

**University of Waterloo
Department of Economics
Economics 211 Online
Introduction to Mathematical Economics**

Course Outline Spring 2020

Instructor: John Burbidge

Communication

I do not use Learn. All the information for this course will be posted at:

[John Burbidge's web page](#)

You are responsible for checking the above web site Monday through Friday each week of the term. My email address is jburbidg@uwaterloo.ca. You can email me at this address and I will try to respond within 24 hours. Any work you submit to me must be hand-written (not typed) on lined paper. Then, in a single email message, send an image of each page to me at jburbidg@uwaterloo.ca. For the last few weeks of the Winter 2020 term, most students scanned their answers to pdf files. Please send images that do NOT have to be rotated to be read. Please put Econ 211, your name and your id number in the subject line of your email. Failure to follow these rules may result in a lower grade.

Course description

The undergraduate calendar description of Econ 211 is:

Introduction to Mathematical Economics: An introduction to mathematical techniques of particular use in economics. Topics include matrix algebra, differentiation, partial derivatives, optimization techniques including constrained optimization - all developed within the context of economic problems. Prereq: ECON 101 or ECON 100/COMM103; one of MATH 104, 4U Advanced Functions, 4U Calculus and Vectors: Not open to students in the Faculty of Mathematics.

Note that Math 104 or its equivalent is a pre-requisite. The undergraduate calendar description of Math 104 is: An introduction to applications of calculus in business, the behavioural sciences, and the social sciences. The models studied will involve polynomial, rational, exponential and logarithmic functions. The major concepts introduced to solve problems are rate of change, optimization, growth and decay, and integration.

Course Goals and Learning Outcomes

Economics is the most mathematical of the social sciences. This course, together with Econ 221, Statistics for Economists, provide students with much of the mathematical background required to complete the core second-, third- and fourth-year courses in economic theory and econometrics.

Text

Martin J. Osborne *Mathematical Methods for Economic Theory*, which is available at:

[Osborne: Mathematical Methods](#)

Topics

Basics: logic, set theoretic notation, functions

Osborne, 1.1, 1.4

Calculus

Osborne, 1.5-1.7, 2.1-2.5

Concavity and convexity

Osborne, 3.1, 3.3, 3.4

Introduction to optimization

Osborne, 4.1-4.3

Interior optima

Osborne, 5.1-5.3

Optimization with equality constraints

Osborne, 6.1, 6.3

Evaluation

The final grade will be based on assignments, quizzes and tests. You must complete: (1) at least 5 assignments; (2) at least 4 quizzes; (3) at least one of Tests 1 and 2; (4) Test 3. If you satisfy conditions (1), (2) and (3) the weight on any missed work will be shifted to Test 3.

Assignments (10% of the final grade)

Assignments will be posted on Mondays and will be due the following Friday. For example, Assignment 1 will be posted on Monday May 11th and your answers to it emailed to the email address above on Friday May 15th. There will be eleven (11) assignments over the term. Each week's assignment will be worth 1 mark, to a maximum of 10 for the term.

Quizzes (40% of the final grade)

There will be nine quizzes on the following Tuesdays: May 19th, May 26th, June 2nd, June 16th, June 23rd, June 30th, July 14th, July 21st and July 28th. The eight highest grades will count 5% each towards the final grade.

Tests (50% of the final grade)

There will be three tests on the following Tuesdays: June 9th, July 7th, and August 4th. The first two tests will be worth 15% each and the third test will be worth 20% of the final grade.

Note: Further information on the timing of assignments, quizzes and tests will be posted on the course web site.

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Economics Department Deferred Final Exam Policy

Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

Academic Integrity

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 [UWaterloo Academic Integrity webpage](#) and the [Arts Academic Integrity webpage](#) for more information.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. 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 his/her 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](#).

Accommodation for Students with Disabilities

Note for students with disabilities: The [AccessAbility Services office](#), located on the first floor of the Needles Hall extension (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 the AS office at the beginning of each academic term.

Mental Health Support

All of us need a support system. The faculty and staff in Arts encourage students to seek out mental health supports if they are needed.

On Campus

- Counselling Services: counselling.services@uwaterloo.ca / 519-888-4567 ext 32655
- MATES: one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services
- Health Services Emergency service: located across the creek from Student Life Centre

Off campus, 24/7

- Good2Talk: Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-433 ext. 6880
- Here 24/7: Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- OK2BME: set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online at the [Faculty of ARTS website](#)

Download UWaterloo and [regional mental health resources](#) (PDF)

Download the [WatSafe app](#) to your phone to quickly access mental health support information

Territorial Acknowledgement

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabeg and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes six miles on each side of the Grand River.