# IE 490 - Facility Location

## Tentative Outline

### Spring 2005

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>3/29-30</td>
<td>Introduction and taxonomy of facility location models</td>
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<td></td>
<td></td>
<td>A simple analytic location model</td>
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<td>2</td>
<td>4/4-6</td>
<td>Continuous location models</td>
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<td></td>
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<td>Network location models</td>
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<td>3</td>
<td>4/11-13</td>
<td>Discrete location models - Set covering, maximal covering, P-center,</td>
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<td></td>
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<td>P-median, fixed charge and others</td>
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<td>4</td>
<td>4/18-20</td>
<td>Solution of discrete location models - Lagrangian relaxation, dual</td>
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<td>ascent, construction and improvement heuristics, neighborhood search</td>
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<td>for P-median, genetic algorithms</td>
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<td>5</td>
<td>4/25-27</td>
<td>Stochastic location models and partial covering location models</td>
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<td>6</td>
<td>5/2-4</td>
<td>Location inventory models</td>
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<td>7</td>
<td>5/9-11</td>
<td>Dynamic location models and multi-objective location</td>
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<tr>
<td>8</td>
<td>5/16-18</td>
<td>Hub location models</td>
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<tr>
<td>9</td>
<td>5/23-25</td>
<td>Competition in facility location models</td>
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<tr>
<td>10</td>
<td>6/1</td>
<td>Selected applications</td>
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</tbody>
</table>
Instructor

Mark S. Daskin  
Department of Industrial Engineering and Management Sciences  
Northwestern University  
Evanston, IL  60208  
Phone:  847-491-8796  
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Office hours:  M W 3-5 (or after class if we have make-up classes)  

Note:  If these hours do not work for a large percentage of the class, alternate times will be arranged. Also, if the posted office hours do not work for you for some reason, please do not hesitate to contact me by e-mail or phone to set up another mutually convenient time.

Evaluation and Assignments

The course will be graded based on three primary inputs:

- Problem sets (some number)  60%  
- Student presentations of papers  25%  
- Class participation  15%  

There will be about 3-5 homework assignments. Some are likely to involve some programming. These assignments will constitute 60% of the grade for each student. In addition, each student will be responsible for presenting 1-2 papers (depending on the enrollment). These presentations should be of an INFORMS presentation level at the beginning (20 minutes of overview of the problem and the key findings) followed, as needed, by a more detailed discussion of the particulars of the paper. Finally, students are expected to participate actively in class, particularly those classes in which other students are presenting material.
# Tentative Schedule (to be discussed)

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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<tbody>
<tr>
<td>27-Mar</td>
<td>28-Mar</td>
<td>29-Mar</td>
<td>30-Mar</td>
<td>31-Mar</td>
<td>1-Apr</td>
<td>2-Apr</td>
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<td></td>
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<td>First day of class (Monday schedule)</td>
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<td>Class</td>
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<td>3-Apr</td>
<td>4-Apr Class</td>
<td>5-Apr</td>
<td>6-Apr Class</td>
<td>7-Apr</td>
<td>8-Apr</td>
<td>9-Apr</td>
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<td>10-Apr</td>
<td>11-Apr Class</td>
<td>12-Apr</td>
<td>13-Apr Class</td>
<td>14-Apr</td>
<td>15-Apr</td>
<td>16-Apr</td>
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<td>17-Apr</td>
<td>18-Apr No class (INFORMS Palm Springs)</td>
<td>19-Apr</td>
<td>20-Apr Class</td>
<td>21-Apr</td>
<td>22-Apr Make-up class???</td>
<td>23-Apr</td>
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<tr>
<td>24-Apr</td>
<td>25-Apr No class (Passover)</td>
<td>26-Apr</td>
<td>27-Apr Class</td>
<td>28-Apr</td>
<td>29-Apr Make-up class???</td>
<td>30-Apr</td>
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<td>1-May</td>
<td>2-May Class</td>
<td>3-May</td>
<td>4-May Class</td>
<td>5-May</td>
<td>6-May</td>
<td>7-May</td>
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<td>27-May Make-up class???</td>
<td>28-May</td>
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<tr>
<td>29-May</td>
<td>30-May No class (Memorial Day)</td>
<td>31-May</td>
<td>1-Jun No class (MSD travels to Spain for ISOLDE X meeting)</td>
<td>2-Jun</td>
<td>3-Jun</td>
<td>4-Jun</td>
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Readings

This section is divided into two parts. In the first part, I provide references to some recent and classic texts on location theory and modeling. Two that are of particular relevance to this course are those that are starred (*): Daskin (1995) and Drezner and Hamacher (2002).

The second part of the readings section below gives selected papers on each of the topics. We will be looking at some and certainly not all of these papers. Many are here for your reference only. The papers to be used in class will be posted on Blackboard or handed out in class. Some papers are designated with a (G) to indicate that they are a "golden oldie" or a classic in the field. Others are designated (O) to indicate that they are an "overview" paper. Within each group of papers, the papers are listed in chronological order.

Overall good references in location theory and modeling:

Sule, D., 2001, :Logistics and facility location and allocation, Marcel Dekker, New York

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2 4/4-6 Continuous location models
Network location models


3 4/11-13 Discrete location models – Set covering, maximal covering, P-center, P-median, fixed charge and others


4 4/18-20 Solution of discrete location models – Lagrangian relaxation, dual ascent, construction and improvement heuristics, neighborhood search for P-median, genetic algorithms


5 4/25-27 Stochastic location models and partial covering location models


Location inventory models


Dynamic location models and multi-objective location


Hub location models


9 5/23-25 Competition in facility location models


10 6/1 Selected Applications

TBA
NU Disability Policy

http://www.northwestern.edu/disability/policies/syllabus.html

To be eligible for disability-related services; students must have a visibly obvious or documented disability as defined by the Americans with Disabilities Act of 1990 (ADA) and Section 504 of the Rehabilitation Act of 1973. Under the ADA and Section 504, a person has a disability if he/she has a physical or mental impairment that substantially limits one or more major life activities such as walking, standing, seeing, speaking, hearing, sitting, breathing, and/or taking care of oneself.

SSD is the designated office at Northwestern University that obtains and files disability-related documents, certifies eligibility for services, determines reasonable accommodations, and develops plans for the provision of such accommodations. Students with disabilities are also offered auxiliary services, including assessment, library and lab assistants, notetakers, tutoring, assistive/adaptive technology, academic, psycho/social support, and mentorship.

Certifying Eligibility for Services

When appropriate, SSD requests disability-related documents from the appropriate licensed professional to certify a student as having a disability and to determine reasonable accommodations. Students who suspect that they have a disability, and have not received a formal assessment, may be referred to on-campus (Counseling and Psychological Services, Department of Communication Sciences and Disorders) or off-campus resources for an evaluation. Pending receipt of documentation, SSD reserves the right to deny services or accommodations.