COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Informatics and Computer Science		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE		**SEMESTER**	**7, 9**
COURSE TITLE	Operational Research		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	
Class exercises	1	
Laboratory exercises	1	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	5	5

COURSE TYPE general background, special background, specialised general knowledge, skills development	Special Background
PREREQUISITE COURSES:	Linear Algebra, Probability Theory, Discrete Mathematics
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

This course gives students an introduction to quantitative management science techniques and decision (support) theory.

The material of the course has been designed in such a way as to arouse the interest of the student since an important part of it concerns applications which are dealt with by these techniques. In the context of practical exercises, students are encouraged to implement the algorithmic techniques taught in the course in order to gain a deeper familiarity and consolidate their application in practical applications. This is also the main objective of the course: the application of theoretical techniques to real problems which are very likely to arise during the student's future professional activity.

Upon successful completion of the course, the students will be able to:

- master the basic techniques of operational research and decision theory,
- implement the algorithms taught in the course,
- employ the techniques taught to solve real problems,

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data Project planning and management

and information, with the use of the necessary technology Adapting to new situations Decision-making Working independently Team work Working in an international environment Working in an interdisciplinary environment Production of new research ideas	Respect for difference and multiculturalism Respect for the natural environment Showing social, professional and ethical responsibility and sensitivity to gender issues Criticism and self-criticism Production of free, creative and inductive thinking …… Others… …….

- Autonomous work
- Generating new research ideas
- Promotion of free, creative and inductive thinking
- Work in a collaborative environment
- Decision making

(3) SYLLABUS

Introduction to Decision Making and Management Science. The Linear and Integer Optimization problem and its use in decision making. Modeling and applications for decision making. The Dual problem and the necessary and sufficient optimality conditions of the GP (Karush, Kuhn, Tucker conditions). Algorithmic solution of the GA – the Simplex method and special cases. Economic interpretation and sensitivity analysis. Solving using PC - introduction to OPL- Studio tool. The PERT method. Stochastic models.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Lectures (live)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Eclass platform for communicating with the students and publishing slides, lecture notes and exercises with solutions.
TEACHING METHODS The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	**Activity** / **Semester workload** Lectures: 39 Class exercises: 26 Home study: 60 Course total: **125**
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	Final exam

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. P. Ipsilantis, Operational research, Propombos Publishers, Athens, 2007.
2. Wagner H.M., Principles of Operations Research, Prentice Hall, 1972.
3. Williams H.P., Model Building in Mathematical Programming, John Wiley and Sons, 1985.
4. Vajda S., Mathematical Programming, Addison-Wesley, 1961.
5. Taha H., Operations Research: An Introduction, MacMillan, 1987.
6. Hillier and Lieberman, Introduction to Operations Research, Holden-Day, Inc.San Francisco, 1986

- Related academic journals:

- European Journal of Operational Research
- Operations Research

- Mathematics of Operations Research
- Journal of the Operations Research Society
- Mathematical Programming
- Mathematical Methods of Operations Research