

University of Waterloo
Department of Economics
Economics 600
Mathematics for Economists
Fall 2026
MTWRF 12:00PM-2:30PM (August 17-28) on Zoom

Instructor Information

Instructor: Keisuke Teeple
Office: Zoom
Office Hours: MTWRF 2:30PM-3:30PM
Email: k2teeple@uwaterloo.ca

Course Description

For better or worse, economics and mathematics are intertwined. Ask any Economics professor about “math camp” before their PhD, and they will remember. In this course, I have taken a collection of mathematical concepts from two books (listed below). I endorse this choice of concepts because I have only included those that I have personally encountered before in an economic setting. In this sense, we will not waste time on math you will likely never use in economics.

There are two “layers” to understanding each concept. First, you will need to know how to apply the concept. This is important for everyone enrolled in 600. If you are an applied economist, you will need calculus and linear algebra for optimization, which is used in a probabilistic setting. These are precisely the four topics I cover: calculus, linear algebra, optimization, and probability. If you are in the PhD (or even considering the PhD), you will also need to know why the results are true. While I will not prove each and every result, I will prove some. These exercises are meant to help you practice more formal mathematical reasoning.

Readings

The following readings are optional:

- C. Simon and L. Blume. Mathematics for Economists. W. W. Norton and Company, 2010.
- R. Durrett. Probability: Theory and Examples. Cambridge University Press, 2017.

Course Requirements and Assessment

Assessment	Date of Evaluation	Weighting
Four graded homework assignments	Due two days after posted	80%
Participation in in-class poll questions	Every lecture	20%
Total		100%

- Work in groups OK, but submit an assignment for each individual.
- Submit assignments in Learn.
- Receive full credit for in-class polls with 80%+ answered (effort only).
- Polls consist of 1-2 survey links given each class, and aggregated responses displayed/discussed.
- While numeric grades will be assigned in Learn, almost every student takes this course for credit/no credit. 60% overall or above is credit.
- On top of ``live'' Zoom lectures, lecture videos will also be recorded/posted in Learn.
- If you cannot attend live Zoom lectures, email me and we can discuss an alternative to in-class polls.

Course Outline

I have picked out what I think are the “main pillars” of mathematical economics and listed them in the course outline below. Within each of the topics below, you will need to be able to *apply* the results from class (like how to take a derivative). For some of the topics below, you will need to be able to *prove* the results from class (like the quotient rule). The latter exercises are, naturally, more difficult than the former.

Calculus

- Derivatives
- Integrals
- Multi-variate calculus
- Euclidean space

Linear Algebra

- Matrices
- Rank and determinant
- Vectors
- Eigenvalues

Optimization

- Convexity
- Unconstrained
- Constrained
- Envelope

Probability

- Random variables
- Moments
- Convergence
- Conditional probability

Late Work

Assume I will not accept it.

Information on Plagiarism Detection

Because this course will make you better at your Econ courses, it makes no sense to copy answers directly from the internet/AI. That being said, I encourage you to consult the books, lecture notes, Wikipedia, and Stack Exchange to complete assignments.

Electronic Device Policy

No problem, just don't bother the rest of the class.

Attendance Policy

You should show up to get your in-class poll credit.

Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the [Office of Academic Integrity webpage](#) for more information.

Discipline

A student is expected to know what constitutes academic integrity to avoid committing an academic offence and to take responsibility for his/her actions. Check [the Office of Academic Integrity](#) for more information. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to [Policy 71 - Student Discipline](#). For typical penalties check [Guidelines for the Assessment of Penalties](#).

Grievance

A student who believes that a decision affecting some aspect of their university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](#), Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Appeals

A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

Note for Students with Disabilities

[AccessAbility Services](#), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com

Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.