14.452: Introduction to Economic Growth

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This half semester class will present an introduction to macroeconomic modeling, focusing on the theory of economic growth and some of its applications. It will introduce a number of models of nonstochastic and stochastic macroeconomic equilibrium. It will use these models to shed light both on the process of economic growth at the world level and on sources of income and growth differences across countries.

The course has a number of objectives: the first is to familiarize you with a set of issues and questions that are central to macroeconomics, and that are also (hopefully) exciting and important; the second is to develop some of the most important tools of dynamic economics useful in macroeconomics as well as in a number of other subdisciplines of economics including general equilibrium theory, political economy, industrial organization and contract theory; and final objective to provide you with a number of workhorse models useful in multiple areas of macroeconomics.


Course details:
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Lectures: TuTh 1-2:30, E51-151.
Recitation: TBA.
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Syllabus

Lecture 1 (first half): Stylized Facts of Economic Growth and Development

This half lecture will give a brief overview of the stylized facts of economic growth and show the large disparities in income per capita across countries. It will also discuss briefly how the world distribution of income across countries has come to be so unequal.

1. Introduction to Modern Economic Growth, Chapter 1.


### Lectures 1 (second half), 2 and 3 (first half): Introduction to the Solow Growth Model

The Solow growth model is a workhorse for many macro applications, and it is the starting place for the modern theory of economic growth. Here we begin with the basics of this model, which will already be familiar to many of you.


### Lecture 3 (second half): The Solow Model and the Data; Growth Accounting, Levels Accounting and the Facts

This lecture uses the Solow growth model to interpret the stylized facts we encountered in the first lecture. In the process, we will also discuss a number of popular empirical strategies used in cross-country work and also the methodology of growth accounting.


**Lecture 4: Foundations of Neoclassical Growth; Representative Consumers, Optimal and Competitive Allocations, Welfare Theorems**

The neoclassical growth model differs from the Solow growth model in incorporating consumer optimization. This half lecture will set up the dynamic maximization problem corresponding to optimal growth in the context of the neoclassical model, and also review the first and second welfare theorems from basic microeconomics, and discuss how they apply in the dynamic, infinite-horizon models.


**Lecture 5: Neoclassical Growth**

This lecture will study the equilibria and the Pareto optimal allocations in the workhorse neoclassical growth model. We will characterize both the steady state equilibrium and the dynamic equilibrium path of the economy starting from an arbitrary level of capital stock.


Lecture 6: Overlapping Generations and Dynamic Efficiency

The other workhorse model of dynamic macro is the overlapping generations model developed by Paul Samuelson and Peter Diamond. This lecture will introduce this model. It will show why there are significant differences between the neoclassical model with a representative consumer and the overlapping generations model and point out a number of applications of the overlapping generations model.


Lecture 7: Competitive Growth under Uncertainty

This lecture will introduce models of stochastic growth. It will first discuss the Brock-Mirman model optimal growth under uncertainty and then show how this allocation can arise as a competitive equilibrium when the economy is endowed with a full set of contingent securities or Arrow securities. The canonical Real Business Cycle model will be discussed briefly as an application. It to also emphasize that low interest rates can arise even without overlapping generations, due to incomplete markets.

Lecture 8: Neoclassical Endogenous Growth: Capital Accumulation, Externalities and Human Capital

This lecture will first present a model of sustained growth using a variant of the neoclassical growth model, then present the first example of a model with endogenous growth due to the knowledge-base or the technology stock of the society expanding over time, and finally discuss the reasons why modeling sustained economic growth the with externalities is unsatisfactory and what special set of issues emerge in modeling technological change. The lecture will also briefly discuss the role of human capital in economic growth and introduce some basic models that are useful for thinking about human capital investments.


Lectures 9 and 10: Endogenous Growth with Expanding Input Varieties

These lectures will introduce the first models of endogenous technological change, where sustained economic growth takes place as a result of purposeful R&D-type activities.

1. Introduction to Modern Economic Growth, Chapter 13.


Lecture 11: Interdependences: Technology Diffusion, Trade and the World Income Distribution in an Open Economy

The models discussed up to this point in the class are closed economy models. These are not good approximations to the world live in, where international trade and exchange of ideas are important. This lecture will provide an overview of major interdependences across countries that arise both because of technology diffusion and international trade. The emphasis will be on how these interdependences fundamentally affect the process of economic growth and the world distribution of income.

1. Introduction to Modern Economic Growth, Chapters 18 and 19.


Lecture 12: Directed Technical Change: Endogenous Skill-Bias and Endogenous Labor-Augmenting Technological Change

This lecture will introduce models of directed technological change, where not only aggregate technological change, but the direction of technological change is endogenous. These models will enable us to discuss why and when technological change may be skill biased (favoring more educated workers), and why we may expect technological change to be labor augmenting.


