Operations Research I – Deterministic Models

Course Syllabus

Spring 2015 | Math 323 | Anke van Zuylen

Basic information

- Class time & location: TR 9:30-10:50 p.m., Small Hall 235
- Instructor:
  Anke van Zuylen
  125 Jones Hall
  Phone: (757) 221-2036 (O)
  Email: anke@wm.edu
  Office Hours: T 3:00-4:00pm, W 3:00-4:00pm

Prerequisites

Math 211 or equivalent experience in elementary multivariate calculus, linear algebra, manipulating matrices, and representing weighted sums in matrix notation.

Description

Math 323 is the first of two introductory courses in operations research. It focuses on the optimization (or mathematical programming) part of operations research–models in which the decisions are variables and we can (sometimes) solve or search for a good decision. We discuss how to form optimization models, how to solve and analyze them, and how to recognize tractable cases. Emphasis is placed on linear programming models. These models are well understood and are of great practical significance. Other areas of optimization are also introduced. Math 424 is the second introductory course. In it, operations research models having probablistic elements are studied.

Textbook

Optimization in Operations Research, Ronald L. Rardin, Prentice Hall (1998). Errata can be found online: http://comp.uark.edu/~rrardin/oorbook/errata/OOR_Errata_3rd.html

Homework and Quizzes

Exercises emphasizing and extending lecture material will be assigned for each chapter. Some of these exercises will be assigned as *homework*, others are intended to help you practice for *in-class quizzes*. On Blackboard, the Homework folder contains the problems you need to hand in (with their due date), and the Exercises folder contains the practice problems. In-class quizzes will take about 15 minutes each, and will be announced in advance. No

makeup quizzes will be given under any circumstances. Late homeworks are not accepted except in the case of an unanticipatable absence (e.g. serious illness, death in the family etc.). Homework and quiz scores will be weighted equally, and the lowest score will be dropped.

Computing

Some homeworks will require the use of AMPL to find the solution. The AMPL language will be introduced in class, and allows you to input a mathematical optimization problem in (almost) the same notation as the notation we use to write models on paper.

Examinations

There will be two midterm exams and a comprehensive final exam. The midterm exams are tentatively scheduled for March 3 and April 16. The final exam is scheduled for Friday, May 8, 9am–noon. All three exams will be "almost closed book," i.e. students may use one (three for the final) 8.5 by 11 inch sheet of notes. Such notes may be on both sides of the paper, but they should be in orginal pen or pencil, *not photo-copies*. Makeup exams will be considered only in the case of unanticipatable absences. Students who miss an exam for any other reason will receive a grade of zero.

Grades

Final grades will be based on three values: homework and quiz average (a_1), midterm average (a_2) and the final exam (a_3).

Define

$$x_i \triangleq \text{ weight used for score } a_i.$$

Then, your final score is the solution of the following optimization problem:

$$\begin{aligned} \max \quad & \sum_{i=1}^{3} a_i x_i \\ \text{s.t.} \quad & \sum_{i=1}^{3} x_i = 1, \\ & 0.25 \le x_1 \le 0.3, \\ & 0.35 \le x_2 \le 0.45, \\ & 0.3 \le x_3 \le 0.4. \end{aligned}$$

Letter grades will be determined based on the final score as follows:

$$A > 94 > A^- > 90 > B^+ > 87 > B > 83 > B^- > 80 > C^+ > 77 > C > 73 > C^- > 70 > D^+ > 67 > D > 63 > D^- > 60 > F.$$