

Overview of Math 340 (Linear Programming)

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Class: MWF: 2-2:50pm
Math Annex 1100

<http://www.math.ubc.ca/~jf/courses/340> is the location of all handouts for this course, including homework solutions, sample exams and solutions, etc.

This is a course in linear programming. We begin the course by discussing matrix games, such as forms of poker, to motivate linear programming; we shall see that bluffing is needed in a simple type of poker game. Then we develop the theory of linear programming, using the textbook *Linear Programming*, by Chvatal; at times we will also refer to *Linear Programming* by Vanderbei, 4th Edition, and *Two-Person Zero-Sum Games*, by Washburn. Both textbooks are available online for free to anyone with a UBC CWL, and you can find links to these textbooks on the course webpage. At the end of the course we revisit matrix games, applying the general theory of linear programming to these games. The topics to be covered are tentatively:

- Topic 1: Matrix games and Poker (read the handout Matrix Games and Poker; we will also refer to parts of *Two-Person Zero-Sum Games*). [Roughly 1–2 weeks.]
- Topic 2: The simplex method (Chapters 1–4 of Chvatal’s textbook). [Roughly 2–3 weeks.]
- Topic 3: Linear programming without linear programming—counting the number of nonbasic variables, applied to: game theory, curve fitting, etc. (Possibly involving Chapter 8 of Chvatal). [Roughly 2 weeks.]
- Topic 4: Duality theory (Chapter 5 of Chvatal). [Roughly 2 weeks.]

Midterm: Wednesday, October 23, covering material up to and including October 9.

- Topic 4: Revised Simplex Method (Chapter 7 of Chvatal). [Roughly 1 week.]
- Topic 5: Sensitivity and Parametric Analysis (Chapter 10). [Roughly 1–2 weeks.]
- Topic 6: More game theory; other applications. [As time permits.]

Classes End: December 4.

Homework: Homework will be assigned roughly weekly. Late homework will not be graded; I will drop your lowest three homework scores in computing your average homework mark.

Midterm and Final: I will give you some old Math 340 exams and some other sample exam problems. We will work through some of these questions in class. These questions represent **part (but not all)** of what you might expect on our midterm and final (since material coverage differs greatly from section to section in Math 340).

I will give only one midterm and only one final during the semester; there are no “make-ups” or alternates. Please make sure you do not make travel plans, work plans, etc. without regard for the midterm and final dates; also, do not make such plans assuming that the preliminary exam schedule will not change.

Calculators, notes, and books are not allowed on the midterm and final. In class we will make sheets of common notes to be distributed with the exams.

Course Grade: Your grade for the course will be

$$(.55)f + (.35) \max(f, m) + (.10) \max(f, m, h),$$

where f, m, h are, respectively, your final exam grade, your midterm grade, and your homework grade. You may work with your fellow students on the homework problems, provided that (1) you list the names of the students with whom you have worked, and (2) you write up your own homework and understand what you have written.

Office Hours: Office hours are by appointment as long as this is feasible (it’s best to e-mail me when you are available if you’d like to meet). When I cannot accomodate all the requests I will revert to limited office hours at posted times (for example, this is almost always true a few days before an exam).