

DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING
ISEN 420: OPERATIONS RESEARCH I

REQUIRED or ELECTIVE: required course

CATALOG DESCRIPTION (3-0) Credit 3

Development and application of fundamental deterministic analytical methods including linear programming, integer programming, dynamic programming and nonlinear optimization.

PREREQUISITES

MATH 304

PROFESSIONAL COMPONENT

This course provides students an experience in modeling, solving and analyzing problems using linear programming with an emphasis on theory, applications, and computer usage.

COURSE LEARNING OUTCOMES

At the end of the course, students should be able to

- consider real-world problems and determine whether or not linear programming is an appropriate modeling framework,
- develop linear programming models that consider the key elements of the real world problem,
- solve the models for their optimal solutions, and
- interpret the models' solutions and infer solutions to the real-world problems.

TEXTBOOK

Introduction to Mathematical Programming, 4th Edition; W. L. Winston and M. Venkataraman; Duxbury Press, Belmont, CA, 2003; ISBN 0-534-35964-7.

TOPICS COVERED

1. Introduction to Linear Programming (Chapter 3)
2. The Simplex Algorithm (Chapter 4)
3. Sensitivity Analysis and Duality (Chapter 6)
4. Transportation and Assignment Problems (Chapter 7)
5. Network Models (Chapter 8)
6. Introduction to Integer Programming (Chapter 9) -if time permits.

CLASS AND LAB SCHEDULE

One hundred and fifty minutes of lectures per week; either three days a week at 50 minutes per day or two days a week at 75 minutes per day. No laboratory component.

CONTRIBUTION TO MEETING REQUIREMENTS OF CRITERION 5:

Subject	Semester hrs	Subject	Semester hrs	Subject	Semester hrs
Mathematics		Engineering Science	2	General	
Basic Science		Engineering Design	1		

RELATIONSHIP OF COURSE TO PROGRAM OUTCOMES:

A – An ability to apply knowledge of mathematics, science, and engineering

E – An ability to identify, formulate, and solve engineering problems

G – An ability to communicate effectively

K – An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

PREPARED BY: Lewis Ntaimo

Date April 7, 2010