

University of Florida
Food and Resource Economics Department

AEB 3510 – Quantitative Methods in Food and Resource Economics

Fall Term 2007

Section: 2209
3 Credit Hours

M W F 10:40am – 11:30am
Classroom: NZH (Newins-Ziegler Hall) 112

Instructor: Mikael Sandberg
Office: 1193 McCarty A
Phone: 392-1826 ext. 408
Office Hours: Mon & Wed 3:00pm – 4:30pm
Thurs 9:30am – 12:00pm
(These represents times when I should be available, however, feel free to drop by anytime. If I am available, I will gladly meet with you. You can also call or e-mail me for an appointment.)
E-mail: sandberg@ufl.edu *(please indicate in which class you are enrolled)*

FRE Program Assistant: Nancy Baker; 1197 McCarty Hall A; 392-1826 ext. 210

Text: *Mathematical Methods for Business and Economics*, by Edward T. Dowling. McGraw Hill/Irwin Publishers, 1993. ISBN: 0-07-017697-3.

WebCT: There is a WebCT web-page for this course. To access WebCT you will need your Gatorlink username and password. The WebCT page will be used for posting grades ONLY.

Course Description: This course is to develop the student's understanding of finite mathematical tools used in economics and business decision-making. Topics include linear equations, matrix algebra and calculus. Lectures and problems will show how these are used to examine economic, financial and managerial problems.

...which means: In short, this is a *mathematics* course. During the semester we will focus on *mathematical techniques* and the *methods of calculus* and how those methods can be applied to economics and business. We will also cover some advanced topics, such as multivariate calculus, Lagrange multipliers and matrix algebra.

Pre-requisites: AEB 3013 *or* ECO 2023 & MAC 2233 *or* MAC 2311. It is assumed that all students have had at least one microeconomics course and one calculus course. You should not attempt to take this class if you have not completed these two courses.

Tentative Course Outline:

(The instructor reserves the right to change this outline as appropriate)

It is my policy to explicitly let you know what sections of each chapter are covered on the exams.

I. Pre-Calculus

Chapter 2: Equations and Graphs

Chapter 3: Functions

Chapter 4: Systems of Equations

II. Calculus and Applications

Chapter 9: Differential Calculus

Chapter 10: Differential Calculus: Uses of the Derivative

Chapter 11: Exponential and Logarithmic Functions

Chapter 12: Integral Calculus

Chapter 13: Calculus of Multivariable Functions

III. Further Topics and the Application of Mathematics

Chapter 5: Matrix Algebra

Chapter 6: Solving Linear Equations with Matrix Algebra

The following is a list of exercises from each chapter that you are responsible for. Any modifications to this list will be announced in class.

Chapter	Topics	Exercises
2. Equations and Graphs	<ul style="list-style-type: none"> • 2.1. Equations • 2.3. Linear Equations and Graphs • 2.4. Slopes • 2.5. Intercepts • 2.6. Slope-Intercept Form • 2.8. Business and Economics Applications 	<p>(p.52 - 54)</p> <p>2.35, 2.36, 2.37, 2.39, 2.40, 2.41, 2.42, 2.49, 2.51, 2.52</p>
3. Functions	<ul style="list-style-type: none"> • 3.1. Definitions • 3.3. Algebra of Functions • 3.4. Linear Functions in Business and Economics • 3.5. Solving Quadratic Equations • 3.6. Graphing Non-linear Functions • 3.7. Non-linear Business and Economics Functions 	<p>(p.86 - 88)</p> <p>3.33, 3.34, 3.35, 3.36, 3.41, 3.42, 3.43, 3.44, 3.45, 3.47, 3.48, 3.50, 3.51</p>
4. Systems of Equations	<ul style="list-style-type: none"> • 4.1. Introduction • 4.2. Graphical Solutions • 4.3. Supply and Demand • 4.4. Break-Even Analysis 	<p>(p. 126)</p> <p>4.33, 4.34, 4.35, 4.36</p>
9. Differential Calculus	<ul style="list-style-type: none"> • 9.1. Limits • 9.3. The Slope of a Curvilinear Function • 9.4. Derivatives • 9.7. Rules of Differentiation • 9.8. Higher-order Derivatives, 	<p>(p.242 - 243)</p> <p>9.26, 9.29, 9.30, 9.31, 9.32, 9.33, 9.34, 9.35</p>

10. Differential Calculus: Uses of the Derivative	<ul style="list-style-type: none"> • 10.1. Increasing and Decreasing Functions • 10.2. Concavity and Convexity • 10.3. Relative Extrema • 10.6. Optimization of Functions <i>(p.273 -274)</i> • 10.7. Successive Derivative Test 10.28, 10.29, 10.31, 10.32, • 10.8. Marginal Concepts in Economics 10.33, 10.34, 10.35, 10.36 • 10.9. Optimizing Economic Functions for Business • 10.10. Relationship among Total, Marginal, and Average Functions
11. Exponential and Logarithmic Functions	<ul style="list-style-type: none"> • 11.1. Exponential Functions • 11.2. Logarithmic Functions • 11.3. Properties of Exponents and Logarithms <i>(p.299 - 300)</i> • 11.4. Natural Exponential and Logarithmic Functions 11.40, 11.41, 11.42, 11.43, 11.44, 11.45, 11.46, 11.47, 11.48, 11.49, 11.50 • 11.5. Solving Natural Exponential and Logarithmic Functions • 11.7. Derivatives
13. Calculus of Multivariable Functions	<ul style="list-style-type: none"> • 13.1. Functions of Several Multivariable Functions • 13.2. Partial Derivatives, • 13.3. Rules of Partial Differentials <i>(p.371-373)</i> • 13.4. Second-order Partial Derivatives 13.46, 13.47, 13.49, 13.50, 13.51, 13.53, 13.54, 13.55, 13.56, 13.57, 13.58, 13.59, 13.60 • 13.5. Optimization of Multivariable Functions • 13.6. Constrained Optimization with Lagrange Multipliers • 13.8. Optimization of Business and Economic Functions
12. Integral Calculus	<ul style="list-style-type: none"> • 12.2. Rules for Indefinite Integrals • 12.3. Area Under a Curve • 12.4. The Definite Integral • 12.5. The Fundamental Theorem of Calculus <i>(p.332 - 333)</i> 12.42, 12.43, 12.44, 12.45, 12.46, 12.49, 12.50, 12.51, 12.52, 12.53, 12.54, 12.55. • 12.6. Properties of Definite Integrals • 12.7. Area between Curves • 12.11. Consumers' and Producers' Surplus
5. Linear (Matrix) Algebra	<ul style="list-style-type: none"> • 5.1. Introduction • 5.2. Definitions and Terms • 5.3. Addition and Subtraction of Matrices <i>(p. 149)</i> • 5.4. Scalar Multiplication 5.40, 5.41, 5.42, 5.44, 5.45, 5.46. • 5.5. Vector Multiplication • 5.6. Multiplication of Matrices • 5.7. Matrix Expression of a System of Linear Equations

6. Solving Linear Equations with Matrix Algebra	<ul style="list-style-type: none"> • 6.1. Determinants and Linear Dependence • 6.2. Third-Order Determinants • 6.3. Cramer’s Rule for Solving Linear Equations 	<p>(p.174-175) 6.16, 6.17, 6.18, 6.19, 6.22.</p>
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Grades: Your final grade for this course will be based on the following:

200 possible points	Regular Exams (the sum of your two (2) highest exam scores out of the <i>first</i> three (3) exams)
100 possible points	Exam 4
100 possible points	Quiz Scores
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Total:	400 possible points

Grades will have the following benchmarks out of the 400 possible grade points:

A	(≥ 360)	C	(280 - 307)
B+	(348 - 359)	D+	(268 - 279)
B	(320 - 347)	D	(240 - 267)
C+	(308 - 319)	E	(≤ 239)

(note that the grades follow the conventional 90 % for an A, 87 % for a B+, 80 % for B etc.). The instructor reserves to right to assign additional subjective points at the end of the semester as appropriate.

Grading is not a negotiation process! The grade you get on an exam or an assignment is not a starting point for further negotiation. The exception is of course if I made a mistake in grading your exam or assignment, in which case I will gladly give you the correct points.

Exams: There will be four (4) in-class exams. Each exam is worth 100 points. The exams will consist of short-answer/problem-solving questions.

The exams are closed book and closed notes. A simple calculator may be used. **However, graphing calculators, cell phones, or other devices with the capability to store formulae are not allowed.** Sharing calculators during an exam is not allowed. Thus, if you do not own a regular simple calculator, you need to acquire one (they cost about 10 – 15 dollars). Sharing calculators during exams is not allowed.

When calculating your final grade, the lowest test score out of the *first* three (3) exams will be dropped. *So if you miss any of the first three (3) exams, for whatever reason, you will get a score of zero (0) for that exam and that particular score will consequently be dropped.* This policy is to help you out if something unforeseen happens or for any other reasons you are not able to perform to your potential. Hence, it is to your benefit to take all four exams. **Note: Exam 4 cannot be dropped.**

Exam Dates:

Exam 1:	September 17
Exam 2:	October 10
Exam 3:	November 7
Exam 4:	December 5 (last day of class!)

You should plan to be present on these dates. The instructor reserves the right to change these dates in the case of unforeseen circumstances. **Early or late exams are not given, so do not plan vacation trips or family engagements on these dates.**

Make-Up Exams: Make-up exams are generally *not* given. Hence, a car not starting, an alarm clock malfunctioning, a sore throat, a severe cold, vacation trips, personal engagements, job interviews etc do not warrant make-up exams. University athletes should see me as soon as possible if there is a conflict.

Once the exams are graded, the results are posted on WebCT. Your graded exams will NOT be returned to you. However, you are more than welcome to come by my office to look over your exam and to discuss any questions you might have.

Quizzes: There will be fifteen (15) short quizzes given throughout the semester. Each quiz is worth 10 points. The quizzes are unannounced. The quizzes may be given in the beginning of class or towards the end of the class period. Quizzes are closed book and closed notes. The quizzes are based on the material covered in class during the previous class periods. If you miss a quiz, you will receive a score of zero (0) for that particular quiz. Your five (5) lowest quiz scores will be dropped and only your 10 highest Quiz scores will count towards your course grade. There are NO make-up quizzes. A calculator may be used. **However, graphing calculators, cell phones or other devices with the capability to store formulae are not allowed.** Sharing calculators during a quiz is not allowed.

Attendance: Given the quantity and the nature of the material covered, it is essential that you come to class regularly. However, formal attendance is not taken. You are an adult, so it is up to you to decide whether you want to attend class or not. And yes, this class “snowballs” pretty quickly.

First Week of Class: As per department policy, if you fail to attend any of the first two class meetings of this course, you will be dropped from this course.

Homework Problems: Homework problems from your textbook will be assigned continuously throughout the semester (the problems are outlined at the end of this syllabus). The answers are available in your textbook. These exercises are not to be turned in for credit. Rather, they are assigned to assist you in learning the material. Completing the assigned problem sets is pre-requisite for doing well in this course. *The quizzes are directly based on assigned homework.*

Photographs: You will all be required to have your picture taken. A department photographer will come by the classroom during the second week of class. You are still required to have your picture taken even if you have been in any of my classes before. If you miss class that day, it is *your* responsibility to make an appointment with me to have your picture taken. Failure to do so before the end of the third week of class will result in a letter grade reduction of your grade on the first exam.

Classroom Etiquette: Be polite and courteous towards your fellow classmates. In order to provide a pleasant environment conducive to everyone's learning the following guidelines are expected:

- ***CELL PHONES and PAGERS are to be turned off***, as it is very disruptive (not to mention arrogant and annoying!) when these devices "go off" during class. So please take a second to turn off your devices before the class begin.
- If you arrive late for class, please take a seat close to the door to minimize the interruption.
- You should avoid talking amongst each other once the lectures begin (this *includes* conversations about the material and the class itself), as this is very disrespectful to your fellow students who are in class to learn.
- You should NOT read the Alligator or any other newspaper in the classroom once the class period begins.
- You should NOT do work for assignments for any other classes once the class period begins.
- You should discontinue the use of any iPods, Blackberries or similar devices once the class period begins.

If you cannot abide by these simple common-sense rules, I would prefer you not coming to class! I reserve the right to penalize any student not following these rules by deducting points solely at my discretion.

Students with Disabilities: The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 392-8565, www.dso.ufl.edu/drc/

Software Use: All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Academic Honesty: In 1995 the UF student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

The Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: **“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court.

(Source: 2007-2008 Undergraduate Catalog)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

Any instances of academic dishonesty will be reported to Student Judicial Affairs.

Campus Helping Resources: Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. Both the Counseling Center and Student Mental Health Services provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health Services is located on the second floor of the Student Health Care Center in the Infirmary.

- *University Counseling Center*, 301 Peabody Hall, 392-1575, www.counsel.ufl.edu
- *Career Resource Center*, CR-100 JWRU, 392-1602, www.crc.ufl.edu/
- *Student Mental Health Services*, Rm. 245 Student Health Care Center, 392-1171, www.shcc.ufl.edu/smhs/

Alcohol and Substance Abuse Program (ASAP)

Center for Sexual Assault / Abuse Recovery & Education (CARE)

Eating Disorders Program

Employee Assistance Program

Suicide Prevention Program

Important Dates:

August 23:	First Day of Class
August 23 – 29:	Drop-Add period
September 3:	Labor Day (no class!)
September 7:	Fee payment deadline
September 17:	Exam 1
October 10:	Exam 2
November 2:	Homecoming (no class!)
November 7:	Exam 3
November 12:	Veterans day (no class!)
November 19:	Last day to drop a course by college petition
November 22 – 23:	Thanksgiving (no class!)
December 5:	Last day of class and Exam 4
December 17:	Final grades released on ISIS