Syllabus of **Advanced Macroeconomics II**
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Bin Wang, College of Economics, Jinan University

This course provides an account of modern macroeconomic theory along with adjunct numerical or macroeconometric methods ever since the neoclassical revolution of macroeconomics. This modern approach features dynamic stochastic general equilibrium view for macroeconomy instead of disequilibrium view of Keynesian economics.

Textbooks: There are no specific textbooks for this course. Please read the lecture notes carefully. I draw extensively from the following excellent textbooks:

- (AC) Adda and Cooper, 2003, Dynamic Economics, MIT University Press.
- (DA) Daron Acemoglu, 2009, Introduction to Modern Economic Growth, Princeton University Press.
- (LS) Ljungqvist and Sargent, 2018, Recursive Macroeconomic Theory, MIT University Press, Fourth Edition.
- (WL) Williamson, 2018, Macroeconomics, Pearson Press, Eighth Edition.
- (DD) David DeJong and Chetan Dave, 2011, Structural Macroeconometrics, Princeton University Press, Second Edition

The materials in this course give graduate students basic tools and models of present macroeconomic research. We will cover basic methods such as dynamic programming and related global and local solution methods. Our models feature discrete time and continuous time interchangeably. I will start with some fundamental elements in macroeconomics in Chapter 1, then familiarize the students with basic dynamic programming technique in Chapter 2, and then we will cover economic growth theories in Chapter 3, overlapping generation model in Chapter 4, and business cycle theories in Chapter 5. I will distribute the lecture notes of each chapter before the lecture starts and you should read the lecture notes and companying reading materials in each chapter.

The structure of this course is as follows. The contents are tentative and I may change these occasionally. You may check later to see the updated syllabus.

1. Chapter 1: Prerequisites of Modern Macroeconomics

- One-period model of work-leisure decision and profit maximization, centralized economy and decentralized economy, welfare theorems
  Readings: Chapter 4,5 of WL
- Two-period model of consumption-savings decision
  Readings: Chapter 9 of WL
- Markov chains and stochastic two-period model
  Readings: Chapter 2.2 of LS

2. Chapter 2: Dynamic Programming

   - Discrete time dynamic programming
     Readings: Chapter 3 of LS, Chapter 2 of AC
   - Practical dynamic programming: global methods
     Readings: Chapter 4 of LS, Chapter 3 of AC
     - Value function iteration
     - Policy function iteration
     - Polynomial approximations
   - Practical dynamic programming: local methods
     - Log-linearization and solve linear rational expectation model
     - Higher-order perturbation

3. Chapter 3: Economic Growth Theories

4. Chapter 4: Overlapping Generation Model
   Readings: Chapter 9 of DA

5. Chapter 5: Business Cycle Theories

Programming Language I will use Matlab as the programming language in this course and teach the basics of Matlab in Week 5 (our course starts at Week 4). You should learn Matlab by yourself through learning by doing. I also encourage you to learn other computer languages such as R, Python, Julia, or Fortran.

Homework and Quiz You can learn only by reading and solving problem sets with pencil and paper. There are four problem sets and one in-class quiz in this course. Every three weeks there is one homework due. The deadlines for the four homework are the lecture day of Week 7,10, 13, and 16. I encourage you to discuss and learn from each other to complete the homework. But every student should write down the answers by herself or himself. The quiz takes place on the third and fourth class of Week 11.

Reading Report I will select a collection of papers for you to read. Each student should choose one different paper from the collection. I will publicize all the papers later in the course. You should read this paper in-depth and maybe read more papers related to the paper you select to get familiar with one subsub-field of macroeconomics. You should hand

in your reading report at the end of the course. The reading report can be one of the three classifications:

- You can submit a referee report of this paper. It should be consisted of what the paper does and its key contributions, what shortcomings of this paper are, and what others you can do to improve this paper.
- You can replicate the results of this paper. The reading report should contain the derivation of the theoretical results or your computer codes and results.
- You can write a research proposal based on the paper you read and related literature in the subsub-field.

If we have time in the last several weeks, you should give a short presentation about your reading report in the class. This is dependent on our time limits.

Grades Your final score is determined by the final exam, four problem sets, one in-class quiz, and one reading report. The final exam accounts for 70%, the four homework accounts for 10%, the quiz accounts for 10%, and the reading report (possible presentation) accounts for 10%. Though homework only accounts for 10%, I believe you can do well in the final and the quiz if you spend time on your homework.

Audit Policy This course is an advanced course in macroeconomics. You can learn only by pencil and paper. My unique audit policy is that you should attend all lectures, and complete and hand in the four problem sets.