Syllabus

ISE 754: Logistics Engineering  Spring 2016

Lecture: Monday and Wednesday, 3:00–4:15 p.m., Daniels 327

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or By Appointment

Logistics engineering is concerned with all of the planning, implementation, and control related activities associated with the acquisition, transport, storage, and distribution of products and services. The logistics network, or supply chain, of a firm can extend from the acquisition of raw materials from the firm’s suppliers to the distribution of finished products to its customers. Central to the study of logistics is the flow of material and information between the facilities of a supply chain—details of the production process within a facility are not of primary concern.

Course Description: This course will present the fundamental quantitative approaches that are used in the design and control of logistics systems, including modeling issues, design concepts, computational considerations, and the use of the MATLAB software package. This quantitative, or engineering, approach to logistics is meant to complement that of business logistics, which is concerned with the management of physical distribution and procurement processes and relationships, and supply chain management, which also includes the coordination of product design, marketing, sales, and finance, both within and between firms, to best support the operation of a firm’s supply chain.

Prerequisites: ISE 453: Design of Production, Logistics, and Service Systems (alternatively, ISE 723: Production Planning, Scheduling and Inventory Control and ISE/OR 501: Introduction to Operations Research would be helpful)

Programming: This course will require some programming/scripting using MATLAB. Although prior experience programming in any language would be helpful, the basics of programming/scripting in MATLAB will be covered in class.

Course Grading:

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>35%</td>
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<tr>
<td>Midterm Exam</td>
<td>25%</td>
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<tr>
<td>Final Project</td>
<td>10%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
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Homework 35% (breakdown within determined later)
**Required Text:** None (all materials will be posted on the Course Schedule)

**Software:** MATLAB can be installed on your personal computer if you are an engineering student (see course homepage for link). You can download the Matlog logistics engineering toolbox from the course homepage.

Several software packages, including MATLAB and Cplex, are available via VCL (see course homepage for link). This will allow you access the software from any browser.

**Permanent Course Homepage:** [http://courses.ncsu.edu/ise754/common/](http://courses.ncsu.edu/ise754/common/)

**Topics:**

1. *Introduction.* Elements of the supply chain; review of business logistics; logistics system modeling; commercial logistics software; introduction to MATLAB.

2. *Facility location.* Great-circle distances and geocoding; minimum cost network flow; continuous single- and multi-facility minisum location; location-allocation.

3. *Freight transport.* Freight transportation systems; independent truck transport charge; LTL tariffs and rates; total logistics cost.

4. *Network models.* Transportation problem; minimum cost network flow; shortest path; road networks; multi-echelon, multi-period, multi-product production and inventory models; network and integer-programming formulations.

5. *Routing.* Multistop truckloads; traveling salesman problem; exact, approximation, and heuristic procedures; basic vehicle routing problem and extensions.

6. *Warehousing.* Basic warehousing operations; warehouse planning; information technology for coordinating a supply chain; activity profiling; order picking systems.

**Course Schedule:** A link to the web version of the ISE 754 Course Schedule is on the course homepage. The schedule will be updated before and after each lecture, and will contain the topic, assignments, and text readings for the lecture. The schedule should be checked on a regular basis. A diary of any MATLAB code demonstrated in class will be available on the schedule after class.

**Homework:** There will be several homework assignments required throughout the semester. Most of the assignments will require that you submit both the code that implements your solutions and a text file (diary) that illustrates the execution and output of your code. You should submit all files used by your code and your submission should be concise and documented. There will be a reduction in the grade of any submission not following these guidelines.

**Exams:** There will be a midterm exam and a final exam during the semester. Both exams will be in class and will be open notes and closed computer.

**Final Project:** The Final Project can either be on a topic of your choosing, subject to the Instructor’s permission, or you can choose one the topics provided by the Instructor. The project can either be individual or you can have one other group member. The grade for the final project will be based on a formal written report along with supporting materials.
Grade Boundaries: Minimum grade in course based on the following boundaries:

A+ : 100.0 – 96.7  B– : 83.3 – 80.0  D : 66.6 – 63.4
A  : 96.6 – 93.4  C+ : 79.9 – 76.7  D– : 63.3 – 60.0
A– : 93.3 – 90.0  C  : 76.6 – 73.4  F : 59.9 – 00.0
B+ : 89.9 – 86.7  C– : 73.3 – 70.0
B  : 86.6 – 83.4  D+ : 69.9 – 66.7

Audit: Space permitting, you can audit this course. The only requirement for a successful audit is that you receive a grade of at least 70 on the Final Project; no other assignments are required, although you are free to do the other assignments and, time permitting, have them graded. In doing your Final Project, you should either do an individual project or, if a group project, the other member must be aware that you are auditing the course.

Academic Integrity: All work turned in with your name is assumed to be only your own work or, if a group assignment, the work of you and your group members. The University policy on academic integrity can be found in the Code of Student Conduct (see Appendix L of the Handbook for Advising and Teaching: www.fis.ncsu.edu/ncsulegal/41.03-codeof.htm). It is understood and expected that a student’s signature on any test or other assignment indicates that the student has neither given nor received unauthorized aid.

Instructor’s Policies: Please contact the instructor regarding incomplete grades, penalties for late assignments, excused absences, and scheduling makeup work.

Reference Materials:


