

SYLLABUS FOR ECON 700

Class Requirements

There will be 3 problem sets. It is strongly recommended that you attempt the problem sets yourself before the solution is posted. You are also encouraged to work in groups. You may discuss difficulties with your group members, other classmates, and the TA (**in that order**) if you are stuck.

Further, there will be 2 in-class midterms and a final exam (all are closed book). The 2nd midterm will only cover material since the first midterm. The final exam is cumulative.

Readings

The class covers real analysis and optimization theory. There is no required textbook. In the first two weeks, you may find the following books helpful as references.

- C. Pugh, *Real Mathematical Analysis*, Springer, 2001.
- W. Rudin, *Principles of Mathematical Analysis*, McGraw-Hill Education, 1976.
- T. Tao, *Analysis, Volume I*, Hindustan Book Agency, 2016.

In the third week, we will study convex analysis and optimization theory. A short (and sufficient for this course) summary in optimization is contained in the appendix of Mas-Colell, Whinston, Green (MWG): *Microeconomic Theory*. It is the required textbook of Econ 710 and 711. The following two books provide not only more rigorous theoretical treatment but also many applications.

- A. de la Fuente, *Methods and Models for Economists*, Cambridge Univ. Press, 2000.
- R. Sundaram, *A First Course in Optimization Theory*, Cambridge Univ. Press, Cambridge, 1996.

I assume that you are familiar with calculus and basic linear algebra. If you do not find my assumption reasonable, the following book and website will be useful.

- C. Simon and L. Blume, *Mathematics for Economists*, W. W. Norton & Company, 1994.
- M. Osborne, [Mathematical methods for economic theory](#). online textbook.

They also cover more advanced topics that we do in a less formal way.

Class Logistics

The class meets on Monday-Friday 9:00-10:15am and 10:45-12:00pm at Gardner Hall 309. There will be recitations almost every afternoon 1:30-2:30pm at Gardner Hall 309. You are expected to attend all classes and recitations. There is no lecture on Aug. 19th, and no recitation on Aug. 18th

Contacting Us

My e-mail is lifei@email.unc.edu. My office is Gardner 300B. My office hour: by appointment. Your TA for this course is Jay Dennis, his e-mail address is jay.dennis@unc.edu. His office hour: by appointment.

Tentative Agenda

1. Logic and Proof
2. Set
3. Number
4. Function and Cardinality
5. Sequence and Limit
6. Midterm I (August 5th)
7. More on Sequence and Limit
8. Basic Topology
9. Continuity
10. Differentiation and Implicit Function Theorem
11. Midterm II (August 12th)
12. Convex Set and Separation Theorem
13. Concave, and Quasi-Concave Function
14. Constrained Optimization and Envelop Theorem
15. Correspondence and Maximum Theorem
16. Final (August 20th)