## **ENG ME 411 Operations Research**

## 2008-2009 Catalog Data: ENG ME 411 Operations Research

Prereq: ENG ME 308 or ENG EC 381 and ENG EK 102 or CAS MA 142. Nature of operations research. Scientific approach to industrial problems. Linear programming, including simplex and transportation algorithms, duality. Network analysis, dynamic programming, game theory, queueing theory and inventory control, and analytic methods for decision making. (Formerly ENG MN 409.) 4 cr., either semester.

Class/Lab Schedule: 4 lecture hours per week

Status in the Curriculum: Elective; Systems Elective in Manufacturing Program

**Textbook(s) and/or Other Required Material:** F. S. Hillier and G.J. Lieberman, *Introduction to Operations Research* (6<sup>th</sup> Edition), McGraw-Hill, 1995

Coordinator: Michael Caramanis, Professor, Mechanical Engineering

### **Prerequisites by topic:**

- 1. Linear Algebra.
- 2. Basic Calculus.
- 3. Basic Probability and Statistics.

#### Goals:

This course is designed to give juniors and seniors an introduction to the mathematical tools and models used in operations research.

#### **Course Learning Outcomes:**

As an outcome of completing this course, students will:

- i. Gain experience in applying skills and methods they have learned in linear algebra, calculus, and probability and statistics to real engineering problems.
- ii. Gain experience in designing and analyzing complex engineering problems.
- iii. Gain experience in doing performance evaluation and optimization on engineering problems.

## **Course Learning Outcomes mapped to Program Outcomes:**

Program:	Α	B	С	D	Е	F	G	Н	Ι	J	Κ	L	М	Ν
Course:	i,ii	ii,iii	ii	iii	Ii	ii,iii	iii	ii,iii		ii,iii	i-	iii	ii,iii	ii,iii
											iii			
Emphasis:	5	3	3	2	3	1	2	2	1	3	4	3	3	4

## **Topics (time spent in weeks):**

- 1. Linear Programming (3.5)
- 2. Transportation problems (1)
- 3. Network problems (1)
- 4. Queueing theory (2.5)
- 5. Inventory theory (2)
- 6. Decision Analysis (2)

# Contribution of Course to Meeting the Professional Component:

Engineering topics: 100%

## Status of Continuous Improvement Review of this Course:

Prepared by: Professor Michael Caramanis Date: April 10, 2009