SIE 546: Algorithms for Networks and Graphs  
Spring 2015

Instructor:  Wei Lin  
Office: Old Engineering 227  
Telephone: 621-6553  
Emails: whlin@email.arizona.edu

Course Hours: Monday and Wednesday, 3:30 pm – 4:45 pm  
Office Hour: By appointment

Course Objectives: Many real-life problems can be formulated with a “network” structure, and efficient algorithms have been developed to solve the resultant problems. The objective of the course is to provide knowledge and skills to students so that they are very comfortable addressing such problems, whether they arise in the workplace or in their research.

Catalog Description: Model formulation and solution of problems on graphs and networks. Topics include heuristics and optimization algorithms on shortest paths, min-cost flow, matching, and traveling salesman problems. Pre-requisite SIE 340 or SIE 440 or SIE 540.

Topics (more-or-less in order of presentation):

1. Introduction on applications (Chapter 1 plus notes)
2. Networks: definitions and notation (part of Chapter 2 plus notes)
3. Introduction to algorithms (part of Chapter 3, Appendix A, plus notes)
4. Shortest path problems (parts of Chapters 4 and 5)
5. Network covering problems (notes and parts of Chapter 13)
6. Maximum flows problems (Chapter 6)
7. Minimum cost flows (Chapter 9)
8. Assignment and matching (parts of Chapter 12 and notes)
9. Multicommodity flows and network traffic (parts of Chapter 17 and notes)
10. Other applications (Chapter 19 and notes)


Grading:  
Homework  30 %  
Mid-term 1  20 %  
Mid-term 2  30 %  
Project  20 %