MACROECONOMICS (PhD. Core)

ECON 6140, Spring 2025

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Office hours: T 4:15-5:15pm & by appointment
Lecture: T-R 2:55 – 4:10 pm

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Office hours: T-R 4:30-5:30pm
Review Session: F 8:40am-9:55am Uris 202

The purpose of this course is to familiarize you with the techniques and models of aggregate dynamic economics. In this course we will spend a fair amount of time developing techniques for dynamic analysis and applying those results to the study of traditional macroeconomic questions related to growth dynamics and inequality. Since the purpose is to help you work with models, and to develop skills that will let you use models to discuss economic issues, the course will be of necessity "narrow." That is, I will **not** cover a lot of topics, but I will try to cover them deeply.

Pre-requisits

Even though we will discuss the basic material in class, it is absolutely necessary that you are familiar with notions of calculus, optimization, probability and statistics. This is a graduate course in economics. Successfully completing the first semester Macro Core class is important since this course builds rapidly from those concepts.

Course Organization

All sessions will be lecture style. I encourage you to read the assigned material in advance and ask questions in class. Quite often I will ask for your ideas and intuition. I welcome your comments and questions. Review sessions are good opportunities to ask more technical questions and discuss exercises. Some technical topics will be mostly discussed during review sessions. There will be a midterm exam at the end of this half of the course, **Tuesday March 11** In addition there will be several homework problems.

I encourage you to work in groups when solving homework problems. This is challenging during the pandemic but I trust that you will find a set of people that you can meet online to discuss assignments. If you need help finding a study partner let us know and we will work with you. During your PhD you will learn a lot from interacting with your peers. And this is good training for the future! I expect you to turn in your own version of homework assignments.

If you have any doubts about what "your own version" means, please check the integrity code at http://www.cuinfo.cornell.edu/aic.cfm. If your handwriting is not good, please plan on typing them.

If you turn in N homework assignments, N-1 will be counted towards your final grade (the one with the lowest grade is automatically dropped). Homework assignments are due at beginning of lecture. Not all questions within a homework will be graded. Successfully completing homework assignments is key to success in this course, and the building block of your study strategy. Late assignments will not be admitted. Submissions should be through the Canvas shell, submissions by email will not be accepted.

That said, emails will be an "official" way of communication for this half of the class. I will use a mailing list for some announcements. Feel free to send me email with questions or concerns at jdc364@cornell.edu. I will ask you to meet me at office hours to answer questions about material since I will not do it via email.

Finally, material such as notes, homework, homework solutions, etc will all be available through the canvas shell. Classes will be recorded and the recording will be available via Canvas shortly after each class. I expect you to come to class, turn on your camera and participate of the class discussion as much as possible. Occasionally, I will set up break-rooms to encourage discussion. I assume you are aware of everything discussed in class, including announcements.

Basic Materials

We will use a variety of different sources. Initially, I will base my lectures on my own notes and a set of notes by Professor R. Manuelli. You will have access to them through the course webpage. Throughout the course I would occasionally use Dirk Krueger's notes *Macroeconomic Theory* (2012) which are readily available online. The two major books that you can use for reference are *Recursive Methods in Macroeconomic Dynamics* (by Nancy Stokey, Bob Lucas and Ed Prescott, 1989) and *Recursive Macroeconomic Theory* (by Lars Ljungqvist and Thomas Sargent, 2004). Both books should be available at the bookstore and library.

As we get into models of endogenous growth, I will refer to particular models and peer reviewed papers. If you prefer a reference book you can use either *The Economics of Growth* (by Philippe Aghion, Peter Howitt, 2008), *Introduction to Modern Economic Growth* (by Acemoglu, 2009) or *Economic Growth* (by Robert Barro and Xavier Sala-i-Martin, 2004).

For a few homework assignments, you will be asked to use your computer. For a treatment of numerical methods you can use *Numerical Methods in Economics* (by Kenneth Judd, 1998) or the notes available at quantecon, https://lectures.quantecon.org/

Grading

40% Homework (questions graded at random), 60% Midterm.

Class schedule

1. January 21
2. January 23
3. January 28
4. January 30
5. February 4
6. February 6
7. February 11
8. February 13
   February 18 (No class, winter break)
9. February 20
10. February 25
11. February 27
12. March 4
13. March 6 Finish Material and Review
14. March 11, during class (I will look for a room so you can take 2 hours to work through the exam)

Code to read tentative outline:

Handbook of Macroeconomics (Volume 2)	HM
Handbook of Economic Growth (Volume 2B)	HG
Manuelli's notes	M
Aghion and Howitt (2008)	AH
Acemoglu (2009)	A
Krueger (2012)	DK

Tentative Outline (12 meetings)

- **Class1: One Sector Growth Model (Ramsey- Cass-Koopmans)***
    - Intro
    - Review of the One sector Growth Model
    - Steady State

  *assumes you are proficient in dynamic optimization. If you are not, please review ``old lecture 1" here and/or come see me during office hours.

M (2), HM (1, 26)

- **Class 2: One Sector Growth Model (Ramsey-Cass-Koopmans)**
    - Saddle Path, existence and uniqueness of a stable manifold.
    - Recursive representation, existence of equilibrium.
    - Computation

M (3), HM (1, 26), HG(6)

- **Class 3-4: Competitive Equilibrium, Heterogeneity**
    - Competitive equilibrium
    - Recursive equilibrium
    - Taxation

M (4), HM (11, 26)

- **Class 4-5**: **Overlapping generations model**
    - The problem of two infinites: dynamic inefficiency
    - Overaccumulation
    - Social Security

- **Class 6-7**: **Heterogeneity and incomplete markets**
    - Gorman aggregation.
    - Bewley economy.
    - Computation

M(4), DK(10)

- **Class 8-9: Exogenous long run growth**
    - Pontryagrin's principle (Review session)
    - AK model
    - Saddle path, uniqueness and stability
    - Application: Human capital accumulation (Ben-Porath)

BSiM (3), A (7 -8), AH (2), HG(3)

- **Class 10-11: Endogenous long run Growth**
    - Externalities (Romer, 1986)
    - Externalities in Human Capital (Lucas, 1988)

A (10, 11), AH (3), HM (1)

- **Class 12: Innovation**
    - Model with Horizontal Innovation (Romer, 1990)

A (11), AH (4, 5), HG (1)