

INTRODUCTION TO STATISTICS

Course Syllabus

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Course Overview

This course is designed for a wide range of students, not just those with a background in economics. It is aimed at those majoring in economic/business/psychology, those who are planning graduate work or plan to use statistics in future employment, and finally those who love statistics. No matter what field you are in, though, you should be confident that by the time you leave this course, you will understand that *'the application of statistics to the study of economics,'* while perhaps different from what you have seen before, is in fact feasible. Also, I believe that a basic understanding of statistics can substantially expand your job opportunities, particularly if you're planning to graduate and enter the job market in the relatively near future. To illustrate the essentials of what we will be doing throughout the course, consider that most statistics are constructed by just taking averages of numbers! Actually, this is something you all already do, whenever you add up your exam and assignment grades in a course, and come up with your total points, or average points, for example. This is all we're going to do in this course, but we're going to learn how to do it well!!

Textbook

Freedman, D., R. Pisani, R. Purves: Statistics, 4th Edition, Norton, 2007

Course Grade

Your grades will be based on a combination of 2 midterms, 6 assignments, a project, and a final exam.

20%: **10% for each of the 2 Midterms**

30%: **5% for each of 6 Assignments**

10%: **Participation**

15%: **Project**

25%: **Final Exam**

In particular, for the assignments and the project (and for studying in general), I recommend teamwork. Note however that each member of a team **must** hand in her/his *own* assignments. That is, while you may confer prior to beginning the assignment, you must complete your assignment individually with no outside help. For the assignments, the teams or groups can be any size. The assignments are due at the *beginning* of the class. **No late assignments will be accepted and no exam may be rescheduled without providing supporting (credible and substantial) documentation.** Finally, questions regarding the grading of assignments and exams must be brought to my attention within the 2 weeks following their return to you (this does not include the final exam).

Clark University encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation in this course or have questions about physical access, please tell the instructor as soon as possible.

Course Outline

Throughout the course additional readings will be used to enhance material covered in the textbook. For specific information regarding these readings, and the dates for which specific readings are assigned, please go to the class web page (at <http://www.clarku.edu/faculty/mcallan/Econ160.html>) and follow the link to “*Readings*” in the left column.

1. *An Introduction to Statistics [Chapters 1 & 2]*

- The physical versus the social sciences – why we have to be careful when using economic statistics.
- Statistics are used to inform us when making decisions. Experimental design, how we derived our statistics, ensures that the information is relevant.

2. *Descriptive Statistics [Chapters 3 through 7]*

- Obtaining relevant information from data is one of the foundations of statistics. This section shows how data can provide relevant information by summarizing the data – either through particular numbers, averages for example, or through pictures.

3. *Correlation and Regression [Chapters 8 through 12]*

- The information that we need may involve a relationship between different variables. This section shows how we can summarize this relationship.
- How can we show that an apparent relationship is significant, rather than just chance? That is, how do we separate association from causation?

4. *Probability [Chapters 13 through 15]*

- Uncertainty is one of the few things that we can be sure of in life: will it rain, will we get stuck in a traffic jam on our way to the final exam, will we have covered the material on the final exam (there is no uncertainty here if you cover all the material, which I suggest!)? All of these questions involve probability. How can we quantify this probability?
- Most uncertainty is *conditional*. Will it rain today usually depends on what time of the year it is, will I get caught in a traffic jam usually depends on what time of day it is, and so on. How do we quantify this *conditional uncertainty*, or *conditional probability*?
- How can we deal with situations where there is uncertainty caused by many different features? *The Normal Distribution*.

5. *Chance Variability [Chapters 16 through 18]*

- We can estimate the probability of an event by taking a sample and determining the probability from that sample. However, if we took another sample the estimated probability would be different. How do we get information about this chance variability?

6. *Sampling [Chapters 19 through 23]*

- Most economic data is obtained by sampling. Using our knowledge of Chance Variability, can we ensure that the information provided by sample data is “accurate”? If not, how do we quantify the possibility of inaccuracy?
- Constructing Samples

7. *Chance Models [Chapters 24 through 25]*

8. *Tests of Significance [Chapters 26 through 29]*

- Returning to relationships between variables, the final section of this course deals with testing the significance of proposed relationships between variables.
- How do we quantify *significance*?

9. *1-3 Lectures Will Be Allotted to Review Sessions*