

COURSE NUMBER: IE 5552, 4 credits	COURSE TITLE: Design and Analysis of Manufacturing Systems
TERMS OFFERED: Fall (every other year)	PREREQUISITES: IE 4521; Upper Division IT or Grad Student
TEXTBOOKS/REQUIRED MATERIAL Factory Physics by Wallace Hopp and Mark Spearman The Goal by Eli Goldratt Lean Thinking by James Womack and Daniel Jones	PREPARED BY: Saif Benjaafar DATE OF PREPARATION: May 7, 2007
COURSE LEADER(S): Saif Benjaafar	CLASS/LABORATORY SCHEDULE: A 2-hour lecture twice per week. CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES: 100% Engineering Topics
CATALOG DESCRIPTION: Flow lines, assembly systems, cellular manufacturing systems, and flexible manufacturing systems. Emphasis is on methodologies for modeling, analysis and optimization. Lead time analysis, capacity and workload allocation, scheduling and shop floor control, work-in-process management, facilities planning and layout, and information management.	COURSE TOPICS Queuing analysis of manufacturing systems (single stage, series systems, assembly systems, and general networks); production control policies (pull versus push systems; lean manufacturing); design of cellular manufacturing systems; design of facility layouts and material handling systems; warehousing and order picking; plant location

COURSE OBJECTIVES	This course is intended to provide an introduction to quantitative methods for design, analysis, and control of manufacturing systems. Systems considered include single stage, series, cells, and general networks. Special focus is on performance evaluation in the presence of variability and on operating policies to cope with this variability. Additional emphasis is on the physical configuration of manufacturing systems, including facility layout and material handling system design. A goal of the course is to provide a scientific basis for interpreting popular industry initiatives, such as Just-in-Time and Lean Manufacturing, and to provide an understanding of the link between manufacturing system design and control issues and strategic objectives regarding cost, responsiveness, and flexibility, among others.
COURSE OUTCOMES	(Letters shown in brackets are linked to program outcomes a-k) 1. Students become familiar with various types of manufacturing systems. [i, k] 2. Students learn quantitative methods for design, analysis, and optimization of manufacturing systems. [a] 3. Students learn how to use and build software tools for design, optimization and simulation of manufacturing systems. [b, e] 4. Students develop an understanding of the effects of variability on the operational performance of manufacturing systems. [a, e] 5. Based on in-depth analysis of several case studies, students apply concepts and tools learned in class to real world situations. [c, e, i, k]

ASSESSMENT TOOLS:	<ol style="list-style-type: none">1. 8 assignments2. 2 in-class exams3. 1 final project4. 1 paper presentation per week, led each week by a group of 2 students
--------------------------	--

IE 5552

Nature of Changes

1. *Required course material now includes Factory Physics by Wallace Hopp and Mark Spearman and Lean Thinking by James Womack and Daniel Jones*
2. *The course topics have been rewritten to include specific manufacturing systems.*
3. *Course objectives have been updated to include current industry practices and industry initiatives.*