

# Inventory Theory and Supply Chain Management (61230)

**Instructors: E.KYRIAKIDIS - M.ZAZANIS**

Elective Course, 4<sup>th</sup> semester, 5 ECTS units

Course level: Graduate (MSc)

Language: Greek

## Course Description

Components of Inventory Models (cost of ordering, holding cost, shortage cost, backlogging, salvage cost, discount rate, lead time, continuous inspection of inventory, periodic inspection of inventory). Deterministic Continuous-Review Models (The basic EOQ Model, EOQ model with planned shortages, EOQ Model with quantity discounts, the role of Just-in-Time). A Deterministic Periodic-Review Model. Deterministic Multiechelon Inventory Models for Supply Chain Management. A Model for a Serial Multiechelon System. A Stochastic Continuous-Review Model. Safety Stock. The policy (s,S).

## Prerequisites

Basic Knowledge of Probability and Calculus.

## Target Learning Outcomes

Students after attending the course will be able to:

- Construct appropriate mathematical models for optimal inventory control in a wholesale or retail store as well as in a production system.
- To find the optimal order quantity as well as the time at which the order should be placed, if the inventory is continuously inspected, there is a constant rate of demand of the inventory and shortages of the inventory are not allowed.
- To find the optimal order quantity as well as the time at which the order should be placed, if the inventory is continuously inspected, there is a constant rate of inventory demand, and inventory shortages are allowed.
- To determine the optimal inventory policy in the case where the inventory is inspected periodically and the demands in different periods are not equal.
- To find the optimal order quantity and safety stock in the case where inventory is continuously inspected and the inventory demand is stochastic.
- To find the optimal order quantity and safety stock in the case where the stock is inspected at equidistant times and the stock demand is stochastic.
- To find the critical values  $s$  and  $S$  that characterize the optimal inventory policy (s,S) in one period problems with stochastic inventory demand.

## Recommended Bibliography

S. Axsater, Inventory Control, 3<sup>rd</sup> Edition, Springer, 2015

F. S. Hillier and G. J. Lieberman, Introduction to Operations Research, 11<sup>th</sup> Edition, McGraw-Hill, 2019.

S. M. Ross, Applied Probability Models with Optimization Applications, Dover, 1992.

**Teaching and Learning Activities**

One three hour lecture per week and home study exercises.

**Assessment and Grading Methods**

Written examination and/or essays and mini projects within the term.