Econ-UA 18: Statistics

2021 Summer Session I

Instructor:	Eric Spurlino	**Time:** MTWR 12:30pm-2pm
TA:	Aleksandra Alferova	**Recitation:** R 3-4:30pm
Zoom Office Hours:	Eric: T 10-11am, R 9-10am	Aleksandra: F 10-11am

Course Description

This is an introductory course in probability and statistics. The goal of the course is to develop a fundamental understanding of statistics, which requires a sufficiently detailed course in probability. Models of probability and statistics are among the most fundamental tools in the Economics toolbox. While an underlying goal of this course is to prepare for future study of Economics, the material will only cover general topics to provide a deeper understanding of all sciences. As statistics is an essential component of scientific language, students will ideally finish the course better-equipped to embrace all forms of scientific literature.

Textbook

Since textbooks are expensive and I won't be following any directly, I recommend two textbooks easily available online for free.

1. *Probability and Statistics* by DeGroot and Schervish, which can be obtained online for free as a PDF (http://bio5495.wustl.edu/Probability/Readings/DeGroot4thEdition.pdf). This book is very long and very comprehensive, and no doubt covers much more than we will be able to cover in this course.

2. *OpenIntro Statistics* available here (https://www.openintro.org/book/os/) for free. This one is less exhaustive than the book above, but written very clearly and with lots of supplemental materials which will aid any studying

Course Structure

Lectures will all be synchronous (live) and take place on Zoom through the course website. Attendance to these is not mandatory, and all lectures will be recorded for later viewing to accommodate those in distant time-zones. While attendance is not mandatory and the courses will be recorded, your attendance is **highly** recommended if possible.

Office Hours

Office hours will be at the times designated in the header. These will also take place virtually, by joining the appropriate Zoom room on the course webpage at the designated times. If you need to schedule additional time to talk by appointment because of timezone difficulties, you can email myself at **spurlino@nyu.edu** or Aleksandra at **aa6549@nyu.edu**.

Grading

There are four components to your grade:

1. Homework (5 total, 4 graded): 33%

2. Exam 1 (Monday, June 14th): 33%

3. Exam 2 (Thursday, July 1st): 33%

Homeworks will be submitted online on the class website, and graded by Aleksandra. Homeworks will be due on Thursdays prior to recitation. Since COVID and virtual learning presents the opportunity for disruptions in one's schedule and ability to complete course assignments, we will drop the lowest grade on any homework. If a problem comes up that prevents you from completing any one homework on time, you can use this policy to have that one missed homework not count against your grade. But remember you can only use this **once** during the session. Since Aleksandra will be going over the homework solutions during her recitation, late homeworks will not be accepted. Collaboration on homeworks is allowed, but each student must upload their own solutions, written by themselves.

Exams will not be multiple choice and be similar to homework in their level of difficulty and type of question. The two exams are assigned equal weight, and the cover only the content covered in the previous 3 weeks. However, the material of this course naturally builds off of itself, so some concepts from the first half will still be relevant for the second exam.

Exams will be open book and take home. You will have a 12 hour window in which you may start your exam, and you will have at least 90 minutes to upload your completed exam once you begin the exam. The exact technology for doing this is not yet determined, but you will be shown specifically how to upload and take the exams prior to the exam date.

Course grades will be determined using the scale above. Letter grades will not be given for anyone component, but point grades will be given for each. These points are then weighted by the scheme given above. Once your final course score (out of 100) is determined, we will use the class distribution of scores to determine how these translate to letter grades. The economics department guidelines for class grade distributions are roughly (A: 29%, B: 40%, C: 22%, D: 5%, F: 4%), where, for example, B refers to B+,B, and B-. Note that this is a **rough** guideline, and not at all a strict curve. I will commit to doing *no worse* than the department grade distribution. For example, if your course score is in the top 69% of the class, you are guaranteed to do no worse than a B-.

Schedule

The first 3 weeks up to the midterm will be focused on the fundamentals of probability theory, leading into the theory of sampling. In the latter 3 weeks we will apply these fundamentals to begin studying the basics of statistical estimation. Further details about specific material and reading will become more clear as we progress.

Week 1: Probability I (Sample spaces, events, set theory, prob. properties, conditional prob.)

Week 2: Probability II (Random variables, distributions, joint dist.), Common Distributions (Discrete)

Week 3: Common Distributions (Discrete and Continuous)

Exam 1: Monday June 14th

Week 4: Inference (Sampling, confidence intervals)

Week 5: Hypothesis Testing

Week 6: Regression, experimental design

Exam 2: Thursday July 1st