

**IE57900: Design and Control of Production and Manufacturing Systems (Fall 2013)**  
**School of Industrial Engineering, Purdue University**

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**Instructor:** Professor Shimon Y. Nof ([nof@purdue.edu](mailto:nof@purdue.edu))  
*Office:* GRIS 255      *Office hours:* Any time, or by email  
*Email:* Please send all class related email to BOTH instructor and TA, beginning the subject line with [IE579]

**TA:** Mohsen Moghaddam ([mmoghadd@purdue.edu](mailto:mmoghadd@purdue.edu))  
TA Office hours: Will be posted on Blackboard, or by email.

**Lectures:** M W F 9:30-10:20 am at ME 1009      **Web:** blackboard.purdue.edu

**Course Objective:** Learn to design and control production/mfg/service systems through a science-based understanding of production system operations and flow.

**Course Description:** To achieve cost-effective and sustainable production/mfg./service systems, a thorough understanding of production system operations and flow are essential. This course focuses on the fundamental understanding of the factors affecting operational performance of production systems. We will discuss the basic models and techniques of inventory control, queuing analysis, job scheduling, and supply networks, and their role in the context of analytics and informatics.

**Course Topics:** Inventory control - EOQ model, dynamic lot-sizing, dynamic lot-sizing in supply chains/networks, news vendor model, base stock model, (R,Q) and (s,S) models; Queuing flow analysis - M/M/1, M/M/s, M/M/s/k, M/G/1, G/M/1, Multi-class queues, Queuing networks; Scheduling - single machine, parallel machines, flow shops, job shops, open shops, supply decision networks.

**Pre-requisites:** Understanding of basic concepts of production control and undergraduate-level statistics and optimization.

**Textbook:** No textbook required. Three Reference Books: 1. W. J. Hopp and M.L. Spearman, "Factory Physics," McGraw-Hill, 2008 or later. 2. M. Pinedo, "Scheduling: Theory, Algorithms and Systems," Springer, 2008; 3. A. Dolgui and J-M. Proth, Supply Chain Engineering, Springer, 2010.

**Class Notes:** Class notes will be posted on Blackboard system usually before the class.

**Homework:** Assignments (5 or 6) will be posted through the Blackboard system.

**Exams:** 3 exams (open books, open notes): In class: W 10/2; W 11/6; take-home: week of finals

**Project:** Write a research report as a team. The focus topic of this semester will be defined early in the semester. Develop your project in two phases:

1. *Proposal:* Introduction / Problem definition / Literature survey.
2. *Report:* Introduction (rev.) / Problem definition (rev.) / Literature survey (rev.) / Analytic methodology / Implementation / Analyses and evaluation / Conclusions.

The best projects will be presented in class by the project team.

**Grading:** HW (20%), Exams 3X (20%), Project (20%).  
Grading on a curve; +/- will be applied.

**Campus emergencies:** *In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course due to campus emergencies: Blackboard web page, my email address: [nof@purdue.edu](mailto:nof@purdue.edu), our school phone: 494-5400.*

*Some emergency procedures will be posted in the course website for your reference.*