

IOE 440: Syllabus & Course Policies  
Operations Analysis & Management – Fall 2010  
Instructor: Soroush Saghafian

**Instructor**

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**TA/GSI**

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**Lectures**

Tuesdays and Thursdays, 3:00pm – 4:30pm, EECS Bldg Room 1500

**Exams (In Class)**

Midterm: October 26, 2009. 3:00pm – 4:30pm, FXB Bldg Room 1109  
Endterm: December 9, 2009. 6:00pm – 7:30pm, IOE Bldg Room 1610

**Required Text Book**

“Factory Physics”, Authors: Wallace J. Hopp, Mark L. Spearman., Publisher: McGraw-Hill/Irwin/Irwin 3rd ed. 2008, ISBN: 0072824034.

**Additional Reading**<sup>1</sup>

“Designing and Managing the Supply Chain: Concepts, Strategies, and Cases”  
Authors: David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi.

**Prerequisites:**

IOE 310 and 316 or equivalent. IOE 440 is open to advanced undergraduates, Master’s, and Ph.D. students. Credit may not be earned for both IOE 440 and OMS 605.

**Grading:**

- Attendance Quizzes: 5%
- Homeworks: 25%
- Midterm Exam: 35%
- Endterm Exam: 35%

**Course Website**

CTools: <https://ctools.umich.edu/>

**Course Description**

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<sup>1</sup> The additional readings required for the course will be made available online (CTools).

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Principles and models for analyzing, and managing manufacturing and service operations as well as supply chains. Emphasis on inventory management and control, capacity management, queueing models of operational dynamics (including cycle time, work-in-process inventory, throughput, and variability), the math and physics of enterprises.

### Core Contents

- Inventory Management (deterministic and stochastic models: EOQ, EOQ with Discount, EPL, Dynamic Lot Sizing using Wagner-Whitin, News Vendor, Multiple Period News Vendor with Backorders or Stockouts, Base Stock Model, (Q,R) Model, (Q,R) with Stochastic Lead-Time, and (s,S) Model)
- Production Capacity Management (Bottleneck Analysis, Product Mix and LP models) ,
- Operations models and performance measures,
- Factory dynamics and measuring variability in single station and tandem queueing systems,
- Queueing models for analysis and management of production systems (M/M/1, M/M/s, G/G/1, G/G/s)
- Supply Chain Management (Inventory, Contracts, Risk Pooling, Forecasting, Information Sharing, and Bullwhip Effect),
- Operations Management in Health Care (Time Permitting),
- Flexibility, agility, and emerging paradigms for high performance (Time Permitting).

### Course Outcomes

We expect that the students who take this course will have an understanding of some of the fundamental issues of *Operations Management* and engineering-oriented analytical tools to address them. Core issues involve effective management of production capacity via a systems approach that identifies critical capacity constraints, deterministic and stochastic modeling of capacity and both principles and methods for designing and improving operations.

Fundamental analytical models describing the relationships between work-in-process, cycle (waiting) time, and system throughput will be learned to provide quantitative approximations of system performance for purposes of benchmarking and improvement. Models of inventory management and production that incorporate economic optimization as well as quality of service will be learned. The students will also gain a basic understanding of the fundamental issues in *Supply Chain Management*.

Some specific examples of the above include:

(a) Gain knowledge of a modeling hierarchy beginning with deterministic and stochastic models of inventory control, models of capacity, system capacity, line balancing, and the role of variability as captured in queueing models.

(b) Master analytical models of the throughput, cycle time, and WIP of operations under varying levels of variability.

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- (c) Articulate fundamental challenges and solutions of supply chain management (e.g., bullwhip effect, decentralized decision-making under local information, use of modularity and risk pooling, risk-sharing via contracts, vendor-managed inventory)

**Grading Policy**

All grades will be posted to CTools. Assignments must be done in teams of 3 students. The group writeup must be submitted as a single copy bearing the names of all group members. All members should sign the assignment, describing that each member has worked on all parts of the assignment. Assignments are due *before* the lecture starts on their due dates. Late submitted materials will not be graded.

**Re-grade Policy**

If you think that there has been an error in the grading of your assignment or exam, you have one week from the day it was returned to you to submit it for a re-grade. (Note: one week is counted from the day the homework became available; you do not get an extension if you chose to pick it up late!) When you resubmit the assignment, it must be accompanied by a clear written explanation of the suspected grading mistake. Re-grading entails re-grading the entire assignment or exam; so you may, in fact, get a lower grade than your original grade.

**Email**

All emails to the Instructor and/or GSI must have **[IOE 440]** in the subject line. Failure to place this in the subject line could cause your email not to be read. Email is sometimes a convenient way to get in touch with the instructors to get an answer to a short question. However, be aware that the professor and the GSI have many other work obligations and probably keep different schedules from you. Therefore, although we do guarantee that we will answer all emails we receive, you should not expect us to answer each of them right away. The most reliable way to get your questions and concerns answered is to attend office hours: keep up with lectures and readings and get started on assignments early, to be prepared to pose questions in office hours. Both the instructor and the GSI are very concerned with your learning.

## HONOR CODE

All students are expected and responsible to be familiar with the Engineering Honor Code (<http://www.engin.umich.edu/students/honorcode/>) and are bound by its requirements. You must observe the Honor Code with respect to examinations, assignments, and all other aspects of this course.

In particular:

Homework: All parts of each assignment should be solved and understood by all members of the group. The group, however, will submit a single write-up. All members should sign the assignment, describing that each member has worked on all parts of the assignment.

Exams: Both exams will be closed book. You will be allowed to bring one page of your own notes and a calculator to perform simple arithmetic operations; details to follow.