

SA405: Advanced Linear Programming
Fall 2012
Syllabus
 CDR JAY FORAKER AND ASST. PROF. DAVID PHILLIPS

Course description: This course is the sequel to SA305, an introduction to linear optimization and models. Amongst the many possible topics, we will focus on linear *integer programming* models and methods. Specific topics as detailed below in the course plan will be covered.

Course text: The required book for the course is *Deterministic Operations Research: Models and Methods in Linear Optimization*.

Course plan:

Week	Day	Date	Broad Topic	Lecture Topic	Reading	Work due	Comments
1	1	8/20/2012	Review of 305	Course policies, simplex review	6.2		This lecture supports the matlab programming assignment.
	2	8/22/2012		Simplex review	8.1		
	3	8/24/2012		Implementing Simplex	Handout		
2	4	8/27/2012		Visual Basic and models	2.1		
	5	8/29/2012	IP: models	Network models	2.9	Simplex code due	
	6	8/31/2012		Fixed-Charge	3.1	Quiz 1	Sections 3.1, 2.9
3	7	9/4/2012		Set Covering	3.2		Note class is on Tuesday due to Labor Day.
	8	9/5/2012		Logical constraints	3.3		
	9	9/7/2012		Combinatorial models	3.4		
4	10	9/10/2012		Combinatorial models	3.4	Quiz 2	3.1-3.5
	11	9/12/2012		Sports scheduling	3.5	Ch 3 excel	
	12	9/14/2012		Vehicle Routing	4.1		
5	13	9/17/2012		Facility location	4.2	Quiz 3	3.5, 4.1
	14	9/19/2012		Network Design	4.2		
	15	9/21/2012		Airline applications	4.3	Quiz 4	4.1-4.2
6	16	9/24/2012		Airline applications	4.3		
	17	9/26/2012		Review		Ch 4 excel	Test on 2.9-4.3
	18	9/28/2012	Test 1			Test 1	6 week grades due 10/2
7	19	10/1/2012	Algorithm design	Greedy 0-1 knapsack	5.1-5.5		
	20	10/3/2012		Set cover	5.5		
	21	10/5/2012		TSP	5.5	Quiz 5	5.1-5.5
8	22	10/8/2012	Network algorithms	Shortest path	12.1-12.2		
	23	10/10/2012		Max flow	12.3		
	24	10/12/2012		MCNF	12.4	Quiz 6	
9	25	10/15/2012		MCNF	12.4		
	26	10/17/2012	IP: introduction	IP definitions and formulations	13.1		
	27	10/19/2012		Relaxations and bounds	13.2	Quiz 7	
10	28	10/22/2012		Preprocessing	13.3		
	29	10/24/2012		Easy IPs	13.4		
	30	10/26/2012	Exact methods	Enumeration, branch-and-bound	14.1-14.2	Quiz 8	
	31	10/29/2012		Branch-and-bound	14.2		
	32	10/31/2012		Review			Test focuses on topics from classes 19-31
	33	11/2/2012	Test 2			Test 2	12 week grades due 11/6
12	34	11/5/2012		Cutting planes	14.3		
	35	11/7/2012		Gomory	14.4		
	36	11/9/2012		Gomory	14.4	Quiz 9	
13	37	11/12/2012					No Class-Veteran's Day
	38	11/14/2012		Valid knapsack	14.5		
	39	11/16/2012		Branch-and-cut	14.6	Quiz 10	
14	40	11/19/2012		Project meetings			
	41	11/21/2012		Project meetings			Early Schedule - Thanksgiving
		11/23/2012					No Class - Thanksgiving
15	53	11/26/2012		Branch-and-cut	14.6		
	54	11/28/2012		Tabu search	15.1, 15.3		
	55	11/30/2012		Genetic algorithms	15.4	Quiz 11	
16	57	12/3/2012		Wrap-up, SOFs			
	58	12/5/2012		Class presentations			
	59	12/7/2012		Class presentations			Last day of classes

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