UNIVERSITY OF TORONTO

ECO227Y1Y Foundations of Econometrics

2025-2026 Academic Year

Fall/Winter Sessions

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1. Key Course Information

Course Platforms:

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

Quercus posts announcements, the course syllabus, lecture slides and notes, test answer keys and grading rubrics, test grades, and scheduled Zoom meetings (for instructors' online office hours), among other resources.

(2) Crowdmark (https://app.crowdmark.com/sign-in/utoronto)

Crowdmark posts graded tests 1, 2, and 3 for student feedback.

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

This is the textbook publisher's platform, which contains the e-textbook and required online exercises (including grades and answer keys). See Quercus on how to sign up for WebAssign.

(4) Zoom

Zoom is a platform for the instructor's online office hours, the schedule and links of which are posted in Quercus.

(5) Microsoft Teams

Microsoft Teams is used for individual or small group meetings between the instructor/TAs and students, in addition to weekly Zoom meetings for the instructor's online office hours.

Lectures:

Tuesdays 11:00 am – 1:00 pm, Fall Term Location: VC323 and Winter Term Location: BL205

Tutorials:

Wednesdays 1:00 pm – 3:00 pm, Fall and Winter Term Location VC323

Office Hours:

-Instructor's Office hours: [1]

- **In-person on** Tuesdays, 2:30 pm – 3:30 pm (after the class), GE213
- **Online on** Thursdays, 4:30 pm-5:30 pm online via Zoom (the schedule and links are posted on Quercus)

-TA Office Hours:[1]

- **In-person on Wednesdays**, 3:00 pm – 4:00 pm, Location: (Fall Term Location: [redacted] from Sept. 10 to Nov. 26, 2025; Winter Term Location: [redacted] from Jan. 14 to Apr. 1, 2026)

2. Course Delivery Method

Lectures and TA tutorials are in person.[2]

Important note: Course materials are copyrighted. You are not allowed to republish or share lecture materials (posted on Quercus, Crowdmark, and WebAssign) with any parties who are not registered in ECO227 at the University of Toronto.

3. Course Description and Intended Learning Outcomes

This is a rigorous introductory course in probability and mathematical statistics intended for students in Economic Specialist programs. The course assumes basic familiarity with elementary calculus and will use it extensively. The course gives students a rigorous introduction to probability and estimation theory, sampling distributions, hypothesis testing, and multiple regression analysis. Students will learn the tools used in economics and finance to model and address randomness and uncertainty.

By the end of the course, students will be able to understand the mathematical foundations of probability and statistics, to apply basic statistical tools to real-life examples, and to get prepared for econometrics courses and empirical research in economics and finance.

[1] There are no office hours during study weeks.

[2] If a tutorial needs to be delivered online because of unexpected situations, students will be informed via Querucs announcements.

4. Textbook

Wackerly et al. (WMS), *Mathematical Statistics with Applications*, 7th edition +

WebAssign (online exercises and resources).

Option 1: Digital- eBook and + WebAssign: Wackerly/Mendenhall/Scheaffer's Mathematical Statistics with Applications, 7th Edition, ISBN: **9781337901185**, purchased via a link in Quercus

Option 2: Printed Book + WebAssign Bundle: Wackerly/Mendenhall/Scheaffer's Mathematical Statistics with Applications, 7th Edition + WebAssign Printed Access Card, ISBN: **9780357004791**, purchased in the University of Toronto Bookstore

The weekly instructor's lectures will be based on WMS. The weekly TA's tutorials will cover math reviews, examples, exercises, and applications of R, relating to the instructor's lectures. The TA's tutorial will also cover some WebAssign questions. The course slides, notes, and supplementary materials covered in both the lectures and tutorials will be posted on Quercus.

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

Date	Week	Lecture Topics In-class Tests Makeup Tests (Date, Time, & Location)	Readings-WMS Chapters	WebAssign Exercises
		Fall 2025		
09-02	1	Introduction & Probability Theory I	1 & 2.1 – 2.12	Fall-Ex1
09-09	2	Probability Theory II	2.1 – 2.12	Fall-Ex2
09-16	3	Probability Theory III	2.1 – 2.12	Fall-Ex3
09-23	4	Probability Theory IV	2.1 – 2.12	Fall-Ex4
09-30	5	Discrete Random Variables I	3.1 – 3.9, 3.11	Fall-Ex5
10-07	6	**In-Person Test #1 (20%)** in Classroom (Makeup Test #1, 2025-11-07, 11 am-1 pm, location: TBA)		
10-14	7	Discrete Random Variables II	3.1 – 3.9, 3.11	Fall-Ex6
10-21	8	Continuous Random Variable I	4.1 – 4.10	Fall-Ex7
10-28	9	**Fall reading week (no class)**		
11-04	10	Continuous Random Variable II	4.1 – 4.10	Fall-Ex8
11-11	11	Continuous Random Variable III	4.1 – 4.10	Fall-Ex9
11-18	12	Continuous Random Variable IV and Multivariate Probability Distribution I	4.1 – 4.10, 5.1 – 5.3	Fall-Ex10

Date	Week	Lecture Topics In-class Tests Makeup Tests (Date, Time, & Location)	Readings-WMS Chapters	WebAssign Exercises
11-25	13	**In-Person Test #2 (20%)** in Classroom (Makeup Test #2, 2026-01-16, 11 am-1 pm, location: TBA)		
		Winter 2026		
01-06	1	Multivariate Probability Distribution II	5.4 - 5.8, 5.10-5.11	Winter-Ex1
01-13	2	Multivariate Probability Distribution II	5.4 - 5.8, 5.10-5.11	Winter-Ex2
01-20	3	Functions of Random Variables I	6.1-6.5, 6.7	Winter-Ex3
01-27	4	Sampling Distribution and Central Limit Theorem I	7.1-7.3, 7.5	Winter-Ex4
02-03	5	Sampling Distribution and Central Limit Theorem II	7.1-7.3, 7.5	Winter-Ex5
02-10	6	**In-Person Test #3 (20%)** in Classroom (Makeup Test #3, 2026-03-06, 11 am-1 pm, location: TBA)		
02-17	7	**Winter reading week (no class)**		
02-24	8	Estimation I	8.1 – 8.9	Winter-Ex6
03-03	9	Estimation II and Point Estimators I	8.1 – 8.9, 9.1-9.4	Winter-Ex7
03-10	10	Point Estimators II and Hypothesis Testing I	9.5-9.7, 10.1	Winter-Ex8
03-17	11	Hypothesis Testing II	10.2 – 10.5	Winter-Ex9
03-24	12	Hypothesis Testing III	10.6 – 10.9	Winter-Ex10
03-31	13	Regression	11.1 – 11.5	
During Final Exam Period, the date and location: TBA	-	**In-Person Test #4 – Final Exam (40%) (Makeup Final Exam, Time and Location, TBA)**		

6. Readings, Problem Sets, and Tutorials

Required readings for each module are shown in section 5. It is recommended that students complete the required readings before attending weekly lectures **each Tuesday**.

Each Wednesday, all students are expected to attend the weekly tutorial. These tutorials will cover key concepts and selected sample exercises, R programming and codes, other relevant software packages, and the answer keys to sample and actual tests. TA also offers in-person office hours each Wednesday immediately after the weekly tutorial.

Each Friday, a weekly WebAssign problem set (Fall-Ex# or Winter-Ex#) will be posted on WebAssign and will be due in 7 days. The resulting total score (e.g.,100%) from these problem sets will be translated into 10% bonus points towards the final grade of the course.

7. Course Policies

7.1 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 instructor *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 tests will only be scheduled for those who sent the email 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. The University of Toronto 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 eligibility information) 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 permitted.** 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

The deadlines of WebAssign exercises are firm. Students should start working on them as early as they are released. An extension may be granted for WebAssign exercises under the same conditions as granting a makeup test (see the above rules).

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. Further to University Policy, if you anticipate missing a major course activity (such as an in-class test) due to a religious observance, please send an email message to kuan.xu@utoronto.ca as early in the course as possible, and with sufficient notice (*at least two weeks*), so that a makeup test may be permitted.

7.2 Communication

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

- The question should require no more than a few sentences in response. If it takes more, office hours are a more appropriate venue.
- If the question is about a WebAssign exercise, please use the function "Asking Your Teacher" within that WebAssign exercise. The instructor will answer your question via WebAssign.
- It is also (strongly) preferable that you use the University of Toronto email addresses: The instructor's spam filter is set to its maximum setting.
- Always identify yourself, UTORid, and ECO227 in your email heading.
- The teaching assistants have the same email policy as they have one hour each per week to reply to course-related email messages.
- Students have *two weeks* to send their regrading requests to kuan.xu@utoronto.ca when their tests are returned. A regrading request must be written clearly with justification based

on your answers and the corresponding grading rubric. A request may be denied if the justification is insufficient.

7.3 Academic Misconduct

Students should be aware 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.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters (https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019). Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see A&S Student Academic Integrity (https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity) and the University of Toronto Website on Academic Integrity (https://www.academicintegrity.utoronto.ca).

7.4 Accommodations

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting https://studentlife.utoronto.ca/department/accessibility-services/. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

7.5 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. The University of Toronto does not condone discrimination or harassment against any persons or communities.

7.6 Scanned Assessments (Tests and Final Exam)

This course will use Crowdmark, a collaborative online grading tool for marking and providing feedback on graded term assessments. Crowdmark provides efficiencies with grading, data recording, returning term assessments, and handling regrade requests. Copies of student work marked in Crowdmark, including grading and feedback, will be available online to students for at least one year. Digital (i.e., online) copies will serve as the authoritative record for course administrative purposes, and paper copies of assessments scanned and uploaded to Crowdmark will be destroyed after the term has ended and final grades are approved.

7.7 Use of GenAI

In this course, you may use generative artificial intelligence (AI) tools, including ChatGPT, Microsoft Copilot, and GitHub Copilot, as learning aids. You can use generative AI to assist you in studying and doing exercises. You will not be permitted to use generative AI on any in-class test or the final exam. While some generative AI tools are currently available for free in Canada, please be warned that the University of Toronto has not vetted these tools. Generative AI may produce content that is incorrect or misleading. These tools may be subject to service interruptions, software modifications, and pricing changes during the semester.