ECON*2770: Intro Mathematical Economics
Winter 2025
0.5 Credits

General Course Information

Instructor:	Hong Li
Email	Hong Li
Office Location	*Remote (Teams/Zoom)*
Office Hours	Hong Li
Department/School	Department of Economics and Finance
Class Schedule:	Mon, Wed: 11:30AM - 12:50PM (ROZH, 102 LEC)
Pre-requisites:	Prerequisite(s): ECON*1100, (ECON*1050, or FARE*1040), (1 of MATH*1030, MATH*1080, MATH*1200)
Restrictions:	

Course Description

This course applies the elements of calculus and matrix algebra to simple microeconomic and macroeconomic problems.

Course Learning Outcomes

Upon successfully completing this course, you will:

Develop the following skills:

1) Written Communication

Many questions posed in lectures, midterms, quizzes and practice assignments require economic interpretation of the answers. Students obtain significant experience in developing logical statements about the economic (and mathematical) models and their results.

2) Analytical Problem Solving

The main emphasis of this course is the learning of mathematical tools and their relationship to economic analysis. Students obtain extensive experience in lectures, midterms, quizzes and practice assignments developing their ability to solve problems analytically.

3) Numerical Problem Solving

This course is designed to teach mathematical tools and their relationship to economic analysis. Students obtain extensive experience in lectures, midterms, quizzes and practice assignments

developing their ability to solve problems numerically. These are typically done as examples of more general mathematical models. See point 2) above.

Knowledge and Understanding:

1) Mathematical Techniques and Understanding

The main goal of this course is for students to attain knowledge of mathematical techniques, such as unconstrained optimization in one variable and several variables, constrained optimization, and linear algebra. The expectation is that students not only learn the methods for the purpose of short term recall but to develop a strong understanding of the mathematic principles involved in order to facilitate further learning and application of the material beyond this course in future economics (and other) courses.

2) Economic Modeling

Equally important as the goal in point 1) above, we expect students to attain knowledge of economic modeling in a way that facilitates a deep and critical perspective of proposed economic analysis both in economic courses and more broadly in economic discourse.

Discipline/Professional and Transferable Skills:

Development of mathematical modeling in a way that allows students to understand any business or public sector that uses mathematics in a way to understand decision making important to the organization.

Attitudes and Values

Development of logical and mathematical approaches to understanding how to achieve organizational goals.

Summary of Course Content and Materials

COURSE CONTENT

Review (little economics, mostly math background): student's responsibility

1. Basic arithmetic and algebra: Hoy, et al., Ch 1 (pp. 3 -10)

2. Sets, subsets, functions: Hoy, et al., Ch 2.1 - 2.4 (pp. 11 - 60)

3. Continuity of functions of one variable with economic applications:
Hoy, et al., Ch 4 (pp. 100-126)

Regular course material (more economic examples and applications):

4. Sequences and limits:

Hoy, et al., Ch 3 (pp. 61-99)

5. Derivatives and differential for functions of one variable:

Hoy, et al., Ch 5

6. Unconstrained optimization of functions of one variable:

Hoy, et al., Ch 6 (excluding pp. 217 - 219)

7. Systems of linear equations:

Hoy, et al., Ch 7

8. Matrices:

Hoy, et al., Ch 8

9. Determinants and the inverse matrix:

Hoy, et al., Ch 9

10. Calculus for functions of n-variables:

Hoy, et al., Ch 11.1 - 11.5 (excluding elasticity of substitution pp. 461-463)

11. Optimization of functions of n-variables:

Hoy, et al., Ch 12

12. Constrained optimization:

Hoy, et al., Ch 13 (omit Dual pp. 513 - 514) but include Interpretation of Lagrange multiplier (λ)

Course Assessment

			Associated Learning Outcomes	Due Date/ location
Assessment 1:	30%	One Midterm (20% for each)	LO 1 - 3	*February 12 (in class)*
Assessment 2:	30%	5 Mobius Assignments (best 4 of 5)	LO 1 - 3	*Announced in class*
Assessment 3:	40%	Final Exam	LO 1 - 3	*See exam schedule*
Total	100%			

NOTE: If your final grade exceeds your term work grade (including midterms and Mobius Assignments, then the weighting will change (in your favour) to 30% on term work and 70% on the final exam.

WARNING: Do not become complacent because of this opportunity. Most people do better on the midterms and assignments than they do on the final exam; and falling behind makes it difficult to do well at all in the course.

Teaching and Learning Practices

Lectures Lectures in this course complement the material in the textbook. However, to understand the material well enough to pass this course, it is essential that you also learn the material in the textbook. I will spend my time in lectures discussing the more challenging aspects of the course, leaving the more straightforward material for you to learn by working through the textbook material, including all of the worked examples in the textbook.

Course Resources

Required Text: Lecture Notes

Recommended Text:

***Mathematics for Economics,* 3rd edition, Hoy, Livernois, McKenna, Rees, and Stengos, MIT Press, 2011 (C$177.50) – referred to as Hoy, et al. in this course outline**

Website for MIT Press:
Mathematics for Economics, Third Edition | The MIT Press

Remark: You may also use the 4th edition of *Mathematics for Economics*, it contains some new materials that won't be covered in this course. Website for MIT Press of the 4th edition:

https://mitpress.mit.edu/9780262046626/mathematics-for-economics/

The cost of the textbook is $177.75 (new). There is no restriction that would prevent a student from using a second-hand copy of the textbook.

Other Resources: Assignments are done using the software program Möbius. There is an annual subscription fee for this software which will cover its use for this course and any other course over this academic year that also uses Möbius. This will be explained fully on the first day of classes and through an email to you before then.

Course Policies

Grading Policies

Unless you have discussed an extension well ahead of the due date with the instructor, late penalties of 5% of the total grade earned per day (including weekends) will be assigned to any assessment (i.e. deducted from the total mark). Extensions will only be granted on the basis of valid medical or personal reasons, and need to be requested via email to the instructor as soon as possible. Late assignments will not be accepted once graded assignments have been returned officially to the class at large, unless circumstances permit and alternative arrangements have been made.

Students who find themselves unable to meet course requirements by the deadlines or the criteria expected because of medical or personal reasons, should review the regulations on academic consideration in the Academic Calendar and discuss their situation with the instructor, program counselor or other academic counselor as appropriate.

http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-grds.shtml

Missed Assignments:

A grade of zero will be assigned if you fail to submit an assignment, unless you are ill or have other compassionate reasons. Please read your Undergraduate Calendar for the regulations regarding illness and compassionate grounds. Please note, vacation travel, moving house, or outside work commitments will not be accepted as valid reasons for missing deadlines.

If you have religious observances which conflict with the course schedule or if you are registered with Student Accessibility Services, please contact the course instructor in order to make arrangements for your assessment if appropriate.

University Policies

Academic Consideration

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the

academic calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or see the website: https://wellness.uoguelph.ca/accessibility/

Course Evaluation Information

Please refer to the Blue by Explorance system.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Drop date

The last date to drop one-semester courses, without academic penalty, is **Friday, April 4, 2025.** For regulations and procedures for Dropping Courses, see the Academic Calendar:

https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml