

## Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IND436	Inventory Management	8	3	0	0	3	4

Prerequisites	
Admission Requirements	

Language of Instruction	English
Course Type	Elective
Course Level	Bachelor Degree
Objective	<p>Inventory management aims to determine the appropriate decisions regarding when and how much to order by taking into consideration the customer service level and cost criteria. A successful inventory management avoids the excess or insufficient inventory, which provides cost savings and increase in customer satisfaction. This elective course focuses mainly on the use of quantitative approaches in determining the optimal inventory policies. The course objectives are the following:</p> <ol style="list-style-type: none"><li>1. Make students be aware of the reasons for holding stock as well as the costs associated with it,</li><li>2. Show students how to make a quantitative analysis of inventory problems,</li><li>3. Inform students about the variety of stock models and the availability of the alternative solution techniques.</li></ol>

Content	<p>Week 1. Introduction to Inventory Management : Motivation for Holding Inventories, Relevant Costs in Inventory Management, Characteristics of Inventory Models</p> <p>Week 2. Deterministic and Stationary demand, Single Product Case: Basic EOQ and EPQ Models, Sensitivity Analysis Regarding These Models</p> <p>Week 3. Deterministic and Stationary Demand, Single Product Case (Cont.): EOQ Model with Positive Lead Time and Quantity Discounts</p> <p>Week 4. Deterministic and Stationary Demand, Multiple Products Case: Evaluation of EOQ-related Ordering Strategies for Multiple Products</p> <p>Week 5. Deterministic and Dynamic Demand: Aggregate Planning Problem- Linear Programming Formulation and a Numerical Application with What's Best and Excel Solver</p> <p>Week 6. Deterministic and Dynamic Demand (Cont.): Dynamic Lot-Size Problem – A Dynamic Programming Algorithm</p> <p>Week 7. Deterministic and Dynamic Demand (Cont.): Dynamic lot-size problem – Wagner-Whitin algorithm and Silver Meal heuristic</p> <p>Week 8. Introducing Stochastic Inventory Models : Reasons for Holding Safety Inventory, Various Product Availability Measures, Categorization of Inventory Policies for Uncertain Environment</p> <p>Week 9. Midterm exam</p> <p>Week 10. Evaluating Product Availability Levels Given an Ordering Policy, Evaluating Safety Inventory or Reorder Point Given Desired Level of Product Availability</p> <p>Week 11. Evaluating Effects of Uncertainty in Supplier Lead Time and Product Aggregation on Safety Inventory</p> <p>Week 12. Newsboy Model and Its extensions</p> <p>Week 13. Periodic-review Stochastic Inventory Models: Evaluating a given policy using Markov Process</p> <p>Week 14. Periodic-review Stochastic Inventory Models (Cont.): Finding Optimal Inventory Policy using Markov Decision Process</p>
References	<p>Nahmias, S., "Production and Operations Analysis", 6th edition, McGraw-Hill Companies, 2008.</p> <p>Chopra, S., Meindl, P., "Supply Chain Management: Strategy, Planning, and Operation", 4th edition, Prentice Hall, 2010.</p>

**Theory Topics**

Week	Weekly Contents
1	Introduction to Inventory Management : Motivation for Holding Inventories, Relevant Costs in Inventory Management, Characteristics of Inventory Models
2	Deterministic and Stationary demand, Single Product Case: Basic EOQ and EPQ Models, Sensitivity Analysis Regarding These Models
3	Deterministic and Stationary Demand, Single Product Case (Cont.): EOQ Model with Positive Lead Time and Quantity Discounts

Week	Weekly Contents
4	Deterministic and Stationary Demand, Multiple Products Case: Evaluation of EOQ-related Ordering Strategies for Multiple Products
5	Deterministic and Dynamic Demand: Aggregate Planning Problem- Linear Programming Formulation and a Numerical Application with What's Best and Excel Solver
6	Deterministic and Dynamic Demand (Cont.): Dynamic Lot-Size Problem – A Dynamic Programming Algorithm
7	Deterministic and Dynamic Demand (Cont.): Dynamic lot-size problem – Wagner-Whitin algorithm and Silver Meal heuristic
8	Introducing Stochastic Inventory Models : Reasons for Holding Safety Inventory, Various Product Availability Measures, Categorization of Inventory Policies for Uncertain Environment
9	Midterm exam
10	Evaluating Product Availability Levels Given an Ordering Policy, Evaluating Safety Inventory or Reorder Point Given Desired Level of Product Availability
11	Evaluating Effects of Uncertainty in Supplier Lead Time and Product Aggregation on Safety Inventory
12	Newsboy Model and Its extensions
13	Periodic-review Stochastic Inventory Models: Evaluating a given policy using Markov Process
14	Periodic-review Stochastic Inventory Models (Cont.): Finding Optimal Inventory Policy using Markov Decision Process