

Principles of Mathematical Economics I
ECONOMICS 2141B-001
Department of Economics
Western University

January 2023

General Information:

Instructor: Mohammad Iftekher Hossain
Office: 4081 SSC
Phone: 519-661-2111 ext. 85054
E-mail: mhossa87@uwo.ca
Office hours: W 10:30 am – 12:30 pm, In Person, Room: SSC 4081
Lectures: **In Person**, M 3:30 - 4:30, SSC 2020
W 2:30 - 4:30, SSC 2024
Course website: <https://owl.uwo.ca/portal>
Undergraduate inquiries: 519-661-3507 or SSC Room 4075 or econugrd@uwo.ca

Registration:

You are responsible for ensuring you are registered in the correct courses. If you are not registered in this course, the Department will not release any of your marks until your registration is corrected. You may check your timetable by using the Login on the Student Services website at <https://student.uwo.ca>. If you notice a problem, please contact your home Faculty Academic Counsellor immediately.

Prerequisite Note:

Antirequisite(s): Economics 2210A/B.

Prerequisite(s): Economics 1021A/B and Economics 1022A/B, or Economics 2001A/B, and 0.5 course from: Mathematics 1225A/B, Calculus 1000A/B, Calculus 1500A/B; plus 0.5 course from Calculus 1301A/B, Calculus 1501A/B, Mathematics 1229A/B, Mathematics 1600A/B. *Prerequisite(s) for your course can be found in the Western Calendar at:* <http://westerncalendar.uwo.ca/Courses.cfm?Subject=ECONOMIC&SelectedCalendar=Live&ArchiveID>

You are responsible for ensuring that you have completed all course prerequisites and that you have not taken any anti-requisite courses. Lack of prerequisites may not be used as a basis for appeal. If you are found to be ineligible for a course, you may be removed from it at any time, and you will receive no adjustment to your fees. This decision cannot be appealed.

If you find that you do not have the course prerequisites, it is in your best interest to drop the course well before the end of the add/drop period. Your prompt attention to this matter will not only help protect your academic record but will ensure that spaces become available for students who require the course in question for graduation.

Course Objectives:

This course introduces some frequently used mathematical tools in economics and business economics and discusses various examples of how these mathematical tools are relevant in economic analysis in everyday life. The course covers calculus and matrix algebra, unconstrained optimization, and constrained optimization techniques with equality and inequality constraints, and applications of these tools in economic theories such as consumer and producer theories, equilibrium in competitive and non-competitive markets, comparative statics, and national income accounting, etc.

Course Learning Outcomes:

After successful completion of the course, students can:

- Present several economic functions using graphs, including linear and non-linear, rational, exponential, and logarithmic functions.
- 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
- Formulate optimization problems in microeconomics, macroeconomics, and business economics.
- Formulate constrained optimization problems with equality constraints, 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.

Recommended Books

Simon, Carl P., and Blume, Lawrence, Mathematics for Economists, Norton & Company, 1994
Lana-Levano, Schaum's Outline of Calculus for Business, Economics and Finance, Fourth Edition, McGraw-Hill, 2021

For the recommended books, please visit the Book Store link:

https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2022B&courses%5B0%5D=001_UW/ECO2141B

Web Materials:

https://economics.uwo.ca/undergraduate/undergraduate_resources/math_resources_for_ec_2100_required_courses_.html

Essential Resources

Lecture notes: All pdf notes are available at OWL, Resources.

Practice questions: Practice questions and answer keys will be available with the progression of the course

Online resources:

https://economics.uwo.ca/undergraduate/undergraduate_resources/math_resources_for_ec_2100_required_courses_.html

All parts of these online resources are necessary for this course.

Resources (OWL): This tool at OWL contains all lecture notes, practice questions, and other related materials.

In-Person Classes: I strongly recommend attending all in-person classes. I will not record in-person classes, and there are no perfect substitutes for in-person classes.

Assessments and Grading:

Your grade point is the total points (out of 100) that you will earn in this course when the semester ends. **Please see the weight below.**

<i>Exam</i>	Date and Time* (Tentative)	Covers (Tentative)	Weight
Midterm Exam 1 (IN-PERSON)	February 08, 2:30 - 3:30	One variable calculus	24%
Midterm Exam 2 (IN-PERSON)	March 15, 2:30 – 3:30	Multivariable calculus	24%
Final Exam (IN-PERSON)	TBA	Cumulative	50%
Class participation/ classwork**	Please see the course schedule		2%

* All dates and times are tentative, as Exam Central must approve them. I will notify you when Exam Central confirms the exam date and time. The Registrar's Office will set the date and time for the final exam. All times are ET.

** I will arrange **ONE review session/ classwork** before each Midterm exam. The review sessions/ classwork are designed to discuss and help you with important topics before Midterm exams. You must attend and participate in these two sessions to get the marks for class participation. **If a student cannot attend both review sessions, the weight of 2% for class participation/ classwork will automatically be allocated to the final exam. Approval from the Academic Counselor is not required if you miss the review session/ classwork.**

Exam Method: Midterm and final exams are in-person, closed-book exams. Note that the assessment dates, times, and methods may change if classes move to online status.

Exam Duration: The duration of each midterm exam is 60 minutes. The duration of the final exam is 120 minutes.

Exam Format: Written responses and questions require calculations

During exams, you may have pens, pencils, a ruler, erasers, your student card, and a non-graphing, non-programmable calculator out of its case at your desk. All other items, including watches and cell phones, must be left in your bag at the front of the examination room.

Policy Regarding Missed Exams:

Midterm Exams

There will be no make up exams for the missed midterm exams.

If you know in advance that you cannot attend a midterm exam, you must take your documentation to Academic Counselling before that exam. If you miss a midterm exam, you must take your documentation to Academic Counselling within 48 hours of the exam. You must meet the 48 hours deadline; otherwise, the instructor will assign a grade of zero. **If your Academic Counselling accepts your documentation, then the percentage for the missed exam will be allocated to your final exam.**

Please note that students are required to submit their documentation to Academic Counseling for their approval, not to the instructor.

Final Exam

The final exam will cover material from the entire term. Students who miss the final exam must take their documentation to Academic Counselling and notify the instructor within 24 hours. **Once your Academic Counselling approves your documentation for the missed Final exam, there will be a makeup date set by the Department. The makeup may differ in length and format from the originally scheduled exam.**

Students who miss any assessment must follow Western University's procedures to approve their absence to receive accommodation. If a student does not get approval from Academic Counselling for a missed exam, the instructor will assign a grade of zero for that exam.

Course Schedule (Tentative):

Please see the tentative course schedule below.

Week 1, Review

Week 2, One variable calculus: foundations

Week 3, One variable calculus: applications

Week 4, One variable calculus: applications in economics

February 06, Review Session/ Classwork

February 08, Midterm 1

Week 6, Functions of several variables: foundations

Reading Week

Week 7, Functions of several variables: applications, Unconstrained optimization of multivariable functions

Week 8, Constrained optimization of multivariable functions

March 13, Review Session/ Classwork

March 15, Midterm 2

Week 10, Linear Algebra

Week 11, Uses of Hessian matrix and Bordered Hessian matrix

Week 12, Constrained optimization: inequality constraints

Week 13, Review

TBA: Final Exam, Cumulative

Professionalism, Privacy, and Copyright:

- Students are expected to follow the [Student Code of Conduct](#).
- All lectures and course materials, including slides, presentations, outlines, and similar materials, are protected by copyright. Students may take notes and make copies of course materials for their own educational purposes only.
- Students may not record lectures, reproduce (or allow others to reproduce), post or distribute lecture notes, assessments, or any other course materials publicly and/or for commercial purposes without written consent.
- Recordings (audio or video) are not permitted without explicit written permission. Permitted recordings may not be distributed or shared.

Please Note

Department and University Policies for Winter 2023

The University expects all students to take responsibility for their own Academic Programs. Students should also check their registration to ensure they are enrolled in the correct courses.

1. **Guidelines, policies, and your academic rights and responsibilities** are posted online in the current Western Academic Calendar at: <http://westerncalendar.uwo.ca>. Claiming that "you didn't know what to do" is not an acceptable excuse for not following the stated policies and procedures.
2. Students must familiarize themselves with the "**Rules of Conduct for Examinations**" http://www.uwo.ca/univsec/pdf/academic_policies/exam/administration.pdf.
3. **Cheating as an academic offence:** Students are responsible for understanding what it means to "cheat." The Department of Economics treats cheating incidents very seriously and will investigate any suspect behavior. Students found guilty will incur penalties that could include a failing grade or being barred from future registration in other Economics courses or programs. The University may impose further penalties such as suspension or expulsion.
4. **Plagiarism:** Students must write their essays and assignments in their own words. When taking an idea/passage from another author, it must be acknowledged with quotation marks where appropriate and referenced with footnotes or citations. Plagiarism is an academic offence (see Scholastic Discipline for Undergraduate Students in the Western Calendar at http://westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_20).

Western University uses software to check for plagiarism and students may be required to electronically submit their work. Those found guilty will be penalized as noted in point 3.

5. It is a Department of Economics policy that **NO** assignments be dated, stamped, or accepted by staff. Students must submit assignments to the instructor.
6. **Appeals:** University policies and procedures for appealing a mark can be found in the Student Academic Appeals section in the current Western Academic Calendar at: http://westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_14. **Please note the relevant deadlines.**

Department of Economics procedures for appealing a mark can be found here: https://economics.uwo.ca/undergraduate/program_counselling/responsibilities_policies.html#appeals. The Department will not consider an appeal unless an attempt has been made to settle the matter with the instructor first. Students who remain dissatisfied with the outcome may proceed to submit an appeal to econugrd@uwo.ca. Please follow the instructions and use the appeal form shown in the above link.

7. **Systematic adjustments of a class grade distribution** (either up or down) can occur in Economics courses. The fact that grades have been adjusted is **not** grounds for an appeal.
8. Note the following **add and drop deadlines**:
 - Deadline to add a second term half course: **Tuesday, January 17, 2023**
 - Deadline to drop a second term half course: **Tuesday, March 7, 2023**

Policy Regarding Makeup Tests and Final Examinations

Faculty of Social Science policy states that oversleeping or misreading an exam schedule is NOT grounds for a makeup. This rule applies to midterm and final exams in the Department of Economics.

Policies Regarding Academic Accommodation

- Academic accommodation will not be granted automatically on request. Students must demonstrate by documentation that there are compelling medical or compassionate grounds before academic accommodation will be considered. The Faculty of Social Science's policies on academic accommodation are found at https://counselling.ssc.uwo.ca/procedures/academic_consideration.html
- **Accommodation for Students with Disabilities:** Students with disabilities or accessibility challenges should work with Accessible Education (formerly SSD, see http://academicsupport.uwo.ca/accessible_education/index.html), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: [Academic Accommodation for Students with Disabilities](#).
- **Rewriting Exams and Retroactive Reweighting are NOT Permitted:** Students who proceed to write a test or examination must be prepared to accept the mark. Rewriting tests or examinations, or retroactive reweighting of marks, is **not** permitted. Students must also book travel arrangements AFTER final exam dates have been posted as they must not conflict with tests or final exams.
- Unless medically incapable of doing so, students must notify their instructor prior to the test date or at least within **24 hours** when requesting a makeup exam. Failure to follow this procedure may result in denial of academic accommodation and a grade of zero. Students should also set up an appointment as soon as possible to meet with their instructor. If the instructor is not available, send an email message to the instructor, copying the Undergraduate Coordinator at econugrd@uwo.ca. **Notifying instructors of a missed exam does not automatically entitle students to a makeup.**

- For medical illnesses, students may consult Student Health Services and request a Student Medical Certificate from the physician. If assessed by an off-campus doctor, students must obtain a certificate from his/her office at the time of the visit/assessment. Student Medical Certificate (SMC) is available here:

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

- **Documentation for Accommodation:** Individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds or for other reasons.
- **Western University policy on Consideration for Student Absence** is available here: https://counselling.ssc.uwo.ca/procedures/probation_rtw/appeals.html
- **Religious Accommodation:** Students should consult the University's list of recognized religious holidays and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the [Western Multicultural Calendar](#).

Policy Regarding Class Attendance and Engagement:

If the instructor deems a student's attendance or engagement in the class to be unsatisfactory, that student may be prohibited from writing the final examination. Examples of unsatisfactory class engagement include frequent absences from an in-person or synchronous online class, lack of assignment submissions, and inadequate use of online course materials. Instructors who intend to make use of this policy will notify the student in advance.

Statement on Mental Health and Support Services:

Students under emotional/mental distress should visit http://uwo.ca/health/mental_wellbeing/ for more information and a complete list of resources on how to obtain help.

Statement on Remote Proctoring:

While Western intends to hold most classes, mid-terms, and finals in person, the London-Middlesex Health unity may require western to teach in a remote format. If this occurs, all assessments will be done remotely and may involve the use of remote proctoring software (i.e., Proctorio, ProctorTrack). Instructors will provide information on the details should the need arise.