Online Course Description
E442 Mathematical Methods in Advanced Microeconomics (3 ECTS)

Contents

This online course deals with selected mathematical topics and concepts as they are applied in Advanced Microeconomics. A prerequisite for this class is that you have a sound knowledge of set theory, linear algebra and calculus. We have uploaded the videos and the presentation files to Ilias, see [link](#).

Please download and print the presentation files first before you watch the videos. The presentation files are available as they are used in the videos and in a printer-friendly format.

There are 13 videos that will talk you through the slides:

1. Introduction; systems of linear equations and some matrix algebra
2. Euclidian space
3. Sequences
4. Open, closed and compact sets
5. Functions
6. Multi-variable calculus
7. Taylor’s theorem\(^1\)
8. Implicit functions
9. Quadratic forms and definite matrices
10. Unconstrained maximization
11. Constrained maximization
12. Homogeneous and homothetic functions
13. Convex sets, concave and quasiconcave functions

\(^1\)Note that there is a typo on slide 74 (slide 71 in the printer-friendly version). It should read: “Thus, the Taylor series about zero yields

\[
e^x = \sum_{k=0}^{\infty} \frac{1}{k!} x^k = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots
\]

\((x^3/3!\) instead of \(x^2/3!\))”
**Textbook**

The textbook this class will follow most closely (but not exclusively) is Carl P. Simon and Lawrence Blume, Mathematics for Economists, Norton. A good refresher textbook is Alpha C. Chiang, Fundamental Methods of Mathematical Economics, McGraw Hill.

**Meetings**

Supplementary to the videos, we have two meetings:

- Wednesday, October 24, starting at 1815;
- Tuesday, October 30, starting at 1815.

These meetings are designed to deal with your questions. They will in no way replace the video presentations. The meetings will take place only if you email me your problems and questions in time before the respective meeting. The deadline for the first meeting is Friday, October 19, at 1600; the deadline for the second meeting is Friday, October 26, at 1600. Please email to frank.staehler@uni-tuebingen.de with the subject line “E442”.

**Exam**

The 60-minute final exam will take place on November 5 at 1815. Registration to the exam is essential and will take place during class time on October 30. We will upload a mock exam on October 25 that will be discussed at the meeting on October 30.

**Rooms**

Please note that our main building in Mohlstraße 36 will be closed from September for two years. Both meetings on October 24 and 30 and the exam on November 5 will take place in the seminar room in Nauklerstraße 50.

**Assessment**

The maximum number of marks you can earn is 60. This exam is an open book exam which means that you are allowed to use any resources you find useful except any communication device like laptops, phones etc. You **pass this course if you earn at least 30 marks in the exam**.

**Terms and conditions**

IMPORTANT: When using Ilias, you are neither allowed to download nor to share the videos. By registering you accept these terms and conditions.
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