UNIVERSITY OF TORONTO
ECO227Y1 Foundations of Econometrics
2023-2024 Academic Year

<u>**Fall/Winter Sessions**</u>

Professor:	Kuan Xu	Email:	kuan.xu@utoronto.ca
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1. Key Course Information

Course Websites:

Quercus (https://q.utoronto.ca)

The platform for the link to WebAssign, syllabus, lecture slides and notes, announcements, graded tests and answer keys, test grades, Zoom (for Instructor's additional online office hours), etc.

WebAssign (https://www.webassign.net/)

The platform for the e-textbook, study resources, exercises, exercise grades, etc.

Lectures:

Wednesdays 3:00 pm – 5:00 pm, Fall Term Location: NL6/Winter Term Location: SS1073

Tutorials:

Fridays 11:00 am – 1:00 pm, Fall and Winter Term Location: SS1073

Office Hours:

Instructor's Office hours: Online on Mondays, 3:30 pm – 4:30 pm, online via Zoom (link posted on Quercus); **In-person on** Wednesdays, 1:00 pm-2:00 pm, GE313

TA Office Hours: In-person on Fridays 1:00 pm – 2:00 pm, Location (Fall Term Location: SS1074; Winter Term Location: TBA)

2. Course Delivery Method

Lectures and tutorials are in person.

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

3. Course Description and Intended Learning Outcomes

This is an introductory course in probability and statistics intended for economic specialists. The course assumes basic familiarity with elementary calculus and will use it extensively. The course gives students a rigorous 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, including hypothesis testing and model parameter estimation.

4. Textbook

> Mathematical Statistics with Applications, 7th Edition (2008) by Dennis D. Wackerly, William Mendenhall III, and Richard L. Scheaffer (WMS), Cengage (with WebAssign)

There are two options at www.UofTBookstore.com**:**
1. **WebAssign Only** which includes the complete e-book: Mathematical Statistics with Applications, 7th Edition, **9781337901185**
2. **Printed Text Bundle**: Mathematical Statistics with Applications, 7th Edition plus WebAssign, **9780357004791**

The lectures in this course are based on Wackerly, Mendenhall, and Scheaffer (WMS), and the weekly tutorial will review the weekly lecture, application of R and other relevant software packages, and exercise questions.

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. Tentative Course Schedule, Topics, Readings, Exercises and Marking Scheme

	Week	Lecture Topic	Readings-WMS Chapters	WebAssign Exercise
		Fall 2023		
09-13	1	Introduction & Probability Theory I	1 & 2.1 – 2.10	Fall-Ex1
09-20	2	Probability Theory II	1 & 2.1 – 2.10	Fall-Ex2
09-27	3	Probability Theory III and Discrete Random Variables I	2.11 – 2.12, 3.1 – 3.3	Fall-Ex3
10-04	4	Discrete Random Variables II	3.4 – 3.9, 3.11	Fall-Ex4
10-11	5	Discrete Random Variables III	3.4 – 3.9, 3.11	Fall-Ex5
10-18	6	**Test #1 (20%)** in Classroom (Makeup 2023-11-03, 9 am-11am)		
10-25	7	Continuous Random Variables I	4.1 – 4.10	Fall-Ex6
11-01	8	Continuous Random Variables II	4.1 – 4.10	Fall-Ex7
11-08	9	**Fall reading week (no class)**		
11-15	10	Continuous Random Variable II and Multivariate Probability Distribution I	4.1 – 4.10, 5.1 – 5.8	Fall-Ex8
11-22	11	Multivariate Probability Distribution I	5.1 – 5.8, 5.10-5.11	Fall-Ex9
11-29	12	Multivariate Probability Distribution II	5.1 – 5.8, 5.10-5.11	Fall-Ex10
12-06	13	**Test #2 (20%)** in Classroom (Makeup 2024-01-12, 9am-11am)		
		Winter 2024		
01-10	1	Functions of Random Variables I	6.1 – 6.5, 6.7	Winter-Ex1
01-17	2	Functions of Random Variables II	6.1 – 6.5, 6.7	Winter-Ex2
01-24	3	Sampling Distribution and Central Limit Theorem	1 & 7.1 – 7.3, 7.5	Winter-Ex3
01-31	4	Estimation I	8.1 – 8.9	Winter-Ex4
02-07	5	Estimation II	8.1 – 8.9	Winter-Ex5
02-14	6	**Test #3 (20%)** in Classroom (Makeup 2024-03-01, 9am-11am)		
02-21	7	**Winder reading week (no class)**		

	Week	Lecture Topic	Readings-WMS Chapters	WebAssign Exercise
02-28	8	Point Estimators I	9.1 – 9.7	Winter-Ex6
03-06	9	Point Estimators II	9.1 – 9.7	Winter-Ex7
03-13	10	Hypothesis Testing	10.1 – 10.9	Winter-Ex8
03-20	11	Regression I	11.1 – 11.7	Winter-Ex9
03-27	12	Regression II	11.1 – 11.7	Winter-Ex10
04-03	13	Review		
During Final Exam Period, the date and location: TBA	-	**Test #4 – Final Exam (40%)**		

7. Readings, Problem Sets, and Tutorials

Required readings for each module are available in section 6. It is recommended that the students complete the required readings before attending weekly lectures.

Each Friday, a weekly problem set (Fall-Ex# or Winter-Ex#) will be posted on WebAssign and will be due in 7 days. The resulting full score (100%) on each problem set on WebAssign will generate 0.5 bonus points towards the final grade with no more than 10 points.

Each Friday, TAs will provide a discussion-based tutorial and all students are expected to attend. The objectives are to help students review the key concepts of the lecture, use R and other relevant software packages, and work on selected exercises. TA also offers office hours each Friday immediately after the weekly tutorial.

8. Course Policies

8.1 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 the instructors *on the day of the test (no later than midnight)* with appropriate documentation, *submitted within two weeks after the test (no later than midnight),* for missing the test.

- Make-up exams will only be scheduled for those who sent the notice and appropriate documentation.

- An email notice must be sent to the instructor kuan.xu@utoronto.ca on the day of the test (no later than midnight).
- The following are recognized forms of documentation:

  a. Absence Declaration via ACORN
  b. U of T Verification of Illness or Injury Form (VOI)
  c. College Registrar's letter
  d. Letter of Academic Accommodation from Accessibility Services

- It is by the University policy that there are no "make-up exams" for "make-up exams."

Regarding the Absence Declaration, students who are absent from academic participation (see below for important information on eligibility) and who require consideration for missed academic work may report their absence using the **ACORN** Absence Declaration Tool. **One absence declaration per academic term is allowed.** Students should also advise their instructor of their absence as required. For more information on the Absence Declaration, see https://www.artsci.utoronto.ca/current/academics/student-absences

The ACORN Absence Declaration Tool is intended to be used in the following circumstances:

- A health condition or injury (e.g., illness, serious physical harm, mental health issue, scheduled surgery)
- A personal or family emergency (e.g., unanticipated and unavoidable familial incident beyond the student's control)
- Bereavement (e.g., the death of a student's immediate family member or close friend)

The ACORN Absence Declaration Tool is not intended to be used in the following circumstances:

- Personal social obligations
- Travel not related to your academic program
- Technological issues
- The avoidance of deadlines or tests

8.2 Communication

The instructor will reply to emails within 48 hours, except on weekends and holidays, with the following provisions:

- The question should require a one (or two) sentence response (maximum). If it takes more, office hours are the more appropriate venue.
- The instructor will not reply to emails with more than 4 sentences. If it takes more, office hours are the more appropriate venue.

- The instructor will not reply to emails concerning grading. For such matters, office hours are more appropriate.
- It is also (strongly) preferable that you use the University of Toronto email addresses: The instructor's spam filter is set to maximum.
- Always identify yourself, UTORid, and the course code in your email heading.
- Please do not send attachments of any kind.
- Please do not submit term work by email.
- The teaching assistants have the same email policy as they have one hour each per week to reply to course-related email messages.

8.3 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 for graded work (e.g., all tests) will be subject to academic discipline ranging from a mark of zero 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.

8.4 Accommodations

The University is committed to accessibility. If a student has a consideration that may require accommodations, please contact Accessibility Services: https://www.studentlife.utoronto.ca/as, 416-978-8060 or accessibility.services@utoronto.ca

8.5 Equity, Diversity, and Inclusion

The University of Toronto is committed to equity, human rights, and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.