ORI 390Q.2 - Production and Inventory Control

Syllabus

Professor
Erhan Kutanoglu
Associate Professor
Operations Research and Industrial Engineering
Department of Mechanical Engineering
The University of Texas at Austin
Office: ETC 5.114
Phone: (512) 232-7194
Fax: (501) 232-1489
E-mail: `erhank@mail.utexas.edu`
Web: `http://www.me.utexas.edu/~erhank`

Office Hours
TTh, 10:30 – 11:30 a.m., (or, stop by anytime, I'll meet you if I am not busy)

Class Meetings
TTh, 12:30 p.m. – 2:00 p.m., ETC 2.140

Course Web Page
Canvas: `http://canvas.utexas.edu`

(Official) Course Description
Subject Matter Description: Industrial engineering techniques for quantitative solution of contemporary systems and management problems. *Topic Description*: Issues in inventory control with known and unknown demand, materials requirement planning, just-in-time, pull control systems, operations scheduling, dispatching and aggregate planning, and the basic dynamics of production and inventory control. *Meeting Information*: Three lecture hours a week for one semester. *Degree Plan Information*: May be repeated for credit when the topics vary. *Prerequisite*: Graduate standing and consent of instructor.

(Real) Prerequisites
Basic probability and statistics, introductory operations research.

Objectives

- Identify dynamic interactions among different elements of a production or distribution system.
- Develop aggregate production plans and detailed schedules through simple policies and more sophisticated mathematical models.
- Analyze and develop inventory management policies within deterministic and stochastic environments.
- Find the differences among several production systems such as MRP, JIT, CONWIP, etc.
- Calculate the effects of variability on the output of a production system, and develop strategies to cope with the adverse effects of variability.

Text

W. J. Hopp and M. L. Spearman, *Factory Physics*, Waveland Press, 2008 (Third edition).

Other references

- S. Nahmias and T.L. Olsen, *Production and Operations Analysis*, Irwin/McGraw-Hill (7th Edition, 2015).
- D. Sipper and R. L. Bulfin, *Production: Planning, Control, and Integration*, McGraw Hill, 1997.
- L. A. Johnson and D. C. Montgomery, *Operations Research in Production Planning, Scheduling, and Inventory Control*, Wiley, 1974.
- E. A. Silver, D. F. Pyke, and R. Peterson, *Inventory Management and Production Planning and Scheduling*, Wiley, 1998.
- P. Zipkin, *Foundations of Inventory Management*, Irwin/McGraw-Hill, 2000.

Software

- MS Excel
- Jensen's Excel Add-ins: `www.me.utexas.edu/ jensen/ORMM/index.html`
- GAMS, Cplex, Mathematica, Matlab

(Tentative) Outline

- Factory Physics? and Manufacturing in America (Chapters 0 and 1)
- Inventory Control: From EOQ to ROP (Chapter 2)
- The MRP Crusade (Chapter 3)
- From the JIT Revolution to Lean Manufacturing (Chapter 4)
- A Science of Manufacturing (Chapter 6)
- Basic Factory Dynamics (Chapter 7)
- Variability Basics (Chapter 8)
- Corrupting Influence of Variability (Chapter 9)
- Push and Pull Production Systems (Chapter 10)
- A Pull Planning Framework (Chapter 13)
- Shop Floor Control (Chapter 14)
- Production Scheduling (Chapter 15)
- Aggregate and Workforce Planning (Chapter 16)
- Supply Chain Management (Chapter 17)

Grading

You will have one exam, about 10 homework assignments, and a project. Grading will be based on the following weights:

- Homework Assignments (Each due before class): 20%

- Term Project (
    ): 40%
- Midterm Exam: 40% (   )

Homework is graded according to the following scale:

- 5 Outstanding. Especially elegant solution, or exceptionally clear justification and writeup.
- 4 Good. The answer is basically correct and clearly presented.
- 3 OK. Got the basic idea, but either some details are wrong or the presentation is not clear.
- 2 Poor. Something of value, but below the standard that I expect.
- 1 You tried, but this is not passing work.

Homework assignment that is one class late will be penalized with a grade level reduction in the above scale; it will not be accepted after that date. You will not be allowed to make up project, or exams unless there is a documented emergency.

Academic Dishonesty
Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, fellow students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. Cheating will not be tolerated, and incidents of dishonesty will be reported. For more information, and for what constitutes "cheating," see:
http://deanofstudents.utexas.edu/sjs/acint_student.php.

Students with Disabilities
The University of Texas at Austin provides, upon request, appropriate academic adjustments for qualified students with disabilities. Any student with a documented disability who requires academic accommodations should contact Services for Students with Disabilities at 471-6259 (voice) or 410-6644 (Video Phone) as soon as possible to request an official letter outlining authorized accommodations. (Also, see http://www.utexas.edu/diversity/ddce/ssd/)

Course Evaluation
Near the end of the semester, you will have an opportunity to anonymously evaluate the course and instructor using the standard Cockrell School of Engineering evaluation form.

Dropping the Course
An engineering student must have the Dean's approval to add or drop a course after the fourth class day of the semester. A student may not drop a class after the fourth class day except for good cause (health or serious personal problems). A student seeking to drop a class after the fourth class day should go the Cockrell School of Engineering Student Services (Engineering Student Services Building, 471-4321).