

**University of Waterloo**  
**Department of Economics**  
**Econ 211 Sections 1 & 2**  
**Introduction to Mathematical Economics**  
**Fall 2016**

Sec 1: 4:00-5:20 MW at AL 208, Sec 2: 2:30-3:50 MW at AL 211

### **Instructor and T.A. Information**

Instructor: Dr. Olivia Mesta

Office: HH 221

Office Phone: 519 888 4567 ext 36559. Please e-mail rather than leaving a voice mail for faster communication.

Office Hours: Mondays 1:00 –2:20 pm or by appointment

Email: [omesta@uwaterloo.ca](mailto:omesta@uwaterloo.ca)

I will be available in my office for the scheduled office hours. It is suggested that you come to office hours for your questions, due to time constraints and difficulty of typing numerical solutions on e-mail, I will not reply to questions about the course material via e-mail. If contacting me by e-mail, please, indicate ECON 211 on the subject line. I will check e-mails regularly during the day. You should not expect to hear from me evenings or weekends. Please, note that class attendance and attendance in tutorials are required and essential for the successful completion of the course.

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.

### **Course Description**

The course aims to connect mathematical tools and elementary economics analysis. It is an introduction to mathematical techniques of particular use in economics. Students are expected to learn the mathematical concepts which are required to tackle problems in economic analysis. The objective of this course is to provide the students with all the necessary mathematical tools that are required to follow 300 level courses in economics. The focus is on mathematics, but different concepts will be taught using applications in economics. Topics include an introduction to matrix algebra, differentiation, partial derivatives, and optimization techniques including constrained optimization. Students are advised to refresh their knowledge on basic arithmetic and algebra, and sets, subsets and functions before proceeding to higher level topics in this course. The goal is to motivate students of economics to study appropriate mathematical tools by demonstrating their power to deal with economic problems.

## **REQUIRED TEXTBOOK**

*Mathematics for Economics*, 3<sup>rd</sup> edition, Hoy, Livernois, McKenna, Rees, and Stengos, MIT Press, March 2011, ISBN-10:

0-262-01507-2, ISBN-13: 978-0-262-01507-3

*Student's Solutions Manual*, (recommended): 3<sup>rd</sup> edition, Hoy, Livernois, McKenna, Rees, and Stengos, MIT Press, April 2012 ISBN-10:

0-262-51794-9, ISBN-13: 978-0-262-51794-2

## **COURSE CONTENT**

**Review material (mainly mathematical concepts)** short lecture notes will be provided; it is students' responsibility to expand on examples from the book. We will not spend much lecture time in class on the first two chapters. Students are expected to review these fundamentals on their own and ask their questions in tutorials or in class.

- Ch. 1. Algebra and arithmetic reviews: Student's Solutions Manual chapter 1 is very helpful to refresh your memory on basic algebra and arithmetic.
- Ch. 2. Review of fundamentals: Sets, subsets, functions: Textbook Ch 2.1 - 2.4 (pp 11 - 60)

**Course material (focused more on economic applications of mathematics)**

- Ch. 3. Sequences, series, and limits Textbook Ch 3.1 - 3.5 (pp 61-99)
- Ch. 4. Continuity of functions of one variable with economic applications: Textbook Ch 4.1 - 4.2 (pp 100-126)
- Ch. 5. Derivatives and differential for functions of one variable.
- External notes: Limit of functions and L'Hopital's rule (notes will be posted)
- Ch. 6. Optimization of functions of one variable.
- Ch. 7. Systems of linear equations.
- Ch. 8. Matrices.
- Ch. 9. Determinants and the inverse matrix. (excluding pp 335-341 on Leontief Model)
- Ch. 10. Some advanced topics in linear algebra.
- Ch. 11. Calculus for functions of n-variables. (excluding pp. 460-463 on elasticity of substitution)
- Ch. 12. (Unconstrained) Optimization of functions of n-variable.

- Ch. 13. Constrained optimization of functions of n-variable (omit Dual consumer problem pp. 513 – 514, include the interpretation of  $\lambda$ , omit section 13.3 pp. 520-525)
- Please note that the schedule above is tentative. It is subject to change according to the pace of the lectures.

## Evaluation

Tutorial Attendance/participation marks	every week starting week 2	5%
Homework sets	5 homework sets	12%
Exam 1	October 5, 2016 (week 4)	24%
Exam 2	November 9, 2016 (week 9)	24%
Final exam	(Cumulative)To be announced by the registrar	35%

Homework sets are due in class almost every 2 weeks:

HW 1 September 28, 2016

HW 2 October 19, 2016

HW 3 November 2, 2016

HW 4 November 16, 2016

HW 5 November 30, 2016

## Policy on Tutorial Attendance/Participation Marks

Weekly tutorial sessions will be held to enhance students' learning experience. Students are encouraged to participate in learning activities as guided by their professor and tutorial leaders. Tutorials will support student engagement with the learning objectives of the course. The location and times for the tutorials are announced by the registrar. The attendance to tutorials as well as lectures are required.

There are more than one tutorial sessions running each week. You must attend the tutorial session you are officially enrolled in order to receive attendance/participation marks each week. Attending to more than one tutorial session will NOT result in extra marks as the only session you can collect marks is the one that you are officially enrolled in. Tutorial attendance/participation marks will start in week 2.

Students will achieve a maximum of 3 marks each week based on their solution to a random question asked during tutorial session: 1 mark is allocated as attendance mark. Students who hand in their solution with the right approach but wrong answer will receive 1 additional mark on top of attendance mark whereas students who hand in a solution with the right approach and right answer will receive 2 additional marks on top of attendance mark. Students who hand in a blank page or wrong approach and wrong answer will receive no mark other than 1 mark which is the attendance mark.

The lowest 2 tutorial sessions' marks will be dropped at the end of the term for everyone to allow for legitimate absences such as due to illness. Students who miss more than 2 tutorial sessions will receive zero marks for the sessions in excess of 2 sessions.

If a student has a medical condition that would cause more than 2 days of absence, the student is required to provide verification of illness form for every day that s/he misses (including the 2 days and the rest) within 3 days of absence in order to qualify for a consideration of shifting the weight for the absences in excess of 2 days (2 days will be dropped for everyone.) If you have documented and verified official reasons for each of the days you missed tutorials (including the 2 days and the rest), the weight of the missed tutorial sessions will be applied to final exam. No shifting of the weight will be considered if a student misses both midterm exams. The documentation for excuses for each day must be submitted to the instructor within 3 days of absence. Students cannot make arrangements at the end of the term bringing medical notes or excuses to cover all the days missed. The policy cannot be abused by first using 2 days with non-documented reasons and then bringing medical notes for the rest of the absences. A consideration for missed tutorial sessions will only be given in the case of illness or emergency reasons. Such excuses as prior personal travel plans and extra-curricular commitments are not legitimate reasons. If a student has an ongoing issue that prevents them from attending tutorials regularly, then the student should bring official documentation stating their condition at the beginning of the term.

Please note that “impersonation” (handing in a solution in tutorial for your absent friend) is an academic offense and can result in a suspension penalty.

### **Policy on Missed Assignments and Tests**

There will be no make-up tests or assignments. No additional assignments or work will be assigned to improve the marks. Students will receive a mark of zero on a missed test without UW verification of illness form. For students who submit the verification of illness form, the weight of the missed test will be shifted to the final examination. The UW verification of illness form must be obtained at the day of the exam and submitted within 3 days after the exam.

There is no make up for missed homework sets. Students are responsible from turning the assignments in during the class time at the due date. Assignments slipped under the office door or sent electronically will not be accepted. Late assignments are not accepted under any circumstance. The lowest one homework score will not count to allow for poor performance and absences due to illness.

- You must write at least one of the two midterm exams to pass the course.
- No deferred final exam will be provided for students who missed all the exams (including the final exam) in this course.

### **Course Modification Warning**

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check his/her Waterloo email and course website on LEARN daily during the term and to note any changes.

### **Electronic Device Policy**

Cell phones, pagers, and other electronic devices must be either turned off or muted during classes.

Laptops are permitted in class for note-taking and in-class activities only. Students using laptops in class for other purposes may be asked to leave the classroom. Consistent abuse of the laptop policy in class will negatively affect the participation grade.

## **Institutional-required statements for undergraduate course outlines approved by Senate Undergraduate Council.**

### **Economics Department Deferred Final Exam Policy**

Deferred Final Exam Policy found at <https://uwaterloo.ca/economics/current-undergraduates/policies-and-resources/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.

**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](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71) (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71>)

**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](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70) (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>), Section 4.

**Appeals:** A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read [Policy 72 - Student Appeals](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72) (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72>).

### **Other sources of information for students:**

#### [Academic Integrity website \(Arts\)](https://uwaterloo.ca/arts/current-undergraduates/student-support/ethical-behaviour)

<https://uwaterloo.ca/arts/current-undergraduates/student-support/ethical-behaviour>

#### [Academic Integrity Office \(UWaterloo\)](https://uwaterloo.ca/academic-integrity/)

<https://uwaterloo.ca/academic-integrity/>

### **Accommodation for Students with Disabilities**

**Note for students with disabilities:** The [AccessAbility Services](https://uwaterloo.ca/disability-services) office (<https://uwaterloo.ca/disability-services>), located on the first floor of the Needles Hall extension (NH 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.

I wish you a productive semester...

Olivia Mesta