

MATH/ECON 530-010/080
MWF 12:20-1:10, Online

Application of Mathematics in Economics
Fall 2020

Web Page: <http://www.math.udel.edu/~edwards/download/m530/f20home.html>
(also referenced from QR code at end of document)

Instructor: Prof. D. A. Edwards
EWG 511

Office Hours: T 1:30–2:30 R 9:30–10:30 or by appointment
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Introduction

Welcome to Application of Mathematics in Economics! In this course you will be learning the theoretical underpinnings of economic problems. The text for this course is *Mathematical Optimization and Economic Theory*, by Intriligator. **The text is required**, since you will be assigned both reading and homework problems from the book. However, I will not be following the book closely. In addition, I may also be lecturing from various other sources, so class attendance and participation is necessary for successful mastery of the material.

Online Meetings

You should have received an e-mail with Zoom meeting information and a link to a survey about your access to technology.

Online classes will be live via Zoom at the normal meeting time. I will come online 10 minutes beforehand to answer questions. Once class begins, your audio will be muted and you should shut off your video. Then if you wish to ask or answer a question, you can turn on your video and audio. Chat will be disabled.

You will receive 1 point for attending at least 35 minutes of each Zoom class. There will also be a daily poll during each Zoom class, which will last for one minute. You will receive 2 points for participating. (If you do not respond when I ask you a question, you will not receive any points for that lecture.)

Office hours will be via Zoom. Regularly scheduled office hours will be held at the times listed above. You may also contact me to set up an appointment.

Electronic Communication

All handouts will be posted at the Web page listed above. You should receive an e-mail when handouts are posted so that you can bring them to the appropriate class. **Canvas will be used only for submitting work.** Important announcements (corrections to typographical errors, etc.) will also be handled by e-mail. Finally, at the URL

<http://www.math.udel.edu/~edwards/download/suggest.html>

you will find an anonymous suggestion box.

Homework

In most cases, homework will be posted on Friday, and it will be due at the beginning of class the following Friday on Canvas. If at all possible, when submitting assignments on Canvas, combine your scans into a single properly rotated file.

The homework will ideally cover material up through the Monday before it is due. **ABSOLUTELY NO LATE HOMEWORK WILL BE ACCEPTED!** If you must miss a due date because of University business, it is your responsibility to make sure the homework gets to me *before* the due date. However, I will drop your two lowest homework scores. Therefore, low scores for assignments where you were pressed for time can be erased as long as you don't have too many of them.

Though you may not copy directly from another's paper or use someone else's ideas (including online aids) as your own¹, I encourage you to discuss the homework problems with your classmates. Any scientific endeavor is rarely done in a vacuum; therefore it is to your advantage to learn the benefits of collaborating.

Obviously, I can assign only a select few homework problems to be turned in. Therefore, I choose ones which, if mastered, show adequate understanding of the material. The examinations will largely be based on the material covered in the homework assignments. However, you are encouraged to try other problems in the book for practice.

I will do my best to have all assignments graded and returned in Canvas by Monday morning.

¹ For more details regarding academic dishonesty, see the Student Handbook (<http://www.udel.edu/stuguide/>).

Exams

Exam dates are listed on the attached schedule. **NO MAKEUP EXAMS WILL BE GIVEN!** The first two will take place during a regular lecture period; the final exam will be three hours long. When the exams are returned, they will have a numerical score and a letter grade on them. The numerical score is your score for the exam; *the letter grade is your grade for the course* to that point, including all homework scores.

At exam time, I will also administer a course evaluation form via Qualtrics. These forms will be seen only by me, so if you have comments that you wish the department to hear, please contact them directly.

Assessment

Your grade for the course will be determined in two stages. First your *raw score* will be calculated using the *higher* of the two algorithms:

- 1) The exams will count for 80% of your grade (final counts double), participation counts 10%, and the homework counts 10%.
- 2) The exams will count for 70% of your grade (final counts double), participation counts 10%, and the homework counts 20%.

Therefore, performing well on the homework will not only help you learn the material, it can also directly help your grade. (In the past, it has been my experience that the vast majority of students improve their grades by using their homework scores.) Then each of the raw scores will be scaled to determine final grades.

Honors Credit

In order to receive honors credit, you will need to complete a separate writing project. More details will be forthcoming as the semester progresses.

Tentative Schedule

Note: This is only a tentative schedule; there may be deviations from it.

week of August 31: introduction, convex sets

September 2: Homework set 1 distributed

week of September 7: convex sets

September 11: Homework set 1 due; homework set 2 distributed

week of September 14: convex sets, preference relations, utility

September 18: Homework set 2 due; homework set 3 distributed

week of September 21: utility, concave functions

September 25: Homework set 3 due; homework set 4 distributed

week of September 28: concave functions, Taylor series, the firm

October 2: Homework set 4 due; homework set 5 distributed

week of October 5: the firm, nonlinear optimization

October 9: Exam I (covers up through Taylor series)

week of October 12: nonlinear optimization, Kuhn-Tucker

October 16: Homework set 5 due; homework set 6 distributed

week of October 19: Kuhn-Tucker, linear programming, duality

October 23: Homework set 6 due; homework set 7 distributed

week of October 26: duality, extreme points and basic solutions

October 30: Homework set 7 due; homework set 8 distributed

week of November 2: shadow costs, game theory

November 6: Homework set 8 due; homework set 9 distributed

week of November 9: Nash equilibria, mixed strategies, nonzero games

November 13: Homework set 9 due; homework set 10 distributed

week of November 16: nonzero games, actuarial science

November 18: Exam II (covers up through Nash equilibria)

week of November 23: Thanksgiving Recess

week of November 30: actuarial transactions, stop-loss and life policies

December 4: Homework set 10 due; supplemental study material distributed

December 7: life policies

December 9: formal review session

