

University of Minnesota
ECON 4113: Introduction to Mathematical Economics
Spring 2006

Lecture: 2:30pm – 3:45pm Tu,Th, Carlson L-118

Instructor....Alexander Vostroknutov

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Office Hours...Tuesday 1:30pm - 2:30pm, 3:45pm - 4:45pm and by appointment

Textbooks:

A.K. Dixit, Optimization in Economic Theory, Oxford University Press, 1990 (required)

C.P. Simon and L. Blume, Mathematics for Economists, W.W. Norton & Company, 1994 (optional)

Prerequisites:

The prerequisites for this course are Econ 3101-3102 and Math 1271-1272, 2243 which you must have successfully completed **before** taking this course. If you think you are underprepared for this class, please talk to me as soon as possible (in the first week of class).

Grading Scale:

| | | | | | | | | | | | |
|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| %: | 100-92 | 91-90 | 89-88 | 87-82 | 81-80 | 79-78 | 77-72 | 71-70 | 69-68 | 67-60 | 59-0 |
| grade: | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | F |

This is the grading system used by the Department of Economics. At the discretion of the instructor this scale may be curved.

Course Requirements and Grading System:

There will be a cumulative final, non-cumulative midterm and 6 homework assignments.

Final: 2 hours, 8:00am – 10:00am Th, May 11, Carlson L-118, top grade of 100%, problem oriented.

Midterm: 1 hour 15 minutes, top grade of 100%, problem oriented (rather than Multiple Choice)

No make-up Midterms are scheduled. In case of **emergency** documented absence, consult instructor.

HWs: Top grade of 100% each. Distributed in class and are posted on the website the same day.

Hws are problem oriented and are written by the instructor.

Late HWs are NOT ACCEPTED (in case of emergency contact instructor).

Must be typed except for graphs and calculations. Typing penalty is grade multiplied by 0.75.

A paper copy must be submitted. Electronic copies are NOT ACCEPTED.

Consult the attached Schedule of Events for dates of the above requirements.

Should the class fall behind schedule, the date for Midterm will **NOT** change.

There will be **NO** individual extra credit.

$$\text{Class Grade} = 0.4 * \text{Final Grade} + 0.3 * \text{Midterm Grade} + 0.3 * (\text{Average Hw Grade})$$

Course Description and Objectives:

Economics is a quantitative discipline, and in recent decades the discourse of the profession has become substantially more precise, in the sense of utilizing formal mathematical models. This has many benefits: assumptions and lines of reasoning become completely explicit; exactly understood results can be used with confidence as a basis for more sophisticated reasoning; novel insights can be derived from the application of sophisticated mathematical methods.

The purpose of this course is to acquaint the students with the central mathematical methods utilized in the mathematical approach to economic analysis, and to show how these methods are applied in the central theories of economics. Specifically, the focus will be on optimization in the presence of constraints, emphasizing the approach derived from multivariate calculus.

Academic Dishonesty

All work submitted must be that of the student.

Excepting only the students' ingenuity, lecture and recitation notes, and the text listed above on the syllabus, all other sources of information used to solve an assignment must be **cited**. This includes, but is not limited to, help received during **office hours**. Also included as academic dishonesty by the student code of conduct is submission of false records of academic achievement; cheating on assignments or examinations; plagiarizing; altering, forging, or misusing a University academic record; taking, acquiring, or using test materials without faculty permission; and acting alone or in cooperation with another to enhance a grade.

A **minimum** penalty for academic dishonesty is a grade of 0 for the assignment. If the offense occurs on a final or midterm, a grade of F or N will be issued. Other penalties may include a complaint to the Office of Academic Integrity and Student Judicial Affairs.

Cooperation among students on Homework is allowed, though each student must hand in their own assignment with citations given for help received. Identical or **essentially similar** homeworks will receive a grade of zero.

Course Announcements:

Important information on the class will be sent to the students' University email account.

Note that I have the predisposition towards sending lots of e-mails.

You may have this account forwarded to another address if you wish.

Be sure to check your University email once a week for announcements.

Email can be activated at <http://www.umn.edu/validate>.

Other, less urgent announcements will be made on www.econ.umn.edu/~aevk

Schedule of Events

In the event the class lags behind this schedule, Midterm date will **NOT** change.
Rather the exams themselves will be altered to reflect what has been covered in class.

| Week | Dates | Comments | Hand Out | Due | Returned |
|------|-------------|--|----------|-----------|----------|
| 1 | 1/17,19 | Intro. Chapter 1: Review of basic concepts | | | |
| 2 | 1/24,26 | Chapter 2: Lagrange's Method: 2 variables | HW 1 | | |
| 3 | 1/31,2/2 | Chapter 3: Lagrange's Method: n variables | | HW 1 | |
| 4 | 2/7,9 | Chapter 4: Shadow prices; Examples | HW 2 | | HW 1 |
| 5 | 2/14,16 | Chapter 5: Maximum function; Envelope Theorem | | HW 2 | |
| 6 | 2/21,23 | Chapter 6: Convex sets; Convex and concave functions | HW 3 | | HW2 |
| 7 | 2/28,3/2 | Chapter 7: Concave programming | | HW 3 | |
| 8 | 3/7,9 | Review (Tu) / Midterm (Th) | | MD | HW 3 |
| | 3/14,16 | SPRING BREAK | | | |
| 9 | 3/21,23 | Chapter 7: Concave programming | HW4 | | MD |
| 10 | 3/28,30 | Chapter 8: Second-Order conditions | | HW 4 | |
| 11 | 4/4,6 | Chapter 9: Choice under uncertainty | HW 5 | | HW 4 |
| 12 | 4/11,13 | Chapter 10: Optimization over time | | HW 5 | |
| 13 | 4/18,20 | Chapter 10: Optimization over time | HW 6 | | HW 5 |
| 14 | 4/25,27 | Chapter 11: Dynamic programming | | HW 6 | |
| 15 | 5/2,4 | Chapter 11: Dynamic programming; Review | | | HW 6 |
| | 5/11 | 8:00am – 10:00am, Final, Carlson L-118 | | | |