

PRINCIPLES OF MATHEMATICAL ECONOMICS  
EC2141B-001  
Department of Economics  
Western University

January 2021

**General Information:**

**Instructor:** Mohammad Iftekher Hossain  
**Office:** 4082 SSC  
**Phone:** 519-661-2111 ext. 87963  
**E-mail:** mhossa87@uwo.ca  
**Office hours:** Thursday 10:00 am – 1.00 pm (ET)  
Zoom meeting IDs and passwords for the office hours will be available for authenticated users (UWO accounts) at OWL every week.

**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](mailto: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 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.

## 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](https://economics.uwo.ca/undergraduate/undergraduate_resources/math_resources_for_ec_2100_required_courses_.html)

For the textbook and the recommended books, please visit:

ECO2141B [https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2020B&courses%5B0%5D=001\\_UW/ECO2141B](https://bookstore.uwo.ca/textbook-search?campus=UWO&term=W2020B&courses%5B0%5D=001_UW/ECO2141B)

## 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.

**Practice Test/ Assignment:** Before every test, I will arrange a Practice test/Assignment. Practice Tests will offer you opportunities to do practice, and it will also make you familiar with the question patterns in the upcoming tests. **4 practice tests/ assignments will carry 10% weights.**

**Online resources:** The following online resources will be used in this course:

[https://economics.uwo.ca/undergraduate/undergraduate\\_resources/math\\_resources\\_for\\_ec\\_2100\\_required\\_courses\\_.html](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 Zoom review sessions before every test/exam. Instructions about how to join the review sessions will be announced in due time. **Attending the review sessions is optional, and no attendance will be recorded.** 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 chapter notes, 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. I regularly follow the Forum

## 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 to use my office hours regularly.
- This course will use the **OWL forum** for discussions. Please use the OWL forum to discuss course-related content.

## Assessments and Grading:

### Grading:

Your grade point is your total points (out of 100) that you will earn in this course when the semester ends. **Two Midterm Exams, Three Practice Tests/ Assignments** and one **Final Exam** will contribute **100%** of the total points (**Please see the weight below**).

<i>Exam</i>	<i>Available at*</i>	<i>Closes at *</i>	<i>Covers</i>	<i>Weight</i>
	(Tentative)	(Tentative)	(Tentative)	
Assignment 1	01-Feb, 9:00 am	05-Feb, 9:00 pm	One variable calculus	3%
Midterm 1	10-Feb, 7:00 pm	10-Feb, 8:30 pm	One variable calculus	20%
Assignment 2	08-Mar, 9:00 am	12-Mar, 9:00 pm	Calculus of several variables	3%
Midterm 2	17-Mar, 7:00 pm	17-Mar, 8:30 pm	Calculus of several variables	20%
Assignment 3	29-Mar, 9:00 am	01-Apr, 9:00 pm	Matrix Algebra	6%
<i>Exam</i>	<i>Available at</i>	<i>Closes at</i>	<i>Covers</i>	<i>Weight</i>
Final Exam	TBA	TBA	Cumulative,	48%

\* 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 as the earliest. The availability period for each midterm exam is 1.5 hours, and the duration of each midterm 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 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.

### Policy Regarding Missed Exams:

Students with approved absence from one midterm exam during the term 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.**

If a student misses more than one midterm exam during the term he/ she must attend a make-up exam for the missed tests which will be proctorhood by zoom. The make-up exam will be arranged after the regular exams and will be closed-book, and, therefore, will be harder.

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 MyLab/ OWL.

<b>Date*</b>	<b>Recommended readings/ tasks</b>
11-Jan – 15-Jan	Explore course outline, Textbook, Resources, Introduction to Mathematical Economics
18-Jan – 22-Jan	One variable calculus: foundations
18-Jan – 22-Jan	One variable calculus: applications
25-Jan – 29-Jan	Exponents and Logarithms
01 Feb – 05 Feb	Assignment 1: One variable calculus
08-Feb, 7:00 pm – 9:00 pm	Review Session (Zoom, Optional)
10-Feb	Midterm 1: One variable calculus
08-Feb – 12-Feb	Unconstrained optimization of functions of several variables
<b>13-Feb – 21-Feb</b>	<b>Reading week</b>
22-Feb – 26 Feb	Unconstrained optimization of functions of several variables
01-Mar – 05 Mar	Constrained optimization: equality constraints
08-Mar – 12-Mar	Constrained optimization: inequality constraints
08-Mar – 12-Mar	Assignment 2: Calculus of several variables
14-Mar, 7.00 pm – 9:00 pm	Review Session (Zoom, Optional)
17-Mar	Midterm 2, Calculus of several variables
22-Mar – 26-Mar	Matrix algebra: applications
29-Mar – 01-Apr	Assignment 3: Matrix algebra: applications
5-Apr – 12-Apr	Economic Applications, Review Session (Zoom, TBA)
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 MyLab and OWL.

\*\* Zoom Meeting ID and Password will be provided for the discussion sessions at the beginning of every week. Only authenticated users (UWO accounts) can join the sessions. The sessions are optional to attend.

### **Tips on How to Be Successful in this Class:**

- Please make it a daily habit to log onto MyLab and OWL to ensure you have seen everything posted to help you succeed in this class.
- Follow weekly checklists created on MyLab/ 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 2020-2021**

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

**Academic Rights and Responsibilities:** Students should be familiar with their “Academic Rights and Responsibilities” as outlined [here](#) in the Western Academic Calendar. Claiming that “you didn’t know what to do” is not an acceptable excuse for not following the stated procedures.

**Guidelines and Policies for Students** are posted online in the current Western Academic Calendar at <http://westerncalendar.uwo.ca>. Undergraduate information for the Faculty of Social Science can be found at: <https://www.ssc.uwo.ca/undergraduate/index.html> and for the Department of Economics at: <https://economics.uwo.ca/undergraduate/index.html>.

**Rules of Conduct for Examinations:** Students are expected to know the university’s Rules of Conduct for Examinations, available [here](#).

**Cheating and Academic Offences:** Students are responsible for understanding what it means to “cheat.” The Department of Economics treats cheating and other academic offences 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 Economics courses or programs. The University may impose further penalties such as suspension or expulsion.

**Plagiarism:** Plagiarism is an academic offence. Students must write their essays and assignments in their own words. Ideas/passages taken from another author must be referenced with footnotes or citations and acknowledged with quotation marks where appropriate. 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. See Scholastic Discipline for Undergraduate Students [here](#) in the Western Academic Calendar.

**Academic Appeals:** Students should refer to the Student Academic Appeals section [here](#) in the Western Academic Calendar. Please note the relevant deadlines.

**Department Appeals Procedures:** 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 submit a written appeal to the Undergraduate Director in Economics, stating the reasons for their appeal. Information on the Department of Economics’ appeals procedure and the appeals form are available [here](#).

**Systematic Adjustments:** Systematic adjustments of class grade distributions (either up or down) can occur in Economics courses. The systematic adjustment of a class grade distribution is **not** grounds for an appeal.

**Add/drop deadlines:**

Deadline to add a second term half course:

**Tuesday January 19, 2021**

Deadline to drop a second term half course:

**Sunday March 14, 2021**

**Oversleeping or Misreading the Exam Schedule:** Faculty of Social Science policy states that oversleeping or misreading the exam schedule is NOT grounds for a makeup. This rule applies to all exams in the Department of Economics.

**End of Term Travel:** Students must book travel arrangements AFTER final exam dates have been posted; travel is not an acceptable excuse for absence from a final exam.

**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.

**Accommodation Policies:** Students with disabilities should work with Accessible Education (formerly SSD), 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](#).

**Academic Consideration for Missed Assessments/Exams due to Student Absence:** Students will have up to two (2) opportunities during the regular academic year to receive academic consideration if they self-report a missed assessment using the online 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., December and April exams)
- absence of a duration greater than 48 hours
- assessments worth more than 30% of the student's final grade
- if a student has already used the self-reporting portal twice during the academic year

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.

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.**

For Western University policy on Consideration for Student Absence, see:  
[Policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs.](#)

For the Student Medical Certificate (SMC), see:  
[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](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/](http://uwo.ca/health/mental_wellbeing/) for more information and a complete list of resources on how to obtain help.