

University of Florida
College of Agricultural and Life Sciences
Food and Resource Economics Department

AEB3510 Quantitative Methods in Food and Resource Economics
Spring Term 2019
3 Credit Hours

Instructor and Contact Information

Instructor:	Luis Moisés Peña Lévano, Ph.D.
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E-mail:	lpenalevano@ufl.edu
Office hours:	(Gainesville: McCarty A, room TBA) Times -9:00 am to 11 am & 1:00 pm – 4:00 pm January 17 th & 31 th , February 21 st , March 14 th , April 11 th & 25 th
Review sessions:	(Gainesville: McCarty A, room TBA) Times -5:00 pm to 7 pm January 17 th & 31 th , February 21 st , March 14 th , April 11 th & 25 th
Teaching Assistant:	Yefan Nian
Office:	TBA
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Office hours:	Monday and Wednesdays (hours to be announced)

Communication must include 'AEB3510 – UNIT #__ + (YOUR LAST NAME AND FIRST NAME)' in order to be answered and it **should be** copied to the teaching assistant [TA]. Any email must be sent during Normal Hours: Monday to Fridays 8:00 am – 5:00 pm. Emails sent outside the normal hours, or not using the title '**AEB3510**' or not copied to the TA **will not be answered**.

DO NOT SENT CANVAS EMAIL – CONTACT THE INSTRUCTOR AND TA USING @UFL EMAIL.

The emails will need to go through the following procedure:

1. Consult to the TA during the TA office hours to solve any doubts. No emails will be solved unless you have contacted the TA first.
2. If you still have doubts on the question after meeting with the TA. Please e-mail me (with copy to the TA), summarizing in **one paragraph** of no more than three lines the e-mail question so that I can more effectively addressing your concerns. If you are stuck on a specific procedure, send me the picture of the problem and where you are specifically having the issue. This will help me to answer more efficiently because I am teaching multiple classes. If you do not put an effort in the question, I will not provide you the hints to solve it – **Courteous and professional** e-mails can expect a prompt reply.
3. I will hold six office hours days of 3 hours from 9 to 11 am & 1 to 4 pm (please see the dates on the schedule of the class). It will generally be planned on Thursdays. Please plan your schedules accordingly.
4. After the office hours, I will also provide 2 hours of review sessions (from 5 – 7 pm) on a classroom (Classroom location is still pending). You can bring any questions you have, and additional examples will be offered too.

The professor reserves the right to change the terms and dates stated in this Course Syllabus depending on upcoming or unexpected events. Any changes will be communicated in class, via the Gatorlink e-mail listserv, and posted on E-Learning Canvas. It is solely the student's responsibility to stay informed of any changes

General Course Information

Textbook:

Required: *Mathematical Methods for Business and Economics*, Schaum's Outlines, by Edward T. Dowling. McGraw Hill/Irwin Publishers. 1993. ISBN: 0-07-017697-3.

- You will need a copy of the book. Please note that there are several editions of the book, all with different covers. All versions are the same, so either one would work
- This book is pretty useful tool, as it offers many solved examples for many of the questions.

Strongly recommended: *Schaum's Outlines of Introduction to Mathematical Economics*, by Edward T. Dowling. 3rd Edition. McGraw-Hill Publishers. 2012. ISBN: 978-0-07-161015-5

- This book contains additional problems and exercises that can be useful for this class. In particular, topics related to matrices and special matrices are included in this unit.

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, linear programming and calculus. Lectures and problems will show how these are used to examine economic, financial and managerial problems. Likewise, in further topics we will make use of Excel to solve mathematical configurations.

AEB3510 is an applied mathematics course. We will also cover some advanced topics, such as multivariate calculus, Lagrange multipliers, integration, and matrix algebra. Up to this point, most mathematics courses you have taken have focused on computational mathematics; this course, however, will emphasize mathematical reasoning and methodology.

This is an upper-division course and it is structured and taught accordingly. The importance in the curriculum means you should plan on spending time outside to review the in-class and online lectures. During exam weeks, the time-commitment will be significantly higher. A lower study input will more than likely adversely affect your grade.

Grading system: The grading system is online through Canvas. This is an automatic/systematic process. Thus, the instructor does not insert the grades. The system automatically grades it and tabulate it. The purpose of the professor in this class is to instruct you in the course, not to directly grade you. Thus, it is your responsibility to obtain good grades, not the instructor to give it. Please, submit the assignments before the deadlines and perform well in the class.

Prerequisites: MAC2233 or MAC2311 (or the equivalent). AEB3510 is taught with the assumption that all students are comfortable with quantitative reasoning, analytical methods, derivatives, graphs, and algebra. It is further assumed that all students have had at least one economics course (i.e., either ECO2013, ECO2023, or the equivalent).

It is also expected that students must have basic knowledge of Excel. We will use standard Windows Excel version. Please install it in your laptops and plan accordingly.

Course objectives: After the successful completion of this course, students should

1. Be able to use calculus and algebra in economic optimization
2. Understand the mathematical principles required to maximize consumers satisfaction
3. Be able to analyze the impact of changes of external variables in an optimization problem
4. Be able to use linear programming to optimize firms' goals
5. Have a strong foundation necessary to succeed in the FRE major

Brief Course Outline: The material in AEB3510 is divided in ten units, each subdivided in chapters

Week	Chapter	Description	Date
UNIT 1. SYSTEM OF EQUATIONS			
1		1 Linear Equations	Jan 7-11
1		2 System of linear equations	
1		3 2x2 system of linear equations	
1		4 Solving systems of linear Equations	
2		5 Economic applications of linear equations	
UNIT 2. FUNCTIONS			Jan 14-18
2		6 Exponents	Jan 22-25
2		7 Defining functions	
2		8 Quadratic functions	
3		9 Exponential functions	
3		10 Logarithmic functions	
UNIT 3. MATRIX ALGEBRA			
3		11 Matrix operations	Jan 28-Feb 1
3		12 Matrix and Vector Multiplication	
3		13 Linear independence and determinants	
4		14 Linear equation in matrices	
4		15 Inverse matrices	
4		16 Cramer's rule for solving linear equations	
EXAM 01			
UNIT 4. FOUNDATION OF DERIVATIVES			
5		17 Limits and the principle of derivatives	Feb 4- 8
5		18 First-order derivatives	
5		19 Derivatives of compounded functions	
6		20 Higher order derivatives	
UNIT 5. DERIVATIVE APPLICATIONS			Feb 11-15
6		21 Derivatives tests	Feb 18-23
6		22 Optimization	
7		23 Sketching the graph	
7		24 Derivatives: Application in economics	
UNIT 6. PARTIAL DERIVATIVES			Feb 25-Mar 1
8		25 First order partial derivatives	Mar 11-15
8		26 Cross and second order derivatives	
9		27 Optimization of functions	
9		28 Constrained optimization: The Lagrange function	
EXAM 02			
UNIT 7. SPECIAL MATRICES			Mar 18-22
10		29 Matrix operations in multivariate functions	Mar 25-29
10		30 Hessian matrices	
11		31 Bordered-Hessian matrix	
UNIT 8. LINEAR PROGRAMMING			
11		33 The feasible region	Apr 1 - 5
12		34 Optimization in LP	
12		35 The normal and dual in LP	
UNIT 9. MATHEMATICAL APPLICATIONS			Apr 8 - 12
12		32 Input-output analysis: Applications	Apr 15 - 19
13		36 Solver: Applications in Economics using LP	
UNIT 10. INTEGRALS			Apr 22 - 24
13		37 Indefinite integrals	Apr 29-May 3
14		38 Definite integrals	
14		39 Integration techniques	
14		40 Area using integration	
15		41 Integral application in economics	
FINAL EXAM			

Evaluation of Performance and Grading

Grades: You have the *opportunity* to earn up to **1000** points throughout the semester. Your final grade in AEB3510 will be based composed by the following items described on the right figure.

On the other side, there are **five ways to obtain bonus points:**

(1) Filling the end of the semester course feedback will allow for **10 extra points**. In order to receive those points, you need to submit the screenshot of the confirmation page as a proof that you submit it. In addition, if more than 75% of the students fill the survey, everybody receives **5 possible extra points**.

(2) There will also be a mid-semester survey. This will allow you for 5 possible extra points.

(3) If your mini-project (described in the course description section) is written in a state-of-art manner. I will provide you with **10 possible extra points**.

(4) If you visit your TA during his office hours with questions regarding AEB3510 assignments at least **three times** during the semester, you will receive **5 bonus points**.

(5) If you attend at least two of the review AEB3510 sessions, you will receive **5 bonus points**.

Description	Quantity	Unit Value	Total
Prelabs	9	10	90
Quiz	13	15	195
Homework	10	30	300
Midterms	2	100	200
Mini-Project*	1	15	15
Final exam	1	200	200
TOTAL			1000

Final Grade	Minimum Score
A	930
A-	900
B+	870
B	830
B-	800
C+	770
C	730
C-	700
D+	670
D	630
D-	600
F	0

This means that there are 40 possible bonus points. This can make a change in letters (from B to A for example). No other opportunities to increase your score will be given.

Final course grades will have the following benchmarks out on **1000** possible grade points as described on the left figure. Please note that grades are **not 'rounded'** or **'adjusted'** at the end of the term. Haggling over grades at the end of the semester is NOT entertained. Of course, if I did a mistake in grading your exam I will gladly give you the correct points. If you believe that your exam is incorrectly graded or that your grade is incorrectly posted, please contact me via e-mail (i.e., in writing) as soon as possible. You have **7 days** after the grade has been posted to voice your concern. After 7 days have passed, your **posted grade will be assumed to be correct and accurate**.

For general information about grading and grading policy at the University of Florida, please refer to: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>.

Pre-lab assignments: Each unit is divided in chapters. In order to motivate reading completely through the whole material, there will be pre-labs which are from 5 to 10 questions based on the examples that will be explain in the chapter. Notice that the problems presented in these pre-labs are fully covered in the videos of the class. It is your task to follow step by step and use your own words and understanding to present the material. **Copy paste from the video is not permitted**. Students are required to show the reasoning on the topics. Pre-lab assignments are expected to be submitted by **5 pm of the due date**. After that time, the points earned is **zero [0] points**.

Homework Assignments: Homework for each unit is assigned. All assignments must be clearly written showing the reasoning step by step. Late homework submissions will be subtracted 25% if turned the next day. At the second day of delay or later, assignments are **no longer accepted** and there are **no make-up opportunities** given. Please note that homework assignments are 30% of your total grade. All homework must be submitted via online through canvas using the following title:

AEB3510 UNIT #____ %LAST NAME% %FIRST NAME%

Excel Applications: Excel skills are expected on this class. There will be a special homework [Unit 9] on Excel Applications. This will not be on the final exam, there will not have pre-lab or quiz. However, there will be a homework based on Excel. Plan accordingly considering these two chapters will implement mathematical applications into economics using Excel. One related to linear programming (LP) and one on input-output (IO) problems.

Quiz: There are one or two quizzes per unit (one quiz weekly). The duration is 20-25 minutes, and these are 2-3 short questions. These are open book. The deadline for the submission is at 11:00 pm of the date indicated in the timetable below.

Review of concepts: There will be additional questions that will be provided for each unit. These are not mandatory. Nevertheless, they are highly recommended and expect some of them to appear in the exam and similar combinations in the quizzes. These questions have the objective to improve the skills in the class.

Mid-terms: There will be two regular exams ('Mid-term exams') offered during the semester. Each exam is worth 100 points. The exams will consist of different multiple-choice, essay and math-solving questions. **In order to gain full credit, it is necessary to show all steps even if it is multiple-choice question (the choices are simply provided to guide you to the correct answer).** Selecting the correct answer without explanation does not earn points. The exams may be based on material covered in class or material from the book.

Each exam is open book, you are allowed to bring the book, notes and previous exercises solved. For the first exam, you are not allowed to bring a calculator. For the second and third exam, you can bring a calculator; however, it cannot be a graphing calculator, you cannot bring a calculator that can compute derivatives or integrals but is allowed to compute determinants using the calculator. You cannot use online resources during the exam. Even if you have all the material with you, you need to prepare extremely well for the exams. Note that the exams are rigorous in nature and substantial preparation will be expected and required. For the examinations, we will use Proctor-U, which is a software that allow students to take an exam on a lab for a specific amount of time. You will be provided four days to complete the exam. Expect to be in the lab for 2 hours. The solutions of the exam will be available the next day after the allowed period to take the exam. Likewise, the results of the exam will be provided the Monday after the exam is taken.

Mini-project: In this task you need to create and solve one math economic problem using any of the topics learned in this class. In order to create the question, you need to be imaginative: use a TV show, anime, soap opera, history, news or any other material. Originality in the problem is evaluated as part of the bonus points for this class. The basis is 15 points, but you can earn up to 10 bonus points if you do a good job in this project. The deadline of the mini-project is the day before reading days (for Spring2019 is **April 24th** at 5:00 pm)

Final Exam: A **comprehensive mandatory Final Exam** is given during the final exam week, you will be able to take the exam between **April 29th and May 3rd [at 5:00 pm] (!)**. Be prepared for the final exam to last three hours. All students are required to take the Final Exam and it will count as 20% points of your final course grade. Early or late exams are not given. Please plan accordingly.

Make-Up Exams: Make-up exams **are not given**. This policy applies for missing a mid-term, except for extreme circumstances, there are several days as option that you can take the exam. Should you miss the Final Exam for any reason, you will need to talk to Dr. Luis Peña-Lévano to evaluate the situation.

Extenuating Circumstances

Exception Exceptions to the Missed Assignment Policy reflect excused University events that fall under the 12-day rule or are of a very serious nature. These exceptions are referred to as "Extenuating circumstances"

and require formal, letter-head documentation from a physician, hospital, UF faculty/academic advisor, or an email from the UF Dean of Students Office sent to the instructor's UF email address, within 24 hours of assignment deadline. A health-clinic note on the day an assignment is due does not warrant extenuating circumstances and the "Missed Assignment" Policy (above) will apply.

Student Responsibility for Online Submissions

Students are responsible for ensuring and verifying that all of their assignment files are uploaded successfully in to Canvas. The instructor cannot be responsible for internet connections or failures.

Students are strongly advised against using wireless connections to complete quizzes or upload assignments. Wireless connections have been problematic in previous semesters with students losing all points due to upload failure. A hard -wired connection can be located at any UF computer lab on campus or any public library to submit graded assignments. TO REPEAT, wireless connections are problematic, and quizzes or assignment uploads may not be saved (without any warning) and therefore locating a hard-wired connection is recommended to submit any graded assignments.

Exam day policy: Please arrive with your ID five minutes early, if possible, to get seated and get your books/bags stowed away so that the exam can be started on the stated time. If you need to use the bathroom, please do so before the exam begins. Students are not allowed to leave the Proctor=U lab during exams and re-enter the classroom. This policy also applies to the Final Exam.

Special Office hours: The instructor of the class will have six different four-hour sessions scheduled (from 3 to 7 pm). It is not mandatory but highly encouraged to attend. During these hours, the instructor will solve any doubt concerning any material of the class.

The dates that each unit is expected to be covered, together with the due dates for the pre-labs, the day of the quizzes, deadline for assignments, date of exams and the special office hours of Dr. Luis Peña-Lévano are presented in the timeline below:

Timeline of the units covered in class – Fall 2019

Week #	Month	Days of the Week					
		M	T	W	R	F	
1	Jan		7	8	9	10	11
2			14	15	16	17	18
3				22	23	24	25
4			28	29	30	31	1
5	Feb		4	5	6	7	8
6			11	12	13	14	15
7			18	19	20	21	22
8			25	26	27	28	1
	Mar						
9			11	12	13	14	15
10			18	19	20	21	22
11		25	26	27	28	29	
12	Apr		1	2	3	4	5
13			8	9	10	11	12
14			15	16	17	18	19
15			22	23	24		
	May		29	30	1	2	3

Unit	Description	Pre-lab	Quiz	Homework	Review/Office	Exam
1	System of equations	Jan 9 [W]	Jan 11 [F]	Jan 14 [M]		
2	Functions	Jan 16 [W]	Jan 18 [F], Jan 23 [W]	Jan 24 [R]	Jan 17 [R]	
3	Matrix Algebra	Jan 28 [M]	Jan 29 [W]	Feb 1 [F]	Jan 31 [R]	
EXAM MIDTERM 1						Feb 2 - 5
4	Foundation of Derivatives	Feb 8 [F]	Feb 11 [M]	Feb 12 [T]		
5	Derivative applications	Feb 15 [F]	Feb 18 [M]	Feb 22 [F]	Feb 21 [R]	
6	Partial Derivatives	Feb 27 [W]	Feb 28 [R], Mar 13 [W]	Mar 15 [F]	Mar 14 [R]	
EXAM MIDTERM 2						Mar 16 - 19
7	Special Matrices	Mar 22 [F]	Mar 25 [M]	Mar 26 [T]		
8	Linear Programming	Mar 28 [R]	Mar 29 [M], Apr 1 [M]	Apr 2 [T]		
9	Mathematical applicaton			Apr 12 [F]	Apr 11 [R]	
10	Integrals	Apr 11 [M]	Apr 16 [T], Apr 22 [M]	Apr 23 [T]	Apr 25 [R]	
FINAL EXAM						Apr 29 - May 3

Online course evaluation: Student assessment of instruction is an important part of efforts to improve teaching and learning. As a motivation, there will be **10 extra bonus points if the task is completed**. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>

Other Important Information

Students are responsible for all deadlines/critical dates and policies set forth by the University of Florida. Deadlines/critical dates are published on the University of Florida Office of the University Registrar's web-site, <http://www.registrar.ufl.edu/>. Current academic policies are presented in the University of Florida Undergraduate Catalog, <https://catalog.ufl.edu/ugrad/current/Pages/home.aspx>. Please familiarize yourself with this information.

Students Requesting Classroom Accommodation: 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. Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodations. Students with disabilities should follow this procedure as early as possible in the semester. This must be done at least 10 days prior to any accommodation is needed.

UF Counseling Services: The life of a college student can sometimes be overwhelming. Resources are available on-campus to help students manage personal issues or gain insight into career and academic goals. Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's various counseling resources. The following resources are available for all UF students:

- For general student affairs: Dean of Students Office, 392-1261 (after hours, please call 392-1111);
- For mental health consultations: Counseling & Wellness Center, 392-1575 (24/7 phone access);
- For students experiencing distress: U Matter, We Care, 294-2273, www.umatter.ufl.edu;
- For physical health consultations: Student Health Care Center, 392-1161;
- For victims of sexual assault: Office of Victim Services, 392-5648 (after hours, please call 392-1111);
- For career guidance: Career Resource Center, 392-1602, www.crc.ufl.edu.

Software Use: All faculty, staff, and students of the University of Florida 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 an 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 their words, **the Honor Code Preamble:** 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 Pledge: 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.

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

Faculty Responsibility: Faculty members have a duty to promote honest behavior and to avoid practices and environments that foster cheating in their classes. Teachers should encourage students to bring negative conditions or incidents of dishonesty to their attention. In their own work, teachers should practice the same high standards they expect from their students.

Administration Responsibility: As highly visible members of our academic community, administrators should be ever vigilant to promote academic honesty and conduct their lives in an ethically exemplary manner. This policy will be vigorously upheld at all times in this course.

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

Student complaints: The University of Florida believes strongly in the ability of students to express concerns regarding their experiences at the University. The University encourages its students who wish to file a written complaint to submit that complaint directly to the department that manages that policy.

- For a residential course, please read the following link:
https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
- For an online course, please follow this link:
<http://www.distance.ufl.edu/student-complaint-process>

By enrolling in this course, you are agreeing to the terms outlined in this syllabus.

I wish everyone a rewarding and productive semester 😊