

## Syllabus for 475, Macro

**Course content:** The main emphasis will be on macroeconomic modelling. The central tools will be developed in the course: dynamic general equilibrium theory and dynamic optimization. A number of topics will also be studied; these topics will only provide a partial survey of modern macroeconomics.

**Examination:** The final grade will be calculated as follows: the midterm exam counts for 25%, the final exam counts for 40%, and the homeworks count for 35%.

**Readings:** No book will be followed closely, but the new book by Ljungqvist and Sargent has a substantial overlap with the course material. There will be a few papers. Parts of other books will be included. In general, the main emphasis will be on what is covered in the lectures. Lecture notes will be available with a delay.

## Course outline

The course will be built around methods, and the different macroeconomic topics will play the role of applications of the methods. There will be relatively little emphasis on macroeconomic data. The lecture enumeration below is approximate.

### 1 The neoclassical growth model

This section will introduce the basic modern macroeconomic framework. It will study dynamic optimization, dynamic equilibrium analysis of two kinds (sequential and recursive equilibria), discuss market structures, look at steady states and dynamics of the basic one-sector growth model, and study the welfare properties of equilibria. Two demographic structures will be studied: the dynastic model (one infinitely-lived consumer) and the overlapping-generations (OG) model.

#### 1.1 The dynastic model

- *Lecture 1:* Introduction, building around the Solow/Swan growth model with an exogenous savings rate.
- *Lectures 2 and 3:* Dynamic optimization. Starting with a finite-horizon problem, study necessary and sufficient conditions for optima. Consider the sequential formulation of an infinite-horizon problem and study the corresponding conditions.

- *Lecture 4:* The dynamic-programming approach to infinite-horizon optimization problems.
- *Lectures 5 and 6:* Steady states and dynamics in the neoclassical growth model. Linearization techniques for characterizing local dynamics.
- *Lecture 6:* Competitive equilibrium: the sequential formulation.
- *Lecture 7:* Recursive competitive equilibrium.
- *Lectures 8 and 9:* Uncertainty and market structures.
- *Lecture 10:* Welfare properties of equilibria.

**Readings:**

1. Ljungqvist and Sargent (2000; henceforth LS), Chapters 1, 2, 7;
2. Stokey and Lucas with Prescott (1989), Chapters 2 and 6.

## 1.2 The OG model

- *Lecture 11:* The basic structure without production. Competitive equilibria and their welfare properties.
- *Lecture 12:* The neoclassical growth model with OG demographics. Welfare properties.

**Readings:**

1. LS, Chapter 8;
2. McCandless (1991), a book at an undergraduate level which is nice (background reading only);
3. Balasko and Shell (1980), the optimality criterion for an endowment economy (background reading only);
4. Cass (1972), on capital overaccumulation (background reading only).

## 2 Growth theory

- *Lectures 13–16:* Growth facts and theories. Solow’s growth model and endogenous growth models (the  $Ak$  model, human capital accumulation, and endogenous technological change).

**Readings:**

1. LS, Chapter 11;

2. Barro and Sala-i-Martin (1995), a graduate textbook in growth which builds on continuous time but has an introductory chapter which is appropriate;
3. Jones (1998), an advanced undergraduate textbook on growth (the introduction is useful; background reading only);
4. Lucas (1995), the famous human capital accumulation paper (background reading only);
5. Romer (1990), the endogenous technical change paper (on R&D).

### 3 Fiscal policy

- *Lecture 17*: Ricardian equivalence propositions.
- *Lecture 18*: Optimal taxation of capital and labor under commitment.

#### Readings:

1. LS, Chapter 9;
2. Atkeson, Chari, and Kehoe (1999), FRB of Mpls Quarterly Review;
3. Barro (1974), the famous Ricardian equivalence paper (background reading only).

### 4 Asset pricing

- *Lectures 19 and 20*: The Lucas tree model and the equity premium puzzle with some suggested solutions.

#### Readings:

1. LS, Chapter 10;
2. Lucas (1978) (only if you're curious—it's mathematically demanding; background reading only);
3. Mehra and Prescott (JME, 1985), the puzzle paper;
4. Kocherlakota (JLE, 1996), a nice survey.

## 5 Business cycle theory

- *Lecture 21*: Business cycle facts.
- *Lecture 22–23*: Real business cycle analysis.
- *Lecture 24*: Sunspot models of cycles.

### Readings:

1. Prescott (1986), another FRB of Mpls paper, including (negative) comments by now Secretary of Treasury Larry Summers;
2. Cooley (1995), the chapter on calibrating the stochastic growth model;
3. Farmer (1993), a good book to read in general; it has some sunspot material.