ECONOMICS 41: STATISTICS FOR ECONOMISTS
Instructor: Kirill Ponomarev
UCLA, Summer Session A, 2021

Course Description: This course is an introduction to the theory and practice of Statistics with an emphasis on its use in Economics. It will introduce the basic statistical concepts such as random variables, probability distributions, statistical estimation, confidence intervals and hypothesis testing (see the Course Outline below).

Prerequisites: Mathematics 31AB or their equivalents. Students are expected to be familiar with basic rules of differentiation and integration and be able to draw and understand graphs.

Course Format: Live lectures, recorded and posted afterwards. For each week, there is about 3.5–4 hours of lecture material, which includes both theory and examples. It is strongly recommended that you keep up with the pace of the course. There is no TA, but, in addition to the lecture notes, I will post some TA notes with more detailed explanation and examples, and hold plenty of office hours.

Office Hours: TBD.

Exam dates: Mid-term exam: Tuesday, July 6th. Time slots: 9-11:15 am PDT and 8-10:15 pm PDT. Final exam: Thursday, July 29th. Time slots: 9-11:15 am PDT and 8-10:15 pm PDT. Each student will pick one time slot for each exam at their convenience. <u>Exams must be taken at the scheduled time</u>.

Communication: Please use the <u>Discussion Forum</u> for all of the questions about content of the course (e.g clarifications, hints on the home assignments, etc.). If you have an administrative question, the answer is probably contained in this syllabus so read it carefully first. Otherwise, send me an e-mail to ponomkirill@gmail.com. Please clearly indicate your name and put "Econ 41 summer" in the subject line.

Textbook: The course is self-contained, but some of the exercises are taken from "Probability and Statistical Inference" by Hogg, Tanis and Zimmerman (9-th edition). All relevant exercises will be posted on the class website.

Home Assignments: There are four home assignments graded for completion. Solutions will be posted on the course website after the due date. *The students are responsible for verifying that the main steps and the answers are correct.* Attempting all of the homework problems is strongly recommended since the exam problems will be similar to those. Write your solution on paper and use an app such as "Scannable" to scan it and make a single pdf file. If you're using a tablet, make sure to export your solutions in the pdf format. Upload your solution to the website using the link provided in the "Home Assignments" folder on the course website.

Exams: There will be a mid-term and a final exam. The mid-term exam will cover the material from Lectures 1-8 (according to the Course Outline, see below) and the final exam will include everything, but the highlight will be on the material from Lectures 9-15. Both exams are multiple choice, administered through the course website and require Respondus. Each of the exams is 2 hours and 15 minutes long and contains 45 questions. There will be multiple versions to prevent cheating.

Exam Rules: Exams are open-notes. Students are required to use the Respondus browser on their laptop or PC, and an extra device that can be used to join a Zoom proctoring meeting (a phone or a tablet). It is your responsibility to make sure that the camera is working properly (and your device does not run out of juice) for the duration of the exams. Please have some form of photo ID.

Evaluation: The final grade will be calculated as follows:

> **Option 1:** 10% Home Assignments, 30% Midterm Exam, 60% Final Exam
>
> **Option 2:** 10% Home Assignments, 40% Midterm Exam, 50% Final Exam
>
> **Final Grade:** $\max\{$**Option 1**, **Option 2**$\}$

No other factors will be considered (!).

Center for Accessible Education (CAE): Any student with a pre-existing illness or condition who requests special arrangements must (a) qualify under CAE rules for such special arrangements and (b) must take the exam with CAE. Any such arrangements with CAE must be communicated to the instructor during the first week of classes. For additional information and the qualification conditions of the Center for Accessible Education please visit their website

at https://www.cae.ucla.edu/. All other students must take the exam at the scheduled time under the same time constraints. It is the responsibility of all students who request special arrangements with CAE to be familiar with all of their rules as well as the rules of this class.

ACADEMIC DISHONESTY Any cases of cheating will be reported to the Office of the Dean of Students. For more details please refer to the Office of the Dean of Students website at https://www.deanofstudents.ucla.edu/Academic-Integrity.

Course Outline

1. **Probability:** Basic concepts, methods of enumeration, conditional probability, independent events. (Lectures 1-4)

2. **Discrete random variables:** Discrete random variables and their distributions, mean, variance, covariance, independent random variables, special distributions: Bernoulli, Binomial and Poisson (Lectures 5-8). Multivariate distributions (Lecture 9).

3. **Continuous random variables:** Continuous random variables and their distributions, special distributions: Uniform, Exponential and Normal distribution, Chi-squared and t-distributions (Lectures 10-11).

4. **Elements of statistical estimation and inference:** Markov's and Chebyshev's inequalities, Jensen's inequality, sample moments, convergence in probability and its' properties, Law of Large Numbers, Central Limit Theorem, Maximum Likelihood Estimation (Lectures 12-13)

5. **Applications of statistical inference:** confidence intervals for the mean, testing hypotheses about the mean (Lectures 14-15)