**Syllabus**

**Course title ECBS 6001 – Advanced Macroeconomics**

**Instructor** Zsófia L. Bárány, Miklós Koren

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Office , B510 by appointment

**Credits**  4 US credits (8 ECTS credits)

**Module** []

**Term**  Fall and Winter 2023-2024

**Course level** PhD

**Prerequisites** Master's level Macroeconomics, This is a compulsory, core class for first-year PhD in Economics students and a compulsory class for second-year MA in Economics, Data and Policy students with a Research specialization.

**Course drop**

**1. Course Description**

**Content.** The course introduces two building blocks of macroeconomic modeling: forward-looking dynamic models and general equilibrium with heterogeneous agents. These tools are applied to problems of economic growth, labor market search, and industry dynamics. Quantitative model solutions are also illustrated using the Julia programming language.

**Relevance.** Dynamics and equilibrium are two building blocks of macroeconomic thinking. These approaches are essential for studying a wide range of problems in macroeconomics, labor economics, industrial organization, economic geography, international trade. .

**2. Learning Outcomes**

**Key outcomes.** By the end of the course, students will be able to

- Analyze growth models including the Solow and Ramsey frameworks.

- Evaluate endogenous growth theories and their implications.

- Apply search and matching models to labor market analysis.

- Analyze industry equilibrium with heterogeneous firms.

- Understand the importance of input-output linkages in macroeconomic contexts.

- Solve dynamic programming problems and ordinary differential equations using Julia.

**Other outcomes.** The course will also help develop skills in the following areas.

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| --- | --- |
| **Learning Area** | **Learning Outcome** |
| Critical thinking |  |
| Quantitative reasoning |  |
| Technology skills |  |
| Interpersonal communication skills |  |
| Management knowledge and skills |  |
| Cultural sensitivity and diversity |  |
| Ethics and social responsibility |  |

**3. Reading List**

**Required**

**Recommended**

**4. Teaching Method and Learning Activities**

Learning objectives will be achieved through

- Conceptual lectures.

- Student presentations.

- Live coding together with instructor.

- Group discussion.

**5. Assessment**

Grading will be based on the total score out of 100, in line with CEU’s standard grading guidelines.

- Weekly take-home assignments (60 percent)

- End-of-year exam (40 percent)

**6. Technical requirements**

- Personal laptop computer with administrative privileges to install open source software.

- Operating system: Windows 10+ or Mac OS X 10.8+, or Linux 2.6.18+

- Ability to install Julia 1.10, https://julialang.org/downloads/

- Internet access.

**7. Topic Outline and Schedule**

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| **Session** | **Topics** | **Readings** |
| Weeks 1-2 | Growth facts, the Solow and the Ramsey model | [] |
| Weeks 3-5 | Overlapping generations model and introduction to dynamic programming | [] |
| Weeks 6-10 | Linear algebra, dynamic programming and ODEs in Julia | [] |
| Weeks 11-12 | Endogenous growth | [] |
| Weeks 13-16 | Search and matching models of the labor market | [] |
| Weeks 17-18 | Industry equilibrium models of heterogeneous firms | [] |
| Weeks 19-20 | The Hopenhayn model of industry dynamics | [] |
| Weeks 21-22 | Solving industry dynamics models in Julia | [] |
| Weeks 23-24 | Input-output linkages | [] |

**8. Short Bio of the Instructor**

Zsófia Bárány is associate professor at CEU. She is a macroeconomist interested in economic growth, technological change and its impact on the labor market. A large part of her work aims at understanding the driving forces behind long-run trends in the evolution of labor market outcomes, such as inequality, or job polarization, taking into account individual heterogeneity.

Miklós Koren is professor of economics at CEU, senior research fellow at the Institute of Economics, and research fellow of the Centre for Economic Policy Research. His research focuses on how talent and technology jointly determine business success. Professor Koren has more than two decades of experience with microeconometrics and quantitative macro modeling. He is a certified Carpentries Instructor.