**Department of Economics and Finance**

**ECON*2770.01**
**Introductory Mathematical Economics**
**Fall 2013**

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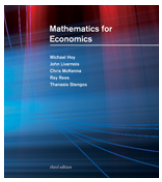
Email: cmckenna@uoguelph.ca
Lectures: T, Th, 19:00 – 20:20, MACK 120
Lab 01: F, 12:30 – 13:20, MACN 118
Lab 02: F, 13:30 – 14:20, MACK 238
Lab 03: F, 14:30 – 15:20, ROZH 109
Office hours: T, Th, 14:00 – 15:30, or by appointment.

**Course outline**

**Description:** This is an introductory undergraduate course in mathematical economics. Along with the numerous economic applications, students will find this an invaluable accompaniment to intermediate microeconomics, macroeconomics and more advanced courses. The course places emphasis both on mathematical tools and their application to economic problems in approximately equal measure.

**Main text:** Hoy, M., J. Livernois, C. McKenna, R. Rees, and T. Stengos,, *Mathematics for Economics*, MIT Press, 3rd Edition. [Hoy, et al]




There is also a Student Solutions Manual, which is available as an e-book via the MIT Press website – this is recommended, but not required. Supplementary material is available at the book's website: http://mitpress.mit.edu/math_econ3/ The text is on reserve in the University Library.

**On-line resources:** All course material, including lecture slides will be posted on Courselink. I will be making use of some graphic tools using *Mathematica*. Some of these are downloaded from the *Mathematica Demonstrations* page, while I have developed some others. In any event, to read the lecture slides you will need the **free Adobe Reader** and to play with the interactive Mathematica tools you need to download the **free CDF Player** from www.wolfram.com, which is available for a variety of platforms.

Prerequisites: ECON*1100, ECON*1050, MATH*1000 or MATH*1080 or MATH*1200.

**Assessment:**

**Assignments** (weekly via Maple TA): best ten out of eleven, for a total of 2**0%.** More information about the assignments and Maple TA will be given at the start of the course.
**Quizzes**: best four out of five, for a total of **10%**. The quizzes will take place in class time approximately every two weeks. They will last 15 minutes and may be at any suitable time during the class.
**Midterm** (**20%**) will last 50 minutes and will take place on **October 17** at the start of class.
**Final** (**50%)** is cumulative. Final exam is **on December 13, 2013** from **2:30-4:30 pm**.

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Instructor: Prof. C. McKenna

There are no make-ups for assignments, quizzes or the midterm. The weight for missed components of the term work for documented medical or compassionate reasons will be shifted to the final.

**Student responsibilities:** You should be aware of your responsibilities regarding University policies on academic misconduct, drop dates, email communication and course requirements. You are advised to visit:

http://www.uoguelph.ca/economics/node/1115

**Class etiquette and communication protocol**

Out of respect for your classmates and me, do not use cell phones for any form of communication during class. You are welcome to use laptops or tablets to take notes.
I receive a large number of emails each day. Please put the course number in the subject line and restrict your email questions to ones requiring only short answers. I will not be able to answer technical questions by email – it takes too long. Email is by far the best way to contact me for questions or to make an appointment, and I can generally get back to you within two hours.

**A word (or two) of advice…**

The only way to learn mathematical economics is to do it. Memorization isn't enough and it is very easy to deceive yourself that you have grasped a concept and that you can apply it appropriately. Make full use of the text, classes, labs and tests, and identify weaknesses early. The rewards to getting to grips with the material in this course are huge and it will make your progress through your program all the smoother. Finally, do not gamble on shifting weight to the final, it increases stress and is never successful.

**Course content**

Week 0: First class meeting, 5 September: Course overview and preliminaries. You will be required to prepare for the course by reading chapters 1, 2 and 4 of Hoy et al. I will give an overview of this material in the first class and the first lab will cover exercises in this material. However, this should be review and is essentially your responsibility. The first quiz will cover this material. I will, however spend some time on ch 3 of Hoy, et al in week 1.

Basic arithmetic and algebra: Hoy, et al., Ch 1 (pp. 3 -10)
Sets, subsets, functions: Hoy, et al., Ch 2.1 - 2.4 (pp. 11 - 60)
Continuity of functions of one variable with economic applications: Hoy, et al., Ch 4 (pp. 100-126)

Wk 1: Sequences, series and limits:
Hoy, et al. Ch 3 (pp. 61 – 99)

Wk 2: Differential calculus for univariate functions:
Hoy, et al., Ch 5

Wk 3: Optimization of univariate functions:
Hoy, et al., Ch 6 (excl. pp. 217 – 219)

Wk 4, 5 & 6: Systems of linear equations:
Hoy, et al., Ch 7

Matrices:
Hoy, et al., Ch 8

Determinants and the inverse matrix:
Hoy et al., Ch 9

Wk 7 & 8: Calculus for functions of *n*-variables:
Hoy et al., Ch 11.1 – 11.5 (excl. pp. 464 – 469)

Wk 9: Optimization of functions of *n*-variables:
Hoy et al., Ch 12

Wk 10: Constrained optimization:
Hoy et al., Ch 13 (excl. pp. 513 – 514) but include interpretation of $\lambda$

Wk 11 & 12: Comparative statics:
Hoy et al., Ch 14

**Please Note**: You will be asked to complete an evaluation of this course during the last two weeks of the semester. The Department of Economic Policy regarding the conduct and use of these evaluations will be found at:

http://www.uoguelph.ca/economics/academics/courses/course-evaluation

**In keeping with the University's Learning Outcomes, the Department of Economics and Finance Learning Outcomes (skills and knowledge competencies) for this course are:**

**Skills:**

**1) Written Communication**

Many questions posed in lectures, midterms, quizzes and practice assignments require economic interpretation of the answers. Students obtain significant experience in developing logical statements about the economic (and mathematical) models and their results.

**2) Analytical Problem Solving**

The main emphasis of this course is the learning of mathematical tools **and** their relationship to economic analysis. Students obtain extensive experience in lectures, midterms, quizzes and practice assignments developing their ability to solve problems analytically.

**3) Numerical Problem Solving**

This course is designed to teach mathematical tools and their relationship to economic analysis. Students obtain extensive experience in lectures, midterms, quizzes and practice assignments developing their ability to solve problems numerically. These are typically done as examples of more general mathematical models. See point 2) above.

**Knowledge:**

**1) Mathematical Techniques and Understanding**

A principle main goal of this course is for students to attain knowledge of mathematical techniques, such as unconstrained optimization in one variable and several variables, constrained optimization, and linear algebra. The expectation is that students not only learn the methods for the purpose of short term recall but to develop a strong understanding of the mathematic principles involved in order to facilitate further learning and application of the material beyond this course in future economics (and other) courses.

**2) Economic Modeling**

Equally important as the goal in point 1) above, we expect students to attain knowledge of economic modeling in a way that facilitates a deep and critical perspective of proposed economic analysis both in economic courses and more broadly in economic discourse.