

Day #	Date	Topic	Group timeline
1	M 1/26	Snow day	
2	W 1/28	Introduction, work on example of LP	Start forming groups
3	M 2/2	Worked examples (mathematically formulating LP from words)	Groups are formed
4	W 2/4	Geometric sol to 2D/3D LP, matrix notation, polyhedra, vertices	
5	M 2/9	Convex geometry: convexity, half-spaces, polyhedra	
6	W 2/11	Group presentations (Project #1)	Deliver Project #1
		President's day	
7	W 2/18	Extremal points, convex hull, finding all vertices of polyhedra	Regroup?
8	M 2/23	Slack variables, equational formulation of LP, basic feasible sol	
9	W 2/25	Simplex method I: intuitive approach	
10	M 3/2	Simplex method II: algorithm	
11	W 3/4	Simplex method (example), Degeneracy and cycling	
12	M 3/9	Artificial variables and two-phase method	
13	W 3/11	Group presentations (Project #2)	Deliver Project #2
14	M 3/16	Two-phase method complete example	Regroup?
15	W 3/18	Applications of LP: max flow, currency exchange arbitrage	
16	M 3/23	Applications of LP: optimal classifiers, largest ball in polygon	
17	W 3/25	Dual linear program and duality theorem	
18	M 3/30	Dual linear program examples, min cut	
		Spring break	
19	M 4/13	Review of Linear Algebra: eigenvalues, diagonalization	
20	W 4/15	Positive semidefinite matrices, Sylvester's criterion	
21	M 4/20	Spectrahedra and equivalent formulations	
22	W 4/22	Semidefinite programs and Spectrahedral shadows	
23	M 4/27	Semialgebraic sets, Quantifier Elimination	
24	W 4/29	Example of optimization problem on 2d spectrahedron	
25	M 5/4	Polynomials: nonnegative v. sum of squares	
26	W 5/6	Dual SDP, duality theorem, survey of applications of SDP	
27	M 5/11	Groups meet to prepare final presentation	
28	W 5/13	Groups meet to prepare final presentation	

M 5/18	Final group presentation (Project #3)	Deliver Project #3
--------	---------------------------------------	--------------------

Linear programming

Proj #1: LP, 2 var, std form, solve geometrically

Proj #2: LP, 5+ var, with slack, simplex method

Convex Algebraic Geometry and Semidefinite programming

Proj #3: SDP, 3x3 matrix, dual, software implement.