Math 409, Discrete Optimization

Lecture:	MWF 9:30, EE1 037
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Text:	*Combinatorial Optimization* (required)
Author:	William Cook, *et. al.*
Text:	*Algorithmic Graph Theory* (required)
Author:	Alan Gibbons

Math 409 investigates several topics connected with optimization and flow questions on networks. The following list of topics includes more than I can cover, so I will make some choices as the quarter proceeds.

1. Elementary estimation of orders of magnitude. (Gibbons, §1.2; Cook, Chapter 1; lectures)
2. Graphs – elementary properties and concepts. (Gibbons, §1.1, 1.3, 1.4)
3. Minimum spanning trees. (Cook, §2.1; Gibbons, §2.1)
4. Shortest paths. (Cook, §2.2)
5. Network flow problems. (Cook, §3.1 - 3.3; Gibbons, §4.1)
6. Minimum cost flow problems (Cook, §4.1; Gibbons, §4.4)
7. Optimal matchings (Cook, §5.1 - 5.2; Gibbons, §5.1-5.3)

8. Electrical networks (lectures)
9. Critical path analysis and scheduling (lectures)
10. Multi-terminal flow (lectures)
11. NP completeness (Gibbons, §8.1, 8.2; Cook, §9.1 - 9.9)

Homework will be collected at regular intervals and will count 30% of the course grade. There will be one 50 minute midterm test which will count 30% of the course grade. The midterm test will be closed book but you will be allowed to bring notes on one side of a notebook size sheet of paper. There will be a two hour closed book final exam which will count 40% of the course grade. For the final you will be allowed to bring notes on both sides of a notebook size sheet of paper. No calculators will be allowed on tests.

Here are the first few homework assignments :

DATE	ASSIGNMENT
Apr. 5	Gibbons: 1.1, 1.3, 1.5
Apr. 12	Gibbons: 1.6, 1.7, 1.9
Apr. 19	Cook: 2.1, 2.4, 2.5, 2.9
Apr. 26	Cook: 2.8, 2.18, 2.19
May 3	Cook: 2.21(c), 2.23, 2.36
May 5	**MIDTERM**
May 14	
May 21	
May 28	
June 4	
June 9	**FINAL EXAM** (8:30-10:20 a.m.)

These assignments are due at the beginning of class on the due date.