

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

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|---------------|----------------------------------|--------------------|-------------------|
| Instructor: | Lucia Vojtassak | Lecture Location: | EDC 280 |
| Phone: | 403 220 6550 | Lecture Days/Time: | MWF 14:00 – 14:50 |
| Email: | lvojtass@ucalgary.ca | | |
| Office: | SS 336 | | |
| Office Hours: | M 15:00 – 15:50 R 9:00 – 9:50 | Winter 2019 | |

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 Objectives/Learning Outcomes:

By the end of the term, (i) students should be able to perform multivariable unconstrained and constrained optimization and the comparative statics, all applied on the economic problems; (ii) students will be introduced to dynamic analysis and dynamic models.

Prerequisites:

Economics 387, Mathematics 211.

Required Textbook(s):

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

Reserved Readings:

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.

Timetable

| <u>Part I</u> | Hours |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 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 | 3 |
| Jacobian determinants, Implicit Differentiation for Multiple Equations, Comparative Statics of General Function Models | |
| <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) | |

Grade Determination and Final Examination Details:

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|-------------------|----------|-------------|-------------------------------------------------------------------|--|
| 5 assignments | | | | |
| 4 best count | 5% each | 20% | Due dates: Jan 25, Feb 13, March 8, March 27, and April 12, 2019. | |
| 4 Tests | | | | |
| 3 best count | 15% each | 45% | In class: Jan 28, Feb 15, March 11, March 29, 2019. | |
| Final Examination | | 35% | | |
| | | 100% | | |

Grading Scale

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|----|----------|----|---------|----|---------|
| A+ | 95 – 100 | B | 73 – 76 | C- | 60 – 62 |
| A | 85 – 94 | B- | 70 – 72 | D+ | 56 – 59 |
| A- | 80 – 84 | C+ | 67 – 69 | D | 50 – 55 |
| B+ | 77 – 79 | C | 63 – 66 | F | 0 – 49 |

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

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.

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

Assignments

1. Five short assignments are to be submitted at the beginning of class on the date due. Answers to assignments will be either discussed in class shortly after each assignment falls due or posted on the D2L. For this reason, late assignments will be given a score of zero, although you may still wish to have the work corrected and returned without a score being recorded. Please do not slide assignment under my office door – they will not be marked.
2. Students are encouraged to discuss the assignments with their classmates, but each must write up their own answers. Copying or misrepresenting someone else's work as your own is a serious offence, which will not be tolerated. Your attention is directed to the "Statement of Intellectual Honesty" in the 2018-2019 Calendar. Taking credit for someone else's work is something for which I show zero tolerance.

Examination

1. Tests and final exam will not consist of the multiple-choice questions.
2. Tests will be held in classroom during regular lecture hours and will last 50 minutes.
3. The lowest test mark will be ignored.
4. Tests are designed to reward diligence. In particular, most students who diligently prepare for the tests will go into the final exam with a sound mark. On the other hand, students who do not take the time to prepare for the tests will go into the final exam with a weak mark, or will have dropped the course before the final exam.
5. There will be a Registrar scheduled final examination, lasting 2 hours. It will be a comprehensive examination of all-material covered in the course.
6. The tests and exam must be completed during the specified time. Extra time will not be given for any reason.
7. All examinations will be closed-book.
8. Answers to the tests and the final exam questions must make use of equations and diagrams wherever possible. Numerical and problem-solving questions require analytical answers.
9. THERE WILL BE NO MAKEUP OR DEFERRED EXAMS under any circumstances, nor may the exams be written early. Students unable to write the 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. If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam www.ucalgary.ca/registrar/exams/deferred_final Under no circumstance will this be accommodated by the department. Any student who finds it necessary to miss the one or more of the tests must notify the instructor in advance and produce a valid medical certificate or other required documentation in order to have the weighting adjusted. This adjustment will result in the final exam counting for 35% plus the weight of the excused missed test(s).
10. Examinations will not be given before the indicated examination date. For further information see the 2018-2019 Calendar.
11. The use of a simple calculator during test and examination is permitted. The use of graphing calculators, cell phones, and computers is not permitted.

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 Dishonesty, 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:

The student accommodation policy can be found at: ucalgary.ca/access/accommodations/policy.

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities ucalgary.ca/policies/files/policies/student-accommodation-policy.

Students needing an Accommodation based on a Protected Ground other than disability should communicate this need, preferably in writing, to the course instructor.

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.
- Online writing resources are available at <http://www.ucalgary.ca/ssc/resources/writing-support>.

Evacuation Assembly Point:

In case of an emergency evacuation during class, students must gather at the designated assembly point nearest to the classroom. The assembly point for this classroom is the Scurfield Hall – Atrium.

Safewalk:

The Safewalk program provides volunteers to walk students safely to their destination anywhere on campus. This service is free and available 24 hrs/day, 365 days a year. **Call 403-220-5333.**

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

Personal information is collected in accordance with FOIP. For more information, see <http://www.ucalgary.ca/legalservices/foip/foip-hia>.

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.

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2018 – 11 – 13