

M&IS 74018 MATHEMATICAL PROGRAMMING

Department of Management & Information Systems

Kent State University

Fall 2013

INSTRUCTOR: Alfred L. Guiffrida, Ph.D.

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OFFICE HOURS: Monday 5:30-6:30; 9:30 – 10:30; Tuesday 3:00 – 6:00

Course Objective

The objective of this course is to introduce the student to mathematical programming. Mathematical programming is a portfolio of optimization methodologies that can be used to assist decision makers in a variety of fields such as Supply Chain Management, Production Planning, and Resource Allocation. We will concentrate on the theoretic underpinnings of the methodologies as well as their real-world applications. These skills acquired in this course will prepare you for more advanced work in your academic research.

Topics include: advanced techniques including interior-point methods in linear programming; branch-and-bound and cutting-plane methods; traveling salesman and knapsack models in integer programming. We will also cover some review of basics and related mathematics. In addition contact with metaheuristics such as genetic algorithms.

Learning Objectives

After completing this course the student will be:

1. Able to solve formulate optimization problems.
2. Able to solve optimization problems using computer software.
3. Able to extend classroom knowledge to independent research
4. Able to read optimization research papers found in the literature

COURSE STYLE: Seminar style, Student Presentations and Term Paper.

TEXTS: Lectures and readings will be based on selected chapters from several texts, journal articles, web resources, and other library materials.

COURSE POINTS: In class presentations - 100 points, Course Term Paper - 100 points, Total - 200 points.

COURSE TERM PAPER: This may be an individual or team project. Topics will be selected with instructor assistance. The goal of the project will be to write a paper that can be submitted at least to a conference within one semester after the end of course.

GRADING: A = Excellent (170 – 200 points), B = Average (140 – 169) , C = Poor (< 140)

PREREQUISITE: BAD 6/74003. Students in the course who do not have the proper prerequisite risk being deregistered from the class.

GENERAL CALENDAR

Week	Topics
1	Linear Programming (LP) formulations and applications
2	Nonlinear Programming and Spreadsheet Solvers
3	Planning for the course term paper
4	Math background topics, Taylor's series, matrices, Newton Methods
5	Classical unconstrained algorithms
6	Constrained optimization algorithms, cutting-plane methods
7	Case Studies from Interfaces
8	Course research paper presentations – initial problem statements
9	Genetic and Evolutionary algorithms
10	Case Studies from Management Science
11	Course research paper presentations – initial model formulations

- 12 Metaheuristic methods, Tabu Search, Ant Colonies, Simulated Annealing
- 13 Work on the Course Term paper
- 14 Multi-criteria and Multi-objective problems
- 15 Course research papers – final presentation

The Following Policies Apply to All Students in this Course

- A.** Students attending the course who do not have the proper prerequisite risk being deregistered from the class.
- B.** Enrollment: Students have responsibility to ensure they are properly enrolled in classes. You are advised to review your official class schedule (using Student Tools on FlashLine) during the first two weeks of the semester to ensure you are properly enrolled in this class and section. Should you find an error in your class schedule, you have until Sunday, September 8, 2013 to correct the error. If registration errors are not corrected by this date and you continue to attend and participate in classes for which you are not officially enrolled, you are advised now that you **will not** receive a grade at the conclusion of the semester for any class in which you are not properly registered.
- C.** Academic honesty: We will follow the University Policy on Academic Integrity. Academic honesty: Cheating means to misrepresent the source, nature, or other conditions of your academic work (e.g., tests, quizzes, papers, projects, homework assignments) so as to get undeserved credit. The use of intellectual property of others without giving them appropriate credit is a serious academic offence. It is the University's policy that cheating or plagiarism result in receiving a failing grade (0 points) for the work or course. Repeat offences may result in dismissal from the University.
- D.** For Fall 2013 the course withdrawal deadline is November 3, 2013. Withdrawal before the deadline results in a "W" on the official transcript; after the deadline a grade must be calculated and reported.
- E.** Students with disabilities: University policy 3342-3-18 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through the Student Accessibility Services (contact 330-672-3391 or visit <http://www.registars.kent.edu/disability> for more information on registration procedures).