

ECO 1011 H1F

Mathematics and Statistics for PhD Students

Department of Economics, University of Toronto

Summer 2020

Course Dates: August 18 – September 4
Instructor: Prof. Martin Burda
Office: Economics Department, room 234
Contact: martin.burda@utoronto.ca; phone 416-978-4479

TA: Jie Fang
Contact: jie.fang@mail.utoronto.ca

Course Description

The course provides an intensive introduction to rigorous mathematical and statistical analysis at the graduate level. Statistical software will be used in class assignments. All PhD and MA students in the doctoral stream are required to take the course.

Course Materials

Course materials consist of lecture notes that will be posted on [Quercus](#). There is no textbook for the course.

Evaluation

The final grade (credit or no credit) is based on the following:

Task	Date
Term Test 1	August 27, 2020 (online)
Term Test 2	September 4, 2020 (online)

Credit for the course is earned by scoring at least 50% on Term Test 1, and at least 50% on Term Test 2. In exceptional circumstances the instructor may require a written assignment that will enter the final grade. There are no make-up tests or any additional tests after Term Test 2.

ECO1011, Summer 2020

Day	Date	Reading from Lecture Notes	Problem Sets discussed
Tuesday	Aug 18	1. Methods of Proofs 2. Set Theory	
Wednesday	Aug 19	3. Metric Spaces 4. Analysis in Metric Spaces	PS 1
Thursday	Aug 20	5. Vector Spaces 6. Linear Algebra in Vector Spaces	PS 2
Friday	Aug 21	7. Correspondences 8. Continuity	PS 3
Monday	Aug 24	9. Constrained Optimization 10. Dynamic Optimization 11. Dynamic Programming	PS 4
Tuesday	Aug 25	12. DP Application - Optimal Economic Growth 13. DP Application - Labor Supply 14. Dynamic Optimization in Continuous Time	PS 5
Wednesday	Aug 26	15. Numerical Analysis 16. Numerical Optimization	PS 6
Thursday	Aug 27	<i>Term Test 1</i>	
Friday	Aug 28	17. Introduction to Probability 18. Measure-Theoretic Probability 19. Random Variables and Distributions	
Monday	Aug 31	20. Statistical Properties of Estimators 21. Statistical Properties of Estimators 22. Stochastic Orders and Delta Method	PS 7
Tuesday	Sep 1	23. Regression with Matrix Algebra 24. Maximum Likelihood 25. GMM	PS 8
Wednesday	Sep 2	26. Testing of Nonlinear Hypotheses 27. Bootstrap Methods 28. Elements of Bayesian Analysis	PS 9
Thursday	Sep 3	29. MCMC	
Friday	Sep 4	<i>Term Test 2</i>	