

ISYS 3060 - Systems Optimization

Catalog Description

3060. Systems Optimization (3) (F) 3 lecture hours per week. P: MATH 2154, MATH 3307. System optimization: problem formulations, identification of decision variables, use of graphical methods, linear programming, duality, and sensitivity analysis. Applications include transportation analysis, network analysis, project management, decision analysis, and production planning.

Required Materials:

1. Winston, Wayne L. *Operations Research: Applications and Algorithms, 4th Edition*, Prentice Hall, 2003, ISBN 13: 9780534380588
2. National Council of Examiners for Engineering and Surveying, *Fundamentals of Engineering Supplied-Reference Handbook (8th Edition)*, 2008, ISBN 978-1-932613-30-8.

Course Objectives:

Upon completion of this course each student will be able to:

- Formulate an optimization problem
- Identify decision variables and constraints
- Solve optimization problems employing graphical and iterative methods
- Understand the simplex method and duality
- Perform sensitivity analysis on an optimized solution
- Apply linear programming to solve optimization problems from a range of engineering applications
- Formulate and solve transportation network problems and assignment problems.

Lecture Topics:

- matrices and vectors (3 hours)
- overview of operations research modeling (4.5 hours)
- concepts of linear programming (4.5 hours)
- graphical approaches to solving linear programming problems (4.5 hours)
- basic feasible solutions and extreme points (3 hours)
- Simplex Method (3 hours)
- algebra of the Simplex Method (3 hours)
- duality theory and sensitivity analysis (4.5 hours)
- economic interpretation of the dual (1 hour)
- transportation and assignment problems (3 hours)
- network analysis using PERT and CPM (2 hours)
- integer programming (1 hour)
- introduction to queuing theory (2 hours)
- 2 tests during the semester (3 hours)

Grading:

Grading		Assessment	
A	90% or better	Homework/Assignments	40%
B	80% or better	Tests (3) @15% each	45%
C	70% or better	Final Exam	15%
D	60% or better	Total	100%
F	Less than 60%		