Ivan Franko National University of Lviv, Ukraine
Faculty of Mechanics and Mathematics

Macro Topics: Introduction to Matlab
Course Syllabus

Spring Semester 2019/2020

Teacher: Olga Bychkova, MSc., M.A.
Email: Olga.Bychkova@cerge–ei.cz
Office hours: TBA

Course webpage: TBA
Lectures: TBA
Exercise sessions: TBA

Description of the Course

The course provides students with the tools and concepts necessary to understand modern macroeconomic theory — discrete time dynamic programming and continuous time optimal control. Study of specific models will take a back seat to mastering the techniques. We will use Matlab to utilize basic numerical methods of solving the problems. Some supplementary exercises on using the software will be prepared. Basic courses in Macroeconomics and Mathmatics are prerequisites.

Literature

The main textbooks for this course are:
A Attaway, S. (2012). *Matlab: A practical introduction to programming and problem solving — 2nd edition.* Elsevier.
B Bertsekas, D. (2005.) *Dynamic programming and optimal control.* Athena Scientific.
LS Ljungquist, L., & Sargent, T. J. (2004). *Recursive macroeconomic theory — 2nd edition.* Cambridge, MA: MIT Press.
M McCandless G. (2008). *The ABCs of RBCs: An introduction to dynamic macroeconomic models.* Cambridge: Harvard University Press.

Additional handouts may be distributed in class or posted on the course webpage along with the lecture notes.

Main Topics Covered

1. Discrete time dynamic programming: finite and infinite horizon (B volume 1 chapter 1, B volume 2 chapter 1, LS chapter 3, M chapter 3).
2. Numerical solution methods:
   (i) Guess and verify, value function iteration, and policy function iteration (Howard improvement algorithm).

- Simplified growth model with log utility, Cobb–Douglas production function, and full depreciation (LS chapter 3).
- Search/stop problem (LS chapter 6).

(ii) Search models (LS chapter 6).
- Neal's model of career choice (LS chapter 6.5).

(iii) Log–linearization.
- RBC (Real Business Cycle) model (M chapter 6).

(iv) Linear–quadratic problem (LS chapter 5).

Grades are based on three components

30% **Problem sets** (weekly assignments distributed each Friday except for midterm and final exam weeks, due one week later)
30% **Midterm exam**
40% **Final exam**

Effort expectations

Students are expected to attend classes and actively participate. Also, they are encouraged to read assigned chapters beforehand so that we can focus on discussion and deeper understanding in class rather than explanation of basic concepts.