

SUPPLY CHAIN MANAGEMENT

ENIE 301

Lecture : 3
Tutorial : 1
Practical : 0

Year : III
Part : I

Course Objectives:

The objective of this course is to equip students with the ability to analyze, design, and improve supply chains across all stages by using the six primary performance drivers, namely facilities, inventory, transportation, information, sourcing, and pricing, so they can balance cost, responsiveness, and risk in real industrial contexts.

1 Introduction (4 hours)

- 1.1 Supply chain objectives
- 1.2 Cost–responsiveness frontier
- 1.3 Process views (Cycle versus push–pull)
- 1.4 Supply chain operations reference (SCOR) model key performance indicators (KPIs)
- 1.5 Strategic fit across the six drivers; Nepal/region

2 Production and Storage (6 hours)

- 2.1 Network design
 - 2.1.1 Roles of plants and distribution centers (DC)
 - 2.1.2 Capacity and flow
 - 2.1.3 Little's law
- 2.2 Location models
- 2.3 Capacity planning and aggregate planning links
- 2.4 Postponement, cross-docking and throughput bottlenecks
- 2.5 Facility layout choices for flow and responsiveness

3 Inventory (6 hours)

- 3.1 Demand variability, service levels, lead times
- 3.2 Economic order point
- 3.3 Reorder point
- 3.4 Safety stock (Normal and non-normal demand)
- 3.5 Continuous versus periodic review
- 3.6 Newsvendor model
- 3.7 Risk pooling, multi-echelon/base-stock policies, cycle counting

- 4 Transportation (6 hours)**
- 4.1 Modes, less-than-truck-load (LTL)/ full-truck-load (FTL), intermodal
 - 4.2 Carrier selection and Incoterm's basics
 - 4.3 Transport cost structures
 - 4.4 Consolidation and milk runs
 - 4.5 Routing and scheduling (TSP/VRP intuition)
 - 4.6 Cross-docking and time windows
 - 4.7 Performance trade-offs: Cost, speed, reliability, emissions
- 5 Information (6 hours)**
- 5.1 Forecasting for operations
 - 5.1.1 Moving averages
 - 5.1.2 Exponential smoothing
 - 5.1.3 Seasonality
 - 5.1.4 Error metrics
 - 5.2 Bullwhip effect: Causes, measurement, mitigation
 - 5.3 ERP/EDI basics
 - 5.4 Visibility (RFID/IoT)
 - 5.5 Data governance
 - 5.6 Blockchain (Signal versus noise)
 - 5.7 Coordination via information sharing and analytics dashboards
- 6 Sourcing (4 hours)**
- 6.1 Make-buy
 - 6.2 Total cost of ownership (TCO) and landed cost
 - 6.3 Supplier segmentation (Kraljic)
 - 6.4 Global versus local sourcing, dual sourcing
 - 6.5 Contracts and collaboration: VMI/consignment, SLAs, risk and resilience in supplier networks
- 7 Pricing (4 hours)**
- 7.1 Pricing as a coordination lever
 - 7.2 Price discrimination basics
 - 7.3 Revenue management intuition (Markdowns, booking limits)
 - 7.4 Dynamic versus static pricing
 - 7.5 Avoiding double marginalization
- 8 Recent Trends in Supply Chain (9 hours)**
- 8.1 Digital supply chains: AI/ML, blockchain, IoT-enabled visibility
 - 8.2 E-commerce fulfillment, last-mile innovations, omnichannel distribution
 - 8.3 Supply chain resilience: Risk sensing, stress testing, nearshoring, dual sourcing

- 8.4 Green and circular supply chains: Carbon accounting, closed-loop systems, ESG compliance
- 8.5 Humanitarian and health supply chains (COVID-19 lessons, vaccines, disaster logistics)
- 8.6 Geopolitical and sustainability drivers (Trade wars, decarbonization commitments, digital trade rules)

Tutorial

(15 hours)

- 1. Build an Excel dashboard for fill rate, cycle time, cash-to-cash; Quick case on strategic fit
- 2. Excel/Solver p-median/p-center exercises; Scenario analysis (Add/remove DC; Measure KPI shifts)
- 3. EOQ/ROP calculator; safety stock under service targets; Newsvendor lab with sensitivity
- 4. Transportation LP and lane consolidation; heuristic VRP (Sweep/nearest-neighbor) with time windows
- 5. Forecast build-off (MA versus ES) + error comparison; Beer game spreadsheet and variance amplification
- 6. Supplier scorecard + TCO model; Simple markdown optimization and contract parameter tuning
- 7. Case analysis: Compare a traditional versus digitally enabled supply chain

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapters	Hours	Marks distribution*
1	4	6
2	6	8
3	6	8
4	6	8
5	6	8
6 and 7	8	10
8	9	12
Total	45	60

* There may be minor deviation in marks distribution.

References

- 1. Chopra, S., Meindl, P. (2016). Supply chain management: Strategy, planning, and operation. Pearson.
- 2. Huang, S. H. (2013). Supply chain management for engineers. CRC Press.
- 3. Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E. (2008). Designing and managing the supply chain. McGraw-Hill Irwin.
- 4. Sanders, N. R. (2020). Supply chain management: A global perspective. Wiley.