Syllabus, ECON 2010

Mathematics for Economists

Instructor: Andriy Norets, andriy_norets@brown.edu

Lectures: TTh 10:30-11:50am in 8 Fones Alley 016

Office Hours: Tue, 9:30-10:30am and by appointment

Teaching Assistant: Cole Davis, cole_davis@brown.edu, Office Hours and TA session: TBD

Course Overview: The goal of this class is to give students the essential tools in mathematics that will allow them to pursue high level research in economics; it is structured primarily as an advanced real analysis course.

Textbooks: The main textbook for the first part of the course is "Real Analysis with Economic Applications", by Efe A. Ok. The textbook for the second part of the course is "Probability for Statisticians" by Galen R. Shorack. A useful book for reviewing calculus is "Mathematics for Economics" by Carl P. Simon and Lawrence Blume.

Grading: The grade for the course will be based on problem sets (30%), a midterm (30%), and a final exam (40%). There will be a problem set for each topic we cover, 6-7 problem sets overall. A problem set will be assigned soon after the relevant material is covered in class; students will have 7-10 days to complete it. Late problem sets will not be accepted.

Course Activities: Over 13 weeks, students will spend 3 hours per week in class (39 hours total). Reading, studying, and completing analytical assignments will take 10 hours per week for a total of 130 hours. A preparation for the midterm and final exam will take approximately 26 hours. Total number of hours is 195.

Accessibility and Accommodation: Brown University is committed to full inclusion of all students. Please inform me early in the term if you may require accommodations or modification of any of course procedures. If you need accommodations around online learning or in classroom accommodations, please be sure to reach out to Student Accessibility Services (SAS) for their assistance (seas@brown.edu, 401-863-9588).

Course Outline

This is tentative, and may change.

1. Brief Review of $\mathbb{R}$
2. Metric Spaces, Open and Closed sets, Connectedness and Separability, Compactness, Sequential Compactness, Completeness (C.1-5 in Ok)
3. Continuity and Compactness (D.1-4 in Ok)
4. Continuity of Correspondences, the Maximum Theorem (E.1-3 in Ok)
5. Fixed Points and Contraction Mappings (C.6 in Ok)
6. σ-fields and measures (1.1 in Shorack)
7. Measurable functions, convergence a.s., in measure/probability, in distribution, Slutsky theorem (2.1-4 in Shorack)
8. Lebesgue integral, monotone and dominated convergence theorems (3.1-3 in Shorack).