Economics 45 (010): Statistical Methods

Spring 2022

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Instructor:	Felipe A. Araujo	**Time:**	Tu & Th 10:45am–12:00pm
Email:	f.araujo@lehigh.edu	**Place:**	Maginnes Hall 290

Course page: The offical course page is on Course Site, where I will post problem sets, answer keys, lecture materials, as well as any relevant communication.

Office Hours: Mo & We 3:00-4:30 PM or by appointment. Office hours can be held online or in person at RBC 266. You can access the office-hour Zoom session by clicking here. If you plan to attend online, please email me beforehand.

Course Grader: Siyuan Lin (sil420@lehigh.edu).

Course Overview and Requirements: This course focuses on developing an understanding of the basic tools of statistical analysis and learning how to apply them to a wide variety of situations and data encountered in the areas of business and economics. Topics include descriptive statistics, probability and probability distributions, sampling, estimation, hypothesis testing, chi-square tests, correlation and simple linear regression. By the end of this course, students should be able to do the following:

- Compute and interpret descriptive statistical measures;

- Understand basic concepts of probability theory, such as common probability distributions and probability rules;

- Comprehend and apply the basics of inferential statistics (estimation and hypothesis testing);

- Work with measures of statistical association such as correlation and linear regression.

Textbook and Software: The textbook used in this class is *Statistics for Business and Economics*, 14$^{\text{th}}$ edition, by Anderson, Sweeney, Williams, Camm, Cochran, Fry and Ohlmann. There is a link on Course Site to purchase or rent the textbook. As to statistical software, we will use Microsoft Excel. The textbook provides an introduction to Excel in the appendix.

Grading Policy: Grades will be based on your performance on problem sets, two midterm exams and one final exam. The weights used to compute the weighted average score, based on which a letter grade will be determined, and the exam dates, are listed below. All exams are mandatory.

Grading components, dates, and weights

Grade Component	Date	Weight
Attendance	-	5%
Problem Sets	Weekly assignment	20%
Midterm #1	February 24 (75 min)	20%
Midterm #2	April 7 (75 min)	20%
Final Exam	May 12, 4-7pm at LL 270	35%

Numerical and letter grades

Score	Letter Grade
$[92, 100]$	A
$[90, 92)$	A-
$[87, 90)$	B+
$[82, 87)$	B
$[80, 82)$	B-
$[77, 80)$	C+
$[72, 77)$	C
$[70, 72)$	C-
$[67, 70)$	D+
$[62, 67)$	D
$[60, 62)$	D-
$[0, 60)$	F

Problem Sets: Problem sets are due at the start of the class on the due date. They will be graded using a 0–5 scale: 5 = Excellent (no major error or only minimal errors); 4 = Good (a few minor errors); 3 = Fair (some major errors); 2 = So-so (many major errors); 1 = Poor (very few correct answers); 0 = Not handed in or nothing correct. We will have 10 problem sets. The lowest-grade problem set will not be counted towards the final grade. If you have a question about the grading on a particular problem set, please first look at the solutions posted on Course Site and then write a note explaining your question. I will return it to the grader to give your answer another look. Here are some requirements on doing the problem sets:

- The problem sets can be handwritten or typed. Make sure it is readable and write your name on each page. You can be submit it either electronically on Course Site or a hard copy at the start of the class;

- Show all the steps in your answer. Minimal or no credit will be given for *only* the right answer;

- For any problem set you may use statistical software unless otherwise stated. Do *not* submit software output without a written explanation;

- Although you may consult with other students, the work which you hand in should be your own;

- In order for me to post answer keys at Course Site in a timely manner, please keep in mind that problem sets cannot be accepted after the due date.

Midterm Exams: Two 75-minute midterms will be given in class during the semester. No make-ups will be given for the midterms. An absence from an exam will only be allowed in the case of a medical or other emergency. In such situations a note from the Dean of Students' Office is necessary. If one midterm is missed with valid reasons, the remaining graded work will have adjusted weights. An unexcused absence from the midterm exam will receive a zero score.

Final Exam: The final exam will be comprehensive. The date and location will be determined by the Registration & Academic Services. If you are unable to take the final at the designated time, then you must follow the procedures in the Lehigh Student Handbook. No makeup finals will be given except on the official makeup day as determined by the Registrar.

Attendance: Attendance is mandatory and makes up 5% of the final grade. Most importantly, however, is that missing even one lecture can put you behind in a short time as the material naturally builds upon previous concepts. I'm glad you're still reading! To verify you have read the entire syllabus, please email me a picture of a blue parrot at f.araujo@lehigh.edu, with the subject line "Stats: parrot picture".

Tutoring The College of Business Undergraduate Programs Office publishes a grid outlining the various business tutoring options and times at the beginning of every semester. If you have any questions or concerns about tutoring, please contact Assistant Dean Emily Ford at eaf311@lehigh.edu.

Accommodations for Students with Disabilities: Lehigh University is committed to maintaining an equitable and inclusive community and welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact Disability Support Services (DSS), provide documentation, and participate in an interactive review process. If the documentation supports a request for reasonable accommodations, DSS will provide students with a Letter of Accommodations. Students who are approved for accommodations at Lehigh should share this letter and discuss their accommodations and learning needs with instructors as early in the semester as possible. For more information or to request services, please contact Disability Support Services in person in Williams Hall, Suite 301, via phone at 610-758-4152, via email at indss@lehigh.edu, or online at https://studentaffairs.lehigh.edu/disabilities.

Lehigh Student Senate Academic Integrity Statement: "We, the Lehigh University Student Senate, as the standing representative body of all undergraduates, reaffirm the duty and obligation of the students to meet and uphold the highest principles and values of personal, moral and ethical conduct. As partners in our educational community, both students and faculty share the responsibility for promoting the helping to ensure an environment of academic integrity. As such, each student is expected to complete all academic course work in accordance to the standards set forth by the faculty and in compliance with the university's Code of Conduct."

The Principles of Our Equitable Community: Lehigh University endorses The Principles of Our Equitable Community. We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Course Outline and Schedule: The table below details the complete class and assignment schedules as well as the topics covered and the relevant textbook sections.

Lectures and Assignments: Topics and Schedule

Date	Topic and Textbook Sections	Assignment and Due Date
Week 1	**Data and descriptive statistics**	
01/25	Ch. 1, sec. 1.1-1.6	
01/27	Ch. 2, sec. 2.1-2.3 (appendix 2.2, self-study)	PS #1 due 02/01
Week 2	**Descriptive statistics**	
02/01	Ch. 2, sec. 2.4-2.5; Ch. 3, sec. 3.1-3.2	
02/03	Ch. 3, sec. 3.3-3.5 (appendix 3.1-3.3, self-study)	PS #2 due 02/08
Week 3	**Introduction to probability**	
02/08	Ch. 4, sec. 4.1-4.3	
02/10	Ch. 4, sec. 4.4-4.5	
Week 4	**Discrete probability distributions**	
02/15	Ch. 5, sec. 5.1-5.4	
02/17	Ch. 5, sec. 5.5-5.7 (appendix 5.1-5.3, self-study)	PS #3 due 02/22
Week 5	**Review session and midterm**	
02/22	Review Session	
02/24	**MIDTERM #1**	
Week 6	**Continuous probability distributions**	
03/01	Ch. 6, sec. 6.1-6.2	
03/03	Ch. 6, sec. 6.3-6.4 (appendix 6.1-6.3, self-study)	PS #4 due 03/08
Week 7	**Sampling distributions**	
03/08	Ch. 7, sec. 7.1-7.5	
03/10	Ch. 7, sec. 7.6-7.7 (appendix 7.1-7.3, self-study)	PS #5 due 03/22
SPRING	**BREAK**	
03/15	Spring Break 101, Chapter 1	
03/17	Spring Break 101, Chapter 2	
Week 8	**Interval Estimation**	
03/22	Ch. 8, sec. 8.1-8.2	
03/24	Ch. 8, sec. 8.3-8.4	PS #6 due 03/29
Week 9	**Inference I: hypothesis tests**	
03/29	Ch. 9, sec. 9.1-9.3	
03/31	Ch. 9, sec. 9.4-9.8 (appendix 9.1-9.3, self-study)	PS #7 due 04/05
Week 10	**Review session and midterm**	
04/05	Review Session	
04/07	**MIDTERM # 2**	
Week 11	**Inference II: means and proportions**	
04/12	Ch. 10, sec. 10.1-10.2	
04/14	Ch. 10, sec. 10.3-10.4 (appendix 10.1-10.3, self-study)	PS #8 due 04/19
Week 12	**Experimental design and ANOVA**	
04/19	Ch. 13, sec. 13.1-13.2	
04/21	Ch. 13, sec. 13.2-13.4 (appendix 13.1-13.3, self-study)	PS #9 due 04/26
Week 13	**Linear regression I**	
04/26	Ch. 14, sec. 14.1-14.2	
04/28	Ch. 14, sec. 14.3-14.5	PS #10 due 05/03
Week 14	**Linear regression II**	
05/03	Ch. 14, sec. 14.6-14.7	
05/05	Review Session	
Week 15	**Final Exam**	
TBD	**TBD**	