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DEPARTEMENT EKONOMIE - DEPARTMENT OF ECONOMICS

Mathematical Methods for Economics 771

Course Framework

February 2019

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Prof. G. Liu

1 Objectives of the course

The use of mathematics as a tool within economics serves at least two purposes. First and foremost, mathematical formalisms help to communicate ideas succinctly and with clarity that is often more difficult to do any other way. But a second, perhaps more important role for mathematics, is that it helps us clarify how our conclusions (say over the efficacy of policy) follow from our (often hidden) assumptions. A formal approach to theorising about the economy offers a way of making transparent the underlying assumptions behind received ideas. Indeed, some of the most celebrated advances in economics during the 20th century have embodied exactly this idea. Formal training in mathematical methods is therefore a core competency demanded by our postgraduate coursework degree programmes. In the Mathematical Economics course, the aim is to provide the building blocks to be able to engage in understanding theoretical models which you may come across in other areas within economics as well as enabling you to develop your own theoretical models.

2 Course Contacts

Role	Name	E-mail	Room	Consultation hours
Lecturers	Marisa von Fintel	marisa.vonfintel@gmail.com	611	By appointment via e-mail only
	Guangling Liu	gliu@sun.ac.za	504	
Tutor	Rebecca Selkirk	17175437@sun.ac.za	601	By appointment via e-mail only
Postgraduate administrator	Carina Smit	carina@sun.ac.za	506A	-

3 Prescribed Text and other Course Resources

- The prescribed text for the course is Simon, C.P. and Blume, L. 1994. *Mathematics for Economists*, New York: WW Norton and Company.

- As an additional source, students may also consult Chiang, A.C. and Wainwright, K. 2005. *Fundamental Methods of Mathematical Economics*, New York: McGraw-Hill.

- All announcements will be made during lectures. However information regarding the course, including announcements, tutorial assignments, and lecture notes will be posted on the course website (go to the departmental website at http://www.ekon.sun.ac.za and

click on the link to the Mathematical Methods for Economics page on the top left of the main page). Please check the website on a regular basis.

- You will require a password to access the website. To obtain access rights, enter your student e-mail address on the following webpage: http://www.ekon.sun.ac.za/requestactivation. For any queries regarding the website, please contact Carina.

4   Course Structure

Two formal lectures are scheduled for every week of the semester, on Mondays from 8:30-10:30 and Fridays from 8:30-10:30. In addition to formal lectures, a weekly tutorial is scheduled on Mondays from 14:00-16:00. This slot will be used to work through problems with the tutor. This course requires a substantial amount of practice to be able to implement and grasp the theoretical concepts and solve the problems in tests and exams. Students should prioritize the attendance of tutorials and the completion of problem sets.

When a chapter is covered in the lectures, a set of problems from the text will be posted on the course website. Students will then be expected to work through all of the problems during the course of the following week as preparation for the tutorial. At the beginning of each tutorial, students will write a 20 minute test, which will consist of one or more of the problems contained in the problem set from the previous week. These questions will be chosen at random. The marks for the tutorial component of the course (10% of final mark) will be calculated as the average of the best 6 tutorial tests (out of a total of 9 tests) completed by each student. If a student is absent for a tutorial test, they will be assigned a mark of zero for that test.

5   Assessments

The final mark for this course will be calculated as follows (please note the relevant dates of assessment):

1. Test 1: 30% (Chapters 12-15)

    - Date: Friday 15 March 2019 8:30-10:30

2. Tutorial mark: 10%

3. Final exam: 60%

- The exam timetable will be compiled by Carina Smit at the end of the semester.

Please note the following important information:

- The final exam will consist of three sections.

- Students who passed the test in March are only required to write the first and second sections, covering Chapters 16-19 and Appendix A4 (50 %) and Chapter 23, Recursive Methods and Linearisation (50%). These students write for 3 hours.

- Students who missed the test in March are not required to submit a medical certificate but are required to write all three sections of the final exam ($3 + 2 = 5$ hours). The third section will examine the same material as the test in March (Chapter 12 to 15).

- In the case of illness, students who have written the test in March but who miss the final exam are obliged to present a valid medical certificate to the department, after which they may qualify to write the medical exam. This assessment will take place in the same week as all other supplementary exams for the postgraduate programme. The date will be announced in due course.

- Students who are ill and submit a medical certificate for the final exam will not receive a mark for any of the assessments completed on the day of the examination.

- Should students miss both the test in March and the final exam, they will not be awarded the credits for this module, and results will be recorded as "incomplete". This will be the case even if students have a medical certificate for both missed opportunities.

6 Basic Course Outline

The primary contact sessions are as follows:

Session	Time	Venue
Lecture I	Mondays 8:30-10:30	Room 207B Schumann Building
Lecture II	Fridays 8:30-10:30	Room 207B Schumann Building
Tutorials	Mondays 14:00-17:00	Room 207B Schumann Building

Please note that the second lecture timeslot on Fridays will only be used if necessary. The use of this lecture time will be announced during the preceding Monday lecture each week and it is

therefore imperative for you to stay up to date with announcements during lectures as well as on the course website.

The table on the next page sets out the basic course outline. The time taken and order of the topics may be adjusted to suit the schedule, but will be timeously communicated to students in class and/or via the course website.

Mondays 8:30-10:30 (Lecture I)		Mondays 14:00-16:00 (Tutorial)		Fridays 8:30-10:30 (Lecture II)	
Calculus of several variables and integral calculus (Dr. M. von Fintel)					
4 Feb	Ch 12 (Limits and Sets)	**4 Feb**	No Tutorial	**8 Feb**	No Lecture
11 Feb	Ch 13 (Functions of Several variables)	**11 Feb**	Tutorial: Ch 12	**15 Feb**	No Lecture
18 Feb	Ch 14 (Calculus of Several Variables)	**18 Feb**	Tutorial: Ch 13	**22 Feb**	Ch 14 (Calculus of Several Variables)
25 Feb	Ch 15 (Implicit Functions)	**25 Feb**	Tutorial: Ch 14	**1 Mar**	Ch 15 (Implicit Functions)
4 Mar	Ch 16&17 (Unconstrained optimization)	**4 Mar**	Tutorial: Ch 15	**8 Mar**	Ch 16&17 (Unconstrained optimization)
11 Mar	Ch 18 (Constrained Optimisation I)	**11 Mar**	No Tutorial	**15 Mar**	Test I
18 Mar	Ch 18 (Constrained Optimisation I)	**18 Mar**	Tutorial: Ch 16&17	**22 Mar**	No Lecture
RECESS I					
1 Apr	Ch 19 (Constrained Optimisation II)	**1 Apr**	No Tutorial	**5 Apr**	No Lecture
8 Apr	Appendix A4 (Integral Calculus)	**8 Apr**	Tutorial: Ch 18&19	**12 Apr**	No Lecture
Eigenvalues & Eigenvectors and Introduction to Dynamic Programming (Prof. G. Liu)					
15 Apr	Ch 23 (Eigenvalues and Eigenvectors)	**15 Apr**	Tutorial: App A4	**19 Apr**	**Good Friday**
22 Apr	**Easter Monday**	**22 Apr**	**Easter Monday**	**26 Apr**	Ch 23 (Eigenvalues and Eigenvectors)
RECESS II					
6 May	Recursive Methods	**6 May**	Tutorial: Ch 23	**10 May**	Linearisation
13 May	No Lecture	**13 May**	Tutorial: Recursive methods & Linearisation	**17 May**	No Lecture