

Huron University College

Department of Economics

Economics 2210 A- Section 550

Mathematical Economics I

Fall 2022

Course Information

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Office Hours: Mondays 2:30 pm - 4:30 pm or by appointment

Lectures: Wednesdays 6:30 pm- 9:30 pm

Classroom: H112

Course Description

This course is designed to provide students with a knowledge of some of the basic mathematical tools used in economic theory. The topics covered are multivariate calculus (focusing on the tools used in economics), concavity and convexity, constrained optimization with more than one choice variable, optimization with inequality constraints, implicit functions and implicit differentiation. Illustrative examples are taken from economics, but the purpose of the course is to teach mathematical methods, not economic theory.

Course Objectives

By the end of the course students are expected to be able to:

- present several economic functions using graphs, including linear and non-linear functions, rational functions, exponential functions, logarithmic functions, and level curves.
- solve simultaneous linear equation systems in economics using matrix inversion and Cramer's rule.
- set up optimal timing problems and solve them using the appropriate techniques
- understand the concepts related to the derivative of implicit functions, slopes of the level curves, homogeneous functions and Euler's theorem, concavity of functions of several variables, properties of Cobb-Douglas and CES functions including elasticity of substitution
- formulate optimization problems in microeconomics, macroeconomics, and business economics.
- formulate constrained optimization problems with equality constraint, inequality constraints, and several constraints.

- interpret the second-order sufficient conditions for optimization techniques using the Hessian and Bordered-Hessian.
- generate comparative statics from optimization problems using various techniques

Prerequisite(s)

Economics 1021A/B and Economics 1022A/B; and 0.5 from Mathematics 1225A/B, Mathematics 1230A/B, Calculus 1000A/B, and 0.5 from Mathematics 1229A/B, Mathematics 1600A/B, Calculus 1301A/B, or Calculus 1501A/B.

Antirequisite(s)

Economics 2141A/B

Class Methods

Classes will be primarily lecture based with some time devoted to discussion and other learning activities.

Course Website

A website on OWL will be used to post materials relating to the course. Any content in the textbook that you will not be tested on is noted in the weekly schedules. It is your responsibility to check OWL daily for class announcements.

Textbooks

- **Required Textbook:**
 - Mathematics for Economists, by C. P. Simon and L. E. Blume. W. W. Norton & Company, 1994. Available at: <https://bookstore.uwo.ca/product/0393957330>
- **Supplementary Reference Textbook:**
 - Mathematics for Economics, by M. Hoy, J. Livernois, C. McKenna, R. Rees, and T. Stengos. The MIT Press, 3rd edition, 2011.
 - Essential Mathematics for Economic Analysis, by K. Sydsæter and P. Hammond. FT Prentice Hall, 3rd edition, 2008.
 - “Fundamental Methods of Mathematical Economics”, by A.C. Chiang and K. Wainwright. McGraw-Hill, 4th edition, 2004.
 - Economist’s Mathematical Manual, by K. Sydsæter, P. Berck, and A. Strøm. Springer, 4th edition, 2005.

Note: Additional readings may be assigned.

Course Outline

The outline below lists the topics that we will cover, and the related readings in the text. Where there are exclusions to the chapter readings, I will note them during the term on OWL.

1. Part I: Introduction
 - Introduction (Ch. 1)
 - One Variable Calculus: Foundations (Ch. 2)
 - One Variable Calculus: Applications (Ch. 3)
 - One Variable Calculus: Chain Rule (Ch. 4)
 - Exponents and Logarithms (Ch. 5)
2. Part II: Linear Algebra
 - Introduction to Linear Algebra (Ch. 6)
 - Systems of Linear Equations (Ch. 7)
 - Matrix Algebra (Ch. 8)
 - Determinants: An Overview (Ch. 9)
3. Part III: Calculus of Several Variables
 - Calculus of Several Variables (Ch. 14)
 - Implicit Functions and Their Derivatives (Ch. 15)
4. Part IV: Optimization
 - Unconstrained Optimization (Ch. 17)
 - Constrained Optimization I: First Order Conditions (Ch. 18)
 - Constrained Optimization II (Ch. 19)
5. Part V: Eigenvalues and Dynamics
 - Ordinary Differential Equations: Scalar Equations (Ch. 24)
 - Ordinary Differential Equations: Systems of Equations (Ch. 25)

Please note that I reserve the right to make modifications to the list of contents as the term proceeds.

Course Evaluation

The assessment in this course will be based on the following:

3 Assignments (10% each)	30%
Assignment 1 (Sep 28–Oct 5)	
Assignment 2 (Oct 19–Oct 26)	
Assignment 3 (Nov 23–Nov 30)	
Midterm Examination (Nov 9)	25%
Final Examination	45%
	<hr/>
	100%

- Each assignment will consist of various analytical questions intended to support and reinforce students' comprehension of the course material, and to provide an indication of the type of questions that will be on the exams. As such, students are encouraged to treat each assignment as a critical learning opportunity. While students are permitted to discuss the assignment material with classmates, each student must ensure that their submitted work is their own. Please see the statement on plagiarism below.

- There will be no make-up tests for the missed assignments and mid-term examinations. Failure to write the midterm exams without proper documentation will result in a grade of zero. A student who misses a test or assignment must provide documentation to the counseling office (not the professor) and if this documentation is accepted as a valid reason for missing a test then (and only then) the weight of the missed test will be reallocated to the final exam. This is the only method of accommodation for missed tests and assignments that will be used in this course.
- The final exam covers all material. It will be held during the December Examination Period as scheduled by the University.

Communication:

- All course materials and announcements will be posted on OWL. Please visit the portal often.
- Office hours are a perfect opportunity to approach me and discuss course material. Think of my office hours as an opportunity to receive free tutoring each week. If you cannot attend office hours due to a course conflict, you can email me and we schedule a mutually agreeable time to meet.
- I will usually respond to email within a day (except on weekends and holidays). However, I will only read emails sent through a UWO account for record-keeping and identification purposes. Please put "ECON2210A" in the message title or your email may be caught by my spam filter.
- I will only respond to email posing questions that can be answered in a sentence or two; otherwise you should see me during my office hours.

Satisfactory Performance Criteria:

Students must fulfill all of the preceding course requirements in order to achieve a passing grade. No course grades are final until approved by the Faculty Dean. Application to write a deferred final examination must be made to the Registrars Office. Students must fulfill all of the preceding course requirements in order to achieve a passing grade.

Regrading:

Students seeking reappraisal of their graded assignment or mid-term examination should contact the instructor within a week after they receive their grades. Students are required to send e-mail to the instructor with the subject "ECON2210A-REQUEST FOR REGRADING" explaining the reason(s) for requesting a reappraisal of their graded work.

Note: Reappraisals that do not conform to this standard will not be considered.

Treatment of Course Materials

Student, teaching, assignment or professor materials created for this course (including but not limited to lecture slides, presentations and posted notes, labs, case studies, assignments, exams and solutions to assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and **may not be reproduced or redistributed without prior written consent of the author(s)**.

Appendix to Course Outlines: Academic Policies & Regulations Fall/Winter 2022

Pandemic Contingency

Huron will continue to follow the guidance of public health and government officials. It is anticipated that there will be no further disruptions to in-person instruction. This is subject to change.

Student Code of Conduct

Membership in the community of Huron University College and Western University implies acceptance by every student of the principle of respect for the rights, responsibilities, dignity and well-being of others and a readiness to support an environment conducive to the intellectual and personal growth of all who study, work and live within it. Upon registration, students assume the responsibilities that such registration entails. While in the physical or online classroom, students are expected to behave in a manner that supports the learning environment of others. Please review the Student Code of Conduct at:

<https://huronatwestern.ca/sites/default/files/Res%20Life/Student%20Code%20of%20Conduct%20-%20Revised%20September%202019.pdf>.

Prerequisite and Antirequisite Information

Students are responsible for ensuring that they have successfully completed all course prerequisites and that they have not completed any course antirequisites. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Attendance Regulations for Examinations

A student is entitled to be examined in courses in which registration is maintained, subject to the following limitations:

- 1) A student may be debarred from writing the final examination for failure to maintain satisfactory academic standing throughout the year.
- 2) Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course will be reported to the Dean of the Faculty offering the course (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course. The Dean of the Faculty offering the course will communicate that decision to the Dean of the Faculty of registration.

Review the policy on Attendance Regulations for Examinations here: [Academic Calendar - Western University \(uwo.ca\)](https://www.uwo.ca/academic_calendar/western/index.html)

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website: [Academic Calendar - Western University \(uwo.ca\)](https://www.uwo.ca/academic_calendar/western/index.html). The appeals process is also outlined in this policy as well as more generally at the following website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/appealsundergrad.pdf.

Turnitin.com

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Statement on Use of Electronic Devices

It is not appropriate to use electronic devices (such as, but not limited to, laptops, tablets, cell phones) in the classroom for non-classroom activities. Such activity is disruptive and distracting to other students and to the instructor, and can inhibit learning. Students are expected to respect the classroom environment and to refrain from inappropriate use of technology and other electronic devices in class.

Statement on Use of Personal Response Systems (“Clickers”)

Personal Response Systems (“clickers”) may be used in some classes. If clickers are to be used in a class, it is the responsibility of the student to ensure that the device is activated and functional. Students must see their instructor if they have any concerns about whether the clicker is malfunctioning. Students must use only their own clicker. If clicker records are used to compute a portion of the course grade:

- the use of somebody else’s clicker in class constitutes a scholastic offence
- the possession of a clicker belonging to another student will be interpreted as an attempt to commit a scholastic offence.

Academic Consideration for Missed Work

All students pursuing academic consideration, regardless of type, must contact their instructors no less than 24 hours following the end of the period of absence to clarify how they will be expected to fulfill the academic responsibilities missed during their absence. **Students are reminded that they should consider carefully the implications of postponing tests or midterm exams or delaying submission of work, and are encouraged to make appropriate decisions based on their specific circumstances.**

Students who have conditions for which academic accommodation is appropriate, such as disabilities or ongoing or chronic health conditions, should work with Accessible Education Services to determine appropriate forms of accommodation. Further details concerning policies and procedures may be found at:

<http://academicsupport.uwo.ca/>.

Policy on Academic Consideration for a Medical/ Non-Medical Absence

- (a) **Consideration on Medical Grounds for assignments worth *less than 10%* of final grade:
Consult Instructor Directly and Contact Academic Advising**

When seeking consideration on **medical grounds** for assignments worth *less than 10%* of the final course grade, the student should contact the instructor directly. The student need only share broad outlines of the medical situation. The instructor **may** require the student to submit documentation to the academic advisors, in which case she or he will advise the student and inform the academic advisors to expect documentation. If documentation is requested, the student will need to complete and submit the [Student Medical Certificate](#). The instructor may **not** collect medical documentation. The advisors will contact the instructor when the medical documentation is received, and will outline the severity and duration of the medical challenge as expressed on the Student Medical Certificate and in any other supporting documentation. The student will be informed that the instructor has been notified of the presence of medical documentation, and will be instructed to work as quickly as possible with the instructor on an agreement for accommodation.

b) Medical Grounds for assignments worth 10% or more of final grade: Go Directly to Academic Advising

University Senate policy, which can be found at [Academic Calendar - Western University \(uwo.ca\)](https://www.uwo.ca/academic_calendar) requires that all student requests for accommodation on medical grounds for assignments worth 10% or more of the final grade be made directly to the academic advising office of the home faculty (for Huron students, the “home faculty” is Huron), with supporting documentation in the form (minimally) of the Senate-approved Student Medical Certificate found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

The documentation is submitted in confidence and will not be shown to instructors. The advisors will contact the instructor when the medical documentation is received, and will outline the severity and duration of the medical challenge as expressed on the Student Medical Certificate and in any other supporting documentation. The student will be informed that the instructor has been notified of the presence of medical documentation, and will be instructed to work as quickly as possible with the instructor on an agreement for accommodation. The instructor will not normally deny accommodation where appropriate medical documentation is in place and where the duration it describes aligns with the due date(s) of assignment(s). Before denying a request for accommodation on medical grounds, the instructor will consult with the Dean. The instructor’s decision is appealable to the Dean.

c) Consideration on Non-Medical Grounds: Consult Huron Support Services/Academic Advising, or email huronsss@uwo.ca.

Students seeking academic consideration for a **non-medical** absence (e.g. varsity sports, religious, compassionate, or bereavement) will be required to provide appropriate documentation. All consideration requests must include a completed [Consideration Request Form](#). Late penalties may apply at the discretion of the instructor.

Please review the full policy on Academic Consideration for medical and non-medical absence at: [accommodation_medical.pdf \(uwo.ca\)](#). Consult [Huron Academic Advising](#) at huronsss@uwo.ca for any further questions or information.

Support Services

For advice on course selections, degree requirements, and for assistance with requests for medical accommodation, students should email an Academic Advisor in Huron’s Student Support Services at huronsss@uwo.ca. An outline of the range of services offered is found on the Huron website at: <https://huronatwestern.ca/student-life/student-services/>.

Department Chairs, Program Directors and Coordinators are also able to answer questions about individual programs. Contact information can be found on the Huron website at: <https://huronatwestern.ca/contact/faculty-staff-directory/>.

If you think that you are too far behind to catch up or that your workload is not manageable, you should consult your Academic Advisor. If you are considering reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines. Please refer to the Advising website, <https://huronatwestern.ca/student-life/student-services/academic-advising/> or review the list of official Sessional Dates on the Academic Calendar, available here: <https://www.westerncalendar.uwo.ca/SessionalDates.cfm>.

You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. Note that dropping a course may affect OSAP and/or Scholarship/Bursary eligibility.

Huron Student Support Services: <https://huronatwestern.ca/student-life/student-services/>

Office of the Registrar: <https://registrar.uwo.ca/>

Student Quick Reference Guide: <https://huronatwestern.ca/student-life/student-services/#1>

Academic Support & Engagement: <http://academicsupport.uwo.ca/>

Huron University College Student Council: <https://huronatwestern.ca/student-life/beyond-classroom/hucsc/>

Western USC: <http://westernusc.ca/your-services/#studentservices>

Wellness and Health Supports at Huron and Western

University students may encounter setbacks from time to time that can impact academic performance. Huron offers a variety of services that are here to support your success and wellbeing. All Huron staff and faculty have received training on responding to disclosures of Gender-Based Sexual Violence (GBSV); students should know that the Community Safety Office is a resource for survivors, providing support and, if desired, guidance while referring them to the further supports that they may require. Please visit <https://huronatwestern.ca/student-life-campus/student-services/wellness-safety> for more information or contact staff directly:

Wellness Services: huronwellness@huron.uwo.ca

Community Safety Office: safety@huron.uwo.ca

Additional supports for Health and Wellness may be found and accessed at Western through, <https://www.uwo.ca/health/>.

Western Calendar - Policy Pages -

[Academic Calendar - Western University \(uwo.ca\)](#)