ORI 391Q.10 Stochastic Optimization (#19030)

General Information

Instructor: David Morton
Office: ETC 5.118
Telephone: 512-471-4104
Office Hours: Noon-1pm on Mondays and Wednesdays
If you want to see me outside these hours please send me an email.
E-mail: morton@mail.utexas.edu
Web site: Blackboard

Computer facilities: Obtain an account at: http://hpc.me.utexas.edu/

Prerequisites: Graduate-level knowledge of linear programming, nonlinear programming, probability and statistics.


Can be downloaded from: http://www.gams.com/docs/document.htm

Grading Policy

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Problem Sets</td>
<td>30%</td>
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<tr>
<td>In-Semester Exam (Wednesday, November 17)</td>
<td>40%</td>
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<tr>
<td>Project (Due: Thursday, December 9 at noon)</td>
<td>30%</td>
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Problem sets are due at the beginning of class on designated days. On problem sets, you may work with classmates in discussing “how” to solve a problem, but you must write your own solution. (This includes writing your own GAMS code.) Late problem sets will not be accepted. Class attendance is encouraged but not required and is not a factor in the grading policy.
Course Outline

• Modeling and Applications (weeks 1-4)
  Extending the linear programming model
  Feasibility: fat, penalty, and chance-constrained models
  Optimality: expected-value, probability threshold, Markowitz, and expected utility
  Stochastic programming with recourse
  Some applications
    Capacity expansion planning (power systems and telecommunications),
    Financial planning, Vehicle allocation, Hydroelectric scheduling
    Capacitated facility location, Network interdiction / design
  Bounds on the value of information and the value of the stochastic solution
  Solving and analyzing a stochastic program in a modeling language

• “Exact” Optimization Methods (weeks 5-7)
  Extensive forms
  L-shaped method
    Enhancements: multicut, proximal term, bunching, preliminary cuts
  Extensions to multistage setting

• Deterministic Approximation and Bounding Techniques (weeks 8-9)
  Jensen and Edmundson-Madansky bounds
  Bounds for network recourse problems
    Stochastic PERT, max-flow, telecommunications, vehicle allocation
  Sequential approximation methods

• Monte Carlo Sampling-Based Approximations (weeks 10-12)
  Internal and external approximations
  Consistency
  Rates of convergence
  Solution validation
  Sequential issues

• Additional Topics (weeks 13-15)
  Robust optimization
  Infinitesimal Perturbation Analysis
References

Stochastic Programming Community Home Page: http://stoprog.org


Additional Information

• The University of Texas at Austin provides upon request appropriate academic adjustments for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 471-6259, http://www.utexas.edu/diversity/ddce/sss/

• See http://www.utexas.edu/ogs/student_services/academic_policies/add_drop.html for the policy on adding and dropping a course.
• A Course-Instructor Survey will be administered near the end of the semester.

• Honor Code: The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

• Plagiarism is a serious offense and is cause for dismissal from the University. Please see http://deanofstudents.utexas.edu/sjs/scholdis_plagiarism.php and http://www.lib.utexas.edu/services/instruction/learningmodules/plagiarism/index.html

• By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.