

Advanced Macroeconomics (IEE. B402, Offered Quarter=2Q)

Instructor: Ryoji Ohdoi (Associate Professor, Industrial Engineering and Economics)

Office Hour: W9-636, Tue. and Fri. 13:20–14:50, or by appointment.

E-mail: ohdoi.r.aa[at]m.titech.ac.jp

Grading policy: The final grade is based on homework assignments (30%), midterm- and final examinations (30% and 40%).

Course description: This course is designed for mainly first-year graduate students to help them understand the basic analytical tools of modern macroeconomics. The first half of this course covers (i) the mathematical methods often used in macroeconomics (e.g., dynamic programming, optimal control theory, dynamical system), and (ii) the Ramsey-Cass-Koopmans model, which now gives us a benchmark for many areas of macroeconomic analysis. Then, in the second half, we extend this model to understand the mechanics of several important economic phenomena, including economic growth, business cycle, unemployment and so on.

References: There is no designated textbook. Handouts or slides used for each class will be available on the corresponding page of [Tokyo Tech OCW](#) by the day before the class. The books listed below are main references of this course, which I will refer to in the teaching materials.

- [1] Acemoglu, D. (2009) *Introduction to Modern Economic Growth*, Princeton University Press.
- [2] Barro, R. J. and X. Sala-i-Martin (2004) *Economic Growth*, Second Edition, Cambridge, MIT Press.
- [3] Blanchard, O. and S. Fischer (1989) *Lectures on Macroeconomics*, Cambridge, MIT Press.
- [4] Sorger G. (2015) *Dynamic Economic Analysis*, Cambridge University Press.
- [5] Stokey, N. L., R. E. Lucas Jr., and E. Prescott (1989) *Recursive Methods in Economic Dynamics*, Harvard University Press.

Topics covered in the course:

1. Infinite-horizon dynamic optimization (3 lectures)
 - (a) Introduction
 - (b) Dynamic programming (often used in discrete-time models)
Ch. 4 of Stokey, Lucas and Prescott (1989), Ch. 5 of Sorger (2015)
 - (c) Optimal control (used in continuous-time models)
Ch. 7 of Acemoglu (2009), Appendix of Barro and Sala-i-Martin (2004)
2. Dynamical system (1–2 lecture)
Ch. 2, 3 of Sorger (2015), Appendix of Barro and Sala-i-Martin (2004)
3. The Ramsey-Cass-Koopmans model and its applications (3–4 lectures)
 - (a) Setup of the model and derivation of social optimum
 - (b) Characterization of decentralized equilibrium
 - (c) Some applications
Ch. 2 of Blanchard and Fischer (1989)
4. Endogenous growth models (2 lectures)
Ch. 4 of Barro and Sala-i-Martin (2004), Ch. 11 of Acemoglu (2009)
5. Some macroeconomic applications of stochastic dynamic programming (3 lectures)

NOTE:

The above list is the tentative plan of the course, thereby it is subject to change.

Owing to a time constraint, an overlapping generations model, a new Keynesian DSGE model, or a heterogenous-agent model will not be covered.