

**SUMMER 2019**  
**Department of Economics**  
**TOBB University of Economics and Technology**  
**Econ 261: MATHEMATICS FOR ECONOMISTS**

<b>INSTRUCTOR:</b> Ayça Özdoğan Atabay <b>OFFICE:</b> 293/6 <b>PHONE:</b> (312) 292 4543 <b>E-MAIL:</b> aozdogan@etu.edu.tr	<b>CLASS TIME:</b> 9:00-10.20 Tuesday-Friday <b>CLASSROOM:</b> 309 <b>OFFICE HRS:</b> 11-12 am on Tuesdays and Fridays <b>URL:</b> <a href="http://aycaozdogan.weebly.com">http://aycaozdogan.weebly.com</a>
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If the above office hours do not fit to your schedule, you can come to office hours via appointment. The best way to contact me is through email. Emails will be returned within 24 hours except over the weekends. Important information will be sent to students' university email accounts, as well as posted on my webpage. It is your responsibility to check your emails and the website regularly (at least once a week).

### **COURSE DESCRIPTION/CONTENT**

This course intends to introduce the basic mathematical tools used in economics with their applications. Mathematical preliminaries and their use in several economics problems will be of interest. Linear algebra, constrained and un-constrained optimization will be the main subjects of the course.

### **PREREQUISITES**

Students should have successfully completed MAT 103 or ECON 105 prior to taking this course.

### **TEXTBOOK**

There will be no required textbooks for the class. The following constitute a partial list of recommended resources.

- Klein, M. W., *Mathematical Methods for Economics*, 2nd ed., Addison Wesley, 2002. (K)  
Chiang, A. and K. Wainwright, *Fundamental Methods of Mathematical Economics*, 4th ed, McGraw-Hill Irwin, 2005. (CW)  
Simon, C. P. and L. Blume, *Mathematics for Economists*, 1st ed.  
Sundaram, R.K., *A First Course in Optimization Theory*, Cambridge University Press, 1996.

### **GRADING POLICY**

The final grade is determined as follows: **PQ (%15) + MT 1 (%25) + MT 2 (%25) + Final (%35)**

Below are the grading cut-off points:

AA: 92-100, BA: 85-91, BB: 78-84, CB: 70-77, CC: 65-69, DC: 56-64, DD: 50-55.

Incomplete grade (I): A low class standing is not a valid reason for an I grade. An I grade is given only in exceptional circumstances like hospitalization or family emergencies; and an arrangement must be worked out between the student and me before the final exam. I require written proof of emergencies. You have one year to make up an I; and must repeat the course in its entirety.

#### Pop-quizzes (15%)

There will be random number of random quizzes. **No make-up** will be granted for the quizzes. The lowest quiz score will be dropped and the average of the rest will be counted in the final grade.

#### Midterm (25% each)

Make up's are not allowed for the midterm exam under any circumstances, except in medical emergencies for which a doctor's note is required. If a student knows he/she will be absent on the day of the exam for legitimate reasons (such as participation in activities sponsored by the university etc.), it is his/her responsibility to notify the instructor as far in advance as possible (again, with documentation). The midterm exam will be in class and closed book.

#### Final (35%)

The final is cumulative. The make-up will be granted only in case of a valid and documented reason. Absence without any valid documentation will result in a grade of zero from that exam. In case of an illness, you are required to bring a formal doctor's note from a hospital. Students who want to take a make-up exam need to inform me by email as early as possible.

### **NOTES**

1. Students are responsible for material covered in both the lecture and supporting material in the mentioned chapters of the textbook. Everything discussed in class is part of the course and will appear on exams.
2. For undergraduate courses, one credit is defined as equivalent to three hours of additional work per week for the course, in order for students to achieve an average grade. This implies that you should put in quite a bit of work on this course.
3. Please attend to class. If you miss more than 30% of the lectures, you fail complying with the rules of YÖK. Plus, there will be pop-quizzes that determine 15% of your final score.
4. Please use technology “responsibly” while you are in the classroom. This means **TURNING OFF** your cell-phones, any other devices, and your computers as well. The instructor thanks you in advance.

### **NOTES ON ACADEMIC HONESTY AND STUDENT CONDUCT**

All the work submitted must be that of student. You are encouraged to work with others in understanding the concepts and problems. However, each student must hand in their own homework assignment and all the sources of information and references used including a classmate (except for the textbook, lecture and recitation notes) must be **cited**. Identical answers will receive a score of zero. If the academic dishonesty occurs on a final or midterm, a grade of F or N will be received. Cheating and plagiarism will be penalized according to the disciplinary rules of the university and YÖK.

## SAVE THE DATES (Tentative)

**Midterm 1:** June 11, **Midterm 2:** July 16,  
**Lectures dropped:** June 14 (Friday) and June 25 (Tuesday)

## TENTATIVE COURSE PLAN

- I. Matrix (Linear algebra) (About 3 weeks)
- II. Review of functions, differentiation, integral calculus etc. (1 week)

### *MIDTERM I (JUNE 11)*

- III. Static Optimization (About 4-5 weeks)
  - Optimization without constraints,
  - Optimization with Equality Constraints (Lagrangian),
  - Optimization with Inequality Constraints (Kuhn-Tucker conditions)
  - Wierstrass Theorem
  - Duality and Envelope Theorems
  - Implicit function theorem

### *MIDTERM II (JULY 16)*

- IV. Introduction to dynamic optimization in discrete-time: Dynamic Lagrange method (1 week)
- V. Introduction to dynamic programming and Bellman equation; and economic applications (if time permits)