IE480-1: Production and Logistics -1  
Winter 2010

Instructor: Karen Smilowitz  
Office: Tech M233  
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Class Time and Location: MW 9:00-10:20 (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

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Related readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/4</td>
<td>Overview of production and logistics; Assessing problem complexity</td>
<td>LOL 1; ICO I.5; LLRC 3; NDL 3; NF B.1</td>
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<tr>
<td>2</td>
<td>1/11</td>
<td>Facility location: Covering models; greedy heuristics; branch and bound; Lagrangian relaxation</td>
<td>NDL 1,4; NF 16; IOC II.3, II.4</td>
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<tr>
<td>3</td>
<td>1/18</td>
<td>Median models; No class on 1/18 Improvement heuristics</td>
<td>LOL 12; NDL 5-6</td>
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<tr>
<td>4</td>
<td>1/25</td>
<td>Fixed charge models: weak and strong formulations; fractional cutting plane approach; model extensions</td>
<td>ICO II.5; NDL 7-8</td>
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<tr>
<td>5</td>
<td>2/1</td>
<td>Transportation: TSP formulation and solution procedures; heuristics (construction and improvement) for the TSP</td>
<td>LLRS 2,5; LOL 3; ICO II.6</td>
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<tr>
<td>6</td>
<td>2/8</td>
<td>Heuristics and exact algorithms for the VRP; Set covering approaches with column generation</td>
<td>LLRS 12; LOL 13, 14</td>
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<tr>
<td>7</td>
<td>2/15</td>
<td>Variants of the VRP</td>
<td>LOL 16</td>
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<tr>
<td>8</td>
<td>2/17</td>
<td>MIDTERM</td>
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<tr>
<td>9</td>
<td>3/1</td>
<td>Deterministic inventory models: EOQ and model relaxations; Wagner Whitin</td>
<td>LOL 6, 7</td>
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<tr>
<td>10</td>
<td>3/8</td>
<td>Stochastic inventory models: single period (newsvendor); multi-period models</td>
<td>LOL 8</td>
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<td></td>
<td>3/17</td>
<td>Stochastic inventory: multi-period models, risk pooling</td>
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<td></td>
<td>3/17</td>
<td>FINAL EXAM: 9-11 am</td>
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**Prerequisites**

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

**Course Materials**

The course notes draw material from a variety of texts:

Other reference texts:
- Golden, B. L. and A. A. Assad (eds.), 1988, Vehicle Routing: Methods and Studies, North Holland, Amsterdam.

**Course Assessment**

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

1. Problem sets (25%).
2. Midterm exam (30%).
3. Final exam (40%).
4. 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. 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.