**Department of Industrial Engineering**

# IEE574 Applied Deterministic Operations Research

*Semester: Fall 2012* *Instructor: Muhong Zhang*

**Prerequisites**: Undergrad OR (IEE376 or equivalent); Calculus and Basic Linear Algebra

**Required text**:Introduction to Operations Research, Ninth Edition, Hillier & Lieberman, Irwin/McGraw-Hill, 2010.

**Reference books**: Optimization in Operations Research,
Ronald L. Rardin, Prentice Hall, 1998. ISBN: 002-398415-5 .

Introduction to Mathematical Programming: Applications and Algorithms,
W. L. Winston & M. Venkataramanan, 4th ed., Duxbury Press, 2002. ISBN: 0-534-35964-7.

AMPL: A Modeling Language For Mathematical Programming, Robert Fourer, David M. Gay, and Brian W. Kernighan, 2nd ed., Duxbury Press/Brooks/Cole Publishing Company, 2002. ISBN 0-534-38809-4

**Instructor**: Muhong Zhang (email: `muhong.zhang@asu.edu` phone: 965–2899)
**Lectures**: Mon Wed 1:30 – 2:45 PM (BYAC 190)
**Office hrs**: Mon 3:00–5:00 PM (Brickyard 314)

**Teaching assistant**: Chao Li (email: `chaoli2012@asu.edu`)
**Office hrs**: Wed. 9:30 - 11:30 AM (BYENG 221)

**Course web page**: `https://myasucourses.asu.edu/` (Blackboard)
**Course number**: 76783

## Course description

This is an advanced course on deterministic Operations Research(OR). In the course, we will formulate mathematical models and introduce solution methods for real–life optimal decision problems. We will study several typical classes mathematical models including linear programming, nonlinear programming, dynamic programming, discrete optimization, etc. The course will focus on the modeling of the real-life problems into the appropriate modeling classes, as well as the methodology to solve the corresponding models.

## Organization

Students will be assigned theoretical, modeling, as well as computational homework problems, some of which will require the use of computers. Homeworks are due at the beginning of the class. There will be two midterm exams and a final exam. If you miss the midterm exam, your final exam grade will be prorated to cover the midterm. You can use calculators during the exams.

**Grading**

- Homework: 15%
- Case studies: 10%
- Midterm exam: 25% each [Sep. 26 and Nov. 05, 1:30 – 2:45 PM]
- Final Exam: 25% [Dec. 14, 9:50 - 11:40 AM]

## Outline

1. Review of LP, more formulations/applications, extensions to LP, Duality/sensitivity and consequences

   Exam #1 (5th week)

2. Dynamic Programming & Nonlinear programming,

   Exam #2 (10th week)

3. Discrete Optimization, Networks (Min-Cost Circulation Problem)

   Exam #3 (Final)

This syllabus may be modified as time and interests dictate.