

PORTLAND STATE UNIVERSITY  
Department of Economics  
Winter 2009

EC380: INTRODUCTION TO MATHEMATICAL ECONOMICS

**Professor:** Rossitza Wooster  
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**Class Meetings: UNITAS 205**  
TR 2:00 – 3:50 pm.  
**Office Hours\***  
T 10:00 am – 11:00 pm  
\*By Appointment

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**Syllabus**

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**Prerequisites** Mth 251, Ec 201, Ec 202.

**Course Description** This course presents the mathematics required for studying economics at the undergraduate level. Mathematical concepts are developed in the context of economics and applications are drawn from a wide range of fields in economics including microeconomics, macroeconomics, economics growth, international trade, international finance, labor and environmental economics, industrial organization and development economics. The course covers equations, functions, sets, matrix algebra, total and partial differentiation, as well as comparative static analysis in the context of partial and general equilibrium models.

**Learning Objectives** This course is intended to assist economics majors in becoming comfortable with the basic mathematical tools used in economic analyses. Learning objectives therefore include developing skills that will allow you to:

- 1) Thoroughly understand mathematical methods and concepts employed in economic models, equilibrium analysis, and comparative static analysis. Mathematical techniques include, but are not limited to, equations, functions, sets, matrix algebra, and differential calculus.
- 2) Competently apply mathematical methods in problems and applications that aim to analyze economic problems.

Mastering these goals will prove useful in concurrent and later courses as well as in future work and research. It will also provide you with a solid foundation toward delivering analytical economic services to an employer. Finally, an understanding of mathematical economics will allow you to comprehend the articles in leading economics journals that are essential for keeping up with advances in economic science after graduation.

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**Required Text** “*Fundamental Methods of Mathematical Economics*”, by Alpha C. Chiang and Kevin Wainwright, 4<sup>th</sup> ed., McGraw-Hill Irwin, ISBN: 0-07-010910-9.

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**Graded Components**

This course involves a significant amount of homework designed to give you plenty of “hands-on experience” with the mathematical techniques covered in class. Homework assignments will require you to solve exercises and work through applications. Assignments and exams are discussed in more detail below:

1. Five problem sets will be assigned and graded but only four of these will count toward your course grade (assignment with the lowest score will be dropped). Each homework assignment is worth 10% of the course grade for a total of 40% (after dropping the lowest homework grade). Homework assignments are intended to facilitate comprehension and practice with application of mathematical techniques such as linear and non-linear models, partial and total derivatives, among others (learning objective 1).
2. There will be a Midterm and a Final exam each worth 30% of the course grade. Midterm and Final exams are designed to test the extent to which you have mastered the mathematical techniques, including problem solving and application of mathematical concepts to analysis of common economic problems (learning objective 2).

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**Policies**

- Late homework assignments will NOT be accepted for grading. Please see tentative schedule for deadlines. If a deadline changes for any reason, the new deadline will be posted on the homework in question, a week in advance of the due date.
- The exams cannot be rescheduled or made up, so do not take the course if you cannot take the exams during their scheduled times. The only exceptions to this rule are: (i) documented medical emergencies; and (ii) absence due to active military, police, and/or jury duty (need letter from the appropriate official).
- Improving your grade through “extra work” is NOT an option in this class!
- An *Incomplete* (letter grade “I”) or a *Withdrawal* (letter grade “W”) is not to be viewed as a substitute for a failing grade in this course (letter grade “F”).
- Students with documented learning disabilities or special needs, must contact both the Testing Center and the course instructor at least a week in advance of scheduled exams times.
- Class attendance is highly recommended. If you miss class, it is your responsibility to find out what you missed, get notes from peers, etc.

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**Course TA**

The teaching assistant (TA) for this class is Jordan C. Perry. Jordan will be grading homework assignments throughout the term as well offering tutoring assistance for this course. Tutoring hours and location are as follows:

**When: Wednesday, 2:00 – 3:00 pm.**  
**Where: CH 241 – A.**  
**Contact: jordancperry@gmail.com**

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## Tentative Schedule

Week	Topic	Reading
Week 1	<ul style="list-style-type: none"> <li>• The Nature of Mathematical Economics</li> <li>• Economic Models</li> </ul>	Chapters 1, 2
Week 2	<ul style="list-style-type: none"> <li>• Equilibrium Analysis in economics</li> <li>• <b>Homework No. 1: <u>DUE Thursday, January 15<sup>th</sup>, 2009</u></b></li> </ul>	Chapter 3
Week 3	<ul style="list-style-type: none"> <li>• Linear Models and Matrix Algebra</li> </ul>	Chapter 4
Week 4	<ul style="list-style-type: none"> <li>• Linear Models and Matrix Algebra</li> <li>• <b>Homework No. 2: <u>DUE Thursday, January 29<sup>th</sup>, 2009</u></b></li> </ul>	Chapter 4
Week 5	<ul style="list-style-type: none"> <li>• Linear Models and Matrix Algebra (Continued)</li> <li>• <b>Midterm Exam: <u>Thursday, February 5<sup>th</sup>, 2009</u></b></li> </ul>	Chapter 5
Week 6	<ul style="list-style-type: none"> <li>• Linear Models and Matrix Algebra (Continued)</li> <li>• <b>Homework No. 3: <u>DUE Thursday, February 12<sup>th</sup>, 2009</u></b></li> </ul>	Chapter 5
Week 7	<ul style="list-style-type: none"> <li>• Comparative Statics and the Concept of the Derivative</li> </ul>	Chapter 6
Week 8	<ul style="list-style-type: none"> <li>• Rules of Differentiation and their use in Comparative Statics</li> <li>• <b>Homework No. 4: <u>DUE Tuesday, February 24<sup>th</sup>, 2009</u></b></li> <li>• <b>Class Canceled: Thursday February 26<sup>th</sup>, 2009</b></li> </ul>	Chapter 7
Week 9	<ul style="list-style-type: none"> <li>• Comparative-Static Analysis of General-Function Models</li> </ul>	Chapter 8
Week 10	<ul style="list-style-type: none"> <li>• Comparative-Static Analysis of General-Function Models</li> <li>• <b>Homework No. 5: <u>DUE Tuesday, March 10<sup>th</sup>, 2009</u></b></li> </ul>	Chapter 8
Finals Week	<ul style="list-style-type: none"> <li>• <b>Final Exam: <u>Monday, March 16<sup>th</sup>, 2009, 10:15 – 12:05.</u></b></li> </ul>	