Timings and location

Monday and Wednesday, 1:25-2:40 pm, Marcus 106

Contact:

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Email: hbalasubraman@ecs.umass.edu

Office Hours: Monday (after class) 3:00 – 4:00 pm.

Course Website: On Spark

Course Summary

Linear Programming is one of the most basic tools in Engineering and Management Science and is utilized not only throughout the curriculum but is one of the most widely used Operations Research tools in industry. It maintains wide applicability in all aspects of Engineering, Management Science, Computer Science, Regional Planning, Forestry, Public Policy and Public Health fields. This course covers the theoretical, algorithmic and applied aspects of Linear Programming. The theoretical aspects include the development of the simplex method, revised simplex method, duality, convergence and optimality proofs, computational complexity of the simplex method and an introduction to the development of other competing algorithms. The applied aspects include problem formulation, sensitivity analysis, parametric programming and selected applications.

Requirements

The course meets two times a week for two 75 minute lectures. The final grade in the course will be comprised of the following. Homework will account for (20%) of your grade. There will be two examinations (25% each – one midterm in October and a final in December) for a total of (50%). There will be a quiz worth 10% in November. The term project will be worth 20%. The project will be a brief application or development of the theory and limited to ten pages in length due at the end of the semester. Students will have submit a one page proposal due the first week of October. The first midterm will on Oct 14th (Wednesday).

Prerequisites

Graduate standing or consent of the instructor. Knowledge of linear algebra is essential (MATH 235, 236 or equivalent).

Textbook and references

The required text for the course is titled: Linear Programming and Network Flows, it
is written by Bazaraa, Jarvis, and Sherali published by Wiley, 2005. Other textbooks that may be referred to include:

3. *Linear Programming*, Vasek Chvatal
5. *Introduction to Linear Optimization*, Bertsimas and Tsitsiklis

In addition to the text, classrooms notes, journal articles and assorted reports may supplement the text.

**Topics Covered**

1. Introduction: Notation, examples, formulations, basic ideas.
2. Review of linear algebra, convexity and polyhedral theory
3. The Simplex Method
4. Starting solution and convergence: The Two-Phase method, the Big-M method and other concepts
5. Special Simplex implementations and optimality conditions
6. Duality and sensitivity analysis
7. Stochastic linear programming
8. Interior point methods

**University Policy on Academic Misconduct:**
This course adheres to the UMass – Amherst Policy and Procedures Relating to Academic Integrity. Acts of academic misconduct (e.g., cheating, plagiarism, submitting work prepared by another, etc.) will *never* be tolerated.

Please review these university websites for elaboration:

http://www.umass.edu/dean_students/codeofconduct/acadhonesty/

**Accessibility Issues:**
If you are a student with a disability requiring adaptations or adjustments to participate in or benefit from class, or if you have a health problem that might require emergency attention, please contact the instructor *immediately*. Disability documentation is required to arrange for any adaptations. If you have not obtained the necessary documentation, contact Disability Services at (413) 545-0892 or view the policies online at: http://www.umass.edu/disability/ or http://www.umass.edu/ug_programguide/generalinfo/disabilityservices.html