Inventory Theory and Supply Chain Management (m62211p)

Instructors: –

Elective Course, 3rd or 4th semester, 5 ECTS units

Course level: Graduate (MSc)

Language: Greek (or English if foreign students attend)

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 Cintinuous-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, 3rd Edition, Springer, 2015
F. S. Hillier and G. J. Lieberman, Introduction to Operations Research, 11th 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.