George Mason University
Department of SEOR and Mathematical Sciences Department
Fall 2009
Professor Roman A. Polyak

OR 641/ Math 689 Linear Programming.

Tuesday 4:30-7:10, Thompson Hall room 119
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Office Hours: Monday 3 pm-5 pm or by appointment. **E-mail**: rpolyak@gmu.edu
Text: I. Griva ,S. Nash and A. Sofer , Linear and Nonlinear Optimization,
Second Edition , SIAM ,2009.

Course Summary: Linear programming (LP) is used in optimal recourses allocation, production planning, scheduling, transportation problems, it has military applications just to mention a few.
The course focuses on the theory and methods for solving LP.
In the first part of the course we will cover the Simplex Method, Duality Theory, Pricing in LP, Revised Simplex, Column Generation in LP.
In the second part we consider LP Decomposition, Enhancements of the Simplex Method, Steepest Edge Method.
We conclude the course by discussing some modern trends in Linear Programming: Complexity in LP ,Affine Scaling and Interior Point Methods.
Students will gain hands on experience in solving large scale LP via computational work with the software CPLEX.

Grading: 15% homework, 35% midterm exam, 15 % project, 35 % final exam.

Course Schedule

1. Real life applications which lead to LP formulation. Elements of Linear Algebra.
2. Basic solutions and extreme points. Simplex Method.
3. More on Simplex Method.
4. Duality in LP.
5. Pricing in LP and the Revised Simplex method.
6. Column generation in LP.

Midterm

7. Dantzig –Wolf decomposition.
8. Steepest Edge Method
9. Modem trends in LP.
10. LP complexity, ellipsoid method.
11. Affine Scaling method.
12. Elements of Interior Point Methods.

Students in OR 750 will be given additional assignments.

Final Exam: December 15, 2009