



### COURSE DESCRIPTION

Principles, models, and techniques for planning and analysis of production and distribution systems; application of mathematical optimization models and solution methods for aggregate planning, supply chain planning, push (MRP) and pull (JIT) material flow management, and inventory control under deterministic and stochastic demands.

### EXPECTED LEARNING OUTCOMES

At the end of the courses, students should be able to:

- Describe different types and levels of decision making in a production system.
- Model, formulate, solve, analyze problems arising in aggregate production and supply chain planning.
- Model and analyze fundamental inventory control systems with known and uncertain demand.
- Describe and analyze push (MRP) and pull (JIT) production systems.

### COURSE FORMAT

- In Person | **15-week** semester
- Tailored to your **professional needs**
- **3-credit** hour | You may apply it towards SIE MS and PhD programs
- **Prerequisites:** SIE 305, SIE 340, knowledge of mathematical programming, basic stochastic process and probability models, or consent of advisor



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### COURSE SCHEDULE

#### CH. 1: STRATEGY AND COMPETITION

- ▶ Strategy and Competition

#### CH. 2: FORECASTING

- ▶ Forecasting Basics
- ▶ Time Series Forecasting Methods

#### CH. 3: SALES AND OPERATIONS PLANNING (S&OP)

- ▶ Introduction to S&OP
- ▶ Quantitative Methods for S&OP

#### CH. 4: INVENTORY MANAGEMENT WITH KNOWN DEMAND

- ▶ Inventory Fundamentals and the Economic Order Quantity (EOQ) Model
- ▶ EOQ with Finite Production Rate and Under Quantity Discounts
- ▶ EOQ for Multiproduct Systems
- ▶ EOQ Models for Production Planning

#### CH. 5: INVENTORY MANAGEMENT WITH UNCERTAIN DEMAND

- ▶ Uncertainty and the Newsvendor problem
- ▶  $(Q,R)$  and the Service Levels (Type 1 and Type 2)

#### CH. 6: SUPPLY CHAIN STRATEGY

#### CH. 7: SUPPLY CHAIN ANALYTICS

- ▶ Network Design and Facility Location Models
- ▶ Transportation and Routing Problems and Solution Methods

#### CH. 8: SERVICE OPERATIONS MANAGEMENT

- ▶ Introduction to Service Systems
- ▶ Poisson Process, Queuing Systems and General Queuing Models

#### CH. 9: PRODUCTION CONTROL SYSTEMS: PUSH AND PULL

- ▶ Network Design and Facility Location Models
- ▶ Transportation and Routing Problems and Solution Methods



Real-World  
Application



Flexible/Interactive  
Learning



Bridge Theory &  
Practice



Innovative  
Curriculum



Distinguished  
Faculty

FROM EFFICIENCY TO INNOVATION—LEAD THE FUTURE OF INDUSTRIAL ENGINEERING.

