Macroeconomic Theory I

Economics 608   Module 1 (Fall 2012)
Tuesday, Thursday 11:30 – 1:00   Rawls 2079

Purdue University
Krannert School of Management Department of Economics

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                     (I am also available by appointment)
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Prerequisites
None

Course description
The course will discuss the important theoretical foundations required to conduct research on macroeconomic topics, broadly defined. This course will introduce the class of micro-founded models used in the so-called Real Business Cycle (RBC) school of macroeconomic thought.

This particular course will introduce the mathematical preliminaries, the properties of the deterministic models, and the recursive competitive equilibrium concept. Econ 611 (Module 2) will present material on continuous time models (taught by Professor Rui Li). I return in Econ 612 (Module 3, spring semester) to continue our discussion of RBC models by introducing stochastic models and ultimately models with heterogeneous agents.

All together, the first year macroeconomic education will allow you to address how firms and consumers allocate resources in a competitive setting and how the allocation and prices (wages and interest rates) respond to changes in policy and institutions.

Learning outcomes
- Acquire the necessary mathematical tools to be able to analyze micro-founded models of production and savings.
- Use the tools of dynamic programming to characterize the solution to problems with an infinite time horizon (that are formulated in a recursive manner).
- Apply the concept of a Recursive Competitive Equilibrium to a variety of macroeconomic settings.

Course materials

There is no mandatory course textbook, but the following texts are excellent reference sources. They are both at the Reserve Desk in the Roland G. Parrish Library of Economics and Management (2nd floor of Krannert).

- Recursive Methods in Economic Dynamics by Nancy L. Stokey and Robert E. Lucas with Edward C. Prescott (Harvard University Press, Cambridge, Mass., 1989)
- Dynamic Economics: Quantitative Methods and Applications by Jerome Adda and Russell Cooper (MIT Press, Cambridge, Mass., 2003)

Course structure (14 lectures)

The course will contain 14 lectures with a Final Exam taking place during the final meeting period (October 11). The Final Exam will cover all material from these 14 lectures and students are permitted 75 minutes to complete the exam.

Date	Topic
August 21	Course Introduction; Planner's Problem of Classical Growth Model
August 23	Basic Topology
August 28	Normed Vector Spaces
August 30	Welfare Theorems
September 4	Extreme Value Theorem
September 6	Nonlinear Programming and Duality
September 11	Convex Analysis: Kuhn-Tucker Conditions
September 13	Sequence of Markets Equilibrium (SME)
September 18	Sequence of Markets Equilibrium Easy (SMEE)
September 20	Dynamic Programming I (Correspondences)
September 25	Dynamic Programming II (Blackwell and Contraction Mapping)
September 27	Dynamic Programming III (Envelope Theorem)
October 2	Recursive Competitive Equilibrium (RCE)
October 4	RCE Applications
October 9	October Break Holiday: No Class
October 11	Final Exam (in class)
October 16	No class meeting (Module 2 begins on October 17)

Methodology
The course will be based on a series of lectures. The lectures are comprehensive, but can be supplemented by the reference texts cited above. The lectures are supported by:

1) *Exercises and class participation*

   At the end of every lecture, I will assign several short exercises to be completed at home. At the beginning of the following lecture, students will turn in their solutions to the assigned exercises. Occasionally, I may require students to complete in-class activities related to the completed exercises.

   Each exercise is graded on a 5-point scale based on correctness, with partial credit given as a strictly increasing function of effort. The credit awarded for the small group activities will depend upon the length of the activity. Solutions to all exercises will be posted on the class webpage located at www.matthew-hoelle.com/teaching.html.

2) *Final Exam*

   During the final meeting period (October 11), a Final Exam will be given (closed notes, closed books). The exam will cover all the material covered in the 14 lectures of Module 1. Students are permitted 75 minutes to complete the exam.

   The exam breakdown is as follows:

   2/3 weight: Deterministic Growth Model
   -   For a past exam, see Question 1 on Econ 612 (Spring 12) Final Exam. (This question considers a stochastic economy, whereas I will only ask you to consider a deterministic economy. Thus, ignore the shocks z_t, the histories h_t, and the so-called Arrow securities $b_z(h_t)$ required to accommodate the uncertainty in a stochastic setting.)

   -   Also, consider the exercise applications distributed on October 2 (and discussed in class on October 4).

   1/3 weight: Potpourri
   -   One possibility is Kuhn-Tucker.
   -   A second possibility is Dynamic Programming.
   -   A third possibility is Second Basic Welfare Theorem.

Assessment

Exercises and class participation	50%
Final Exam	50%