

MATHEMATICAL ECONOMICS

EC2141A-650

Department of Economics

Western University

September 2021

General Information:

Instructor: Mohammad Iftekher Hossain
Office: 4082 SSC
Phone: 519-661-2111 ext. 87963
E-mail: mhossa87@uwo.ca
Office hours: Thursday 11:00 am – 1.00 pm (ET)
Zoom meeting IDs and passwords for office hours will be available for authenticated users (UWO accounts) at OWL every week.
Email office hours: Thursday 1:00 pm – 3:00 pm (ET)

Delivery mode: Online
(Textbook, Online Resources, PPTs, Prerecorded videos, Review Sessions)

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 (i) introduces some frequently used mathematical tools in economics and business economics, and (ii) 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, logarithmic function.
- 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.

Textbook(s):

Simon, Carl P., and Blume, Lawrence. 1994. Mathematics for Economists. Norton & Company

Recommended:

Edward T. Dowling, Introduction to Mathematical Economics, Third Edition, McGraw-Hill, 2001

Teresa Bradley, Essential Mathematics for Economics and Business, Fourth Edition, Wiley, 2013

Web Materials:

https://economics.uwo.ca/undergraduate/undergraduate_resources/math_resources_for_ec_2100_required_courses.html

For the textbook and the recommended books, please visit the book Store

link: https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2021A&courses%5B0%5D=650_UW/ECO2141A

Essential Resources

PPTs: All PPTs will be available through OWL before the commencement of the semester.

VoiceThreads (VTs): It is a tool available at OWL. I will upload prerecorded videos at VTs explaining the key concepts in every topic 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 required for this course.

Review Sessions (Zoom): I will arrange some review sessions using Zoom before every test/exam. Instructions about how to join the review sessions will be announced in due time. Attending the review sessions is optional. After the review sessions, I will email the questions discussed and detailed answers to all of you.

Resources (OWL): This tool at OWL contains all PPTs, sample questions, and other related materials.

Tests & Quizzes/ Assignment (OWL): I will use these two tools to administer all tests and quizzes.

Forum (OWL): Please use the Forum to discuss course-related content. The Forum is an important tool for students' discussions and an opportunity to connect and work together.

Technical Requirements

- Laptop or computer
- Stable internet connection
- Microphone and Webcam
- Scanner/ Smartphone

Important Instructions

- You should check the course website (OWL) every 24-48 hours.
- I will provide a weekly update about readings, VoiceThreads, office hours, exams at the beginning of every week.
- Please use the OWL "messages" tool to email me and teaching assistant(s).
- I monitor the emails daily; you will receive a response in 24 – 48 hours. However, I recommend you use my office hours regularly and **email me during my email office hours (Thursday 1:00 pm – 3:00 pm)**.
- This course will use the **OWL forum** for discussions. Please use the OWL forum to discuss course-related content.

Assessments and Grading:

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

<i>Exam</i>	<i>Available at*</i> (Tentative)	<i>Closes at *</i> (Tentative)	<i>Covers</i> (Tentative)	<i>Weight</i>
Assignment 1**	07-Oct, 9:00 am	08-Oct, 9:00 pm	One variable calculus	4%
Midterm Exan	14-Oct, 7:00 pm	14-Oct, 8:30 pm	One variable calculus	31%
Assignment 2	11-Nov, 9:00 am	12-Nov, 9:00 pm	Calculus of several variables	5%
Assignment 3	02-Dec, 9:00 am	03-Dec, 9:00 pm	Matrix Algebra	5%
Final Exam	TBA	TBA	Cumulative,	53%
Participation in the review sessions/ office hours/ submission of a short essay/tasks (TBA)				2%

* All dates and times are strictly based on the Time zone in London, ON. When the Registrar's office confirms the date and time for the tests/ exams, I will notify you earliest. The availability period for the

midterm exam is 90 minutes, and the duration is 75 minutes. The duration of the final exam is 2 hours. All tests will be administered using the "Tests & Quizzes/ Assignment" tool at OWL.

** Assignment questions will be available at the beginning of the assigned week through the Assignment tool at OWL and to be submitted through the Assignment/ Tests & Quizzes tool at OWL within the given time.

Tests/ exams are open-book tests/ exams. Tests will be a mixed format. Although the tests/ exams are open-book, to do well, students should prepare for the tests/ exams as they do for the closed-book tests/ exams. **Any form of collaboration during the exams is strictly prohibited; the Department will take appropriate measures if there is any evidence of collaboration.**

Policy Regarding Missed Exams:

Students with approved absences from the midterm exam will have the weight of the missed exam reallocated to the final exam. **Please remember that the final exam is cumulative, and, therefore, the difficulty level in the final exam is much higher than the midterm exams.**

Students who have an approved absence from the final exam will write a makeup exam that may differ in format from the original final exam and will be proctored using Zoom. The exam format in the make up exam will also be different from the regular exam, and will, therefore, be much harder.

Students who miss any assessment (Tests and the Final Exam) must follow Western University's procedures for approval of their absence to receive accommodation.

Course Schedule (Tentative):

Please see the course schedule below. If there is any change in this schedule, students will be notified in due time using the "Announcement" tool available at OWL

Date*	Recommended readings/ tasks
07-Sep – 10-Sep	Explore course outline, Textbook, Resources, Introduction to Mathematical Economics
13-Sep – 17-Sep	One variable calculus: foundations
20-Sep – 24-Sep	One variable calculus: applications
27-Sep – 01-Oct	Exponents and Logarithms
07-Oct – 08-Oct	Assignment 1: One variable calculus
TBA, In the week of 11-Oct	Review Session (Zoom)
14-Oct, 7:00 pm (Tentative)	Midterm Exam - One variable calculus
18-Oct – 22-Oct	Functions of several variables
25-Oct – 29-Oct	Unconstrained optimization of multivariable functions
Reading week	
08-Nov – 12-Nov	Constrained optimization: equality constraints
11-Nov – 12-Nov	Assignment 2: Calculus of multivariable functions
15-Nov – 19-Nov	Constrained optimization: applications in economics
22-Nov – 26-Nov	Matrix algebra
02-Dec – 03-Dec	Assignment 3: Matrix algebra: applications
TBA, in the week of 04-Dec	Review Session (Zoom), Submission of a short-essay/ tasks
06-Dec – 08-Dec	Review
TBA: Final Exam	Cumulative

* Dates mentioned for the online tests are tentative. If there is any change in this tentative schedule, students will be notified through the "Announcement" tool available at OWL.

Tips on How to Be Successful in this Class:

- Please make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
- Follow weekly checklists announced at OWL or create your own to help you stay on track.
- Treat this course as you would a face-to-face course. Take notes as you go through the lesson material. Keeping handwritten notes or notes in a regular Word document will help you learn more effectively than just reading or watching.
- Do not be afraid to ask questions. If you have questions or are struggling with a topic, check the online discussion boards or contact me and or teaching assistant(s).

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 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 & University Policies for Fall 2021

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 first term half course:
Deadline to drop a first term half course:

Thursday September 16, 2021
Friday November 12, 2021

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

- The Faculty of Social Science's policies on academic accommodation are found at http://counselling.ssc.uwo.ca/procedures/having_problems/index.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. Self-Reported Absences cannot be used once a student has proceeded to start to write a test or exam.
- **Self-Reported Absences:** Students will have two opportunities during the fall and winter terms to receive academic consideration if they self-report a missed assessment using the online self-reported absence portal, provided the following conditions are met: the assessment is missed due to an absence of no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted otherwise on the syllabus. Students are not able to use the self-reporting option in the following circumstances:
 - for exams scheduled by the Office of the Registrar (e.g., final exams)
 - absence of a duration greater than 48 hours
 - assessments worth more than 30% of the student's final grade
 - if the student has opened or started the test or exam
 - if a student has already used the self-reporting portal twice during the fall/winter terms

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate (SMC) if the absence is medical or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office for more information about the relevant documentation. It is strongly recommended that students notify the instructor as soon as possible, ideally before the assessment, when they become aware of an absence. University policy is that students must communicate with their instructors no later than 24 hours after the end of the period covered by the SMC or immediately upon their return from their documented absence. Failure to follow University policy and procedures may result in denial of academic accommodation and a grade of zero.

- **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. **All required documentation for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**
- **Western University policy on Consideration for Student Absence** is available here: [Policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs.](#)
- **Student Medical Certificate (SMC):** This form is available here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.
- **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.