Fall 2013   Math 566   Discrete Optimization   Course Information

Class Meeting Time & Place: MWF: 9:00–9:50am; Black Engineering 1071

Instructor:	Derrick Stolee
E-mail:	dstolee@iastate.edu
Office:	416 Carver
Office Hours:	M: 10:00–10:50am, T: 12:00–1:00pm (or by appointment)
Homepage:	http://www.math.iastate.edu/dstolee/566/

Text: *Combinatorial Optimization* by William Cook, et al, John Wiley & Sons, 1998.

Course Topics: We will discuss the deep connections between combinatorial problems and linear programming, especially the notion of duality. Our topics will be selected from the following chapters:

- Combinatorial problems, Certificates, Tools.
- Appendix A: Linear programming, duality.
- Chapter 3: Network flow problems, maximum flow problems, minimum cuts.
- Chapter 5: Maximum matchings, minimum-weight perfect matchings.
- Chapter 6: Integer programming, total unimodularity, cutting planes, branch-and-bound.
- Chapter 7: The Traveling salesman problem, heuristics, local search, exact algorithms.
- Chapter 8: Matroids and the greedy algorithm.

Homework: Usually there will be a few homework problems assigned for each class. Assigned homework problems will be collected every other Wednesday, and all solutions must be typed using LaTeX. Some partial credits will be given to late homework and correction or completion for the incorrect or incomplete solutions if they are turned in by the following Friday. In this case the partial credit will be less than one-half the usual score.

Implementation Reports: Students will implement several algorithms during the semester, and each implementation will be paired with a typed report. A set of problem instances will be given that must be solved, and a set of questions will be given whose answers must be presented in the report. All students will receive access to the Math department Sage server, where all computation can be completed. Students may use other programming languages and environments subject to instructor approval. Reports will typically be due in the weeks between homework assignments.

Grading: The course grade will be based on homework (25%), implementation reports (25%) one in-class midterm (25%, scheduled on October 25), and one 24-hour take-home final (25%).

Additional References:
T. S. Ferguson, Linear Programming: A Concise Introduction, found at
            http://www.math.ucla.edu/~tom/LP.pdf

J. H. van Lint and R. M. Wilson, *A Course in Combinatorics*, Cambridge Univ. Press.

More online resources are listed at the course website.

University Policies

Academic Dishonesty The class will follow Iowa State Universitys policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. http://www.dso.iastate.edu/ja/academic/misconduct.html

Disability Accommodation Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu . Retroactive requests for accommodations will not be honored.

Dead Week This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook.

Harassment and Discrimination Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.