IE480-1: Production and Logistics -1
Winter 2007

Instructor: Karen Smilowitz
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Class Time and Location: TR 11:00-12:20 (Tech M228)

Course Description

This course will provide an introduction to modeling and solution methods for facility location, transportation and inventory management decisions.

Learning Objectives

By the end of the quarter, you should learn

1. To model and formulate a variety of logistics problems;
2. To develop and assess solution methods for these problems; and,
3. To use these tools to analyze strategic, tactical, and operational supply-chain decisions including facility location, vehicle routing, and inventory management.

Course outline

Week	*Date*	*Topic*	*Reading*
1	1/4	Overview of production and logistics; Introduction to complexity	NDL 3
2	1/9	Facility location: Covering models; greedy heuristics; branch and bound; Lagrangian relaxation	NDL 1,4
3	1/16	P-center and P-median models; search methods; improvement methods	NDL 5-6
4	1/23	Fixed charge models: weak and strong formulations; fractional cutting plane approach; model extensions	NDL 7-8
5	1/30	Transportation: TSP formulation and solution procedures; heuristics (construction and improvement) for the TSP	
6	2/6	Heuristics and exact algorithms for the VRP; Set covering approaches with column generation	
7	2/13	Variants of the VRP	
8	2/20	Deterministic inventory models: introduction to EOQ and model relaxations; Wagner Whitin	
9	2/27	Stochastic inventory models: single period models (newsvendor); multi-period models	
10	3/6	Stochastic inventory: multi-period models, risk pooling	
	3/13	FINAL EXAM: 12-2 pm	

Prerequisites

IEMS 450-1 is a prerequisite for this class. In addition, students should be familiar with some high level programming language.

Course Materials

Recommended text: Daskin, M. S., 1995, Network and Discrete Location: Models, Algorithms and Applications, John Wiley and Sons, Inc., New York.

Other reference texts:
Ahuja, R. K., T. L. Magnanti and J. B. Orlin, Network Flows: Theory, Algorithms and Applications, Prentice Hall, Englewood Cliffs, NJ, 1993.
Bramel, J. and D. S. Simchi-Levi, 1997, The Logic of Logistics, Springer Verlag, New York.
Francis, R. L., L. F. McGinnis, Jr. and J. A. White, 1992, Facility Layout and Location: An Analytical Approach, Prentice Hall, Englewood Cliffs, NJ.
Golden, B. L. and A. A. Assad (eds.), 1988, Vehicle Routing: Methods and Studies, North Holland, Amsterdam.
Lawler, E. L., J. K. Lenstra, A. H. G. Rinnooy Kan, and D. B. Shmoys, 1985, The Traveling Salesman Problem: A Guided Tour of Combinatorial Optimization, John Wiley and Sons, New York.
Mirchandani, P. B., and R. L. Francis, 1990, Discrete Location Theory, John Wiley and Sons, Inc., New York.
Nahmias, S., 1997, Production and Operations Management, Third Edition, Irwin, Chicago.
Nemhauser, G. L. and L. A. Wolsey, Integer and Combinatorial Optimization, John Wiley, NY, 1988.

Course Assessment

There will be approximately 5 problem sets and a final exam.

1. Problem sets (35%).
2. Final exam (60%).
3. Participation (5%). Students are expected to prepare for and actively participate in class discussions.

Homework Policy

A due date will be specified on each assignment. Late assignments will not be accepted, except in the most extraordinary circumstances and then only with my prior permission.

Homework assignments are NOT group projects. If it is clear that you have not completed the assignment on your own, you will not receive credit. In some cases, you may ask your peers for help, in which case you must acknowledge this help in your assignment, "'I thank XXX for helping me solve this problem." Failure to follow this model will result in a loss of credit for the assignment.