Topics

1. Integer programming formulations (1 week)
2. Optimality, Relaxation and Bounds LP relaxation, Combinatorial Relaxations, Lagrangian relaxation, duality (1-2 weeks)
3. Well-solved cases: Network flow, shortest path, optimal trees, matchings and assignments (1-2 weeks)
4. Branch-and-Bound methods: (1-2 weeks)
5. Cutting Plane algorithms (2 weeks) Valid Inequalities, theory and practice
6. Strong Valid Inequalities (2 weeks) Polyhedra, facets, faces, cover inequalities, separation etc..
7. Theory of Lagrange Duality (1 week)
8. Approximation algorithms (1-2 weeks)
9. Any other topic of interest to the instructor and students as time permits, in particular, recent work on semidefinite programming relaxations.