14.452: Introduction to Economic Growth

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This half semester class will present an introduction to macroeconomic modeling, particularly economic growth. It will focus both on models of economic growth and their empirical applications, and try to shed light on the mechanics of economic growth, technological change and 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 the third is to provide a first introduction to some of the key empirical issues in economic growth.

We will have 13 lectures in total. On November 14, I will be away and the TA, Karthik Sastry, will hold a recitation during the lecture. I will give a make-up lecture during recitation time on November 22. We do have a lecture on November 26, but no lecture on November 28 (Thanksgiving).


There will be four problem sets, and only one or two questions within each problem set will be due for grading. The problem sets will have a 30% weight in the final grade, with the remaining 70% coming from the final exam.

What follows is an approximate breakdown of topics to lectures. Some topics will take a little more than the indicated amount, and some less, but the syllabus should give you a rough idea of the topics that will be covered in different parts of the course.

Course details:
My e-mail: daron@MIT.edu
Lectures: TuTh 1-2:30, E51-151
Recitation: F 2:30-4pm, E51-151
Teaching Assistant: Karthik Sastry, ksastry@mit.edu
Final exam: Wednesday Dec. 18, 1:30-4:30pm, E51-145
Syllabus

Lecture 1: Stylized Facts and Proximate and Fundamental Causes of Economic Development

This 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 provide an example of how to investigate the relationship between a country level characteristic (in this instance democracy) and economic growth. 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 2 and 3: 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.

1. Introduction to Modern Economic Growth, Chapter 2.


Lecture 4: 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.


**Lectures 5, 6 and 7: Neoclassical Growth**

The neoclassical growth model differs from the Solow growth model in incorporating consumer optimization. These collectors will first introduced the foundations of consumer optimization in dynamic economies and discuss the assumption of representative households. They will then 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 8: 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 focus is on this model. As a preliminary step, called discuss the first than the second welfare theorems in dynamic economies, and then turned to the overlapping generations model. This will enable us to understand sources of and conditions for dynamic inefficiency in overlapping generations model. We will also discuss various applications of overlapping generations models.


Lecture 9: 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.


**Lecture 10: Endogenous Technical Change**

This lecture will introduce the first models of endogenous technological change, where sustained economic growth takes place as a result of purposeful R&D-type activities. We will also briefly discuss some of the evidence on knowledge spillovers and externalities and the innovation process.


Lecture 11: 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.


Lecture 12: Beyond Factor-Augmenting Technology

This lecture will revisit the question of whether the standard aggregate production function used in macro and growth models, assuming factor-augmenting technological change, is plausible, and what the alternatives are, and how these alternatives help us think about the stylized facts of growth and the implications of technological change.

Lecture 13: Interdependencies: Technology Diffusion and Trade

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.


