grade in this

course. Lectures are sequential in this course, so missing class and not studying the missed material before the next lecture is a recipe for disaster. *I cannot over-emphasize how important classes are in order to obtain a passing grade. Although attendance is not mandatory, you are responsible for any announcement or instructions given in class (this include instructions for test).*

Prerequisites:

Econ 1000, or 2010 and 2020 and either Econ 1078 and 1088 or equivalent math courses. The latter prerequisites are strictly enforced, if you are listed as not meeting the course prerequisites, you must show me that you have the appropriate math equivalent.

We will be using differentiation and integration.

Homework: I will post 3 homework on Desire2Learn. The due dates will be clear in the homework file when posted. I will also post on Desire2Learn a pdf answer sheet for you to submit your homework answers. I do not accept homework that is not in the answer sheet format. For homework, I will grade only your answer, as the answer sheet suggests.

Exams: None of the exams are cumulative, not even the final. In the exams you must show the work for all non true or false questions. Answers, even if correct, without the appropriate “work” and calculations shown will be given zero points. This does not mean you have to show me how to add and multiply, what it means is that if the question requires you to make some mathematical steps, those steps should be shown in your answer. There may be questions on exams that requires a written explanation, therefore such explanations must be shown in order for you to get full credits in these questions. Some exams might have bonus questions. No one will obtain more than 100% in an exam. For the final, I will give you in class a list of atrocities. If you write any of these atrocities or anything resembling them, you will receive -1% for each time you write it. If you obtain negative points on the final, these points will be subtracted after the bonus question is factored in, in case the final has a bonus question. For example, suppose you write five atrocities, but you answer 90% of the exam correctly. Furthermore, assume you answer correctly the bonus question and suppose it is worth 20%. Your grade after the bonus question is 100%. However, after the atrocity deduction, you would get a final exam grade of 95%. No one will obtain less than 0% in any exam.

Textbook:

- Caniglia, A. (1992) *Statistics for Economics: An Intuitive Approach*. Harper-collins College Press.

Students are required to acquire the above textbook.

Other helpful textbooks:

- Amemiya, T. (1994) *Introduction to Statistics and Econometrics*. Harvard University Press, Cambridge, MA.
- Ashenfelter, O., P. Levine & D. Zimmerman (2006) *Statistics and Econometrics: Methods and Applications*. John Wiley & Sons, New York, NY.
- Bradley, T. (2007) *Essential Statistics for Economics, Business and Management*. John Wiley & Sons, New York, NY.
- Johnson, R. & G.K. Bhattacharyya (2010) *Statistics: Principles & Methods* (6th edition). John Wiley & Sons, New York, NY.
- Spanos, A. (1999) *Probability Theory and Statistical Inference: Econometric Modeling with Observational Data*. Cambridge University Press, New York, NY.
- Chiang, A. & K. Wainwright (2005) *Fundamental Methods of Mathematical Economics*. McGrall-Hill, New York, NY.

Course outline:

1. Set Theory
 - Unions and Intersections
 - De Morgan's Law
 - Functions
2. Probability
 - Axioms of Probability
 - Combination and Permutation
 - Conditional Probability
 - Independence
 - Bayes Theorem
3. Random Variables
 - Distribution Function
 - Discrete Random Variable and Probability Mass Functions
 - Continuous Random Variables and Density Functions
 - Conditional Distributions
 - Independence of Random Variables
4. Moments and Expectations

- Mean, Mode and Median
- Variance and Standard Deviation
- Covariance and Correlation

5. Useful Distributions

- Bernoulli Distribution
- Binomial Distribution
- Poisson Distribution
- Uniform Distribution
- Normal Distribution
- Chi-squared Distribution
- t-Student Distribution
- F Distribution

6. Estimation and Inference

- Method of moments estimator
- Bias, Efficiency and Mean Squared Error
- Test Hypothesis
- Interval Estimation

7. Asymptotic Theory (if time permits)

- Convergence in r -th mean
- Almost Sure Convergence
- Convergence in Probability
- Convergence in Distribution
- Law of Large Numbers
- Central Limit Theorems
- Hypothesis Testing without the Normality Assumption

Exam Material: Based on the items of the course outline:

Exam	Material
Midterm 1	1 and 2
Midterm 2	3 and 4
Final Exam	5, 6 and 7

Miscellaneous:

- **Hardware and Software:** R will be used for some data analysis. Although not required, there are many excellent R manuals available. R is supported in many of the campus computer labs, including the lab in the basement of the Economics building. R is an open source program which can be downloaded in <http://cran.r-project.org/>. You may use other softwares, such as Excel, however, I will not cover Excel in this class. In addition to this you will need a calculator for the exams.

Visit <http://webdata.colorado.edu/labs/map/> for a list of computer laboratories and available software.

- **Special accommodations:**

Refer to <http://www.colorado.edu/disabilityservices>.

- **E-Mail Policy:** I will not answer questions about statistics via email. Those emails with questions about statistics will be ignored. If you should have any questions, please come to office hours or ask during class as the material is being presented. I will not answer any question on an email in which the answer can be found on the syllabus. I do not repeat in class announcements in emails.
- **Participation:** Participation is highly recommended. No question shall be labeled “stupid” and I will not tolerate disrespect to one’s question, answer or observation.
- **Office hours:** I will not give away answers to problem sets during office hours. During office hours I will answer specific questions about the material. However, if the question is of the type, “How do I answer this question of the problem set”, and you have not yet handed in the problem set, I will not answer it.
- **Make up work:** There is no make up exams.
- **Late work:** Work handed in late will have 30% taken away from it. After that, 10% will be marked off for each day the work have not been handed in.
- **Let-me-google/D2L-that-for-you questions:** I reserve the right to ignore any question that can be answered by careful reading of this syllabus or any distributed material. For example, I reserve the right to not answer questions of the type: “When are your office hours?”; “Where is your office?”; “Where can I get the software R?”; “Is the final exam cumulative?”; “When is homework 1 due?” etc.

Enjoy!