

ORI 391Q Network Flow Programming

Required Texts **Network Flows** by Ahuja, Magnanti and Orlin, published by Prentice Hall (1993).
Network Flow Programming, Class Notes for ME 391Q, Spring 1998 by Paul A. Jensen, Printed by the University Co-op

Syllabus:

A variety of situations arising from the study of transportation, water resources, manufacturing and many others have network flow models. A flow network is a collection of nodes and arcs. Each arc passes from one node to another and carries a commodity called flow. A requirement is that flow be conserved at each node. The optimization problem is to find the flow in each arc that minimizes the total cost of the flow in the network. This course has three aspects: modeling real problems as networks, the theory associated with network optimization and algorithms implementing the theory. The course covers the broad range of network flow type problems, but stresses the pure and generalized, single commodity, minimum cost network flow problem.

Grade Components:

Three Exams (Including Final):	70 - 100%
Each exam counts 1/3 of Exam Score:	
Homework and Class Activities Grade:	0 - 30%

Grade Determination:

Average Score 85 - 100%	A
75 - 85%	B
60 - 75%	C

The Homework and Class Activities Grade has a variable score that contributes up to 30% of the grade. The difference between 100 and this score is the weight given to the exam grade. Each of the three exams has equal weight. Homework is to be prepared by each student individually and turned in on the date given in the schedule. Late homework will not be accepted.

Tentative Schedule

Lect.	Date	Topic	Chapters	Lectures	Due
1	20-Jan	Introduction and Network Models	Ch. 1	1	
2	22-Jan	Problem Classes and Solving Network Models		1, 5	
3	27-Jan	More Models		1	HW 1
4	29-Jan	Networks with side constraints	Ch. 2	2	
5	3-Feb	Networks with integer variables		3	HW 2
6	5-Feb	Distance problems		4	
7	10-Feb	Algorithm Design and Analysis	Ch. 3		HW 3
8	12-Feb	Shortest Paths: Label-Setting	Ch. 4	6	
9	17-Feb	Shortest Paths: Label-Correcting	Ch. 5		HW 4
10	19-Feb	Maximum Flows	Ch. 6		
11	24-Feb	Maximum Flows	Ch. 7		HW 5
12	26-Feb	Review			
13	3-Mar	Review			
14	5-Mar	Exam			
15	10-Mar	Primal and Dual Problems for Networks		7, 8	
16	12-Mar	LP and the Unbounded Network Problem		9	
	17-Mar	Spring Break			
	19-Mar	Spring Break			
17	24-Mar	Minimum Cost Flows: Basic Algorithms	Ch. 9		HW 6
18	26-Mar	Minimum Cost Flows: Basic Algorithms			
19	31-Mar	Minimum Cost Flows: Network Simplex	Ch. 11	10	HW 7
20	26-Mar	Minimum Cost Flows: Network Simplex		11	
21	2-Apr	Simplex for shortest path and max flow problems		12,13	HW 8
22	7-Apr	Basic Trees and Computation		14	
23	9-Apr	Review			HW 9
24	14-Apr	Review			
25	16-Apr	Exam			
26	21-Apr	Generalized Minimum cost flow problem	Ch. 15	15	
27	23-Apr	Simplex for Generalized Problems		16, 17, 18	
28	28-Apr	INFORMS			HW 10
29	30-Apr	The complete algorithm		19, 20	
30	5-May	Review			HW 11
31	7-May	Review			

ORI 391Q Network Flow Programming

STUDENT INFORMATION FORM

Name _____

What name do you prefer that I call you in class? _____

Social Security Number _____

Phone (for emergency communications) _____

e-mail address _____

PHONE (for emergency communications) _____

Graduate Program (OR, Civil, ...) _____

Graduate Degree Sought (M.S. or Ph.D.) _____

How many semesters have you been a graduate student at UT. _____ (use 0 for first).

What other colleges or universities have you attended? Give degrees and dates.

List the courses you have already taken or taking that may have relevance to this course. Show current courses with an asterisk.

Do you have any difficulties or special problems that may interfere with your performance in this course? (e.g., health problems, language difficulties, etc.)