

OIDD 321 – Introduction to Management Science – Syllabus - Spring 2016

University of Pennsylvania - The Wharton School - Department of Operations and Information Management

Professor:

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Office: JMHH – room 568

Office hours: Thursdays 4:45-5:45pm

Course Description:

Understanding how to use data and business analytics can be the key differential for a company's success or failure. This course is designed to introduce fundamental quantitative decision making tools for a broad range of managerial decision problems. Topics covered include linear, nonlinear and discrete optimization, dynamic programming, decision making under uncertainty and simulation.

This course will introduce the techniques above in a practical managerial context, demonstrating their potential on a wide array of applications. Example applications are portfolio management, electricity auctions, revenue management for airlines, manufacturing, advertising budget allocation, and healthcare scheduling operations. Emphasis in this course is placed on mathematical modeling of such real world problems and implementation of quantitative decision making tools.

Course Objective:

The first objective of this course is to develop the student's analytical thinking skills in business settings. The student will learn to observe a real-world managerial problem and translate it into a mathematical model that can produce real quantitative insight. The emphasis will be on model formulation and interpretation of results, not on mathematical theory.

The second objective is to introduce students to the quantitative tool set available through optimization and simulation techniques. The students will be able to identify settings where models can be used effectively and which techniques can be used to solve it. They will also experience some of the computational resources available to solve these problems and understand the difficulties involved in gathering the relevant data and using modeling software.

Grading:

- Homeworks (4 total) 25%
- Quiz 30%
- Final project 30%
- Class participation 15%

Website/course materials:

We will be using a Canvas website and all class material will be posted there, including lecture slides, homework, in-class case material. There will be no required textbook.

Quiz: There will be one in-class open-book (no electronics) individual quiz on, Monday, Mar 21st, 6-8pm.
(location TBD)

Homework:

Homeworks must be turned-in individually. Every student should attempt to solve the problems on their own. Once the student has worked on the problems, collaboration with colleagues is encouraged, but each student should make their own write-up. **You must turn in the homework with your Penn ID number, do not write your name on it.**

Final Project:

The project will be done in groups of 3. The subject of the project is flexible and needs to be approved by the professor. If the team does not have a project idea, the professor will help you come up with project ideas. Each team is expected to submit a report due on April 19 and provide a 20 minute presentation on the project.

Calendar:

14-Jan		
19-Jan		
21-Jan		
26-Jan		
28-Jan		
2-Feb	Linear Optimization	HW1 due
4-Feb		
9-Feb		
11-Feb		
16-Feb		
18-Feb	Integer Optimization	
23-Feb		
25-Feb		
25-Feb	Network Optimization	HW2 due
1-Mar		
3-Mar		
8-Mar	Non-linear Optimization	
10-Mar	Spring Break	
15-Mar		
17-Mar		
17-Mar	Review Session before Quiz	HW3 due
21-Mar (Monday)	Quiz (6-8pm)	
22-Mar		
24-Mar		
24-Mar	Decision Trees	
29-Mar		
31-Mar		
31-Mar	Simulation	
5-Apr		
7-Apr		
12-Apr		
12-Apr	Dynamic Programming	HW4 due
14-Apr	Stochastic Optimization	
19-Apr		Project report due
21-Apr		
26-Apr		
26-Apr	Final Project Presentation	