

Math 180 Syllabus (Analytical Methods in Economics, Law, and Medicine)
Fall 2013

Lecture: MWF 1:00-1:50 in DRL 4C2

Lecturer: Chris Hays

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Office Hours: Tuesdays, 10:00-12:00

Course Web Page: All homework, course announcements and supplementary lecture materials will be posted at:

www.math.upenn.edu/~chhays/180.html

Text Book: There is no required textbook for this course. However, *Analytic Methods for Lawyers* by Jackson, Kaplow, etc. is recommended. This book will be put on reserve in the library. Other books may be added to the reserve list as the class progresses.

Course Description: The primary goal of the course is to improve students' abilities to reason quantitatively and communicate technical ideas effectively. Along the way, we will explore a number of mathematical topics that are relevant to the world today.

1. Decision theory: helping one make the best choice when outcomes are uncertain. Applications to business and legal strategy.
2. Probability: the science of chance. Applications to legal cases, medical decisions, everyday life.
3. Statistics: using a sample to make inferences about a population. Applications to the upcoming presidential election and much more.
4. Game theory: formulating optimal strategies. Applications to economics, law and business.
5. Voting theory: exploring the many ways of designing ballots and elections, with their pros and cons. Applications to the election.
6. Introductory finance: present vs. future value, revenue streams. Applications to business and economics.
7. Additional topics, such as fair division and auction theory, as time permits.

Attendance and Course Notes: To be successful in this course, you should be present for all class meetings. You will be tested on the material **as it is covered in class**. If you miss a lecture, make sure that you copy from a classmate and review the notes from that day. For absences lasting longer than a day, you should also contact the College Office. For more information, see www.college.upenn.edu/class-attendance.

Homework: Homework assignments will be posted online. They will be due as noted, typically once every week, always at the beginning of class. You are responsible for being aware of the assignments and due dates. You are encouraged to work with others to exchange ideas and help each other understand how to approach problems, but the work you turn in must be your own!

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One of the goals of the course is to exercise your technical writing skills. Therefore, any work you turn in must be legibly written in complete sentences, with proper grammar, spelling, and punctuation. Both the quality and content of your writing will be taken into account in grading.

Exams: There will be two in-class midterms. There is no final exam. Missed exams will count as zero, except for reasons such as serious illness, family emergency, etc. (in which case written notification from a doctor or a dean is required). The midterms will be held:

Midterm 1: Friday, September 27

Midterm 2: Friday, November 22

All exams are to be taken under the University's Code of Academic Integrity (see below).

Final Paper: In lieu of a final exam, you will be required to write a paper on a subject of your choosing. The topic must be relevant to the course, include a quantitative component, and be approved by me. I will be available to suggest topics, but you will probably find the most interesting ideas by following current events. Additional details on the paper will be given as the semester progresses. Important due dates are:

Friday, November 1: Please turn in the title and a one paragraph summary of your paper, followed by a list of possible references.

Monday, November 25: Please turn in a partial draft of your paper, at least 1-2 pages, with an outline for the remainder of the paper.

Monday, December 9: Final paper is due.

Grading Scheme: The overall grade will be computed as follows:

Homework will be worth 25%

Midterm exams will be worth 25% each (50% total)

The final paper will be worth 25%

Academic Integrity: In this course, collaboration on homework assignments is allowed and encouraged, but the work you hand in must be entirely your own. You are not allowed to have any outside help (people, books, cell phones or notes) during exams.

Academic integrity is taken very seriously, and Penn's Code of Academic Integrity will be strictly enforced. Cheating on homework, quizzes or exams (using notes, copying/sharing work with other students, etc.) will result in a score of 0 on that work and referral to the Office of Student Conduct.