Elective Course 4: Demand Forecasting and Inventory Management

Course Type:	PS: Program Specialisation	Course Credits:	2
Course Code:	O4PE537	Course Duration:	30 Hours

Course Objective:

- To familiarize students with concepts, methods, and techniques of demand forecasting.
- To equip students with practical skills for managing and optimizing inventory levels effectively.
- To develop analytical capabilities for evaluating forecasting accuracy, inventory costs, and service levels.
- To foster understanding of technology-driven inventory management systems and forecasting tools.
- To cultivate strategic insights into contemporary challenges and innovations in demand and inventory management.

Course Outcomes:

- CO1: Remember the importance of demand forecasting in businesses
- CO2: Understand key concepts and techniques of demand forecasting
- CO3: Apply forecasting models to real-world business scenarios
- CO4: Analyze different inventory management techniques and models
- CO5: Evaluate the impact of demand forecasting on supply chain efficiency
- CO6: Develop and implement inventory management strategies to optimize stock levels, minimize costs, and prevent stockouts or overstocking

Unit/ Module	Content	CO Mapping	Hours Assigned
1	Introduction to Demand Forecasting: Concept & Importance of Demand Forecasting, Qualitative vs. Quantitative Forecasting, Factors affecting forecasting accuracy Case studies on demand planning	CO1, CO4, CO5	3

2	Forecasting Techniques, Time Series Analysis, Moving Averages, weighted Averages, Exponential Smoothing Regression Analysis & ARIMA Models	CO1, CO2	3
3	Measurement of Forecasting Accuracy with different parameters like MAD, MSE, MAPE and Tracking signal Inventory Management Basics, Types of Inventory, Functions & Costs of Inventory, Just-in-Time (JIT) and Lean Inventory Practices	CO1, CO2, CO3	3
4	Inventory Control Techniques, ABC, VED, FSN, and HML Analysis, Numerical on ABC analysis, Safety Stock & Service Level Determination Continuous vs. Periodic Review Systems	CO1, CO2, CO3, CO4	3
5	Fixed order interval system, Inventory problem formulation and solution under constraints, Numerical problems. Dynamic Inventory Problems under Certainty: Fixed Order Size System (EOQ and its variants)	CO1, CO3, CO4	3
6	Economic Production Quantity (EPQ) Dynamic Inventory Problems under Risk: Types of inventory control systems with known stock-out costs and service levels	CO2, CO3, CO4	3
7	Approximate and exact methods for safety stock determination, Numerical problems	CO3, CO4, CO6	3

	Probabilistic models and safety stock Numerical on the same		
8	Demand-Supply Coordination & Technology Demand-Supply Matching Strategies Role of ERP and Supply Chain Analytics	CO2, CO4, CO5	3
9	Technology Adoption: IoT, Blockchain, AI in Inventory & Forecasting Industry Applications, Inventory Strategies in Retail, Manufacturing, and E- commerce	CO4, CO5	3
10	Demand Forecasting Failures & Lessons Learned; Sustainability in Inventory Management, Case study on sustainable practices	CO5, CO6	3

Textbooks:

1. Operations management by B. Mahadevan
2. Production and Operations Management – Norman Gaither

Reference Books:

1. Tersine, R J, Principles of Inventory and Materials Management, PTR Prentice Hall.
2. Modern Production Management – William Smith McGrawHill
3. Starr, M K and Miller,D W, Inventory Control: Theory and Practice, Prentice Hall.
4. Silver, E A, Pyke, D F and Peterson, R, Inventory Management and Production Planning and Scheduling, John Wiley.