

FACULTY OF **ENGINEERING**

DEGREE COURSE: **COMPUTER AND CONTROL ENGINEERING**

MASTER DEGREE: **COMPUTER AND CONTROL ENGINEERING**

SUBJECT: OPERATIONS RESEARCH II

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OBJECTIVES

The course aims at introducing the students to the analysis and solution of some decisional problems that are particularly important in practice. During the course, particular emphasis will be given to applications of linear programming, of network optimization, of integer linear programming, in the logistics and transport sector. Therefore, the students will be provided with the computational and modeling skills necessary for solving the addressed problems.

CONTENTS

The course will cover the following topics:

Review of Linear Programming (LP).

LP Applications. Resource allocation problem. Product mix problem. Diet problem. Problem in production management.

Using software tools for modeling and solving optimization problems.

The transportation problem.

The assignment problem.

Network optimization. Introductory concepts. The maximum flow problem. The minimum spanning tree problem. The shortest-path problem.

Integer Linear Programming. Introductory concepts. LP relaxation. The Branch and Bound method. The binary Knapsack problem.

Introduction to supply chain management. Introductory concepts. Logistics facility location models.

Introduction to inventory management. Introductory concepts. The Economic Order Quantity (EOQ) model.

Distributive Logistics: The one-dimensional bin packing problem. The asymmetric travelling salesman problem. The symmetric travelling salesman problem. The vehicle scheduling problem.

LEARNING OUTCOMES

The course aims to provide the students with both computational and modeling skills in order to solve the problems under consideration.

ASSESSMENT

Written exam: multiple-choice tests and open-ended questions

RECOMMENDED TEXTBOOKS

- F.S. Hillier, G.J. Lieberman, *Introduction to Operations Research*, Eighth Edition, McGraw-Hill International Edition, 2005.
- G. Ghiani, G. Laporte, R. Musmanno, *Introduction to Logistics Systems Planning and Control*, Wiley, 2003.

Recommended Readings:

- Bertsimas D. and J. N. Tsitsiklis. *Introduction to Linear Optimization*, Athena Scientific, 1997.
 - Luenberger D. and Y. Ye. *Linear and Nonlinear Programming*, Springer, 3rd edition, 2008. (Note: for the part concerning the LP).
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