

University of Florida
College of Agricultural and Life Sciences
Food and Resource Economics Department – Plant City Campus

AEB3510 Quantitative Methods in Food and Resource Economics

Spring Term 2018

3 Credit Hours

Scheme of the class:

Face-to-face lecture - Tuesdays 4:00 pm – 4:30 pm

Laboratory - Tuesdays: 4:30 pm – 5:30 pm

Online Classes: Posted every Tuesday at 7:00 pm (approximately 1.5-hours lecture)

Classroom: Auditorium

Instructor and Contact Information

Instructor: Luis Moises Peña Lévano, Ph.D.
Office: UF Plant City Campus, Office # 104
Phone: (813)757- 2184
Office Hours: Thursdays 11:00 am – 1:00 pm;
Other times by appointment.
E-mail: lpenalevano@ufl.edu

Many students find more comfortable and efficient to send e-mail with questions. Please note that I do not use the e-mail tool within E-Learning – please use my Gatorlink e-mail for all correspondence. When e-mailing me, please indicate in which class you are enrolled and in the subject (in one sentence) what is the e-mail question so that I can more effectively address your concerns – This will help me to answer more efficiently because I am teaching multiple classes. ***Courteous and professional*** e-mails can expect a prompt reply.

Undergraduate academic advising is handled by Mr. Jason Steward, see contact information below.

Undergraduate Advisor: Mr. Jason Steward; UF Plant City Campus, Office # 104;
Phone number: (813) 757-2280;
E-mail: jsteward@ufl.edu

The instructor 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: *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

E-Learning: The E-learning we will be using is through an online source entitled Top-Hat. You will receive an invitation via email to purchase the software. The access for this software is bought one time per semester and provide access to both courses AEB 3103 and AEB 3510. You can add the AEB 3510 into your course list account. In order to do this, please enter the Join Code 400105. Assignments, dynamic classes and slides will be posted through this page.

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 and programming, matrix algebra and calculus. Lectures and problems will show how these are used to examine economic, financial and managerial problems. Likewise, in further topics we will made use of Excel to solve linear programming problems as well as input-output table 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.

Prerequisites: MAC2233 or MAC2311 (or the equivalent). AEB3103 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). This course is complimentary and strongly advised to be taken together with AEB3510.

Attendance and related issues: Students are assumed to be highly committed academically. AEB3510 is a highly analytical course. We are going to proceed at a rather quick pace. Attending class is a prerequisite for doing well in this course, and it counts as part of your final grade. Because the lectures and labs are scheduled in the same session – given the nature and the quantity of material covered, missing class will detrimentally impact your performance. It is further assumed that students will arrive to class on-time. Class will promptly start at 4:00pm. Arriving late or leaving early without prior consent is considered unprofessional behavior.

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 covered in AEB3510 can be divided into five distinct modules.

I. Pre-calculus

- WEEK 1: JANUARY 9TH
 Chapter 1: Review
 Chapter 2: Equations and graphs
 WEEK 2: JANUARY 16TH
 Chapter 3: Functions
 WEEK 3: JANUARY 23TH
 Chapter 4: System of equations

II. Calculus and integration

- WEEK 4: JANUARY 30TH
 Chapter 9: Differential calculus
 *****EXAM 1 (February 6th – Topics covered: Weeks 1-4) *****
 WEEK 5: FEBRUARY 6TH
 Chapter 10: Differential calculus: Uses of the derivative
 WEEK 6: FEBRUARY 13TH
 Chapter 11: Exponential and logarithmic functions
 WEEK 7: FEBRUARY 20TH
 Chapter 13: Calculus of multivariable functions & Lagrange functions
 WEEK 8: FEBRUARY 27TH
 Chapter 12: Integral calculus

III. Matrix algebra and linear programming

- *****EXAM 2 (March 13th – Topics covered: Weeks 5-8) *****
 WEEK 9: MARCH 13TH
 Chapter 5: Matrix algebra
 WEEK 10: MARCH 20TH
 Chapter 6: Solving linear equations with matrix algebra
 WEEK 11: MARCH 27TH
 Chapter 7: Linear programming: Using graphs
 Chapter 8: Linear programming: The simplex algorithm and the dual

IV. Applications of mathematics in economics

- WEEK 12: APRIL 3TH
 Topic 1: Linear programming optimization using Excel
 Topic 2: Input-output tables

V. Advance topics: Differential equations

- *****EXAM 3 (April 10th – Topics covered: Weeks 9-12) *****
 WEEK 13: APRIL 10TH
 Topic 3: Differential equations – Initial value problems
 Topic 4: Linear models – exponential growth and decays
 WEEK 14: Review of Modules
 *****WEEK 15 – FINAL EXAM (April 24th – Topics covered: Weeks 9-12) *****
 WEEK 16: Final presentations (Tuesday May 1th, 4:05 pm – 5:35 pm)

In summary, each chapter is taught per week making a total of 13 weeks.

Note: During exam weeks (of either AEB 3013 or AEB 3510), AEB 3103 will be taught from 3:15 pm – 4:45pm, whereas AEB 3510 will be taught from 4:45 pm – 6:00 pm,

The exams will be scheduled on Tuesdays and it will last exactly 70 minutes, from 2:00 pm – 3:10 pm.

Except the final exam that lasts 120 minutes. AEB3103 will start its review from 4:05 pm -5:20 pm

Evaluation of Performance and Grading

Grades: You have the *opportunity* to earn up to 700 points throughout the semester. Your final grade in AEB3103 will be based on the following:

Sum of highest two	
Mid-Term exams	
(@ 100 points each)	200 possible points
Final Exam	100 possible points
Attendance and Participation	10 possible points
Pre-lab assignments	20 possible points
Presentation project	50 possible points
Excel assignments	40 possible points
Dynamic online questions	60 possible points
<u>Homework Assignments</u>	<u>220 possible points</u>
TOTAL	700 possible points

Final course grades will have the following benchmarks out of the 700 possible grade points:

A (≥ 635)	C (475 - 499)
A- (610 - 634)	C- (450 - 474)
B+ (580 - 609)	D+ (410 - 449)
B (550 - 579)	D (380 - 409)
B- (525 - 549)	D- (351 - 379)
C+ (500 - 524)	E (≤ 350)

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>.

Exams: There will be three regular exams ('Mid-term exams') offered during the semester for AEB510. Each exam is worth 100 points. The exams will consist of different multiple-choice and math-solving questions. The multiple choice and essays questions will be answered through Top-Hat. Thus, the laptop is permitted during the exams. The math-solving questions will be turned in paper during the exam in order to receive full credit. The exams may be based on material covered in class or material from the book. The exams are rigorous in nature and substantial preparation will be expected and required.

Your **two highest mid-term exam grades** count towards your final course grade for a total of 200 points, see the above rubric (2 exams @ 100 points each). Each exam is scheduled for 70 minutes and will commence at 2:00 pm. The exam dates are specified in this course syllabus (page 3 and also in the next page). There will be further lecturing on exam days.

The exams are closed book and closed notes, but the laptop and a simple calculator is welcomed to be used. The instructor will provide formulas necessary for the exam. Sharing information is not permitted. Cellphones should be turned off as well as other electronic devices. This policy will be STRICTLY enforced during exams. Sharing calculators during an exam is not allowed. Thus, if you do not own a simple calculator, you will need to purchase one. If you are unsure whether or not your calculator is acceptable for use in AEB3510, please consult me as soon as possible.

Final Exam: A **comprehensive mandatory Final Exam** is given a week before the normal final exam week, **Tuesday April 24th at 2:00 pm (!)**. Please make note of the date and the time. The Final Exam will be similar in structure as the other exams. A review for the modules will be imparted a week before the final exam. The Final Exam is given in our regular classroom and will last for two hours. All students are required to take the Final Exam and it will count as 100 points of your final course grade, regardless of your performance on the previous three exams. The Final Exam cannot be dropped unless as noted in the Special note. Early or late exams are not given. Please plan accordingly.

Exam Dates:

Mid-term Exam 1:	Tuesday February 6 at 2:00 pm
Mid-term Exam 2:	Tuesday March 13 at 2:00 pm
Mid-term Exam 3:	Tuesday April 10 at 2:00 pm
Final Exam:	Tuesday April 24 at 2:00 pm

The instructor reserves the right to change these dates as appropriate. Any changes will be communicated on E-Learning and via the Gatorlink listserv.

Special note: If you obtain **87 or higher** in all your midterms, you can **opt to not take the final exam**.

Make-Up Exams: Make-up exams are not given. Should you miss any of the mid-term exams, that exam score is simply dropped (i.e., your two highest mid-term grades count in the calculation of your final course grade). This policy applies for missing a mid-term, except for extreme circumstances. Should you miss the Final Exam for any reason, you will need to talk to your instructor to evaluate the situation.

Exam day policy: It is expected that all students be on time to exams. Please arrive 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 classroom during exams and re-enter the classroom. No one will be allowed to enter the classroom to begin the exam after the first student has turned in their finished exam. This policy also applies to the Final Exam.

Excel assignment: Each student will be assigned with one linear programming (LP) and one input-output (IO) problem. Using Excel and four power point slides (two slides per exercise) will show the step-by-step solution and its meaning in economic terms. The evaluation is as follows: Each exercise solution and procedure will worth 15 points making a total of 30 points. The remaining 10 points will be earned at the moment of presenting the solution to the class (a 5 minutes presentation per exercise). The instructor will choose at random which of the two exercises will be presented in class to have an equal number of presentations of LP and IO problems. Please note that each student will receive two different problems with different numbers. Thus, although the procedure can be similar, and team work is approved for this exercise. The solutions and procedures will be different for each student.

Case study project: There will be one presentation at the end of the course with a total of 50 points. This presentation will be based from a problem assigned by the professor from eight potential topics:

1. Firm cost minimization of inputs
2. Transportation problem
3. Minimizing the cost of feeding
4. Maximizing net revenue of farmers
5. Input-output table of a country

The topics will be selected on Tuesday, February 27th. The student will read about the topic and solve the mathematical problem by hand and turn to the professor by **Tuesday April 17th at 2 pm**. The professor will provide feedback on the procedure and improve their modeling strategy. The correction will be provided on Tuesday **April 24th at 4:00 pm**.

The slides presentations are expected to be sent for ALL by **Saturday April 28th at 1 pm**. This will be presented to the class on **Tuesday May 1st** at 4 pm, and the selection of which student will be presenting that week will be at random. This presentation will last 15 minutes.

The composition of the presentation must be as followed:

- Presentation of the topic – Mathematical concepts
- Use of the mathematic principles taught in class to explain how to solve the problem
- Economic interpretation of the problem
- Main message and conclusions that can be learned from this event

Homework Assignments: There will be eight take-home homework assignments throughout the semester. Each homework project will be worth 20 points. The lowest scored assignment from the 12 sets of homework will be dropped. Thus, for your final course grade, a total of 220 points will be allocated to homework. All assignments must be typed – further information will be provided in class. Late homework submissions will be subtracted 15% if turned the next day and 25% for the second day. After the second day of delay, assignments are no longer accepted and there are no make-up opportunities given. If you need to miss class on the due date, you must turn in your homework via online.

Dynamic online problems: You are required to read the on-line lectures before coming to class, except for the week 1. Each dynamic lectures of the 13 weeks will come with dynamic short questions. There will be a total of 130 questions (10 each week) that will be dispersed through all the material in Top-Hat. Each question worth 0.5 points. The total points that you can earn from the dynamic online questions is 60 points (which means that you need to have 120 questions out of 130 questions right in order to get the full amount of points - in other words, there are 10 bonus questions that can help you to get all the points!!). In order to get full credit of the points, you must finish the dynamic online questions by Monday at 9:00 pm before the day of the class (except week 1. For the online-classes of week 1 and week 2 [Introduction, Chapter 1 and 2] you must finish by Monday January 15th at 9 pm before the Tuesday January 16th session of Week Class 2).

Assignments: Each chapter of the book represents a week of classes. A total of 10 questions will be considered in every weekly assignment, each homework has a value of 20 points. The 10 questions are separated by three different sub-sections [A,B,C].

- Sub-section A – Simple multiple-choice mathematical problems
- Sub-section B – Mathematical problems turned in paper
- Sub-section C – Application problems
- Each question from Sub-Section A will worth 1 points. Sub-section B questions will have a value of 2 points each. Generally, sub-section C will be one 1 question and will be worthy about 5-6 points. The distribution of the questions will be explained in the homework assignments.

Attendance and participation: Due to the fast pace of the class, it is encouraged that the students assist to all the classes. Thus, a total of 10 points will be provided to each student as an incentive to come to classes.

Each time a student does not come to a class session, unless there is a justifiable absence, 1 point will be taken from the 10 points.

Professional Etiquette: In order to provide a productive environment conducive to everyone's learning, adherence to the following guidelines is expected:

- No texting, web surfing, or any other use of cellular devices is permitted or tolerated during class sessions unless it is necessary for the classroom. Please silence your device.
- You can use your tablets or laptops only to take notes for your classes.;
- Students are expected to be on-time for class. It is disruptive when students arrive late – not to mention disrespectful to myself and your fellow students. Coming frequently late to classes will reduce up to 1 point of participation per occasion after the third time;
- Leaving class early without prior permission is not allowed, unless justifiable reasons;
- You should avoid talking amongst each other once the lectures begin (this includes conversations about the material and the class itself). Please raise your hand if you have any questions;

If you cannot comply with these simple expectations, you may be asked to leave the classroom and you will be counted as absent (which is equivalent to subtract up to 1 point of attendance and participation). The instructor reserves the right to penalize any student violating these rules.

Pre-lab assignments: Each chapter in the textbook is accompanied by numerous study and review problems. In order to motivate reading before the chapters before the class, and considering that the material will be available online five days before the classes, there will be pre-lab assignments to reinforce the material. This will be simple problems that will help to improve your skills. The questions are presented below and will be also posted and must solved through Top-Hat. They must be solved before every Tuesday at 10:00 am. Failing to submit the pre-lab assignment before the class session will be punished with 0 points. Before the class session, complete solutions and explanations for ALL of these problems will be posted on Top-Hat under the 'Solutions' tab. There will be a total of 12 assignments. Each of them has a value of 2 points each. Your 10 out of 12 highest grades from your pre-lab assignments will count in your final grade.

Before Tuesday at 10 am of	Chapter	Page	Problems
Week 2	Chapter 1	23 – 26	31b 32c 37b 41a 47a
	Chapter 2	52 – 54	35d 36d 38a,e 43a 45d 50
	Chapter 3	86 - 87	34d 43 46a 48d 50a
Week 3	Chapter 4	125 – 127	31b 32b 34b 39b
Week 4	Chapter 9	242 – 243	26c 27d 29f 30b 33d
Week 5	Chapter 10	273 – 275	28d 29b 31c 32a 36c
Week 6	Chapter 11	299 – 301	40c 46a 49f 58 68
Week 7	Chapter 13	371 – 373	46a 48d 51d 54d 60a
Week 8	Chapter 12	332 – 333	42g 45f 46c 48b
Week 9	Chapter 5	148 – 149	41a,f,i 44c 46e,h 48d
Week 10	Chapter 6	174 – 175	16b 17a 18d 21a
Week 11	Chapter 7	194 – 195	32, 36
	Chapter 8	214 – 215	12,18,21
Week 12	Topics 1,2	Handout	1,2,3
Week 13	Topics 3,4	Handout	1,2,3

Professional Etiquette: In order to provide a productive environment conducive to everyone's learning, adherence to the following guidelines is expected:

- No texting, web surfing, or any other use of cellular devices is tolerated in class;
- You should avoid using any tablets, laptops, cell phones, and touch-screen devices other than for the use of the class. Please silence your device;
- Students are expected to be on-time for class. It is disruptive when students arrive late – not to mention disrespectful to myself and your fellow students;
- Leaving class early without prior permission is not tolerated;
- You should avoid talking amongst each other once the lectures begin. Please raise your hand if you have any questions;

The instructor reserves the right to penalize any student violating these rules by deducting points from the student's grade as appropriate.

Online course evaluation: Student assessment of instruction is an important part of efforts to improve teaching and learning. 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 😊