

ADVANCED MATHEMATICAL ECONOMICS  
ECONOMICS EC3310A-001  
Department of Economics  
Western University

September 2020

**General Information:**

**Instructor:** Gregory Pavlov  
**Office:** 4017 SSC  
**Phone:** 519-661-2111 ext. 86786  
**E-mail:** gpavlov@uwo.ca  
**Office hours:** Wednesday 10:00am-12:00pm ET on Zoom  
**Delivery mode:** Online asynchronous  
**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:**

The prerequisites for this course are **Economics 2210A/B** or both of **Mathematics 1600A/B** and **Calculus 1501A/B** (**Calculus 1301A/B** with a mark of at least 85% will be allowed as a substitute for **Calculus 1501A/B**).

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 is a second part of the introduction to mathematical economics (the first part is Economics 2210A/B). The focus of the course is the application of linear algebra, differential calculus, differential equations, and constrained and dynamic optimization techniques to the modeling of decision making by economic agents.

## Course Learning Outcomes:

As a result of taking this course the students will gain a deep understanding of the methods of linear algebra, calculus and optimization in application to Economics. The students will be able to apply these concepts and tools to analyze various economic models. The students will also be well prepared to take more advanced courses in modern economic theory and methods and to analyze models for their senior thesis projects.

## Textbook(s) and Course Materials:

Knut Sydsæter, Peter Hammond, Atle Seierstad and Arne Strøm (2008) *Further Mathematics for Economic Analysis*, Prentice Hall, 2<sup>nd</sup> ed.

For more information on this textbook see

<https://catalogue.pearsoned.ca/educator/product/Further-Mathematics-for-Economic-Analysis/9780273713289.page>

Solution manual to selected problems will be posted on OWL

## Topics Covered and Readings:

1. Review of linear algebra, calculus and static optimization (Chapters 1-3).
2. Integration (Chapter 4).
3. Differential equations (Chapters 5-7).
4. Optimal control (Chapters 8-10).
5. Difference equations (Chapter 11).
6. Dynamic programming (Chapter 12).

## Communication:

- (i) Course OWL site
  - All course materials will be posted on course OWL site.
  - Students should check the course OWL site every 24-48 hours
- (ii) Regular Q & A meetings on Zoom
  - I plan to be available to answer questions about the course on Tuesdays and Thursdays 10:00-11:00am ET on Zoom.
  - These meetings will not be recorded.
  - Please try to bring your questions during these times rather than at the office hours because I expect the office hours to be busy due to my other courses.
  - If there is an upcoming assignment or an exam, then questions about those will be prioritized.
  - The first meeting is on Thursday September 10.
  - There will be no meetings on Tuesday November 3 and Thursday November 5 (Fall Reading week).
  - The last meeting is on Tuesday December 8.
  - There will be an additional meeting scheduled a few days before the final exam.

- (iii) OWL discussion forum
  - This course will use OWL forum for discussions.
  - The discussion forum will be monitored daily.
- (iv) Email
  - Important announcements will be sent by email in addition to being posted on OWL.
  - Please put *Econ 3310* in the Subject when you send me an email about the course.
  - Emails will be monitored daily.

### Technical Requirements

- Laptop or computer
- Stable internet connection
- Microphone
- Webcam

For technical support, see the OWL Help page or contact Western Technology Services Helpdesk (<https://wts.uwo.ca/about-wts/contact.html>). Google Chrome or Mozilla Firefox are the preferred browsers for OWL; update your browser frequently.

### Assessments and Grading:

Problem sets (total of 7; due dates below): 35%  
 Diagnostic test (to be completed on OWL by Wednesday September 16 at 4:00pm ET): 3%  
 Short essay (due Wednesday December 9 at 4:00pm ET): 5%  
 Midterm (tentatively scheduled for Tuesday October 20 at 9:30am ET): 22%  
 Final (TBA): 35%

#### Problem sets

Problem sets will be posted in advance on the course information website. They will be due on the following dates by 4:00pm ET (electronic submission):

Problem set	Due date
1	Friday September 25
2	Friday October 2
3	Friday October 9
4	Friday November 13
5	Friday November 20
6	Friday November 27
7	Friday December 4

- No late problem sets will be accepted.
- You can work on the problem sets in groups. However, each student is supposed to submit an individual problem set and list the names of the people in his/her study group.
- Problem set with the worst score will not count for the calculation of the final mark.

- Each problem set should be submitted on OWL as a single file (PDF or WORD format).
- Marked problem sets will be returned electronically through OWL.

### **Diagnostic test**

- You will be asked you to take a diagnostic test during the first week of the course.
- It is to be completed on OWL by Wednesday September 16 at 4:00pm ET.
- No late submission will be allowed.
- It is not for a grade, everyone who takes it will get 3% of the course mark.
- There are two goals of the test. First, I want to get an idea of the general class level and which specific topics need special attention. Second, you may find out what areas need improvement.

### **Short essay**

- You will be asked to write a short essay either on one of the suggested topics or on an approved topic of your own. Suggested topics will be on importance of particular mathematical concepts for the topics covered in the course.
- Maximum 600 words. Please make it double spaced and 12pt font.
- The essay is due by Wednesday December 9 at 4:00pm ET (electronic submission).
- The essay grade will be based on both content and on quality of writing (grammar, organization, and style).
- Penalty for late submission is 1% of the total course mark per day (including weekends).

### **Midterm and Final exams**

- Midterm exam is tentatively scheduled for Tuesday October 20 at 9:30am ET. It will be 2 hours long.
- Final exam will be scheduled by the registrar. It will be 2 hours long.
- During exams students are forbidden to communicate with any person other than an examination proctor or the instructor.
- Students are forbidden from using any books, notes, study guides, diagrams, communication equipment such as a cell phone, computer programs or software, online resources or websites, or other aids unless authorized by the instructor; such authorization must be stated explicitly during the examination.
- Missed tests without illness self-reports or approved, documented official accommodation will be given a mark of zero. If there has been an illness self-report or approved, documented official accommodation, a make-up exam will be offered.
- Marked midterm exam will be returned electronically through OWL. You will be able to make a virtual appointment to see your final exam if required.

### **Online Proctoring Notice**

- Tests and examinations in this course will be conducted using Zoom. You will be required to keep your camera on for the entire session, hold up your student card for identification purposes, and share your screen with the invigilator if asked to do so at any time during the exam. The exam session will not be recorded.<sup>1</sup>

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<sup>1</sup> Please note that Zoom servers are located outside Canada. If you would prefer to use only your first name or a nickname to login to Zoom, please discuss this with your instructor in advance of the test or examination.

- More information about the use of Zoom for exam invigilation is available in the Online Proctoring Guidelines at the following link:  
<https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>
- Completion of this course will require you to have a reliable internet connection and a device that meets the system requirements for Zoom. Information about the system requirements are available at the following link:  
<https://support.zoom.us/hc/en-us>

### **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.

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

Students in this class should understand the level of autonomy and self-discipline required to be successful.

- Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
- Follow suggested timelines posted on 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.
- Connect with others. Try forming an online study group and meet on a weekly basis for study and peer support.
- Do not be afraid to ask questions. If you have questions or are struggling with a topic, check the online discussion boards or contact your instructor or teaching assistant.
- Get enough practice solving problems by yourself.

**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 first term half course:

**Thursday September 17, 2020**

Deadline to drop a first term half course:

**Thursday November 12, 2020**

**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 Student Absence:** Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the term, provided the following conditions are met: the absence is 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 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 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.