



Institute of Economics  
Department of Economic Theory  
Prof. Dr. Marten Hillebrand  
Tel: +49 761 / 203-2326  
E-mail: [marten.hillebrand@vwl.uni-freiburg.de](mailto:marten.hillebrand@vwl.uni-freiburg.de)  
Rempartstrasse 10-16  
D-79085, Freiburg im Breisgau  
URL: [www.macro.uni-freiburg.de](http://www.macro.uni-freiburg.de)

Syllabus for the Master's course  
**Advanced Macroeconomics 2**  
Summer semester 2023

- Summary:

The course studies macroeconomic models at an advanced level using state-of-the-art dynamic general equilibrium theory. The focus is on models of economic growth describing the long run evolution of economies. The course is organized in two parts.

Part I discusses the general economic forces generating the empirically observed increase in key macroeconomic variables over time and the determinants of per-capita income which is generally used as a (crude) measure of well-being in a country. We will also explore whether fiscal policy can and should influence the growth process in an attempt to foster production and income. Finally, we will study the role of natural resources for the production process and whether scarcity of these resources limits output and growth in the long run. Departing from the Solow growth model, we will discuss the previous issues using the neoclassical growth model which forms the basis for virtually all modern macroeconomic models. This model will be discussed in great depth and detail and alternative theoretical and numerical approaches for determining the equilibrium growth path will be derived and compared.

Common to all models explored in Part I is that growth of labor efficiency being the driver of growth is taken as exogenous. This assumption is relaxed in Part II which focuses on the Romer model of endogenous growth aiming to explain efficiency growth due to technological progress and how policy can affect this process. Time permitting, we will also explore technological change directed towards specific production factors or technologies and use this idea to study the implications for environmental problems.

All theoretical results will be illustrated and quantified by numerical simulation scripts written in PYTHON which will be made available to all participants.

- Literature:

Acemoglu (2009): *Modern Economic Growth*, Princeton University Press

Miao (2014): *Economic Dynamics in Discrete Time*, MIT press.

Additional references will be given in class.

- Target audience:

Students enrolled in the M.Sc. programs Economics and VWL.

- Credit points: 6 ECTS

- Contents (tentative):

- Part I: Exogenous Growth Models

- 1. The Solow Model
    - 2. The Neoclassical Growth (NCG) Model
    - 3. Labor Supply and Fiscal Policy in the NCG Model
    - 4. Energy and Natural Resources

- Part II: Endogenous Growth Models

- 5. The Romer Model
    - 6. Directed Technical Change\*
    - 7. Directed Technical Change and the Environment\*

- \* = 'time permitting'

- Prerequisites:

Course participants are expected to have a sound understanding of intermediate macroeconomics and microeconomics paired with a solid background in basic mathematics (linear algebra, calculus, constrained optimization, etc.). Since the course will have a strongly quantitative focus, we also expect a genuine interest in economic theory and mathematical model building. Having completed any of the courses Advanced Macroeconomics I or Advanced Mathematics in Economics and Finance from the winter semester is favorable but not required.

- Course meeting times:

- One-and a half lecture classes ( $3 \times 45$  min.) per week
  - Lecture classes take place on Wednesdays, 10-13 in lecture hall HS 1015
  - The first lecture class is on Wednesday, April 19 at 10:15 am.
  - Lecture classes are complemented by tutorial classes (offered in English and Chinese):
    - regular tutorial classes discussing course material relevant for the exam
    - supplementary tutorials discussing additional material not relevant for the exam.

We will alternate between regular and supplementary tutorials every week.

- Tutorials are taught by Philipp Emanuel Moog (in English) and Tong Wu (in Chinese).
  - Meeting times and venues will be announced in the first lecture class.

- Organization:

- The entire course takes place on-site with in-person attendance. There will neither be live-streaming nor pre-recorded videos (screencasts).
  - The entire course material (slides, problem sets, etc.) will be provided electronically on the ILIAS platform ([ilias.uni-freiburg.de](https://ilias.uni-freiburg.de)).
  - Students can directly sign up for the course and no password is required.
  - The course material will be released gradually every week prior to the lecture classes.
  - Participants enrolled in the course will be notified about all updates.
  - The same procedure applies for the tutorial classes.
  - We will also set up the ILIAS course to include a discussion forum permitting all participants to engage in discussions and ask questions.

- Examination:

- Two-hour (90 minutes) written final exam at the end of the semester.
  - The tentative examination date is Monday, August 7, 12-14 in HS 1010.
  - A retake will be offered at the end of the following semester.