

IEOR 250
Introduction to Production Planning and Logistics Models
Fall 2007

Instructor:

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Office Hours:

Tuesday 11:00-12:00
Thursday 2:00-3:30
or by appointment.

GSI:

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GSI Office Hours:

To Be Determined

Course Meetings:

Tuesday 9:30-11:00 1174 Etcheverry Hall
Thursday 9:30-11:00 1174 Etcheverry Hall

Course Description:

We will explore quantitative approaches for making a variety of strategic, operational, and tactical decisions related to production planning and control, inventory planning and control, distribution planning, routing, scheduling, and forecasting. We will consider a wide variety of fundamental models and algorithms that address these issues, as well as a selection of more advanced models and algorithms that build on this fundamental knowledge. By the end of the course, you will have a broad understanding of the fundamental approaches used in operations management, and will be prepared to read advanced literature and take advanced courses in this area.

Text:

A course reader is available at Copy Central (2483 Hearst at Euclid). There are some typos and errors in the course notes – please let me know of them as you find them, and I'll maintain a list on the web site.

Also, the following books, on reserve in the engineering library, might prove useful:

Network and Discrete Location by Daskin (1995: Wiley)

Production and Operations Analysis by Nahmias (2004 plus various other editions: Irwin-McGraw Hill)

Analysis of Inventory Systems by Hadley and Whiten (1963: Prentice-Hall)

Production and Inventory Management by Hax and Candea (1984: Prentice-Hall)

The Logic of Logistics by Simchi-Levi, Chen, and Bramel (2004:Springer-Verlag)

Scheduling: Theory, Algorithms, and Systems by Pinedo (2001: Prentice Hall)

Logistics of Production and Inventory edited by Graves, Rinnooy Kan, and Zipkin (1993: Elsevier)

Factory Physics by Hopp and Spearman (2000: Irwin- McGraw Hill)

Assignments and Grading

There will be approximately bi-weekly homework assignments. Each homework assignment must be turned in at the start of class on the assignment's due date.

There will also be a **midterm** and a **final exam**.

Final grades will be based on exam grades and homework performance.

Course Topics

I will try to cover most of the following topics, roughly in the order they are listed. The previous times I taught this class, I didn't have time to cover the scheduling, planning, and queuing-based material that I wanted to, so I plan to eliminate some of the inventory material so I can get to this material this semester. However, please let me know if there is a particular topic listed here that you would especially like to get to.

- Inventory Theory
 - Deterministic
 - * EOQ and extensions
 - * Power-of-Two (Multi-Echelon, Joint Replenishment)
 - * Time-varying demand
 - * Capacitated Lot Sizing – Florian-Klein
 - * ELSP
 - Stochastic
 - * Periodic Review (Newsboy and Base Stock)
 - * Continuous Review and Multi-period (S-s, Q-r)
 - * Multi-Echelon (Clark-Scarf)
- Location Models
 - Center Models

- Covering Models
- Median Models
- Fixed Charged Models
- Heuristics, Lagrangian Relaxation
- Routing Models
 - TSP approximations
 - Heuristics
- Production Scheduling
 - Single Machine Models
 - * Algorithms
 - * Interchange arguments
 - Parallel Machine Models
 - * Algorithms
 - * Approximations
 - Flowshop + Jobshop
 - * Shifting Bottleneck
 - * Dispatch Rules
 - * Critical Path scheduling
 - Heuristics for resource-constrained scheduling
- Production Planning and Control
 - MRP
 - Aggregate Planning and Techniques for Hierarchical Linkage/Disaggregation
 - Kanban, Conwip
 - * Queuing-based modeling approaches