

ME 645

Production Systems

Course Outline:

This course is intended to provide an introduction to the design, analysis and control of manufacturing systems. Systems of interest include automated flow lines, assembly systems, cellular and flexible manufacturing systems. Both hardware and software requirements of such systems will be reviewed. However, emphasis will be on methodologies of system design, modeling and control. Issues addressed will include part flow management, lead time analysis, facilities planning and layout, real time production control and scheduling, and information flow management. Special attention will be paid to emerging trends in manufacturing such as JIT, agile manufacturing, theory of constraints, computer integration, and distributed manufacturing.

Textbooks:

Automation, Production Systems, and Computer Integrated Manufacturing, 2nd Ed., Groover, Prentice Hall, 2001.

The Goal: A process of on-going improvement, 2nd edition, E.M. Goldratt, J. Cox.

Course Objectives:

When you finish this course, you will understand the key concepts of manufacturing systems integration, including:

- Information flow in a manufacturing enterprise
- Organization of integrated manufacturing systems
- Fixed and programmable automation techniques
- Flexible material handling; Flexible manufacturing methods
- Techniques for part tracking, identification and automated visual inspection

Schedule:

Introduction, Manufacturing Functions, Lean & Agile Manufacturing Ch. 1-2, Ch. 27
Basic Automation Advanced Automation Levels of Automation Ch. 3
Managing Quality: Statistical Process Control ,Sensors Actuators Ch. 4, Ch. 5, Handout
CNC Machines, Industrial Robots Ch. 6, Ch. 7
Location and Lay-out Strategies Handout
Material Handling Material Transport Material Storage Ch. 9, Ch. 10
Storage Systems, Automatic Data Capture Ch. 11, Ch. 12
FMS Design Chs 13, 14, 16, 18
Inspection Principles, Technologies, & Automated Visual Inspection Ch. 22, Ch. 23
Production Planning and Control Systems Ch. 26