

## 040522 UK Mathematical Methods B for Economics

Lecturer: Univ.-Prof. Dipl.-Ing. Dr. Gerhard Sorger

Tuesday 14:15- 15:45 and Wednesday 9:15-10:45 Seminar Room 1 (Hohenstaufengasse)

Course starts on March 7<sup>th</sup>, 2012

**Target group:** Master students of *Economics*. The course counts for 4 hours (8 ETCS points).

**Prerequisites:** Knowledge of macroeconomics, microeconomics, and mathematics as covered in the Bachelor program.

**Contents:** The course deals with mathematical methods for the analysis of deterministic dynamic economic models in discrete time. These methods include the theory of difference equations and the theory of deterministic dynamic programming.

**Objectives:** After successful completion of this course, students

- can formulate dynamic economic models using difference equations and dynamic optimization problems;
- are familiar with the basic terminology used in the theory of difference equations and dynamic programming;
- are familiar with the theory of linear difference equations;
- are familiar with the following elements of the theory of autonomous difference equations: local linearization techniques, stability analysis, and the basics of bifurcation theory and deterministic chaos;
- understand several methods for the solution of dynamic optimization problems (Euler equation, transversality condition, Lagrangian approach, dynamic programming);
- are able to characterize the solutions of simple dynamic optimization problems.

**Bibliography:** The course does not follow any particular textbook. Good references are *Economic Dynamics* by Giancarlo Gandolfo (Springer-Verlag, 2010), *Discrete Dynamical Systems* by Oded Galor (Springer-Verlag, 2011), *Further Mathematics for Economic Analysis* by K. Sydsaeter, P. Hammond, A. Seierstad, and A. Strom (Prentice Hall, 2005), *Economic Dynamics* by R. Shone (Cambridge University Press, 2002), and *Recursive Methods in Economic Dynamics* by N.L. Stokey and R.E. Lucas, Jr. (Harvard University Press, 1989).

**Assessment:** There will be frequent homework exercises as well as a written test at the end of the term.

**Registration:** Online registration via UNIVIS.

**Website:** [homepage.univie.ac.at/gerhard.sorger/teaching.html](http://homepage.univie.ac.at/gerhard.sorger/teaching.html)