PRINCIPLES OF MATHEMATICAL ECONOMICS 1
ECONOMICS EC 2210B 001
Department of Economics
Western University

January 2019

General Information:

Instructor:	Mohammad Iftekher Hossain
Office:	4082 SSC
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Office hours:	MW 1:45-2:45

Classroom meeting time(s) & location:

	M	3:30-4:30	SSC 2020
	W	3:30-5:30	SSC 2020

Course website: https://owl.uwo.ca/portal

Undergraduate inquiries: 519-661-3507or 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 2141A/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.

Extra Information: 3 lecture hours. Note at Main campus: Economics 2210A/B cannot be taken for credit after completing Economics 3310A/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 successfully 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 the principles of mathematical economics (linear and matrix algebra, differential calculus, maximization, and constrained maximization) with applications including the theory of the firm and consumer theory.

Course Learning Outcomes:
After successful completion 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
- 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 of optimization using the Hessian and Bordered-Hessian
- generate the comparative statics from optimization problems, using various techniques
- understand and apply the techniques of integral calculus, differential equation, and difference equation in economic theories

Textbook(s):
Simon, Carl P., and Blume, Lawrence. 1994. Mathematics for Economists. Norton & Company

Recommended:
Teresa Bradley. 2017. Essential Mathematics for Economics and Business. Fourth Edition. Willey

Software: In some sessions, we will use MATLAB and Excel solve systems of equations and sketch graphs.

Web Materials:
http://economics.uwo.ca/undergraduate/undergraduate_resources/math_resources_for_ec_2200_required_courses.html

Class Format:
Combination of lecture, problem solving and discussion
Class format will allow individual and group problem-solving. During sessions, students will be encouraged to ask and answer questions. They will spend a considerable amount of class time to formulate and solve problems by themselves and in groups. Towards the end of the sessions when the utility of the students will be close to zero (or even negative in two-hour sessions), they will be given group works.

Grading:
Grading will be based on the total points earned by the end of the semester. Assignments will contribute 20%, Midterm will contribute 30%, and a cumulative final exam will contribute 50% of the points possible. University and Departmental guidelines for grading will be strictly followed.

Grade	Scale	Explanation
A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work that is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	<50	Fail

Evaluation:

Evaluation Type	Weight	Date, Time and Room
Four Assignments	20%	Assignment 1: January 23, 2019 Assignment 2/ Class Test: February 6, 2019 Assignment 3: March 20, 2019 Assignment 4/ Class Test: April 3, 2019
Mid-Term	30%	Date: February 27, 2019 Time: 3:30-5:30 Exam duration: 90 Minutes Syllabus: Chapter 1-Chapter 5 from the Textbook Location: Classroom Method: Closed book examination
Final Examination	50%	Set by the Registrar Exam duration: Two Hours Syllabus: Cumulative Method: Closed book examination

Assignments will be posted at least 3 days before the submission deadlines through OWL.

Course outline and tentative class schedule

	Topics	Tentative Schedule
I	Introduction	Week 1
II	One Variable Calculus, Graphing Economic Functions, Maxima and Minima, Comparative Statics, Implicit functions, and Inverse Functions, Sketching Cost, Production, and Profit Functions	Week 2-5
III	Exponential and Logarithmic Functions, The Number e, Graphing Exponential, and Logarithmic Functions, Computing Present Value, Discounting, Optimal Timing, and Annuities	Week 6
IV	Linear Algebra Gaussian and Gauss-Jordan Elimination, Elementary Row Operations, Algebra of Square Matrix, Determinant of a Matrix, Linear Independence, Inverse Matrix, Cramer's Rule	Week 7-8
V	Calculus of Several Variables and Unconstrained Optimization, Marginal Concepts, Finding Profit-Maximizing Output for Competitive Firms and Monopolists, Use of Hessian to Check the Second-order Conditions for Unconstrained Optimizations	Week 8-10
VI	Constrained Optimization with Equality Constraints and Inequality Constraints, Graphing Level Curves, Utility Maximization, Cost Minimization, Output Maximization, Cobb-Douglas and CES Production Function, Marginal Impact of the Constraint, Using Bordered-Hessian Matrix to Check the Second-Order Conditions for Constrained Optimizations	Week 10-12
VII	Integral Calculus, Differential Equation and Difference Equation, Cobweb Model	Week 12-13

Classroom Expectations:

Students are expected to attend lectures, listen attentively, participate in group activities, and take notes. Students should arrive on time. Please remember that to obtain a satisfactory grade in this course; regular attendance is important as the exam questions will focus on the materials that will be discussed in the lectures and assignments. Please bring pages/notebooks and pens/pencils so that in addition to draw funny pictures, you can also take important notes.

Students can use mobile phones and laptops only to get access to the lecture notes. Students cannot use Facebook, Twitter, or any site using the internet (this is the opportunity cost of attending the lectures). During lectures, students cannot use mobile phones or laptops to take pictures or record the lectures (I cannot be in smiling face always expecting that you will take pictures during the lectures!).

Please remember that the more you study and practice, the better your grade will be (but please be aware of diminishing returns and opportunity cost!).

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Please Note
Department Policies for 2018-2019

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Remember that 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 and policies for the Faculty of Social Science and the Department of Economics are posted online in the current Western Academic Calendar at: http://westerncalendar.uwo.ca.

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 a notation on an official academic transcript, 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 in class or to the instructor during office hours.

6. When appealing a mark, students should refer to 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.

    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 with a written appeal (e-mails are not acceptable) to the Undergraduate Director in Economics, stating the reasons for their appeal. A checklist is provided at: http://economics.uwo.ca/undergraduate/program_counselling/responsibilities_policies.html#appeals.

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 <u>add</u> a second term half course: **Tuesday January 15, 2019**
    Deadline to <u>drop</u> a second term half course: **Thursday March 7, 2019**

9. 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.

Policy Regarding Makeup Tests and Final Examinations

*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.*

Students who proceed to write a test or examination must be prepared to accept the mark. Rewriting tests or examinations, or having their value reweighted on a retroactive basis, is **not** permitted. Students must also book travel arrangements AFTER final exam dates have been posted as they must not conflict with test 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, copying the Undergraduate Coordinator at econugrd@uwo.ca. **Notifying instructors of a missed exam does not automatically entitle students to a makeup**.

Students who seek a makeup exam must also provide supporting medical or other relevant documentation that their absence from a scheduled test or exam is beyond their control. Documentation should be submitted to the Academic Counselling Office of the student's *home* Faculty **as soon as possible (preferably within 24 hours of the scheduled test)**. Failure to follow this procedure may result in denial of academic accommodation and a grade of zero. If the documentation submitted is not acceptable, students will receive a zero for the missed test.

For personal illness, 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. The off-campus medical certificate form must also be used and can be found at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf. Notes stating "For Medical Reasons" are not considered sufficient.

For religious or compassionate circumstances, students should ask their Academic Counsellor what documentation to provide. If documentation is judged sufficient, the Academic Counsellor will issue a Recommendation for a Special Examination (a single form for midterms or a triple-color form for final exams). Once students have this form, they must contact their instructor as soon as possible to make arrangements. Even if approved by their Academic Counsellor, there is no guarantee that students will be allowed to write the makeup test/exam.

For final examinations, students need to seek permission from their *home* Faculty Counsellor, Instructor, and the Department Undergraduate Director. Failure to follow this procedure may result in a grade of zero. Students must ensure that the Special Examination form has been signed by the Instructor and Department Undergraduate Director and that the form is returned to the Academic Counselling Office for approval without delay. If approved, makeup examinations will be written within one month of the end of the exam period.

Policies Regarding Academic Accommodation

The Faculty of Social Science's policies regarding academic accommodation is found at
http://counselling.ssc.uwo.ca/procedures/having_problems/index.html.
"Academic Rights and Responsibilities" are also outlined in the Western Calendar at
http://westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=1&command=showCategory&SelectedCalendar=Live&ArchiveID=. Claiming that "you didn't know what to do" is not
an acceptable excuse for not following the stated procedures.

Policy Regarding Class Attendance

If the instructor deems a student's class attendance as unsatisfactory, that student may be
prohibited from writing the final examination. If there is intent to make use of this University
policy, the student will be notified in writing.

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.