Course Information

IE598: Inventory and Production Systems

Instructor Information

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Time and Classroom: 214 Ceramics Building, TR 02:00pm-03:20pm.

Prerequisites


Course Description

The theory of inventory and production systems lays the groundwork for supply chain management. The field has progressed tremendously in past years, and yet still has great potential for future growth. Difficult canonical problems remain to be solved, which calls for developments of novel analytical methods. The ever-changing business world gives rise to new areas to explore. The goal of this course is to obtain a fundamental understanding of the field, to acquire quantitative skills for analyzing and optimizing inventory and production systems, to investigate related managerial strategies, and to get an exposure to emerging new areas. For students who are interested in focusing their graduate studies on supply chain management and related topics, the course prepare them to spring into action.

The course is composed of four parts. In the first part, we will go through several classical works to get a historic perspective of the field. For students who are new to this subject, the discussion also serves as an introduction to relevant concepts and models. The second part focuses on the analysis of two canonical models, the serial and assembly systems. The purpose is to get into “nuts and bolts” of technical methods. The third part discusses supply chain strategies at both conceptual and technical levels. Topics include component commonality, process flexibility, information coordination, and pricing. The last part presents recent work on environment-aware supply chain management and the interface between operations and finance.

Lectures will be organized around 20+ selected research papers. I will lead the discussion of each paper by giving an overview and singling out some specific issues in the paper. In the next lecture, one student is asked to give a short presentation on these issues and answer questions from other students. Students take turns to be the presenter, each presents the same number of times during the semester. The quality of the presentation determines 40% of the final grade. The remaining 60% is based on a final paper in which students formulate and analyze a supply-chain problem of their own choice.
Tentative schedule and readings (papers will be available online).

Week 1-4 (Aug. 26 – Sept. 18): Introduction and Early Developments


Week 5-8 (Sept 23- Oct 16): Serial and Assembly Systems


Week 9 (Oct 21-23): Component Commonality and Process Flexibility


Week 10 (Oct. 28-30): Information and incentives

• Cachon, Gérard P., and Martin A. Lariviere. "Contracting to Assure Supply: How to Share Demand Forecasts in a Supply Chain." *Management science* 47.5 (2001): 629-646

Week 11-12 (Nov 4-13): Pricing in Supply Chain


Week 13 (Nov. 18-20): Sustainable Supply Chain


Week 14 (Dec. 2-4): Interface between Supply Chain Management and Finance.