Basic information

- Class time & location: MWF 11:00-11:50 p.m., Morton Hall 238

- Instructor:
  Anke van Zuylen
  125 Jones Hall
  Phone: (757) 221-2036 (O)
  Email: anke@wm.edu
  Office Hours: M 2:00-4:00pm, W 3:00-5:00pm

Prerequisites:

Csci 628 (Linear Programming). We'll also use (and review) concepts from Algorithms and Datastructures.

Description

Network flow problems are a subclass of linear programming problems, with many applications in a wide range of areas such as computer networking, manufacturing, telecommunications and transportation, but also in finance, social and defense context.

In this course, we will survey algorithms and applications of network flow problems. We will focus on the following four problems.

- Maximum flows

- Shortest paths

- Minimum cost flows

- Minimum spanning trees

Goals

- to obtain knowledge of the key network optimization problems, and state-of-the-art algorithms for solving them

- to develop algorithmic thinking skills:

  - obtaining intuition for the development of algorithms

- finding an algorithm's "weaknesses" or proving they do not exist:
  * proving correctness
  * running time analysis

- to learn how to recognize applications of network flows and to demonstrate equivalence of problems

Text book:

Ravindra K. Ahuja, Thomas L. Magnanti and James B. Orlin, *Network Flows: Theory, Algorithms, and Applications*, Upper Saddle River, NJ: Prentice Hall, 1993. ISBN: 9780136175490.
We will cover (parts of) Chapters 1-10, 12, 13, and 19.

Grades:

There will be a midterm exam and a final exam. The midterm exam will count 35% and the final exam 35% of the final course grade. The midterm exam will be a take-home exam, and is tentatively scheduled for March 15. The final exam is scheduled for Tuesday, April 30 from 9:00 to 12:00. Both exams will be open notes, but closed book, i.e. you may use your own notes, the problem sets and problem set solutions. However, you may not use the text book as a resource when taking the exam.

Homework assignments will be given periodically throughout the semester and together will count 30% of the final course grade.

Homework Policy:

You are allowed to discuss the homework problems with your classmates. However, you *have to write down the solutions on your own.* If you find materials online or elsewhere that help you understand the lecture materials, and if this indirectly helps you in solving a homework problem, feel free to read and use the material. However, if you find the *solution* to a homework problem, you are not allowed to use it. If it is unclear to you whether something you found online can or cannot be used by you, please talk to me.

For each homework problem, please list who you talked to, and which resources (except for the text book) you consulted. This is not used for grading purposes, it is merely good scientific practice to list your sources and the help you received.