

# Math 464 — Linear Optimization (Spring 2007)

Time	Tu-Thu 2:50–4:05 p.m.
Location	Todd 211
Instructor	Bala Krishnamoorthy
Office	Neill 325
Office Hours	Mon 2:00–4:00 p.m., Wed 1:00–3:00 p.m.
Email	kbala@wsu.edu
Course web page	<a href="http://www.wsu.edu/~kbala/Math464.html">http://www.wsu.edu/~kbala/Math464.html</a>
Book	Dimitris Bertsimas and John N. Tsitsiklis – Introduction to Linear Optimization Athena Scientific. ISBN: 1-866529-19-1
References	Katta G. Murty – Linear Programming John Wiley and Sons. ISBN: 047109725X  Bazaraa, Jarvis, and Sherali — Linear Programming and Network Flows, second edition John Wiley and Sons ISBN: 0471636819

## Description of the Course

Linear optimization (or linear programming) is the most important branch of optimization, with applications to several areas such as chemistry, computer science, defence, finance, public policy, scheduling, telecommunications, transportation, and many others. This course will provide an integrated view of the theory, solution techniques, and applications of linear optimization. The treatment of most topics will begin with a geometric point of view, followed by the development of the solution techniques (algorithms), which are described using linear algebra. A background in linear algebra and multivariate calculus is assumed. Topics covered include linear programming formulations, geometry of linear programming, the simplex method, duality, sensitivity analysis, interior point methods, and integer programming basics. Apart from problems involving proofs (in homework and exams), the student will use MATLAB for implementing a few algorithms. A state-of-the-art modeling software (AMPL) will also be introduced for solving real-life examples.

## Organization and Grading

There will be around 11 homework assignments. Each assignment will be handed out at least one week before the day on which it will be due. Some of the problems will involve working with MATLAB or AMPL. Discussion of homework problems with others is allowed, but each person should hand in his or her own written solutions and codes.

There will be one mid-term and a final exam. The mid-term will be an in-class, closed-book exam. The final exam will be an in-class, open-book exam. It will be cumulative, but will concentrate more on the topics covered after the mid-term. Apart from the homework assignments and the two exams, there will be a course project. Students could work on the project in teams of two (or individually).

The total score for the course will be calculated using the following weights:

- homework - 45 %
- project - 15 %
- mid-term - 20 %
- final exam - 20 %.

The least homework grade **from among those turned in** will be dropped.

There are no specific cut-off points specified for letter grades. The final scores for the course will be curved to determine your grades.

## Software

There will be a few homework assignments in MATLAB. Students registered for the class can use MATLAB available at <http://my.math.wsu.edu>. In order to login, one should use his or her WSU student id and **4mymath** as the password. Using the version available in a PC or in the machines in one of the labs in Neill Hall would be more efficient though.

The modeling software AMPL will be introduced. You are encouraged to **download and install the student version of AMPL on your PC from <http://www.ampl.com>**. This web page also provides an interface to upload your models and get the solution directly. Necessary documentation will be provided to each student in the form of class handouts. If you are interested in reading the AMPL book, you are welcome to borrow it from the Owen Library (I will keep my book in the references section for Math 464 – you'll be able to check it out for short periods of time).

## Important Dates

Midterm Exam	Tuesday, February 27
Spring Break	March 12-17
Final Exam	Thursday, May 3, 10:10 a.m – 1:00 p.m.

A detailed (but *tentative*) schedule for the entire course will be distributed by next week (i.e., by Tuesday, January 16). Throughout the semester, you should check the course web page regularly for updates.