UNIVERSITY OF TORONTO
ECO227Y1Y Foundations of Econometrics
2020-2021 Academic Year

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1. Key Course Information

Course website: Quercus (https://q.utoronto.ca)
Piazza: https://piazza.com/utoronto.ca/fall2020/eco227y1y
Lectures: Thursdays 3:00 – 5:00pm ET (online synchronous, Zoom)
Tutorials: Fridays 4:00 – 5:00pm ET (online synchronous, Zoom)
Office hours: Wednesday 9:00 – 10:00pm ET (Zoom)
TA office hours: Monday 9:00 – 10:00pm ET (Zoom)
TAs: Joon Cho & Alan Kong
TA email: joonhwan.cho@mail.utoronto.ca (for use, see section 10.2 & .3)

2. Course Delivery Method

Lectures and tutorials are delivered remotely. They are live-streamed and recorded, permitting synchronous delivery as well as asynchronous attendance. Regular assessments and tests will also take place remotely and should be submitted digitally online (see section 9). The completion window depends on the type of assessment.

To complete this online course, you must have access to (1) a computer or a tablet with a working microphone and webcam, (2) reliable high-speed internet and reliable electricity, (3) the hardware, software, and knowledge to scan your handwritten work to be uploaded. Any required software that may otherwise have to be purchased is available to students through the University.

3. Course Description and Intended Learning Outcomes

This is an introduction to probability and statistics intended for economic specialists. The course assumes basic familiarity with elementary calculus and will use it extensively. The course provides students with a demanding introduction to probability theory, estimation theory, sampling distributions, hypothesis testing, and simple regression analysis. By the end of the course, students should be familiar with the basic tools used to model uncertainty in economics and finance, to test hypotheses, and to estimate model parameters.

4. Textbooks

Required: *Mathematical Statistics with Applications*, 7th Edition (2008) by Dennis D. Wackerly, William Mendenhall III and Richard L. Scheaffer (Brooks/Cole)

Optional: *Stats: Data and Models*, 5th Edition (2019) by David E. Bock, Paul F. Velleman and Richard D. De Veaux

The lectures in this course are based on Wackerly, Mendenhall and Scheaffer (WMS), and the tutorials will cover selected exercises in the same textbook. If a student has never taken a Statistics course before, Bock, Velleman and De Veaux (BVD) is recommended to gain some perspectives on statistical practice and statistical thinking.

5. Prerequisites and Co-requisites

ECO101H1 and ECO102H1 (or ECO100Y1) are required with a minimum grade of 70%. Students are expected to have had an introductory undergraduate course in calculus. In particular, passing MAT133Y1 with a minimum grade of 63%; MAT135H1 and MAT136H1 with a minimum grade of 60%; MAT137Y1 with a minimum grade of 55%; or MAT157Y1 with a minimum grade of 55% will satisfy the calculus prerequisite for this course. It is also recommended that students be enrolled in second-year courses in linear algebra (i.e., MAT223H1 or MAT240H1) and multivariate calculus (i.e., MAT235Y1; MAT237Y1; or ECO210H1) at the same times as their enrolment in ECO227Y1.

6. Lectures and Tutorials

Both lectures and tutorials are live-streamed and recorded on Zoom. The links will be posted on the course website. During tutorials, the TA will walk through selected exercises from weekly problem sets (see section 8). Recordings for both the lectures and tutorials will be available online for all enrolled students each week after class. Students can either stream online or download from Quercus course website to study and review the material. However, students are strongly advised to attend the classes live, if possible, to engage in questions, discussions, etc. potentially raised during the class.

Important note: Course materials are copyrighted. You are not allowed to republish or share lecture materials, including recorded videos.

7. Tentative Course Schedule

The chapters in the table below are from WMS.

Date	Week	Topic	Chapters
Fall 2020			
09-10	1	Introduction & Probability Theory I	1 & 2.1 – 2.10
09-17	2	Probability Theory II	
09-24	3	Discrete Random Variables I	2.11 – 2.12 3.1 – 3.9, 3.11
10-01	4	Discrete Random Variables II	
10-08	5	Discrete Random Variables III	
10-15	6	Continuous Random Variables I	4.1 – 4.10
10-22	7	Continuous Random Variables II	
10-29	8	Continuous Random Variables III	
11-05	9	Continuous Random Variables IV	
11-12	10	**Fall reading week (no class)**	-
11-19	-	**Test #1**	-
11-26	11	Multivariate Probability Distribution I	5.1 – 5.8, 5.11
12-03	12	Multivariate Probability Distribution II	
Winter 2020			
01-07	13	Functions of Random Variables I	6.1 – 6.5, 6.7
01-14	14	Functions of Random Variables II	
01-21	15	Sampling Distribution and Central Limit Theorem	1 & 7.1 – 7.3, 7.5
01-28	16	Estimation I	8.1 – 8.9
02-04	17	Estimation II	
02-11	-	**Test #2**	-
02-18	18	**Winder reading week (no class)**	-
02-25	19	Point Estimators I	9.1 – 9.7
03-04	20	Point Estimators II	
03-11	21	Hypothesis Testing	10.1 – 10.9
03-18	22	Regression I	11.1 – 11.7
03-25	23	Regression II	
04-01	24	Bayesian Methods & Review	16
TBA	-	**Test #3**	-

8. Readings and Problem Sets

Required readings for each module are available in the table in section 7. It is recommended that the students complete the readings before attending or watching weekly lectures. Each Friday, a problem set will be posted based on the week's lecture and reading. Each exercise in the problem set will be classified as one of the three types: "assigned," "unassigned" and "tutorial." Students are required to submit work for assigned exercises as part of the course assessment (see section 9.2). Tutorial exercises will be covered by the TA during weekly tutorial. Unassigned exercises will be left as ungraded homework. Although not graded, students are expected to complete the entire problem set after each lecture.

9. Evaluation

Assessment	Tentative Date	Weight
Test #1	Thursday, Nov. 19 (2 hours)	25%
Test #2	Thursday, Feb. 11 (2 hours)	25%
Test #3	TBA (2 hours)	30%
Problem sets	Every lecture week (22 weeks)	14%
Participation	Throughout the course	6%

9.1 Tests

All three tests are noncumulative and should be thought of as midterm tests. For each test, students will be given a limited amount of time to complete the test. Students will be required to write the test on paper and upload to Crowdmark. To accommodate students in different time zones, we plan to make the test available in multiple time windows on the dates specified above. We may also use university-approved electronic proctoring for tests. Authorized aids for the tests will be announced near the test dates.

Important Note: You are expected to work on all tests by yourself, proctored or not. You may not use unauthorized aids or communicate with others about the test.

9.2 Problem Sets

There will be 22 problem sets throughout the course. Each problem set (posted on Fridays) will be due before the next lecture (Thursdays, 3pm ET). Students should show their work for all "assigned" exercises on paper and upload to Crowdmark. However, only one randomly selected exercise will be marked. Students will be rewarded either full, partial or zero mark(s) based on the work for the selected exercise. Reasonable collaboration is allowed.

Excuses such as lateness, temporary illness, technical difficulties, time zone differences, or forgetting about it will be not entertained. Students are expected to start working on the problem set well before the deadline so that any inadvertent interruptions are avoided. In order to accommodate students who miss a weekly problem set due to above or other conflicts, we will use only the best 20 of 22 problem sets towards the final grade, each worth 0.7%.

Important note: There are no further accommodations for failing to submit a properly completed problem set before the due date.

9.3 Participation

The course is designed to accommodate both synchronous and asynchronous online delivery. Given students are in distinct time zones, participation marks will not be based on live attendance or in-class participation. Instead, students are strongly encouraged to engage with their peers in Piazza—forming active discussions, asking and answering questions. Participation mark will be based on individual degree of engagement in the forum throughout the course. Further details will be available on Quercus page.

10. Course Policies

10.1 Policies on Missed Tests

A grade of zero will be given to students who do not write the test, unless an email notice is sent to me (ismael.mourifie@utoronto.ca) *on the day of the test* with an appropriate and convincing reason for missing the test. Make-up tests will only be scheduled based on legitimate medical reasons or acute emergencies. It is by the University policy that there are no "make-up tests" for "make-up tests."

Accommodations for missing more work than addressed above (i.e., more than one test and/or more than two problem sets) are extremely limited. In such limited situations, we will consider whether accommodations can still meet all course requirements or whether the student must be advised to drop the course and retake it when able to complete the required work.

10.2 Remark Requests

Remark requests must be made in email to Joon (joonhwan.cho@mail.utoronto.ca) with subject "ECO227 Remark Request for [assignment name, e.g., Problem Set Week 5]" *within one week* of the work being returned. The email should clearly explain, for each question, why more points are justified. If remark request is made for a test, then the whole test will be remarked to ensure consistency. Any remark requests are batch-processed after the deadline, not immediately.

Important note: Any remark request failing to follow the instruction above (email heading, content, deadline) will not be processed without further notice.

10.3 Communication

Piazza is the main virtual platform for all course-related communication, complementing the limited availability of office hours. While the emphasis is on peer communication (student-to-student discussion and Q&A), the instructor and the TAs will also monitor and answer questions. For any question that would interest other people (e.g., course content, test, problem set, etc.), please post on Piazza. For any private matters, students may reach the instructor via email with the following provisions:

a. The question should require a short response. If it takes more, office hours are the more appropriate venue.
b. Students are strongly encouraged to use the University of Toronto email addresses, i.e., of the form username@mail.utoronto.ca, in order to not end up in the spam folder.
c. Begin the heading of the email by identifying the course, i.e., "ECO227 [Heading]" and begin the email body by identifying oneself.
d. Do not send attachments of any kind or submit work by email.

Our TA Joon is assigned 1 hour per week to respond to students, and the same email policy holds for them.

10.4 Academic Misconduct

Students should note that copying, plagiarizing, or other forms of academic misconduct will not be tolerated. Any student caught engaging in such activities will be subject to academic discipline ranging from a mark of zero on the assignment, test or examination to dismissal from the university as outlined in the academic handbook. Any student abetting or otherwise assisting in such misconduct will also be subject to academic penalties.

10.5 Accessibility

The University is committed to accessibility. If a student requires accommodations for a disability, or has any accessibility concerns about the course, please contact Accessibility Services as soon as possible. Their website is http://www.studentlife.utoronto.ca/as.