ISE 330: Introduction to Operations Research: Deterministic Models

Spring 2021

Time: TBD
Location: TBD

Instructor: Prof. Phebe Vayanos
Office: OHE 310L
Office Hours: TBD
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TA: TBD
Location: TBD
Office Hours:
TBD
TA Contact Info: TBD

Catalogue Description

This course is a basic introduction to important models and solution methods in Industrial and Systems Engineering (ISE). ISE is concerned with the modeling, analysis, and solution of complex decision problems that arise in the management or design of a large-scale industrial system such as a supply chain, transportation network, or manufacturing assembly line. This course will focus specifically on the modeling and solution of linear programs, dynamic programs, and integer programs, as well as additional applications thereof in transportation, logistics, supply chain management, among others.

Prerequisite(s)

MATH 225 - Linear algebra and linear differential equations.

Course Notes

Students will be responsible for downloading the lecture notes for each lecture from the course website. All handouts, including homework, homework solutions, exams, and exam solutions will be posted in the Blackboard course website:

https://blackboard.usc.edu/

Additional readings and notes beyond the main texts used in the lectures will be provided by the instructor as needed.

Optional Texts

Hillier, Frederick S., and Gerald J. Lieberman. Introduction to Operations Research. 10th edition. McGraw-Hill, 2014.

Badiru, A. B., and O. Omitaomu. Handbook of Industrial Engineering Equations, Formulas, and Calculations. CRC Press, 2011. Available online at https://libraries.usc.edu/

Eiselt, H. A., and Carl-Louis Sandblom. Operations Research: A Model-Based Approach. 2nd edition. Springer, 2012. Available online at https://libraries.usc.edu/

Ravindran, A. Ravi. Operations Research and Management Science Handbook. CRC Press, 2007. Available online at https://libraries.usc.edu/

Grading Breakdown

Students will be graded based on 8 homework assignments (20%), a final project (20%), one mid-term exam (30%), and one final exam (30%). Class participation will be an important tiebreaker. Late submissions will be discounted at 5% for each day late. Submissions made after solutions are published will not be accepted. Solutions will be uploaded 3 days after the deadline.

Policy on Collaborations

You may interact with fellow students when preparing your homework solutions. However, you must write up solutions on your own. Duplicating a solution that someone else has written or providing solutions to be copied is not acceptable. If you do collaborate on homework, you must cite, in your written solution, your collaborators. If you use sources beyond the course materials in one of your solutions, you must also cite such sources.

Course Schedule (tentative)

Please turn over.
PD: project description — 1 page

Lec.	Topic	Read	Homework
1	Introduction to Operations Research	Ch. 1	
2			1 out
3	Modeling with Operations Research and Linear Optimization	Ch. 2 & 3	
4			
5			
6			1 due, 2 out
7			
8			
9	Solving Linear Optimization Problems	Ch. 4 & 5	
10	Julia/JuMP Lecture by TA		2 due, 3 out
11	Solving Linear Optimization Problems (cont'd)		
12			
13			
14			
15			3 due, 4 out
16	Duality Theory	Bb	
17		Bb	
18		Bb	4 due
19	Midterm		
20	Duality Theory	Ch.6	
21			
22			PD due
23		Ch.6	5 due, 6 out
24	Modeling with Integer Programming	Ch. 11-12	
25			
26	Group Meetings in Preparation for Presentations		6 due
27			
28	Project Presentations		

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism –- presenting someone else's ideas as your own, either verbatim or recast in your own words -– is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* and consult https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu or to the *Department of Public Safety* http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* provides certification for students with disabilities and helps arrange the relevant accommodations; consult http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* http://emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.