COURSE UNIT (MODULE) DESCRIPTION

Subject	Science Category	Faculty
Macroeconomics	Economics S 004	Faculty of Economics and Business Administration

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	200	36	164

Coordinator:
Dr. Eglė Jakučionytė

Others:
Dr. Swapnil Singh (https://orcid.org/0000-0002-8046-2111)
Dr. Aurelija Proškutė (https://orcid.org/0009-0006-1566-5461)

Annotation

This course could be viewed as the first in the sequence of PhD macroeconomics courses as it provides an overview of the workhorse models of modern macroeconomics and their role in understanding macroeconomic data. To that end, two models receive higher emphasis: the neoclassical growth model and the real business cycles model. We will start with invoking the key facts about economic growth and business cycles and then relate key models to these facts. A relevant overview of quantitative tools follows equipping for practical macroeconomic applications. In this way, mathematical rigor and the need for presenting applications are balanced by providing a helicopter view of modern macroeconomics. This course could be followed by further extensions, such as heterogeneous agents and firms, and imperfections in labor and financial markets.

Course Outline

Part A: Introduction and Economic Growth

. Facts of economic growth and business cycles

Readings: MAC ch 1-2

(a) A primer on the macroeconomic history

(b) Key macroeconomic facts and interpretations

2. Tools: dynamic optimization in discrete time

Readings: MAC ch 4

(a) A dynamic optimization problem

(b) Sequential methods: finite horizon and infinite horizon

(c) Recursive methods

(d)Dynamic programming and Bellman equation

3. Theories of economic growth

Readings: MAC ch 3, 5-6, 11; LJS 3-4

(a) Basic Solow model

(b) Pareto optimal allocations, competitive equilibrium, welfare theorems

(c) Neoclassical growth model

(d) Application in Matlab/Octave

Part B: Economic Fluctuations

1. Models of business cycles

Readings: MAC ch 1, 7, 12, 16; GAL ch 1-4

(a) Real Business Cycles (RBC) model

i. Basic RBC model

ii. Extensions to the RBC model

(b) New Keynesian model

i. Price rigidities, wage rigidities

ii. Monetary policy strategies

(c) Application in Dynare

Learning Outcomes

Students will deepen their understanding of the core structure of modern macroeconomic models. Most importantly, students will be able to provide key intuition of model results. Students will learn how to write a code for a couple of basic model examples, improving their skills in Matlab/Octave and Dynare. After taking this course, students will also be able to follow more specialized courses in macroeconomics with less difficulty, get better understanding of academic papers on modern macroeconomics and obtain basic skills to start modelling themselves.

Prerequisites

• An undergraduate-level understanding of probability, statistics, linear algebra and macroeconomics is assumed. In case of the need to review material, we suggest the prospective students consult an open-access intermediate macroeconomics book by Garin et al. (2021).

• Students who plan to take this course must have passed the Research Methods course and

Statistics and Mathematics for Economists course that are typically offered in the fall semester.

• We will use Matlab as software to manipulate data and solve models throughout the course. Matlab licences are available for personal computers via VU access. Alternatively, one could use an open- access scientific programming language, Octave. Students are expected to have the software installed before the course.

• Additionally, we will learn how to use Dynare to solve models. It is an open-access package that works with both Matlab and Octave. Students are expected to have the software installed before the course.

Evaluation

The weights below are suggestive and it is up to the instructor to decide the exact weights.

• **Take-home assignments (40%).** There will be at least four assignments in this class. Assignments will require modifications in the application code and/or problem solving and interpretation of the results using the discussed macroeconomic theory. For each assignment, students are expected to be able to present the solution in class, explaining the main intuition of the exercise and the solution.

• **Presentation (20%).** Each student needs to replicate a paper from the reading list (which will be provided by the instructor at the beginning of the semester) and deliver a 30-minute presentation.

•**Written exam (40%).** The exam will cover all the course material. It is expected to take place at the end of the semester.

Reading

This is a restricted list of various books that will be touched during the course.

- (MAC) Marina Azzimonti, Per Krusell, Alisdair McKay, & Toshihiko Mukoyama. (2024, April). *Macroeconomics*. https://phdmacrobook.org/
- (GAL) Gal´ı, J. (2015). *Monetary policy, inflation, and the business cycle: An introduction to the new keynesian framework and its applications* (Second edition). Princeton University Press

Supporting Material

- (ROM) Romer, D. (2019). *Advanced macroeconomics* (Fifth Edition). McGraw-Hill Education
- (GLS) Garin, J., Lester, R., College, C., & Sims, E. (2021). Intermediate macroeconomics. https: //sites.nd.edu/esims/textbook/
- (LJS) Ljungqvist, L., & Sargent, T. J. (2018). *Recursive macroeconomic theory* (Fourth edition). The MIT Press
- The MathWorks, Inc. (2024). *Matlab* [Version R2024a]. Natick, Massachusetts, United States. https: //www.mathworks.com/products/matlab.html
- John W. Eaton and others. (2024). *Gnu octave* [Version 9.2.0]. Boston, Massachusetts, United States. https://octave.org

- Dynare Team. (2024). *Dynare: A program for economic modeling and analysis* [Version 6.1]. Paris, France. https://www.dynare.org/