

Res Econ 212: Intro to Statistics for Social Sciences

Ming Ge

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Office Hours: Tu & Thu 7:00 pm - 8:00 pm EST

Zoom Link: <https://umass-amherst.zoom.us/j/7050599466>

Course Description

This is the first course in a two-course sequence for Resource Economics majors, the first one being the General Education R2 course and the prerequisite to the second course. This course also satisfies the statistics requirements for many majors in Isenberg, Social and Behavioral Science, and Natural Sciences (always check your major requirements).

When students complete this course we want them to have a working understanding of the methods and skills used to organize data, conduct meaningful analysis and draw inferences from the data. As well as being an academic course, knowledge of statistics allows you to experience the world in a different light. The skills you will learn can be used in your everyday decision-making, communication, and interpretations of current news.

This is a four-credit course, and the structure of this course by which you will learn the above concepts fulfills the R1 and R2 designations of the General Education (Gen Ed) Program. In particular, you will be introduced to descriptive statistical methods of collecting, summarizing, analyzing and interpreting numerical data using visual displays and numeric measures. You will develop an understanding of the pitfalls of various summary statistics and be taught how to identify misleading visual displays and misuse of numerical measures. You will also be introduced to elementary probability theory, statistical estimation and hypothesis testing. Mastery of these topics will advance your formal/analytical reasoning skills and improve your sophistication as a consumer of numerical information. You will apply these methods to complete a semester project that addresses an empirical question of your choosing. This project development is aimed to improve your ability to think critically and analytically, obtain and process information using theoretical concepts and empirical methods, and demonstrate clear and effective writing skills. You will be introduced to Microsoft Excel, which will be the primary statistical software used to complete your semester project.

I want to show you through this course that, as well as being extremely useful in an age where numbers are increasingly used, and abused, STATS IS POWER. After taking this course you will be able to test your ideas (hypotheses) with a limited amount of information (data) and to judge the usefulness of survey results commonly found in the media. Teaching you key ingredients for the responsible consumption and production of statistical information is my ultimate goal.

Course Objective

At the end of this course, students will be able to:

- Summarize data visually and numerically.
- Conduct meaningful analysis and draw inferences from the data.
- Recognize scenarios where statistical analysis may be helpful.
- Apply statistical analysis to real world situations.

Number of Credits

This course consists of 4 credits.

Course Communications

Effective communication is important for successful learning, especially for on-line course.

Q&A forum

FAQ Forum on Moodle is available for you to ask question regarding academic matters (such as due dates, any difficulty you may have with homework, things that are not clear from lecture videos, etc.)

In this forum questions can be answered by other students or by the instructor, so I strongly encourage you to ask questions and answer some of them if you can. The forum has the option of posting anonymously so you can ask anything without feeling self-conscious about the relevance of the question. When asking or answering questions, please be respectful and use appropriate language.

E-mail

All administrative issues (grades, absences, etc.) should be sent to: mge@umass.edu. Inquires sent to this address are only seen by me.

Please allow 24 hours for replies from me.

Prerequisites

Knowledge of high school algebra. You must have access to a personal computer and great access to the Internet. Most importantly, you must have a willingness to work hard and abandon any preconceptions that math is hard or not fun!

Required Materials

Textbook

You will have the option between two textbooks.

The first is a FREE online statistics textbook developed by Rice University, University of Houston Clear Lake, and Tufts University. The textbook can be found on the Course Moodle page or at the following link:

<http://www.OnlineStatBook.com>

The second is Applied Statistics in Business and Economics Volume 1, by David Doane and Lori Seward, Chapters 1-9 (4th Edition). The book cost \$75.00. You can purchase the book through the following link:

<http://shop.mheducation.com/mhshop/store/UMASSAMH/subcategory/261/4443>

Personal computer

This course requires to have a personal computer with reliable access to the Internet. For this course, Microsoft Excel will be used. Thus, you should have MS Excel installed on your computer. If MS Excel is not installed, you can download it for free. Check the following website of UMass OIT:

<https://www.umass.edu/it/software/microsoft-office-365-education>

Course Structure

Lecture videos and reading materials

Lecture videos, reading materials and key notes will be posted on Moodle. Each week you are expected to watch the videos of two lectures as well as read the corresponding materials posted. To assure your success in this course, you need to watch these videos carefully.

OWL assignments

Completing assignments is a part of the learning experience. Therefore, after watching the lecture videos, you are required to complete the corresponding assignments on OWL. You are welcome to work with your peers and consult me during my office hours.

You have unlimited number of tries, but only the highest grade will count towards each assignment grade. You may not see the same question on each trial or have the same questions as your peers. The lowest assignment grade is dropped.

The assignments will be closed as soon as the corresponding exam ends.

Exam

Three exams will be issued throughout the semester. Each exam is comprehensive but will mostly cover the materials of the lectures I listed in the brackets. (See the last page)

All the exams will take place during the weekend, starting on Saturday at 9 am and ending on Sunday at 9 pm. They will be posted on OWL. Once you open the exam, you will have 1 hour and 30 mins to complete it.

The exams will be open notes. The formula sheets for the exams can be found in the "Exam Material" tab at the end of the Moodle site.

Attention: You cannot communicate with anyone else when you take the exams. You must work alone.

Team project

The project consists of a real world application of the topics learned in class. You will be randomly assigned into a team and start to work on a project with your team in Week 2. In some weeks, I will hold the discussion sessions to guide you on your team project, while your team also needs to keep working on it outside of the discussion sessions based on your team schedule. The project guideline, the data, and the examples can be found in the "Project Material" tab of the Moodle site.

The final project will be due on July 5th at 11:59 pm. No late submission will be accepted.

Along with the team project, each team will be asked to submit a document listing the names of the full contributors, the marginal contributors, and the non-contributors. A marginal contributor will receive 60% of the grade of the team project, and a non-contributors will receive 0% of the grade of the team project.

Bonus points

Some optional quizzes will be posted under the selected lectures on Moodle. The quizzes contain a number of questions based on the lecture videos and the reading materials.

Each quiz will be worth an extra 1%

Grading Policy

Weight	Assignment
30%	OWL Assignment
20%	Team Project
15%	Exam 1
15%	Exam 2
20%	Exam 3
6%	Bonus Points

Table 1: Grading components

The grading scale (subject to change in favor of students) used in this course is:

Letter grade	A	A-	B+	B	B-	C+	C	C-	D	F
Score	90-100	85-89	80-84	75-79	70-74	65-69	60-64	55-59	50-54	0-49
Points	4	3.7	3.3	3	2.7	2.3	2	1.7	1	0

Table 2: Grading scale

Accommodation policy

UMass is committed to providing an equal educational opportunity for all students. If you have a physical, psychological, or learning disability on file with the Office of Disability Services (DS), you may be eligible for accommodations to help you succeed. If you have a documented disability that requires an accommodation, notify me ASAP. We will work together to make arrangements. If you have physical/mental impediments to your ability to complete coursework, or think you might have a disability, I encourage you to consult DS at <http://www.umass.edu//disability> or 160 Whitmore Admin. Building. The Center for Counseling and Psychological Health (CCPH) helps students who experience a variety of issues and provides individual and group counseling. Visit umass.edu/counseling to learn about their services (related to stress, eating disorders, suicidal thoughts, relationships, and much more).

Academic Honesty

The University's policies on Academic Honesty apply to all work in this course. For examples of cheating and further information on the University's Academic Honesty policy, please see <http://www.umass.edu/honesty>.

Tentative Course Outline

Week	Date	Topic
Week 1	5/19 - 5/22	Lecture 1: Descriptive vs. Inferential Statistics Lecture 2: Variables - Definition, Types, Levels of Measurement Assignments on OWL: Lecture 2
Week 2	5/23 - 5/29	Lecture 3: Understanding Data Displays Lecture 4: Numeric Measures to Summarize Distributions * Assignments on OWL: Lecture 3 & 4 Discussion 1 (Thursday 5/26 8:00 pm - 9:30 pm)
Week 3	5/30 - 6/5	Lecture 5: Bivariate Graphs and Measures * Lecture 6: Probability * Assignments on OWL: Lecture 5 & 6 Discussion 2 (Thursday 6/2 7:00 pm - 8:30 pm) Exam 1 (Lecture 2 - Lecture 5)
Week 4	6/6 - 6/12	Lecture 7: Probability and Bayes Theorem Lecture 8: DRVs and the Binomial Distribution * Assignments on OWL: Lecture 7 & 8 Exam 2 (Lecture 6 - Lecture 8)
Week 5	6/13 - 6/19	Lecture 9: Continuous Random Variables Lecture 10: Point and Interval Estimation-Pop. St. Dev. Known* Assignments on OWL: Lecture 9 & 10
Week 6	6/20 - 6/26	Lecture 11: CI Estimation - Pop. St. Dev. Unknown * Lecture 12: Hypothesis Testing Assignments on OWL: Lecture 11 & 12 Discussion 3 (Thursday 6/23 7:00 pm - 8:30 pm)
Week 7	6/27 - 7/1	Lecture 13: Hypothesis Testing - P-values, Standardized Tests, and Testing Differences in Means Discussion 4 (Thursday 6/30 7:00 pm - 8:30 pm) Exam 3 (Lecture 9 - Lecture 12)
Week 8		Final Project Due on July 5th at 11:59 pm EST

Table 3: Content

Last Updated: 6/23/2022