Design of Manufacturing System

• No general theory or frameworks:
  – factory designs are infrequent
  – factory designs seem to be context specific

• Case study for PC factory
  – design process
  – design issues

• Illustrative example: use of queuing concepts for design of medical tent
PC Factory

Material

Assembly → Test & Software Load → Hi-Pot test

Pack → Inspect

Localize → Audit → Consolidate
Design Process

- Benchmarking and best practices
- Development of design concept
- Development of design guidelines
- Detailed design process
- Development of personnel and material requirements
- Installation and verification of processes and procedures
Design Issues

• Configuration for each stage: serial versus parallel stations
• Material positioning: kitting versus line-side stocking
• Capacity for each stage: where to locate the constraint
Serial vs. Parallel Stations

- Divisibility of process
- Unpredictable process variation
- Tooling and equipment
- Material positioning
- Task complexity
- Demand and mix variability
- Quality considerations
Kitting vs. Line-side stocking

- Cost of picking vs. stocking
- Security and control
- Inventory requirements and inventory costs
- Scheduling complexity
Capacity: where to locate the constraint?

- Cost of capacity
- Predictability of process
- Scheduling complexity
- Yield considerations