

Mathematical Methods in Economics - ECON 3001-B

Carleton University
Department of Economics
Winter-2020

Instructor: Abdallah Zalgout
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Office Hours: W 2:30 pm - 3:30 pm
Office Hours Location: LB B842-B

Class Hours: W and F 1:05 pm - 2:25 pm
Class Room: SA 413
Tutorial Hours: W 2:35 pm - 3:55 pm
Tutorial Room: SA 413

Course Description

This course is designed to provide students with a knowledge of some of the basic mathematical tools used in economic theory. Topics include: Concave and convex functions; homogeneous and exponential functions; equilibrium analysis; linear models and matrix algebra; comparative static methods; constrained optimizations with more than one choice variable; optimization with inequality constraints; implicit functions and implicit differentiation; applied to models.

Prerequisites

ECON 1000 or ECON 1001 or FYSM 1003 with a grade of C- or higher, ECON 1001 and ECON 1401 and ECON 1402 (or equivalent) with a grade of C- or higher in each and a grade point average across the two of 6.50 or higher. Students who believe they have taken a similar background course or courses from another university must provide appropriate documentation to the Department of Economics Undergraduate Administrator, Amanda Wright. A grade of C+ or higher is required to qualify for ECON 4001, ECON 4020, and ECON 4021. (Deferred Final Grade) status at the end of this course precludes (continued) registration in any other course for which the former is a prerequisite.

Textbook

Required Textbook

- *Fundamental Methods of Mathematical Economics*, by A.C. Chiang and K. Wainwright. McGraw Hill, 4th edition, 2004.

Other References

- *Essential Mathematics for Economic Analysis*, by K. Sydsæter and P. Hammond. FT Prentice Hall, 3rd edition, 2008
- *Mathematics for Economists*, by C. P. Simon and L. E. Blume. W. W. Norton & Company, 1994.
- *Economist's Mathematical Manual*, by K. Sydsæter, P. Berck, and A. Strøm. Springer, 4th edition, 2005.

Statement of Expectations

It is assumed that students who have the prerequisites for this course and are therefore allowed to remain enrolled, have in fact learned all of the associated materials. Students should refer back to their notes and/or textbooks from prerequisite courses if they believe they need to refresh their knowledge of the following materials covered in MATH/ECON 1401 and MATH/ECON 1402 as outlined in the official Calendar descriptions for these courses:

- Functional relations: including functional forms and error terms.
- Graphing economic magnitudes: scatter diagrams, time-series graphs, and functional relationships.
- Applied calculus: the mechanics of differentiation and integration, elasticity, and consumer/producer surplus.
- Applied algebra: solving systems of linear equations and Keynesian national income analysis.
- Approaches to (mathematical) problem solving.
- Calculus: including partial differentiation, definite and indefinite integrals, techniques of integration, and unconstrained optimization.
- Vectors and matrices: scalar multiplication, inner product, linear dependence, matrix operations, rank, invertible matrix theorem, and determinants.
- Economic applications such as profit and utility maximization.

Topics

The following outlines the list of major topics to be discussed throughout the semester. The amount of time devoted to each will vary.

Topic	Chapter
Introductory material	Chapters 1,2,3
Linear models and Matrix Algebra	Chapters 4,5
Derivatives and Comparative Statics	Chapters 6,7,8
Optimization	Chapter 9
Exponential and Logarithmic Functions	Chapter 10
Multivariable Optimization	Chapter 11
Constrained Optimization	Chapters 12, 13

Tutorials will be used to expand on material taught during regular lectures, providing additional examples as well as the opportunity to discuss the solutions to the problem sets and other questions.

Grading

Marks are based on three exams. Weights are as follows:

	Weight	Deadline/Date
Assignment I	10%	February 14
Midterm Exam	35%	February 28
Assignment II	10%	March 25
Final Exam	45%	TBD

Students who can document a compelling reason for missing any of the two exams will be excused. In such cases, students must inform the instructor of such an absence in advance if possible. Please note that doctor's note or police report, the documentation provided by students for missed midterm may be subject to verification. If the midterm exam to be missed, a makeup exam will be arranged. Students must fulfil all of the preceding course requirements in order to achieve a passing grade (D- or higher). Application to write a deferred final examination must be made at the Registrar's Office. Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Plagiarism

Please be aware that plagiarism is serious offence at Carleton and should be recognized and avoided. For further information on how to do so, please see "Pammett on Plagiarism and Paraphrasing by clicking [here](#).

Accommodation Statement

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

- **Pregnancy obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services [website](#).
- **Religious obligation:** write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services [website](#).
- **Academic Accommodations for Students with Disabilities:** If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the Paul Menton Centre [website](#)
- **Survivors of Sexual Violence:** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support
- **Accommodation for Student Activities:** Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the policy which can be downloaded from the academic accommodation [page](#).

You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation by clicking [here](#).