Operational Research: Course Description

Course title	Operational Research
Course code	
Type of course	Compulsory
Level of course	Postgraduate
Year of study	First (1st)
Semester	First (1st)
ECTS credits	
Name of lecturer(s)	Associate Professor Ioannis Giannikos
Aim of the course	The aim of the course is to present the process of making decisions in complex business problems using the techniques of Management Science. In addition, the course aims to demonstrate that these techniques are related to each other and constitute an integrated methodology for addressing realistic problem situations.
Learning outcomes	At the end of this course the student should be able to: 1. Formulate linear programming (LP) and integer programming (IP) models. 2. Understand the basic concepts related to the solution of LPs (reduced cost, duality, etc). 3. Understand and interpret the solution results. 4. Formulate and solve by hand simple network analysis problems. 5. Understand the basic concepts of multicriteria analysis. 6. Understand the concepts of queuing theory.
Competences	At the end of the course the student will have further developed the following skills/competences: 1. Solving LP and IP problems using relevant optimizers. 2. Solving network problems using relevant software. 3. Solving multicriteria analysis problems using relevant software 4. Formulation of models and solution of problems in queuing theory using Excel.
Prerequisites	There are no prerequisite courses. It is, however, recommended that students have at least a basic

	knowledge of Differential and Integral Calculus.
Course contents	1. Linear Programming (problem formulation, solution methods, solution by computer) 2. Duality 3. Sensitivity Analysis – Economic interpretation of the results 4. Integer Programming (problem formulation, solution methods, special IP models) 5. Network analysis (shortest path, maximum flow, min cost flow) 6. Queuing Theory 7. Multicriteria Analysis
Recommended reading	1. "Essential Quantitative Methods for Business, Management and Finance", L. Oakshott, Palgrave Macmillan, 2012 2. "Quantitative Methods for Business & Management", F. Dewhurst, Mc Graw Hill, 2006 3. "Quantitative Methods for Decision Makers", M. Wisniewski, Prentice Hall, 2010 4. Hillier, F. και Lieberman , G. "Introduction to Operations Research", (6th edition), McGraw-Hill International Editions, 2005 5. Williams H.P. "Model Building in Mathematical Programming", John Wiley and Sons, 1993 6. Winston W. "Operations Research - Applications and Algorithms", Cengage Learning, 2003
Teaching and learning methods	Lectures – Tutorials – Laboratory sessions
Assessment and grading methods	The grade is calculated based on written exams and assignment given throughout the course. Greek grading scale: 1 to 10. Minimum passing grade: 5
Language of instruction	Greek.