

IE220: Introduction to Operations Research

Instructor: Frank E. Curtis
Office: Mohler 322
Phone: 610.758.4879 (Office)
E-mail: frank.e.curtis@gmail.com
IM: frank.e.curtis (Google Talk)
Web: <http://coral.ie.lehigh.edu/~frankecurtis>

Description: This course covers the process of formulating, analyzing, and solving mathematical models of real-world problems. The models we discuss will fall into one of two categories: *deterministic* and *stochastic*. In the former setting, the quantities defining the model are known and fixed. This section of the course covers linear, integer, and nonlinear programming problems and algorithms. In the latter setting, the quantities are unknown (i.e., random), which in many situations is a more accurate way to model real systems. This section of the course covers Markov chains and queueing models.

Prerequisite and Corequisite: Everyone is required to have taken IE111 or Math231 and Math205 before this course and is required to take IE122 concurrently.

Lectures: Lectures will be held on Mondays, Wednesdays, and Fridays, 9:10am-10:00am in Mohler 453.

Office Hours: I have reserved Tuesdays, 3:00pm-5:00pm in Mohler 322 for office hours. I am also available through e-mail (always) and on Google Talk (often). If I do not respond to an e-mail within 24 hours, then please assume that I have not received it and send a follow-up e-mail. If I do not respond on Google Talk, then I am either busy or you are contacting me too late in the day, in which case you can try again the next day (during work hours) or send an e-mail instead. I am also willing to meet at other times, but in such cases please e-mail me in advance to set up a mutually convenient time.

Course Site: Lecture notes will be posted on Course Site prior to each lecture. Homework assignments, solutions, announcements, and other important material will also be posted on Course Site. Important information, comments, corrections, and updates about the course may also be sent by e-mail (via Course Site); thus, please let me know if you do not receive mass e-mails sent through Course Site.

Teaching Assistant: Gengyang Sun, ges209@lehigh.edu

Textbook: The required textbook, from which homework problems will be assigned, is the following.

- F. S. Hillier and G. J. Lieberman, *Introduction to Operations Research*, Ninth Edition, McGraw-Hill, New York, NY, USA, 2010.

I also recommend the following textbooks, if you have access to them.

- R. L. Rardin, *Optimization in Operations Research*, Prentice Hall, Upper Saddle River, NJ, USA, 1998.
- W. L. Winston, *Operations Research: Applications and Algorithms*, Third Edition, Wadsworth Publishing Company, Belmont, CA, USA, 1994.

Reading the textbook is not required, but is recommended. Note that you are not responsible for material in the textbook that is not covered in lecture.

Software: In this course and in IE122, we will make use of the modeling language AMPL. You should download the student version of AMPL from <http://www.ampl.com/DOWNLOADS/index.html>.

Grading: Your grade will be calculated as follows.

Homeworks:	45%
Midterm Exams:	25%
Final Exam:	25%
Participation:	5%

Homeworks: There will be regular homework assignments throughout the semester.

- *No credit* will be given for any late assignment.
- Each homework must be turned in *at the beginning of class* on the day that it is due.
- You are free to consult with other students when working on homework. However, *the work you turn in must be your own*. Please cite any references you use, including fellow students.
- You *can and will* lose credit for illegible work.

Exams: The midterms and final will be cumulative, closed-book, closed-notes, in-class exams. Formula sheets will be provided for exams making use of formulae we cover in lecture.

Participation: Everyone is expected to attend lecture, ask and respond to questions, and provide feedback about the lectures and assignments. My hope is that everyone will receive all of the possible credit for this part of the grade, but if by the end of the semester I have no idea who you are, then your participation grade will suffer. In short, you are expected to communicate with me during the semester.

Emergencies: Everyone is responsible for all material covered and announcements made in lecture. If you believe you will miss a long period of time in the course due to illness, family emergencies, etc., then please contact me as early as possible. Under no circumstances will I give credit for missed work unless you have discussed your absence with me in advance.

Regrade Requests: If you disagree with a grade you receive on a homework, exam, or project component, then you may submit a regrade request. This request must be in writing and submitted no more than 48 hours after you receive the graded assignment.

Recording Devices: Voice and/or video recording devices may be used only with the approval of everyone in the classroom. Please let me know in advance if you wish to use these types of devices.

Students with Disabilities: If you have a disability for which you are or may be requesting accommodations, please contact me and the Office of Academic Support Services, University Center C212 (610.758.4152) as early as possible in the semester. You must have documentation from Academic Support Services before accommodations can be granted.

Preliminary Schedule:

Week	Dates	Topic(s)	Notes
1	08/29-09/02	Linear Programming	
2	09/05-09/09	Linear Programming	
3	09/12-09/16	Simplex Method	
4	09/19-09/23	Simplex Method	
5	09/26-09/30	Duality and Sensitivity Analysis	
6	10/03-10/07	Transportation and Assignment Problems	Midterm 1
7	10/10-10/14	Network Models	
8	10/17-10/21	Network Models	
9	10/24-10/28	Integer Programming	
10	10/31-11/04	Nonlinear Programming	
11	11/07-11/11	Markov Chains	Midterm 2
12	11/14-11/18	Markov Chains	(No lecture 11/14 or 11/16)
13	11/21-11/25	Queueing Models	(No lecture 11/23 or 11/25)
14	11/28-11/02	Queueing Models	
15	12/05-12/09	Review	