

Course title: Macroeconomics II

Number of credits: 4

Type of course: Core

Course scheduling: Winter Semester; II Year

Number of lecture hours: 56 (approximately)

Evaluation: Mid semester: 40%; Term paper and assignment: 10%; End semester: 50%

Course Instructor: Professor Meeta Keswani Mehra

Overview of the course

The course introduces students to new developments in growth theory, their possible extensions and popular applications. It broadly covers growth models with exogenous savings, models with consumer optimization, and models of endogenous growth with extensions to inclusion of knowledge spillovers, public goods/ infrastructure, and human capital. Next an introduction to select developments in macroeconomics over the recent years in terms of the use of the optimal growth models is provided. The main applications are the use of the infinite horizon consumer optimization to savings and investment in the open economy, and applying overlapping-generations models to social security and altruism. Further, there is a module on demand for money, and finally an introduction to the theory of short run economic fluctuations, with focus on real business cycles to explain the cyclical behavior of employment and output.

Learning objectives

- To enhance the understanding of advanced models and theories in macroeconomics, such as endogenous growth and demand for money as well as applications to social security, altruism, theory of short-run fluctuations and business cycles to add value to career prospects in the field of economics.
- To critically examine modern workhorse theories and associated applications and policy prescriptions in a fast-changing economic world.
- To develop an in-depth understanding of the interplay between different sectors of the economy in a dynamic temporal framework, and how these interactions affect the overall economic performance, growth and policy decisions in real world situations.
- To solve large general equilibrium macroeconomic models using dynamic optimization and differential calculus.

Learning outcomes

- To bridge the gap between undergraduate textbooks in macroeconomics and the modern literature that features dynamic models built upon microeconomic foundations and rational expectations.
- To equip students in conducting theoretical and empirical research in the area of macroeconomic modelling, growth analysis, sources of endogenous growth and technical change, convergence and divergence, and business cycles for the purpose of policy formulation and forecasting.
- To enable students to demonstrate an academic and a professional understanding of macroeconomic issues such as growth, convergence/ divergence, efficiency, social security, altruism, demand for money, real business cycles etc.
- To critically evaluate the theoretical underpinnings of various macro-dynamic closed and open-economy models using mathematics.

- To learn how to use key methodological tools and techniques in modern dynamic macroeconomics.
- To apply those tools to analyze practical questions in dynamic macroeconomics.

Course modules

Module 1: Introduction to growth theory

Importance and motivation to study growth; empirical regularities about economic growth, history of modern growth theory.

Introduction (B&SM)

Module 2: Growth models with exogenous saving rates

- **The Solow-Swan model**

Basic structure; model solutions without and with markets, steady state, golden rule of capital accumulation and dynamic inefficiency, transitional dynamics, comparative statics, extensions to technical progress and physical and human capital, application to convergence, poverty traps and growth accounting

Chp 1 (B&SM), Chp 1 (DR).

- **The A-K model**

Motivating the precursors of endogenous growth, basic structure of the A-K model with exogenous savings; endogenous growth and transitional dynamics

Chp 1 (B&SM)

Module 3: Growth models with endogenous savings

- **Dynamic optimization in continuous time: optimal control theory in the context of growth models**

Appendix A.3 (B&SM), Part 3 Chp 7 (AC), Part II Sections 1-7 (K&S)

- **The Ramsey-Cass-Koopman's model of consumer optimization**

Basic model structure for the decentralized market economy; transitional dynamics; balanced growth path and golden rule capital stock, comparative statics, comparison with social planner's solution; extension to include government purchases and open economy context.

Chps 2 & 3 (B&SM), Chp 2 Part 1 (DR), Chp 2 Sections 2.1-2.2 (B&F).

- **The Diamond's overlapping generations model**

Model setup, dynamics of the decentralized economy, balanced growth path, possibility of dynamic inefficiency of the market economy, extending the model to include government and characterizing the command optimum.

Chp 2 Part B (DR), Chp 3 Section 3.1 (B&F), Appendix 3.8 Chp 3 (B&SM), Chp 6 Section 6.3 (MW).

Module 4: Models of endogenous growth

- **The A-K model (with endogenous savings)**

Model structure; market equilibrium; transitional dynamics.

- **The learning-by-doing and knowledge spillovers model**

Motivating the role of learning-by-investing and knowledge spillovers; characterizing the balanced growth path and the transitional dynamics; Pareto non-optimality and

policy implications.

- **Model of public good/ infrastructure** and endogenous growth.
- **Models with human-capital** (one-sector and two-sector models)

Basic one sector model with both physical and human capital; models with two sectors of production (with differing technologies for production and education); the Uzawa-Lucas model; steady state analysis; transitional dynamics.

Chp 4-5 (B&SM), Chp 3 (MW).

Module 5: Investment and Saving in the Open Economy

Application of the basic Ramsey model to investment and savings in the open economy; q-theory of investment; characterizing the steady state and the dynamics with respect to behavior of consumption, investment, capital stock, and current account balance; effect of productivity shocks to the current account.

Chp 2 Section 2.4 (B&F), Chp 2, Section 2.7 (MW)

Module 6: Altruism, Social Security and Capital Accumulation

Application of Diamond's market economy model to incorporate altruism; application to social security (fully funded schemes versus pay-as-you go systems) and implications for capital accumulation.

Chp 3 Sections 3.1 and 3.2 (B&F), Chp 6 Section 6.3 (MW)

Module 7: Demand for Money Models

The overlapping generations model without and with money; cash-in-advance model of demand for money; money in the utility function (Sidrauski model); money as an intermediate good (Ljungqvist and Sargent model).

Chp 4 (B&F), Chp 8 Sections 8.1-8.8 (MW), Lecture notes by Blanchard at the MIT Open courseware site <http://ocw.mit.edu/NR/rdonlyres/4A31EDC7-DD5F-46AC-8A3A-8A522A44367D/0/slides06.pdf>.

Module 8: Real business cycle dynamics

Basic theory of fluctuations; a baseline real-business cycle model; intertemporal substitution in labor supply by households, intra-temporal trade-off between consumption and labor supply; consumption and labor supply with uncertainty; explanation for output and employment fluctuations for special and general cases of the model

Chp 5 (DR), Chp 2 Section 2.5 (MW).

Readings

1. Barro, Robert J and Sala-i-Martin, Xavier (B&SM). Economic Growth. Second Edition. Prentice Hall, India. 2004. Introduction, Chps 1, 2, 3, 4, 5, Appendix A.3.
2. Blanchard, Olivier Jean and Fischer, Stanley (B&F). Lectures on Macroeconomics. 1996. Prentice Hall of India. Chps. 2, 3 & 4.
3. Blanchard, Olivier. Introducing Money. Lecture notes at the MIT Open courseware site <http://ocw.mit.edu/NR/rdonlyres/4A31EDC7-DD5F-46AC-8A3A-8A522A44367D/0/slides06.pdf>
4. Chiang, Alpha C (AC). Elements of Dynamic Optimization. 1992. Waveland Press Inc. USA. Part III, Ch7.

5. Kamien, Morton I, and Schwartz, Nancy L (K&S). *Dynamic Optimization: The Calculus of Variations and Optimal Control in Economics and Management*. Second Edition. North Holland, London. 1993. Part II: Sections 1-7.
6. Romer, David (DR). *Advanced Macroeconomics*. Second Edition. McGraw-Hill International Edition (Economics Series). 2001. Chp 1, 2 &5.
7. Wickens, Michael (MW). *Macroeconomic Theory: A Dynamic General Equilibrium Approach*. 2008. Princeton University Press. Princeton and Oxford. Chps 2, 3, 6 & 8