

Economics 389 (01) (Introduction to Mathematical Economics II)

Instructor:	L. Vojtassak	Lecture Location:	ST 130
Phone:	403 220 6550	Lecture Days/Time:	MWF 14:00 – 14:50
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Office:	SS 336		
Office Hours:	MF 15:00 – 15:50		
	TR 11:00 – 11:50		Winter 2020

Course Description:

This is a continuation of Mathematical Economics I, where we discussed the essential mathematical background for studying Economics: economic models and equilibrium analysis, basic techniques of calculus including application in comparative statics, unconstrained and constrained optimization, and their applications to resource allocation problems. This course focuses on (i) tools of linear algebra to address topics introduced in Econ 387 again in n -dimensional space and (ii) mathematical techniques used in macroeconomic growth and dynamic models.

Course Learning Outcomes:

This course introduces students to the application of mathematical methods in economic theory. It builds on topics introduced and partially analyzed in Econ 387.

By the end of the course students are supposed to be able to use economics models

1. to perform static equilibrium analysis and comparative statics analysis in n -dimensional linear models using tools of linear algebra (this involves review of matrices, matrix operations, determinants and their rules, Cramer's rule, Jacobian determinant, implicit differentiation for multiple equations, comparative statics of general function models);
2. to perform multi-variable optimization, and introduce concepts of convexity and concavity;
3. to perform constrained optimization, and introduce concepts of quasiconvexity and quasiconcavity;
4. to use concept of integrals, and use of integration;
5. to perform dynamic analysis on economic problems described by the first – order differential equations, both linear and nonlinear; with applications in economic growth models, and natural resource models;
6. to perform dynamic analysis on economic problems that involve higher order differential equations;
7. to perform dynamic analysis on economic problems with simultaneous differential equations.

Course Outline:

<u>Part I</u>	<u>Hours</u>
1. Introduction to Mathematical Economics and Review	1
2. Linear Models and Matrix Algebra	4
Ch 4 - 5 Review of Matrices, Matrix Operations, Multiplications, Transpose, determinants and Their Rules, Expansion by Cofactors, etc.	
3. Extensions Jacobian determinants, Implicit Differentiation for Multiple Equations, Comparative Statics of General Function Models	3
 <u>Part II</u>	
4. Multivariable Optimization	3
Ch 11 Definiteness, Objective Functions with more than Two variables	
5. Optimization with Equality Constraints	10
Ch 12 Extension to Econ 387, n -variable and Multiconstraint cases, Second-order Conditions, Quasiconcavity and Quasiconvexity, Applications	
 <u>Part III</u> Dynamic Analysis	
6. First-order Differential Equations	7
Ch 15	
7. Higher-order Differential Equations	7
Ch 16	
8. Simultaneous Differential Equations (if time permits)	

Prerequisites/corequisites:

Economics 387, Mathematics 211.

Required Textbook(s):

Chiang, Alpha C., and Kevin Wainwright 2005. *Fundamental Methods of Mathematical Economics*, 4th edition. McGraw-Hill.

Books on Reserve:

Chiang, A., and K. Wainwright (2005). *Fundamental Methods of Mathematical Economics*. 4th Edition. McGraw-Hill.

Hands D.W. (2004). *Introductory Mathematical Economics*. Oxford Press.

Hess, P. N. (2001). *Using Mathematics in Economic Analysis*. Oxford Press.

Hoy et al (2011). *Mathematics for Economics*. MIT.

Sydsaeter et al (2012). *Essential Mathematics for Economic Analysis*. 4th Edition. Pearson.

Desire2Learn:

This course will make use of the Desire2Learn (D2L) platform. Students who are registered in the course can log on at <http://d2l.ucalgary.ca> through their student centre. Please note that D2L features a class e-mail list that may be used to distribute course-related information. These e-mails go to your University of Calgary e-mail addresses only.

Tutorials:

Students are expected to attend the bi-weekly tutorial section, date will be determined. During the tutorials, the TA will discuss pre-assigned questions and additional material relevant to the course that is not covered in lectures.

Grade Determination and Final Examination Details:

5 assignments				
4 best count	5% each	20%	Due dates: Jan 27, Feb 12, March 9, March 27, and April 15, 2020	D2L Submissions
4 Tests				
3 best count	15% each	45%	In class: Jan 29, Feb 14, March 11, D2L submission: March 30, 2020.	
Final Examination		35%		
		100%		

The official grading system will be used. See <http://www.ucalgary.ca/pubs/calendar/current/f-1-1.html>.

A passing grade on any particular component of the course is not required for a student to pass the course as a whole.

If a student's letter grade on the final exam exceeds their midterm(s) letter grade, the weight of the midterm(s) is (are) transferred to the final exam. The student must have written the midterm(s) or provided supporting documentation for the absence(s) such as a medical note or statutory declaration.

As per the Writing Across the Curriculum Statement in the Calendar, writing and grading thereof will be a factor in the evaluation of student work. See <https://www.ucalgary.ca/pubs/calendar/current/e-2.html>.

Any student work which remains undistributed after the last day of classes will be available to students through the instructor's office during the instructor's office hours.

Tests and exams **WILL NOT** involve multiple choice questions.

Programmable calculators, cellphones, textbooks, course notes, and other electronic devices will not be allowed during the writing of tests or final examinations. Students are reminded that simply being able to access their cellphone during an exam is academic misconduct.

Test 4 will be written on originally scheduled dates. Tests will be written home and will be closed book. Students are reminded that simply being able to access any help is academic misconduct. Students will be given extra time for D2L submission.

The final examination will be comprehensive, an open-book, take-home exam. The exam will be available on D2L 24 hours before the end of the Registrar's scheduled final exam time. Students will hand in their exam in pdf format on D2L prior to the end of the scheduled completion time of their final exam. The final was scheduled by the Registrar's Office from 15:30-17:30 on April 28, the exam will be available on D2L at 17:30 on April 27 and is to be submitted on D2L before 17:30 on April 28. If a student cannot write their final exam during this interval, they need to apply for a deferred exam at www.ucalgary.ca/registrar/exams/deferred_final. Under no circumstance will this be accommodated by the Department.

THERE WILL BE NO MAKEUP OR DEFERRED QUIZZES/TESTS/EXAMS under any circumstances, nor may the quizzes/tests/exams be written early. Students unable to write the quizzes/tests/exams because of documented illness, family emergency, religious observance, or university-sanctioned event will have the weight shifted to the final examination; otherwise a grade of zero will be assigned.

Reappraisal of Grades and Intellectual Honesty:

For Reappraisal of Graded Term Work, see Calendar I.2

<http://www.ucalgary.ca/pubs/calendar/current/i-2.html>

For Reappraisal of Final Grade, see Calendar I.3

<http://www.ucalgary.ca/pubs/calendar/current/i-3.html>

Statement of Intellectual Honesty, see Calendar K.4

<http://www.ucalgary.ca/pubs/calendar/current/k-4.html>

Plagiarism and Other Academic Misconduct, see Calendar K.5

<http://www.ucalgary.ca/pubs/calendar/current/k-5.html>

Academic Accommodations:

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services. SAS will process the request and issue letters of accommodation to instructors. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>.

Freedom of Information and Protection of Privacy (FOIP) Act:

Personal information is collected in accordance with FOIP. Assignments can only be returned to the student and will be accessible only to authorized faculty and staff. For more information, see <http://www.ucalgary.ca/legalservices/files/legalservices/faq-students.pdf> and http://www.ucalgary.ca/legalservices/files/legalservices/faq-faculty_0.pdf.

Internet and Electronic Communication Device information:

The use of cell phones for any purpose in class is prohibited. Computers and tablets may be used for note taking only unless otherwise authorized by the instructor.

Copyright Legislation:

See the University of Calgary policy on Acceptable Use of Material Protected by Copyright at www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf. Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

Recording of Lectures:

Recording of lectures is prohibited, except for audio recordings authorized as an accommodation by SAS or an audio recording for individual private study and only with the written permission of the instructor. Any unauthorized electronic or mechanical recording of lectures, their transcription, copying, or distribution, constitutes academic misconduct. See <https://www.ucalgary.ca/pubs/calendar/current/e-6.html>.

Important Dates:

Please check: <http://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html>.

Student Organizations:

Faculty of Arts Students' Association (F.A.S.A.):

Economics Department Representative

Office: SS 803, E-mail: econrep@fasaucalgary.ca and Web: www.fasaucalgary.ca.

Society of Undergraduates in Economics:

<https://www.ucalgarysue.com/>.

Society of Undergraduates in Economics is a student run organization whose main purpose is to assist undergraduate economics students to succeed both academically and socially at the University of Calgary. Services include access to the exam bank, career events such as Industry Night and information sessions, mentorship programs, and social events for members. They invite you to join by contacting SUE at societyofundergradsineconomics@gmail.com.

Faculty of Arts Program Advising and Student Information Resources:

- Have a question, but not sure where to start? The Arts Students' Centre is your information resource for everything in Arts! Drop in at SS102, call them at 403-220-3580, or email them at artsads@ucalgary.ca. You can also visit the Faculty of Arts website at <http://arts.ucalgary.ca/undergraduate>, which has detailed information on common academic concerns, including program planning and advice.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at 403-210-ROCK [7625] or visit them in the MacKimmie Library Block.

Student Support and Resources:

- See <https://www.ucalgary.ca/registrar/registration/course-outlines> for information on campus mental health resources, the Student Ombuds' Office, Student Success Centre, Safewalk, and Emergency Evacuation and Assembly.
- Online writing resources are available at <https://ucalgary.ca/student-services/student-success/writing-support>.

Notes:

1. Students are responsible for all assigned material, e.g., supplementary material posted on D2L, regardless of whether or not the material was covered in class.

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2020-03-24