MATH/ECON 530-010/080 Application of Mathematics in Economics
TR 12:30-1:45, PRN 327 Fall 2017
Web Page: `http://www.math.udel.edu/~edwards/download/m530/f17home.html`
(also referenced from QR code at end of document)

Instructor: Prof. D. A. Edwards Office Hours: M 9:30–10:30 W 1–2 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.

If you have a problem, question about the material, or interesting application you would like me to address in class, please feel free to contact me during my office hours or make an appointment. **Extra copies of handouts are available at the Web page listed above.**

Please silence cellular phones before entering the classroom. There will be no makeup classes for snow days unless mandated by the University.

Electronic Communication

I do not use Sakai or Canvas. Important announcements (corrections to typographical errors, etc.) will be handled by e-mail. Also at the URL

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

you will find an anonymous suggestion box.

Homework

The most effective way to succeed in this course is to do all the homework assignments. I select the problems carefully to illustrate the most important topics in the course. Even if you are registered as a listener, I recommend doing the homework, and I will review it.

In most cases, homework will be distributed Tuesday during lecture. and it will be due at the beginning of class the following Tuesday. (The first homework assignment is attached to this sheet.) The homework will ideally cover material up through the day it is distributed. **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. Since mathematics is a subject where the material for one section builds on the section before, it is critical that you keep up to date on the homework: hence the stringent policy. However, to calculate your semester-long homework average, 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 own[1], 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. Model homework solutions will be posted in Morris Library after the assignment is due. Hopefully these will assist you in learning the material.

Homework assignments should be folded like a book with the following information on the "front cover:"

Name
MATH/ECON 530—Edwards
Assignment Number
Date

You will turn in your assignments this way so that I can put your grade on the inside, thus ensuring your privacy. I will make every effort to ensure that your graded homework is returned in a timely manner. The number of points assigned to each problem will be listed.

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.

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

Exams

There will be three exams in the course; the dates are listed on the attached schedule. **NO MAKEUP EXAMS WILL BE GIVEN!** The first two will be 70 minutes long and will take place during a regular lecture period. The final exam will be three hours long. Attached to each examination will be a course evaluation form so that I may receive your suggestions for how the course could be improved. These forms will be seen only by me, so if you have comments that you wish the department to hear, please contact them directly.

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.

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 90% of your grade (final counts double), and the homework counts 10%.
2) The exams will count for 80% of your grade (final counts double), 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. I will post revised versions as the semester progresses.

week of August 28: introduction, convex sets
August 29: Homework set 1 distributed
week of September 4: convex sets, preference relations
week of September 11: preference relations, utility
September 12: Homework set 1 due; homework set 2 distributed
week of September 18: utility, concave functions
September 19: Homework set 2 due; homework set 3 distributed
week of September 25: the firm, nonlinear optimization
September 26: Homework set 3 due; homework set 4 distributed
October 3: nonlinear optimization, Kuhn-Tucker conditions
October 5: Exam I (covers up through the firm)
week of October 9: Kuhn-Tucker theory, linear programming, duality
October 10: Homework set 4 due; homework set 5 distributed
week of October 16: duality, extreme points and basic solutions
October 17: Homework set 5 due; homework set 6 distributed
week of October 23: basic solutions, shadow costs, game theory
October 24: Homework set 6 due; homework set 7 distributed
week of October 30: pure and mixed strategies, Pareto dominance
October 31: Homework set 7 due; homework set 8 distributed
week of November 6: Pareto dominance, dynamic programming
November 7: Homework set 8 due; homework set 9 distributed
November 14: Exam II (covers up through game theory)
November 16: dynamic programming
week of November 20: Thanksgiving Recess
week of November 27: actuarial transactions, stop-loss
November 28: Homework set 9 due; homework set 10 distributed
December 5: stop-loss, life insurance
December 5: Homework set 10 due, supplemental study material distributed
December 7: formal review session