

| Day # | Date | Topic | Group timeline |
|-------|---------|---|----------------------|
| 1 | M 8/28 | Introduction, work on example of LP | Start forming groups |
| 2 | W 8/30 | Worked examples (mathematically formulating LP from words) | Groups are formed |
| | M 9/4 | Labor day | Project 1 sent out |
| 3 | W 9/6 | Geometric sol to 2D/3D LP, matrix notation, polyhedra, vertices | |
| 4 | M 9/11 | Group presentations (Project #1) | Deliver report on BB |
| 5 | W 9/13 | Convex geometry: convexity, half-spaces, polyhedra | Regroup? |
| 6 | M 9/18 | Extremal points, convex hull, finding all vertices of polyhedra | |
| 7 | W 9/20 | Slack variables, equational formulation of LP, basic feasible sol | |
| | M 9/25 | (no classes) | |
| 8 | W 9/27 | Simplex method I: intuitive approach | |
| 9 | M 10/2 | Simplex method II: algorithm | Project 2 sent out |
| 10 | W 10/4 | Simplex method (example), Degeneracy and cycling | |
| 11 | T 10/10 | Artificial variables and two-phase method | |
| 12 | W 10/11 | Two-phase method complete example | |
| 13 | M 10/16 | Group presentations (Project #2) | Deliver report on BB |
| 14 | W 10/18 | Applications of LP: max flow, currency exchange arbitrage | Regroup? |
| 15 | M 10/23 | Applications of LP: optimal classifiers, largest ball in polygon | |
| 16 | W 10/25 | Dual linear program and duality theorem | |
| 17 | M 10/30 | Dual linear program examples, min cut | |
| 18 | W 11/1 | Review of Linear Algebra: eigenvalues, diagonalization | |
| 19 | M 11/6 | Positive semidefinite matrices, Sylvester's criterion | |
| 20 | W 11/8 | Spectrahedra and equivalent formulations | |
| 21 | M 11/13 | LEHMAN MATH COLLOQUIUM | |
| 22 | W 11/15 | Semidefinite programs | Project 3 sent out |
| 23 | M 11/20 | Spectrahedral shadows | |
| | W 11/22 | Thanksgiving | |
| 24 | M 11/27 | Semialgebraic sets, Quantifier Elimination | |
| 25 | W 11/29 | Example of optimization problem on 2d spectrahedron | |
| 26 | M 12/4 | Polynomials: nonnegative v. sum of squares | |
| 27 | W 12/6 | Group presentations (Project #3) | Deliver report on BB |
| 28 | M 12/11 | Dual SDP, duality theorem, survey of applications of SDP | |
| | M 12/18 | Final group presentation (Project #4) | Deliver report on BB |

Linear programming

Proj #1: LP, 2 var,
standard form, solve geom

Proj #2: LP, 7 var, with
slack/artificial, simplex

Convex Algebraic Geometry
and Semidefinite
programming

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

Proj #4: mix LP/SDP,
software implementation