

EC 2040: MATHEMATICS AND STATISTICAL METHODS
MODULE 1: MATHEMATICS
(AS OF OCTOBER 20TH, 2006)

COURSE DESCRIPTION:

In this course we build on the tools and techniques you acquired in EC 1030 – Mathematics and Statistics. We will review briefly some of the topics, before considering them in more detail and to a greater depth. We will pay special attention to systems of linear equations, for which matrix and vector notation will be introduced. Then, a review of calculus will be undertaken, before considering the problem of unconstrained optimization for functions of one variable. Later we will solve the general case of optimization of functions of two or more variables, with and without constraints. Along the way we will learn other concepts such as implicit functions, Taylor expansions, Lagrangians, and the total differentials. At every point, I will try to provide special attention to economic applications

LECTURE MEETINGS:

Lectures are held Tuesdays from 3:00 PM to 4:00 PM, and Wednesdays from 2:00 PM to 3:00 PM in the Arts building, room 1008 (also known as The Edmund Burke Hall). The Math module starts October 10th and ends January 19th (second week of Hilary term).

CLASS MEETINGS:

Vahagn Galstyan and Ole Boysen are the teaching assistants assigned to this course. Tutorials will be held once a week, starting on Monday, October 19th. During tutorials, the teaching assistants will present problems similar to those in your assignments and/or some new material. They will also answer questions in a smaller group setting. Attendance is highly recommended, especially if you are having difficulty understanding the course material. A table at the end of the syllabus contains information about your TAs.

COURSE WEBSITE

All documents (syllabus, lecture notes, assignments) will be posted at the course website. You will be sent an e-mail with the link to that webpage. Notice that there will be NO link through my homepage at the Department of Economics.

GETTING HELP: OFFICE HOURS:

I hold office hours Mondays from 3:00 PM to 4:00 PM and Thursdays from 11:30 AM to 12:30 PM, in the Arts Building, room 3012. No appointment is necessary. Please feel free to drop by my office to ask questions, to make suggestions, or even just to introduce yourself. You can also contact me by e-mail at Martin.Paredes@tcd.ie to set up an appointment at another time. In addition, your TAs will also hold office hours. Please check the course website –when in place– for this information.

TEXTBOOKS:

There is no unique textbook that satisfactorily covers the topics. As such, my lectures will be drawn mostly from a combination of the following two textbooks:

- Knut Sydsaeter & Peter Hammond, *Essential Mathematics for Economic Analysis*, FT Prentice Hall, 2nd Edition, 2005.
- Alpha C. Chiang & Kevin Wainwright, *Fundamental Methods of Mathematical Economics*, McGraw-Hill, 4th Edition, 2005.

Copies of the book have been ordered in bookshops. In addition, I intend to supplement some of my lectures with material from the following textbooks:

- Jeffrey Baldani, James Bradfield & Robert W. Turner, *Mathematical Economics*, Thomson Learning, 2nd Edition, 2005.
- Malcolm Pemberton & Nicholas Rau, *Mathematics for Economists: an Introductory Textbook*, Manchester University Press, 2nd edition, 2001.
- Mik Wisniewski, *Introductory Mathematical Methods in Economics*, McGraw-Hill, 2nd Edition, 1996.

COURSE ASSESSMENT:

There will be two examinations for this module:

- Michaelmas term test:
Standard test on the material covered up to that week in this module. The exam will count for 30% of the overall grade for the Math module.
- Final exam:
The final exam is worth 70% of your overall grade for the Math module. The exam is comprehensive.

If you miss a test or examination arising from illness, the usual rules regarding a medical certificate apply if you wish to be excused. A medical certificate must be supplied to the Department of Economics office within three days of the missed test or examination.

ASSIGNMENTS

I will post several assignments during the semester (possibly weekly). They will not be graded, but I strongly recommend you to solve them on your own. If you struggle in one question, you can ask your TA to solve it during tutorial or during his office hours.

ATTENDANCE TO LECTURES

You are responsible for everything covered in lectures. If, for any reason, you have to miss a lecture, I encourage you to make prior arrangements with another student to take careful notes for you and to sit with you and explain their notes afterward. Please do not ask me to “fill you in” on what you missed.

Please arrive on time. There is absolutely NO chatting during lecture. Also, please turn off your mobile phones. The lecture hall is very large, so procure NOT to sit in the back rows. If along the term I observe too many students in the back rows, I'll enforce a rule to prohibit it.

COURSE OUTLINE (SUBJECT TO CHANGE)

1. Introduction. (Sydsaeter, ch. 1 to 5 | Chiang, ch. 1 to 3)
2. Matrix Algebra and Systems of Linear Equations
(Sydsaeter, ch. 15 & 16 | Chiang, ch. 4 & 5)
3. Derivatives of Functions of One Variable
(Sydsaeter, ch. 6 & 7 | Chiang, ch. 6, 7.1 to 7.3)
4. Derivatives of Functions of Many Variables
(Sydsaeter, ch. 11 & 12 | Chiang, ch. 7.4 to 7.6 & 8)
5. Single-Variable Optimization (Sydsaeter, ch. 8 | Chiang, ch. 9)
6. Multi-Variable Optimization (Sydsaeter, ch. 13 | Chiang, ch. 11)
7. Constrained Optimization (Sydsaeter, ch. 14 | Chiang, ch. 12)
8. Other Topics (including Linear Programming) (Sydsaeter, ch. 17 | Chiang, ch. 13)

SCHEDULE OF TUTORIALS

Day	Time	Location
Monday	4:00 PM to 5:00 PM	AP 2.03
Monday	5:00 PM to 6:00 PM	Arts 3051
Tuesday	9:00 AM to 10:00 AM	Arts 3051
Tuesday	11:00 AM to 12:00 PM	Arts 3051
Wednesday	6:00 PM to 7:00 PM	Arts 5039
Thursday	5:00 PM to 6:00 PM	AP 3.19
Friday	1:00 PM to 2:00 PM	Arts 3106
Friday	4:00 PM to 5:00 PM	Arts 5033

INFORMATION ABOUT YOUR TEACHING ASSISTANTS

Name	E-mail	Office Hours
Ole Boysen	boyseno@tcd.ie	TBA
Vahagn Galstyan	galstyav@tcd.ie	TBA