SMA 6304 / MIT 2.853 / MIT 2.854
Manufacturing Systems I: Analytical Methods and Flow Models
Lecture 1: Overview

Stanley B. Gershwin*

**with some help from my friends*

Course Overview

Goals

- To explain important measures of system performance.
- To show the importance of random, potentially disruptive events in factories.

Course Overview

Goals

- To give some intuition about behavior of these systems.
- To describe some current tools and methods.

Problems

- Manufacturing System Engineering (MSE) not as advanced as other branches of engineering.
- Practitioners encouraged to rely on gurus, slogans, and black boxes.
- Gap between theoreticians and practitioners.

Problems

Quantity, Quality, and Variability

- Quantity – how much and when.
- Quality – how well.

In this course, we focus on *quantity*.

General Statement: Variability is the enemy of manufacturing.

Time

- All factory performance measures are about time.
  - ★ *production rate:* how much is made in a given time.
  - ★ *lead time:* how much time before delivery.
  - ★ *cycle time:* how much time a part spends in the factory.
  - ★ *delivery reliability:* how often a factory delivers on time.
  - ★ *capital pay-back period:* the time before the company get its investment back.

Time

Variability, Uncertainty

- Factories are full of random events:
  - ★ machine failures
  - ★ changes in orders
  - ★ quality failures
  - ★ human variability
- The economic environment is uncertain
  - ★ demand variations
  - ★ supplier unreliability
  - ★ changes in costs and prices

Fabritek Case

Slides due to Professor Larry Wein.