

University of Waterloo
Department of Economics
Econ 311 – Section 1
Mathematical Economics
Spring 2017
Monday and Wednesday, 10-11:20 pm RCH 103

Instructor Information

Instructor: Ryan George

Office: HH 218

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Office Hours: Monday to Thursday 12 noon – 1pm, or by appointment

Email: r22georg@uwaterloo.ca - Include "Econ 311" in the subject line of the message.

T.A. Information

No TA for course.

Course Description

Economics 311 is the second course in a two course sequence representing the core of mathematical economics required for undergraduate students in economics. The objective of this course is to prepare the students for most 400 level economics courses.

Topics include multivariate calculus, constrained and unconstrained optimization of n-variables, comparative statics, integration, techniques for solving difference and differential equations, and optimal control theory – all developed within the context of economic theory.

Course Goals and Learning Outcomes

Through lectures, reading and practice in solving students will obtain:

- An understanding of the tools of optimization used in economic theory
- A basic literacy with regard to modelling dynamics systems;

Required Text

- Hoy, M., Livernois, J., McKenna, C., Rees, R., and Stengos, T., *Mathematics for Economics*, Third Edition, The MIT Press 2011.

One copy of the 8th edition is on reserve in the Dana Porter Library. An additional reference on reserve at Porter is Carl P. Simon and Lawrence Blume, *Mathematics for Economists* (NY: Norton, 1994).

Readings Available on LEARN

- Announcements, lecture summaries, assignments and their solutions, midterm solutions.
- Recommended textbook problems with solutions.

Course Requirements and Assessment

Assessment	Date of Evaluation (if known)	Weighting
Assignments (4 @ 5% each)	TBA	20%
Midterm	June 7 th	35%
Final Examination	Exam Period (scheduled by Registrar's Office)	45%
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Total		100%

Assignments

There will be four assignments over the course of the term. Each will count for 5% of the final grade. The assignments will be posted on LEARN, and due in class. Due dates to be announced. Unless an arrangement has been made with the instructor, *no late assignments will be accepted.*

Midterm Examination

The midterm exam will be **held in class on Wednesday June 7th** . It will test students' proficiency with the material covered in the lectures, assignments and practice problems.

Final Examination

The final exam is comprehensive. The date will be set by the Registrar's Office.

Course Outline (Tentative)

Week	Date	Topic	Readings Due
1	May 1 and 3	1. Review of Multivariate Calculus and Unconstrained Optimization	Ch.10.3, ch. 11.4, 11.6, Ch.12
2	May 8 and 10	2. Optimization subject to Constraints and Concave Programming	Ch. 13.1-2 and 15
3	May 15 and 17	3. Comparative statics	Ch.14.1-2
4	May 23 (Monday schedule on Tuesday) and 24	4. Introduction to Economic Dynamics; Discrete Time Models: Linear First Order Difference Equations 5. Non-Linear First Order Difference Equations	Ch.17, 18 Ch.19
5	May 29 and 31	6. Eigenvalues and Eigenvectors 7. Complex Numbers and Vectors	Ch.10.1,2 Online Appendix; Simon and Blume, <i>Mathematics for Economists</i> , ch.23
6	June 5 and 7	No Class June 5 Midterm June 7	
7	June 12 and 14	8. Systems of Linear Difference Equations	Ch.24.3
8	June 19 and 21	9. Integration	Ch.16
9	June 26 and 28	10. Linear First-Order Differential Equations 11. Non-Linear First-Order Differential Equations	Ch.21 Ch.22
10	July 3 and 5	12. Systems of Differential Equations	Ch.24.1-2
11	July 10 and 12	13. Introduction to Optimal Control Theory	Ch.25
12	July 17 and 19	14. Introduction to Optimal Control Theory	Ch.25
13	July 24	Wrap-up and Final Exam Details	

Missed Work and Accommodation Regarding Assessment

If a student is unable to take a midterm exam for documented reasons, a make-up exam will be offered at an arranged time. ***Please note that students who decide to take an exam cannot be given accommodation after the fact due to illness or personal complicating factors that may have affected their performance.*** If you are not well on the day of an exam it is advisable that you not take the exam and obtain valid documentation of the circumstances of this decision.

Electronic Device Policy

To avoid disruptions to the learning environment handheld devices must be turned off during the lecture and laptops must be used strictly for lecture-related purposes. If a student's use of a laptop becomes a distraction for adjacent students that student will be asked to discontinue its use.

Attendance Policy

Lectures are an important component of the learning process and should be attended regularly.

Faculty of Arts Statements

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 Services

[Mental Health Services](#) aim is to provide holistic programming and services to help you lead a healthy and balanced life. We strive to provide a secure, supportive environment for students of all orientations and backgrounds.

Students suffering from problems with anxiety, depression, problems with sleep, attention, obsessions or compulsions, relationship difficulties, severe winter blues, etc., may make an appointment by phone or in person. Appointments are usually available within two days of initial contact with one of our medical doctors. All contacts are completely confidential.

Contact Health Services

[Health Services Building](#)

Call 519-888-4096 to schedule an appointment

Call 1-866-797-0000 for free 24/7 advice from a health professional

Contact Counselling Services

[Needles Hall Addition, NH 2401](#)

Call 519-888-4567 x 32655 to schedule an appointment

counserv@uwaterloo.ca

Territorial Acknowledgement

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe 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.