1 Course Description

Many modern applications of economics use mathematical, logical and statistical tools to model and analyze individual behavior, markets and economies. Intermediate and upper level undergraduate economics courses frequently utilize these tools and the Department wants to ensure all students are adequately prepared. This course reviews algebra, geometry, calculus, probability and logic, focusing on elements that will be most relevant to economic analysis. You will begin to see how mathematical concepts and techniques are applied to thinking about economic behavior and outcomes.

The Department requires three courses or their equivalents) with grades of C- or better before taking this course. They are ECON200 (Principles of Microeconomics), ECON201 (Principles of Macroeconomics), and either MATH220 (Elementary Calculus) or MATH140 (Calculus I). Students who have taken additional calculus work such as MATH141 or higher should talk with a departmental advisor to determine the best course for you if you have not done so already.

This course meets twice a week for a class session with the professor and a third time in a discussion section with a teaching assistant. Class session will explore the various tools you are being asked to master and explain their significance within economics. Discussion sections will follow up by reviewing problems, answering additional questions you may have and providing further examples. Students’ time required for this class varies considerably based on your prior math coursework and how long it has been since your most recent math course.

2 Course Goals

The primary purpose of this course is to ensure you are familiar with and comfortable using the mathematical tools utilized in upper level economics courses within the department. This includes the development of the following skills:

- Recognize common functions and understand their potential for economic modeling.
- Ability to solve simple systems of equations and find comparative statics.
- Ability to take first and second derivatives for binomial and exponential/log functions, as well as any relevant composite of these functions.
- Understand the economic application of derivatives and how to find function extrema.
- Be able to perform constrained optimization utilizing substitution, Lagrangian and Kuhn-Tucker methods.
- Have a solid understanding of the basics of probability and risk theory and its applications in economic theory.
3 Textbook

The primary textbook we will be utilizing is the University’s custom edition of *Mathematical Methods for Economists* by Michael Klein (ISBN:9781256968184). This text, or the original 2nd edition book, is the only required text. I may also assign other readings, posted online, from other textbooks or articles. I will be clear what you should be reading ahead of time. You are only responsible for material covered in class or discussion sections. It is expected that you will have done the readings before class to help you follow the lecture and to participate in class discussions.

I have also ordered *Schaum’s Outlines of Introduction to Mathematical Economics* from the bookstore as there are usually frequent requests for additional practice problems. I have found this to be the most cost-effective source for additional material. IT IS NOT REQUIRED AND I WILL NOT USE IT IN CLASS/PROBLEM SETS. Keep in mind our curriculum only covers the first 9 chapters of this book (although it is not that expensive).

Additionally, WolframAlpha has a useful app for solving and graphing equations. There are free web and mobile versions as well as paid versions of each. The paid versions provide more detailed steps for solutions in solving. I would recommend exploring the differences between the two and seeing if, based on your skill level, it is something that you would find useful. That said, it should ONLY be used as a check on your own work. You will be required to perform all work yourself on exams.

4 Coursework & Grades

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<td>Problem Sets</td>
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<td>Midterm #1 (Mon Sep 28)</td>
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<td>Midterm #2 (Wed Oct 28)</td>
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<td>Quiz (Fri Nov 20)</td>
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<td>Final Exam (Thr Dec 17)</td>
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**Problem Sets**

You are expected to turn in 6 problem sets. Problem sets are graded on a 3 point scale with the lowest one dropped. Problem sets will be posted on ELMS and their due dates can be found on the course schedule. Problem sets are to be handed **in hard copy only** to your TA on the due date (or in the designated ECON office box before class). Late problem sets are not accepted for any reason, as answers will be posted on ELMS shortly after the discussion sections end. The problem set with the lowest score will be dropped. As such, extensions will not be granted for minor emergencies or illnesses. Electronic submissions are only permitted with PRIOR permission from the TA or professor due to an approved absence. If you miss a problem set due to a University-approved leave of absence, please contact Professor Montgomery.

**Exams and Final Course Grades**

Policies regarding Exams and determination of Final Course Grades are described on ELMS. Please read these at your earliest convenience.
ECON300 Class Policies

• Per policy of the University and Professor, email is the primary means of communication outside the classroom. Students are responsible for checking their UMD email address daily or having it forwarded appropriately. Announcements will be made to ELMS. It is the students’ responsibility to either have ELMS announcements forwarded to their email or check ELMS on a daily basis.

• Economic concepts can be quite difficult at times and the nuance sometimes cannot be fully developed in the text. It is our job to help you understand the material. Please feel free to stop me at any point and ask questions in class either to ask for clarification, or if you think you may have a good idea for an application for the material. If something is confusing to you, it is VERY likely confusing to others in the class as well. Articulating your questions aloud is the best way you will get them answered. In addition to Professor and Teaching Assistant office hours, Academic Success and Tutorial Services will be providing peer tutoring services for this class. More information about the service will be provided during the first week.

• Electronic devices are not permitted in class except with permission from the instructor. ONLY non-graphing, non-communicative calculators are permitted for exams.

• Academic Honesty
All materials handed to us for evaluation is expected to be your work and your work alone. Such material must adhere to the University’s Code of Academic Integrity. We will not give credit to assignments sets that are clearly instances of copying work of your fellow student or any work that represents plagiarism. Any instances of academic dishonesty or cheating on exams will be referred to the Student Honor Council as per University policy. You are responsible for reading and understanding the University’s policies as written in the course catalog.

• Classroom Etiquette
Please arrive on time to lecture with your cell phones and other electronic devices turned silently off and stowed away. Believe it or not, students looking down at their cell phone in their lap is EXTREMELY distracting for instructors. If you need to leave the room for some reason, please do so as quietly and as least disruptive as possible. I reserve the right to remove any student from the classroom who fails to be respectful towards myself or their fellow students.

• Disability Services
If you have the right for accommodation for class or exams, please do not hesitate to contact Professor Montgomery during the first three weeks of class. It is the students responsibility to discuss exam scheduling and provide the proper form which accompany exams taken at DSS five days before the exam. Failure to do so can lead to a forfeiture of your accommodation.

By Sept 11, please acknowledge you have read the policies laid out in the syllabus AND the Exam and Grading Policies page on ELMS by typing in “YES” in the appropriate assignment submission. Failure to do so can lead to you being dropped from the course.
6  ECON300 - Course Schedule

Week 1 - Aug 31
Intro to Class, Concepts and Functions (Chapters 1-2)

Week 2 - Sep 7
More Functions (Chapter 2)
**PROBLEM SET #1 (Sep 11)**

Week 3 - Sep 14
Exponential Growth and Log Functions, Interest Rates (Chapter 3)
**PROBLEM SET #2 (Sep 18)**

Week 4 - Sep 21
Systems of Equations and Comparative Statics (Chapter 4)
**PROBLEM SET #2.5 (Sep 25) - not for credit**

Week 5 - Sep 28
Intro to Differential Calc (Chapter 6)

Week 6 - Oct 5
Univariate Calculus (Chapters 6-7)
**PROBLEM SET #3 (Oct 9)**

Week 7 - Oct 12
Univariate Calculus (Chapter 7)

Week 8 - Oct 19
Multivariate Calculus (Chapter 8)
**PROBLEM SET #4 (Oct 23)**

Week 9 - Oct 26
More practice and Review

Week 10 - Nov 2
Extreme Values (Chapters 9-10)

Week 11 - Nov 9
Constrained Optimization (Chapter 11)
**PROBLEM SET #5 (Nov 13)**

Week 12 - Nov 16
Constrained Optimization (Chapter 11)

Week 13 - Nov 23
Probability Theory (*ONLINE CHAPTER*)

Week 14 - Nov 30
Probability/Risk Theory
**PROBLEM SET #6 (Dec 4)**

Week 15 - Dec 7
Special Topic (TBA)
**PROBLEM SET #6.5 (Dec 11) - not for credit**

**FINAL EXAM - THR Dec 17 1:30pm (tentative)**