Aims

This course will cover selected topics in optimization theory. Applications of the material presented in this course are relevant for many other areas in Economics.

The course aims:

- to teach a set of mathematical tools that can be used in the analysis of a wide set of problems in Economics
- to develop a strong understanding of all key concepts that are presented.

Objectives

The module has three principal objectives:

- to teach a set of basic mathematical results,
- to teach the fundamentals of optimization theory with applications,
- to acquaint students with the tools of dynamic programming and dynamic games.

Teaching

The module will consist of bi-weekly lectures for 14 weeks. There will be written work and discussion of key articles.

Assessment

There will one midterm and a final examination. The midterm will be worth 40% and the final examination 60%.

Exercises will be available during the course. These do not count in the final assessment. They are designed to help understanding of the material covered in the course by providing examples and further illustrations of the course content.
Reading

The readings will be drawn from the texts listed below. These texts contain extensive bibliographies of the relevant literature.

Part I. Recommended text


Part II. Other texts


Comments on texts

Course Outline

1. Preliminaries: Chapter 1
2. Introduction to Optimization Problems and Examples: 2
3. Existence: 3
4. Unconstrained Optima: 4
5. Equality Constraints: 5
6. Inequality Constraints: 6
7. Convexity, Uniqueness: 7, 8
8. Parametric Continuity: 9
9. Supermodularity and Parametric Monotonicity: 10
10. Introduction to Dynamic Programming: 11, 12