Course Syllabus

Course Number: ECO 619

Course Title: Mathematical Economics

Credits: (3:3)

Prerequisites: ECO 301, ECO 319 or equivalent

For Whom Planned: For entering Economics MA students

Instructor Information: Stephen K. Layson, PhD
Office Hours: by appointment
457 Bryan Building
334-4868, (phone)
sklayson@uncg.edu

Catalog Description: Reviews matrix algebra and optimization
theory and introduces theory and
applications in integral calculus and
differential equations.

Class Times and Location: From July 30 to August 13, the class meets
in Bryan 204 from 9:00-12:00 each
morning. The final exam will be on
Tuesday, August 13, from 2-5.

Student Learning Outcomes:

At the end of the course you should be able to:

1. Solve a variety of different unconstrained economic optimization problems for
   objective functions with a single choice variable. (*Quiz 1 and the midterm will
   cover this SLO.*)
2. Demonstrate the Taylor Series expansion of an arbitrary function. *(Quiz 2 and the midterm will cover this SLO.)*

3. Do comparative static analyses for economic models. *(Quiz 3 and the midterm will cover this SLO.)*

4. Find total differentials and total derivatives for economic functions. *(Quiz 4 and the midterm will cover this SLO.)*

5. Express the concepts of growth, decay, and elasticity using exponential or logarithmic functions. *(Quiz 5 and the midterm will cover this SLO.)*

6. Solve multivariable unconstrained economic optimization problems. *(Quiz 6 and the midterm will cover this SLO.)*

7. Solve constrained optimization problems, such as cost minimization subject to an output constraint and utility maximization subject to a budget constraint. *(Quiz 7 and the final exam will cover this SLO.)*

8. Solve constrained optimization problems subject to inequality constraints by using the Kuhn-Tucker Conditions. *(Quiz 8 and the final exam will cover this SLO.)*

9. Solve economic problems with integrals. *(Quiz 9 and the final exam will cover this SLO.)*

10. Solve economic problems with first-order differential equations. *(Quiz 10 and the final exam will cover this SLO.)*

**TEACHING METHODS AND ASSIGNMENTS FOR ACHIEVING LEARNING OUTCOMES:**
Students should first read the assigned chapters in the textbook before the class lectures. The lectures will reinforce and extend the textbook discussion. The students are also *strongly* encouraged to do the textbook exercises at the end of each chapter to help prepare for the midterm and final exams. Additionally, there will be weekly short quizzes to provide continual feedback on how well the students are learning the material.
1) The quizzes will cumulatively count for 20% of your final grade. The two lowest quiz scores will be dropped.
2) There will be a midterm exam counting for 30% of your final grade.
3) The final exam given on Tuesday, August 13 from 2-5, will count for 50% of your final grade.

EVALUATION AND GRADING
The following grading scale will be used for all homework assignments, the midterm exam and the final exam. Percentiles are always rounded down for purposes of assigning letter grades. For example, 92.9 is an A- not an A, etc.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentile</th>
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<tbody>
<tr>
<td>A</td>
<td>93-100%</td>
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<tr>
<td>A-</td>
<td>90-92.9%</td>
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<tr>
<td>B+</td>
<td>87-89.9%</td>
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<tr>
<td>B</td>
<td>83-86.9%</td>
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<tr>
<td>C+</td>
<td>77-79.9%</td>
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<tr>
<td>C</td>
<td>70-76.9%</td>
</tr>
<tr>
<td>F</td>
<td>0-69.9%</td>
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REQUIRED TEXT:

OPTIONAL TEXT: (For students who plan on getting a PhD in economics.)
Mathematics for Economists, by Carl P. Simon and Lawrence Blume. ISBN 0-393-95733-0

ADDITIONAL RESOURCE: The “boot camp prep” site, https://balearn.uncg.edu/wordpress/ecomathreview/, will remain available to you as a resource for reviewing concepts introduced in the first section of ECO 619. You are encouraged to refer to the videos and written materials as supplemental instruction in this course.
TOPICAL OUTLINE/CALENDAR:

July 30  Derivatives of functions of a single variable, Continuity and Differentiability: Chapter 6.

July 31  Partial derivatives, comparative static analysis: Chapter 7.

August 1  Total differentials, total derivatives, and implicit function theorem: Chapter 8.

August 2  Optimization problems with a single choice variable, Taylor Series: Chapter 9.

August 3  Optimization problems with more than one variable, Quadratic forms, Hessians and Concave functions: Chapter 11.

August 6  Midterm over chapters 6-11.

August 7  Constrained optimization and Quasi-concave functions: Chapter 12.

August 9     Integrals: Chapter 14.

August 10    First order differential equations: Chapter 15.

August 13    Final Exam 2-5.

ACADEMIC HONOR CODE:
Students are responsible for familiarizing themselves with the UNCG Academic Honor Code. Procedures and penalties related to these and other violations of the Academic Honor Policy are found at the following web site: http://academicintegrity.uncg.edu/ as well as the Undergraduate Bulletin 2010-2011. Any violation of the Honor Policy may result failure of the assignment and subsequently the entire course.

FACULTY STUDENT GUIDELINES
Can be found at http://www.uncg.edu/ bae/faculty_student_guidelines.pdf

ATTENDANCE POLICY:
Students are expected to attend and be an active participant in all classes.

ADDITIONAL REQUIREMENTS:
None.