Faculty of Liberal Arts and Professional Studies

Department of Economics

YORK U

ECON 3500 (M): Introductory Mathematical Statistics for Economists

Course outline (Winter semester, 2023-24)

Instructor

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Schedule

Lectures: Tuesdays (room DB 1004) and Thursdays (room DB 0005), 14:30-16:00
Office hours (tentatively): Thursdays
Midterm: TBA (tentatively, late February)

Teaching assistant

TBA

Course description

This is an intermediate-level course in mathematical statistics. In the course, we review important concepts from the probability theory, explore some fundamental elements and essential tools of the statistical analysis, investigate a few selected methods of the estimation machinery. We also discuss various concepts which are fundamental for understanding the principles of more advanced econometrics and machine learning techniques.

Course organization

There will be two 90-min lectures per week. All relevant course materials, as well as course updates, will be uploaded on eClass.

Evaluation

The total final grade (100%) will consists of

- 2 problem sets (20%)
- midterm exam (30%)
- final exam (50%)

Constructive in-class participation (active participation in dicsussions, answering questions, etc.) will be rewarded by adding an extra bonus to the final grade (up to 5%, mostly relevant for the cases with a "border" grade).

Important: there will be no make-ups for the midterm exam (30% weight will be shifted to the final exam, and, in case the midterm is missed, the weight of the final exam will be 80%). Late submissions of the problem sets will be penalized.

Textbooks

- [HTZ] Robert V. Hogg, Elliot A. Tanis, Dale Zimmerman, "Probability and Statistical Inference", *9th Edition, Pearson*
- [WMS] Dennis D. Wackerly, William Mendenhall III, Richard L. Scheaffer, "Mathematical Statistics with Applications", *6th or 7th Edition*, *Duxbury Press*

Add/Drop deadlines

Last date to add to the course (with permission of instructor): January 22 (January 31)
Last date to drop the course without receiving a grade: March 11
Course withdrawal period (with grade "W" on transcript): March 12 - April 8

Attendance policy

Attendance is expected, but not strictly mandatory. Constructive in-class participation (active participation in dicsussions, answering questions, etc.) will be rewarded by adding an extra bonus to the final grade (up to 5%, mostly relevant for the cases with a "border" grade).

Updates and announcements

Regular course updates and extra announcements are expected to appear on eClass. Please, check regularly for the corresponding updates.

Important: It is students' responsibility to be aware of any policy (or schedule change). If you miss classes, check if any schedule or policy changes were announced.

Tentative course contents and schedule

# of lectures	Chapters	Topics	Reading (HTZ)	Reading (WMS)
1	Introductory class	Course organization, Q&A		
4	Elements of Probability Theory	Random experiment; probability space; conditional probability; independence; Bayes' Theorem	1	1, 2
4	Random variables and distributions	Random variables; probability distribution functions; moments; discrete and continuous distributions; some univariate distributions	2, 3	3, 4
4	Bivariate distributions	Discrete and continuous multivariate distributions; covariance and correlation; conditional expectation and variance; bivariate normal distribution and its properties	4	5
1	Midterm			
4	Functions of random variables and associated results	Transformation of a random variable; moment-generating function; the Law of Large Numbers; the Central Limit Theorem	5	6, 7
4	Some selected topics in estimation	Sufficient statistics; Introduction to the Maximum Likelihood method; basics of Bayesian inference; overfitting and information criteria	6	9.4, 9.5, 9.7, 16.1, 16.2

Some changes in the schedule are highly possible, as well as minor adjustments of the course content and selected topics.

Exam policy (Midterm and Final)

Both exams are closed book (a single hand written double-sided A4 formula sheet and a basic non-programmable calculator are allowed), independent work is required for all exams. All instances of academic dishonesty in this course will be reported to the appropriate university authorities and can be punishable according to the Senate Policy on Academic Honesty.

You may submit a request to have your term tests re-checked or final exam re-graded. Quiz and midterm re-check requests need to be sent to the instructor or TA within one week of grade release. In your written request, you must identify the questions and the possible errors and/or omissions.

Re-grading of your test will be done in a manner consistent with the rest of the class. A re-check or regrade may result in a raised mark, lowered mark, or no change. In the process, the instructor has the authority to re-grade other questions on the exam if they find it necessary to do so.