

**OPERATIONS RESEARCH I
MATH 4300/8306**

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1.0 Course Description

- 1.1 Overview of Content and Purpose:** (3 hours) Basic Concepts and Linear Programming including convex sets, hyperplanes, polytopes, mathematical modeling, formulation and geometry of linear programming, primal simplex method, dual simplex method, revised simplex method, sensitivity analysis and problem solving using computer packages.
- 1.2 For Whom Intended:** Advanced Undergraduates and Graduates interested in Applied Mathematics.
- 1.3 Prerequisites:** MATH 2050
- 1.4 Unusual Circumstances:** None

2.0 Objectives

- 2.1 Performance Objectives for the Student:**
- 1) To be able to develop models using linear programming
 - 2) To be able to solve a linear program
 - 3) To analyze optimal solutions

3.0 Content and Organization

- 3.1 Topics:**
- 1) Operations Research overview and review of Linear Algebra
 - 2) Introduction to Linear Programming
 - 3) The Simplex Method
 - 4) Interior Point Method
 - 5) Duality
 - 6) Sensitivity Analysis
 - 7) Multiple Objective Linear Programming (optional)

4.0 Teaching Methodology

- 4.1 Methods to be Used:** Lecture.

5.0 Evaluation

- 5.1 Basis for Evaluating Student Performance:** Exams given as open book, closed book or take home. In addition to all requirements, Graduate students will be assigned a project. (Decisions are made by the instructor).
- 5.2 Basis for Determining Final Grade:** Examination grades and homework and, if applicable, the graduate student project, with written examinations at least 50% of the grade, as announced at the beginning of the semester by the instructor. The grading scale will also be announced by the instructor.

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6.0 Resource Material

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| 6.1 | Textbook(s) or
Other required
Readings: | Jensen and Bard, <i>Operations Research Models and Methods</i> , Wiley. |
| 6.2 | Other Suggested
Readings: | Murty, <i>Operations Research, Deterministic Optimizations Models</i> , Prentice-Hall. |
| 6.3 | Other Sources: | Computer Software; to be selected by instructor. |
| 6.4 | Current
Bibliography of
Resources: | Winston, Wayne L., <i>Operations Research, Applications and Algorithms</i> , Duxbury.

Phillips, Ravindran and Solberg, <i>Operations Research Principle and Practice</i> , Wiley. |