

CIM (21-548)

*Advanced Manufacturing Laboratory
Department of Industrial Engineering
Sharif University of Technology*

Session # 10



Course Description

▪ *Instructor*

- *Omid Fatahi Valilai, Ph.D. Industrial Engineering Department, Sharif University of Technology*
- *Email: FValilai@sharif.edu, Tel: 6616-5706*
- *Website: Sharif.edu/~fvalilai*

▪ *Class time*

- *Sunday-Tuesday* *09:00-10:30*

▪ *Course evaluation*

- *Mid-term* *(30%)*
- *Final exam* *(50%)*
- *Quiz* *(5%)*
- *Exercise* *(15%)*

Course Description (Continued ...)

- **Mid-term session:**
 - Sunday: 16th Azar 1393, 09:00 ~ 10:30
- **Final Exam:**
 - Tuesday: 30th Dey 1393, 15:00 ~ 17:30
- **Reference:**
 - Schaefer, D., *Cloud-based Design and Manufacturing (CBDM): A Service-Oriented Product Development Paradigm for the 21st Century*, . London: Springer, 2014
 - Koren, Y., *"The Global Manufacturing Revolution"*, Wiley, 2010
 - Nasr, A., *"Computer-Based Design and Manufacturing An Information-Based Approach"*, Springer, 2007
 - Mitchell, F.H., *"CIM Systems: An Introduction to Computer-Integrated Manufacturing"*, Prentice Hall College Div; 1St Edition edition (January 1991), ISBN: 978-0131332997

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Course Description (Continued..)

- **Contents:**
 - Globalization and Manufacturing Paradigms (8 sessions)
 - System Concepts (3 sessions)
 - Evolution of Manufacturing systems (2 sessions)
 - Manufacturing System Design (4 sessions)
 - Manufacturing Equipment Design (3 sessions)
 - Information flow in Manufacturing Systems (4 sessions)
 - Product design and Manufacturing System (3 sessions)
 - Manufacturing System Implementation (5 sessions)

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Course Description (Continued..)

▪ Contents:

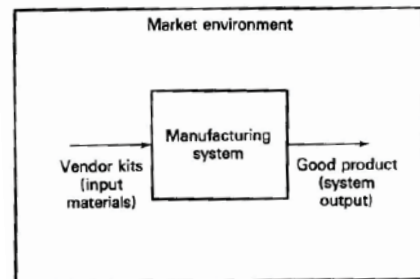
- *Manufacturing System Design* (4 sessions)
 - *Problem definition*
 - *Computer Integrated Manufacturing*
 - *Design principles*
 - *A multi-layer model for study of design principles*
 - *Implementing system design concept*

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Manufacturing System Design

- *A Simple Introductory Model for Studying System-Environment Interactions*
 - *The effects of various design choices on manufacturing system performance can be summarized by means of a system-environment simulation (SES) model.*
 - *The SES model is a simple planning and evaluation tool. This model provides a rough-cut , approximate method for use in considering some of the performance aspects of a manufacturing system within its environment.*



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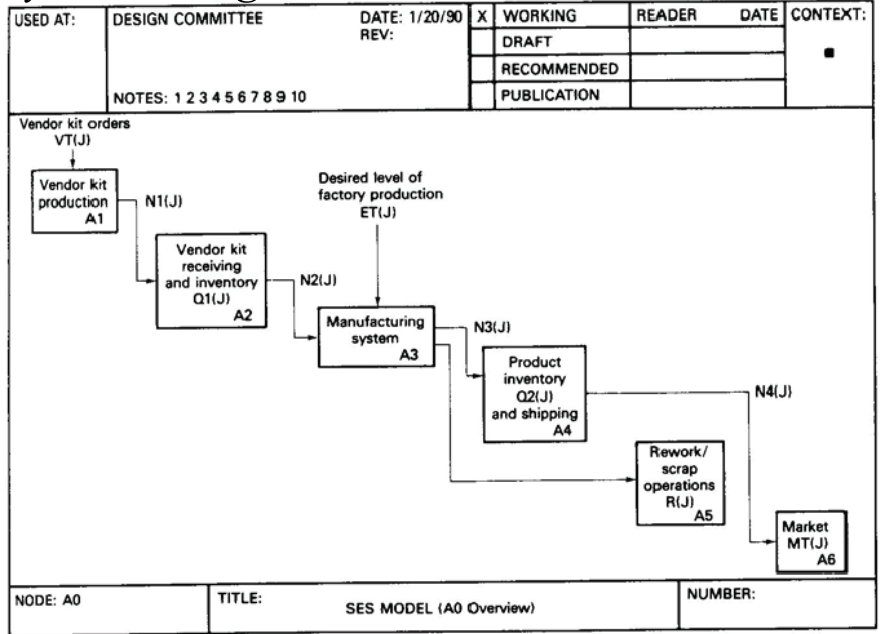
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Manufacturing System Design

A Simple Introductory Model for Studying System-Environment Interactions

- The vendor kit orders $VT(J)$
- The desired level of factory production $ET(J)$

Both control the manufacturing system and the vendor.

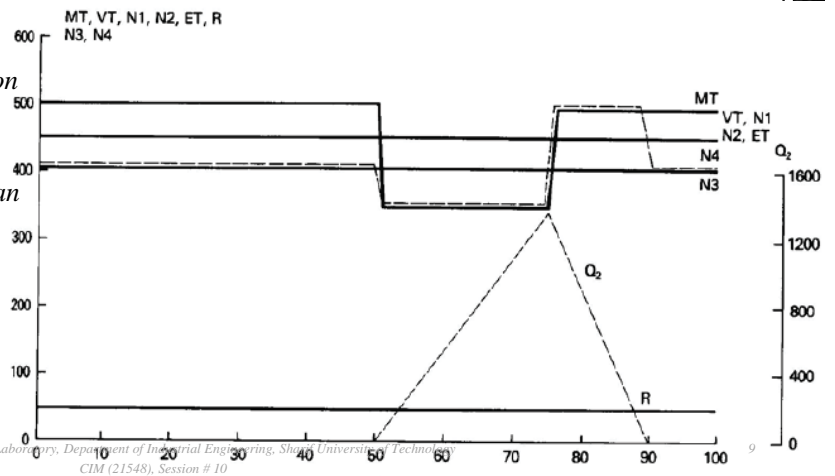


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Manufacturing System Design

A Simple Introductory Model for Studying System-Environment Interactions

- Temporary market disruption
- considers the effect of a temporary market drop on an otherwise stable factory system environment

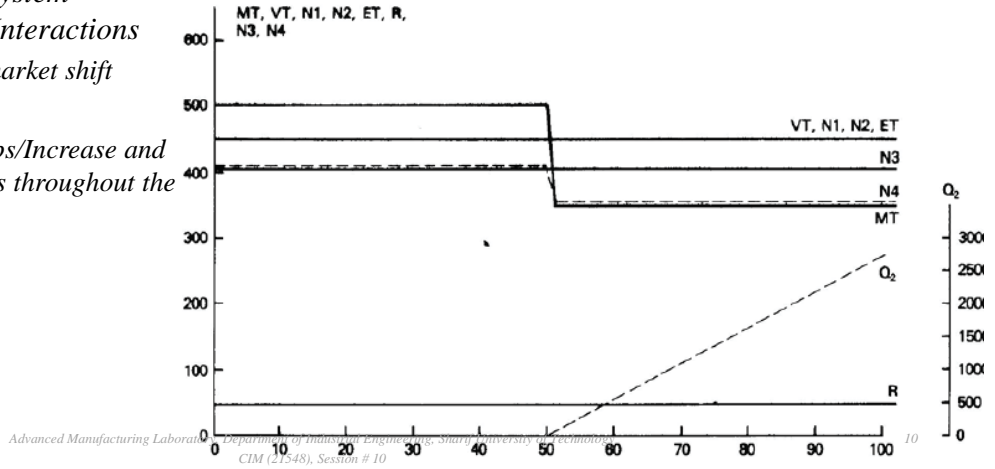


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Manufacturing System Design

▪ A Simple Introductory Model for Studying System-Environment Interactions

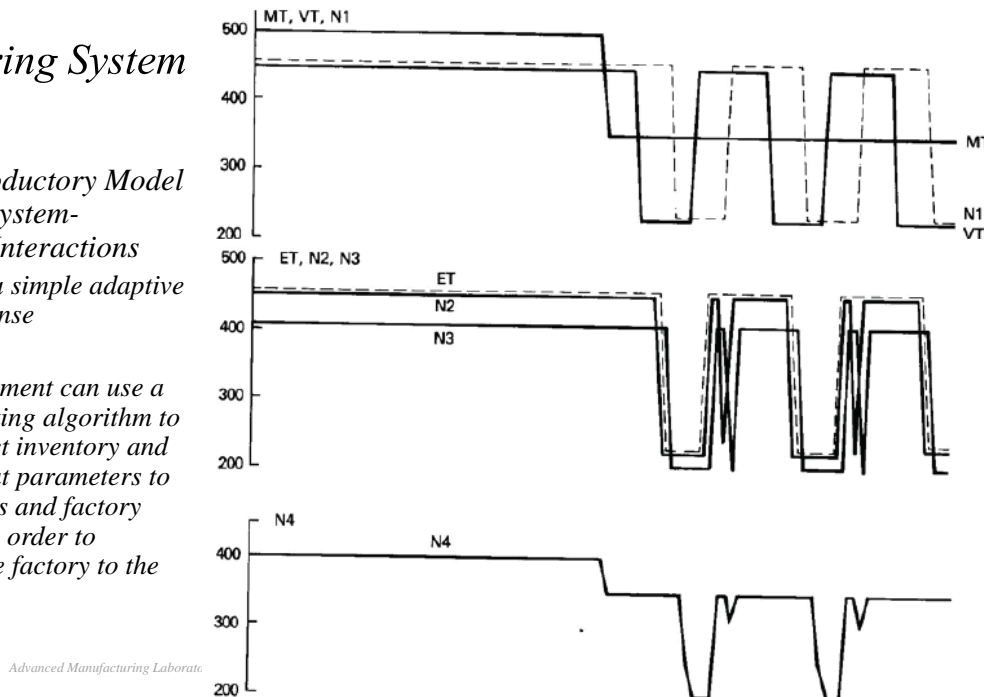
- Permanent market shift
- Demand drops/Increase and this continues throughout the period.



Manufacturing System Design

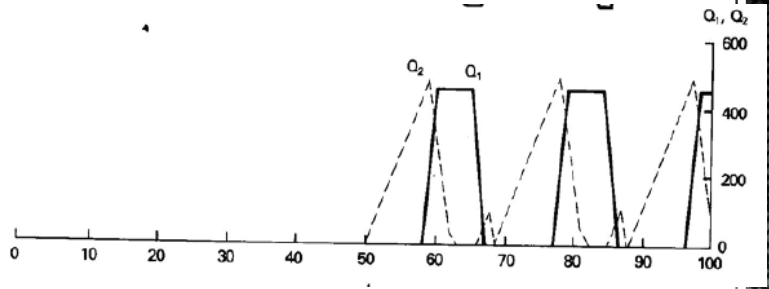
▪ A Simple Introductory Model for Studying System-Environment Interactions

- Introducing a simple adaptive market response
- How management can use a decision-making algorithm to relate product inventory and factory output parameters to vendor orders and factory operations in order to "balance" the factory to the market



Manufacturing System Design

- A Simple Introductory Model for Studying System-Environment Interactions
 - Introducing a simple adaptive market response
 - How management can use a decision-making algorithm to relate product inventory and factory output parameters to vendor orders and factory operations in order to "balance" the factory to the market

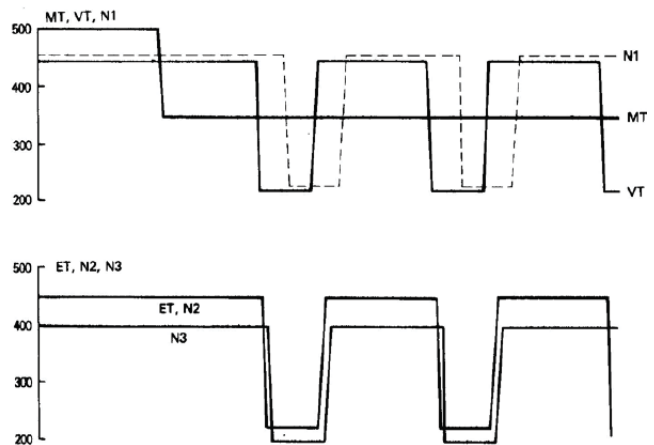


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Manufacturing System Design

- A Simple Introductory Model for Studying System-Environment Interactions
 - Modified adaptive response
 - Management attempts to match factory operation to the market environment by relating factory production directly to the product inventory level without attempting to track market demand

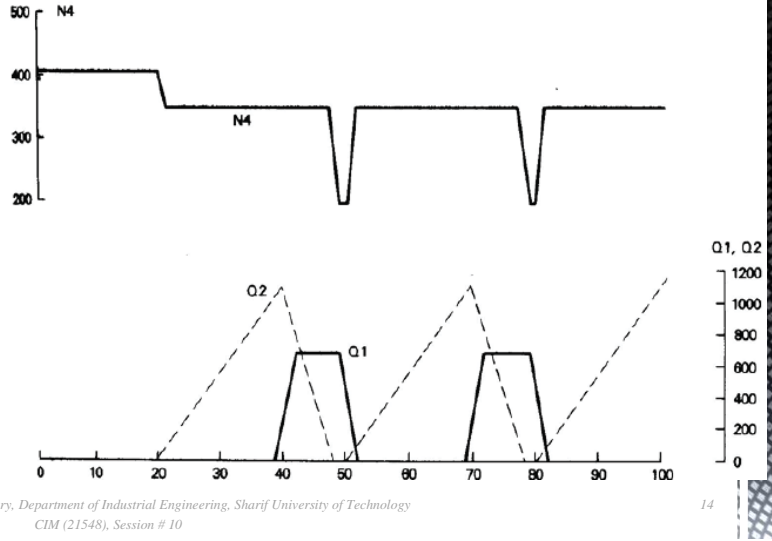


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Manufacturing System Design

- A Simple Introductory Model for Studying System-Environment Interactions
 - Introducing a simple adaptive market response
 - Management attempts to match factory operation to the market environment by relating factory production directly to the product inventory level without attempting to track market demand



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Manufacturing System Design

- A Simple Introductory Model for Studying System-Environment Interactions
 - Financial comparisons

	$3-1$	$3-4$	$3-5$
$(N3)_{AV}$	405	318	340
$(R)_{AV}$	45	35	38
$(Q1)_{AV}$	0	166	225
$(Q2)_{AV}$	0	180	513
$(N4)_{AV}$	405	318	340

(a)

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Manufacturing System Design

- A Simple Introductory Model for Studying System-Environment Interactions
 - Financial comparisons

\$FC = \$1000
 \$VC = \$10
 \$VD = \$1
 \$ST = \$1

Ex. 3-1	Ex. 3-4	Ex. 3-5
\$13.60	\$15.30	\$16.23

\$FC = \$5000
 \$VC = \$5
 \$VD = \$1
 \$ST = \$1

(b)

Ex. 3-1	Ex. 3-4	Ex. 3-5
\$18.52	\$22.20	\$22.44

\$FC = \$5000
 \$VC = \$1
 \$VD = \$1
 \$ST = \$1

(c)

Ex. 3-1	Ex. 3-4	Ex. 3-5
\$13.58	\$17.92	\$17.99

\$FC = \$5000
 \$VC = \$1
 \$VD = \$0.50
 \$ST = \$0.50

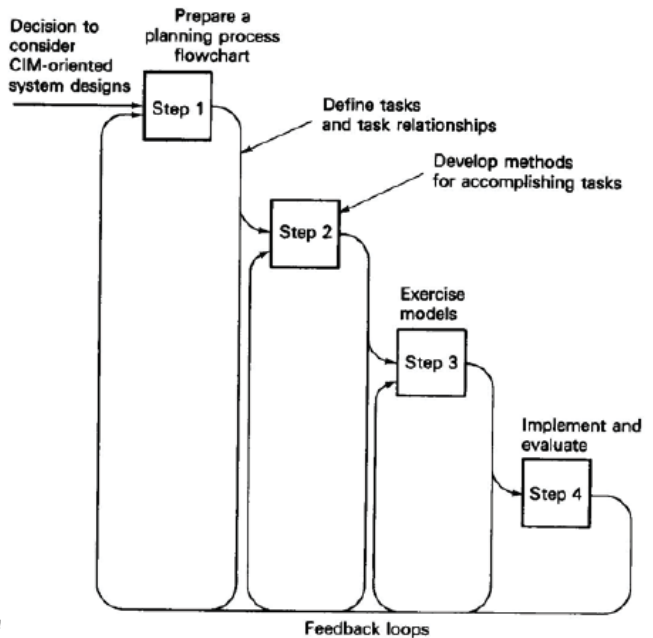
(d)

Ex. 3-1	Ex. 3-4	Ex. 3-5
\$13.58	\$17.38	\$16.90

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Manufacturing System Design

- A Simple Introductory Model for Studying System-Environment Interactions
 - A planning strategy



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