

Week	Date	Read	Topic 1	Topic 2	Topic 3	Homework
1	25-Jan	Ch. 1 (all), Ch. 2(review), Ch. 3.1-3.3	Intro to OR History (Morse) Recent Applications Where to Look for Info Instructor Info	Course Structure Optimization taxonomy LP history LP assumptions (3.1)	LP Graphical Solution (3.2) Special cases (3.3) Admin – student info Admin – student survey	p. 56: 1,4 p. 64: 3,5 p. 69: 1,2,3 Try: p. 69, 7
2	1-Feb	Ch. 3.3-3.12	Standard NPS formulation format Formulation I Product mix	Formulation II Covering, Staffing, Scheduling Blending	Formulation III Multiperiod planning	p. 71: 1 p. 72: 2, p 76:6 p. 93:6,10 p. 104: 3;4
3	8-Feb	MPL Tutorial, Ch. 4.1-4.2, 4.14	Formulation IV Recourse Models (LINDO Handout)	MPL - algebraic model language intro, examples	Standard Form Simplex Intro	Handout, #4 (formulate only) p. 127: 3 Formulate and solve with MPL/CPLEX: p. 123: 57
4	15-Feb	Ch 4.7-4.8, 4.11-4.13,	Tableau I Tableau mechanics, stopping criterion Tableau adjustments	Tableau II Alternative optima Unbounded LPs Degeneracy and cycling	Degeneracy continued Big M, Two-Phase	p. 149: 3,7 p. 154: 2, 8 p. 158: 3 p. 178: 3, find initial BFS using Two-Phase
5	22-Feb	Ch. 6.2, 10.1-10.2 Ch. 6.5-6.11	Matrix form of simplex Revised Simplex	Duality I Formulating the Dual Economic interpretation Dual Theorems	Duality II Shadow prices/reduced costs Complementary slackness	p. 275: 2 (find z, x1, x2, s1, s2 via matrix formulas) p. 567:1 (use product form of inverse) p. 301: 5 p: 313: 2a (also show dual of the dual is the primal) p. 322: 6
6	1-Mar	Ch 6.10	Duality III Elastic constraints/dual bounds Dual simplex/adding constraints	Review		p. 335: 2a class example, #2

7	8-March	MIDTERM				
8	21 March	7.1-7.3 (formulations only), 8.1-8.5	Network terminology Min cost network flow formulation	Network formulations: transportation, transshipment, assignment Maximum weight closure	Critical Path Method (CPM) CPM primal, dual formulations CPM with expediting (new)	p. 403: 5 p. 472: 2a p. 472: 3d
9	22-March	Ch. 9.1	Intro to max-min models Shortest path with interdiction CPM with interdiction and expediting (new)	General max-min problem formulation (new)	IP Formulation I Integral variables Logical conditions: fixed charge, either-or, if-then	p. 472: 3g in-class HW problem p. 504: 18, solve with MPL
10	29-March	Ch. 9.2, 9.3, 9.4	IP Formulation II Limiting variables Economies of scale SOS variables	IP Formulation III Covers Packs Partitions	LP relaxations Network problem integrality Solution implications Branch-and-bound: theory	p. 507: 29 p. 504: 18, solve with MPL, manual branch-and-bound
11	5-April	MPL Manual pp. 90-107, CPLEX Handout	Presolve methods Strong formulations Branch priorities Cuts	Cuts CPLEX MIP Options	Constraint-satisfaction problems In-class challenge; MIP formulations	p. 503: 14, solve with reduction rules p. 549: 3 Sudoku problem
12	12-April	Ch. 11.1-11.5	NLP I Introduction/Taxonomy Convexity/Concavity Line Searches	NLP II Multivariate Unconstrained Optimization Gradients	NLP III Lagrange multiplier methods	p. 628: 2 p. 636: 6
13	19-April	Ch. 11.6-11.10	NLP IV Karush-Kuhn-Tucker Conditions	NLP V Quadratic Programming	Additional Material TBD	
14	26-April	Previous Course Projects				PROJECT DUE
15	3-May	Review	Total Course Picture Formulation	LP Theory Network Theory IP Theory	Dual and Max-Min Theory NLP Theory	
	10-May	FINAL				