Optimal Control and Dynamic Games
Course no. 608.909

Place and time: kick-off meeting **11 October 2017, 5:00 pm**
room L2.2.12 – Lakeside Park building b02, 2nd fl.
Additional sessions (blocs) and individual contacts during the winter term will be agreed upon at the kick-off meeting.

Language: English.

Target group: Master and PhD students in economics and business administration. The course is part of the curriculum of the doctoral program MSOBE.

Prerequisites: working knowledge of the English language; basic knowledge of economics; basics of calculus and linear algebra; some knowledge of intermediate economics and/or quantitative management (operations research) desirable.

Registration for the course: via ZEUS for registered (in Austria: "immactriculated") students; otherwise by email to reinhard.neck@aau.at by October 17, 2017. Any additional details will be made available via Moodle. In order to be able to access this e-learning platform as an external student you need to contact Christina Kopetzky at vwl2@aau.at. Once you have done this we can enrol you in Moodle for the course.

Housing: The closest B&B is Pension Wachau – details at www.pension-wachau.at; the youth hostel (http://www.oejhv.or.at/quartier/9020/9020.htm) is also within walking distance.

Content of the course: introduction to optimal control and dynamic game theory and their applications to problems of economics and management science with special emphasis on macroeconomic policy.

Recommended textbooks for the course: M.D. Intriligator, Mathematical Optimization and Economic Theory. SIAM Classics in Applied Mathematics, Philadelphia, PA 2002, Parts IV and V (chapters 11–16).

T. Basar, G.J. Olsder, Dynamic Noncooperative Game Theory, 2nd ed. SIAM, New York 1999.

M.L. Petit, Control Theory and Dynamic Games in Economic Policy Analysis. Cambridge University Press, Cambridge, UK 1990.

G. Feichtinger, R.F. Hartl, Optimale Kontrolle ökonomischer Prozesse: Anwendungen des Maximumprinzips in den Wirtschaftswissenschaften. De Gruyter, Berlin 1986.

Topics:

1. Dynamic Optimization: the Control Problem.

2. Calculus of Variations.

3. Dynamic Programming.

4. Pontryagin's Maximum Principle.

5. Dynamic Game Theory.

6. Applications in Economics and Management Science.

7. The Theory of Economic Policy: Applied Optimal Control and Dynamic Games.

Depending on the participants' prior knowledge and interests, the topics and schedule may be adapted to their needs.

Prerequisites for a positive assessment:
1. Oral and written examination at the end of the course (40 % each). Alternative: written seminar paper.
2. Execution of some exercises (10 %).
3. Positive assessment of the participation in the discussions (10 %).
4. Regular attendance.

Note on the seminar paper: The topic of the paper will be given individually to each student by the lecturer after having discussed the aims of the Master/PhD student (his/her previous work and/or intended dissertation fields). There will be ample time to deliver the paper **after** the end of the course. It shall show the student's ability to apply the techniques taught in the course to a problem close to his/her interests and prepare him/her for successful work on his Master/PhD thesis. The paper can be written in either English or German.

Note on the participation in the discussions: Questions for a better understanding of the presentations, the text or the exercises can be asked anytime. Only successful and positive contributions to the discussion will be assessed. Never hesitate asking anything if you feel it to be necessary!!