COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	Financial and Management Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ΓΕΟ118	SEMESTER	6
COURSE TITLE	OPERATIONS RESEARCH I		

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
	3	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	*general background, special background, specialised general knowledge, skills development*
PREREQUISITE COURSES:	No
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*

The objective of this course is to provide students with the appropriate basic tools of mathematical programming for the decision support in management and operations systems. The course "Operations Research II" completes to a greater extent this knowledge in order to give students an entire Operations Research methodology. After the successful completion of the course, the student will have:

to know and understand the basic concepts of mathematical programming theory.

to know and understand the basic concepts of mathematical modelling.

to be in position to recognize and classify problems into different categories, i.e., linear programming, integer programming, etc.

to perform the modelling of mathematical programming problems.

to be able to solve efficiently linear programming models

to recognize and apply the appropriate tools for solving linear programming problems.

to analyze, recognize and apply the most suitable methodologies and respective algorithms to solve particular linear programming cases.

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

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Working in an international environment
Working in an interdisciplinary environment
Critical thinking
Production of free, creative and inductive thinking

(3) SYLLABUS

Introduction to operations research, linear programming, modelling, Simplex method, Big M method, duality, sensitivity analysis. IOR Tutorial and Excel Solver. Network optimization, graphs and networks, the shortest path, minimum spanning trees, maximum flow problem, minimal cost flow problem.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	*Face-to-face*
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	*Use of ICT in teaching, use of specific software*
TEACHING METHODS *The manner and methods of teaching are described in detail.*	

Activity	*Semester workload*
Lectures	39
study and analysis of	75

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*	*bibliography*	
	laboratory practice	30
	exams	6
	Course total	***150***
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.*	- Midterm exam (optional: maximum 2 points on final grade), Final examination (problem solving)	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
F.S. Hillier, G. J. Lieberman, Introduction to Operations Research, 8th edition, Mc Graw-Hill International Edition
Operations Research: Applications and Algorithms, W. L. Winston, Duxbury Press, 2003
Linear Programming, J.P. Ignizio, T.M. Cavalier, Prentice Hall, 1993
Operations Research: Principles and Practice, A. Ravindran, D.T. Philips, J.J. Solberg, Wiley, 1987
Linear Programming and Network Flows, M. S. Bazaraa, J.J. Jarvis, H.D. Sherall, Wiley, 1990
Introduction to Operations Research Techniques, H. G. Daellenbach, J. A. George, Allyn and Bacon, 1983
Model Building in Mathematical Programming, H. P. Williams, Wiley, 1999
An Introduction to Management Science: Quantitative Approaches to Decision Making, D.R. Anderson, D.J. Sweeney, T.A. Williams, J.D. Camm, R.K. Martin, South-Western College Pub, 2011
Tools for Thinking: Modelling in Management Science, M. Pidd, Wiley, 2003
Introduction to Management Science, B.W. Taylor, Prentice Hall, 2009
A Practical Introduction to Management Science, D.A. Waters, Addison Wesley Publishing Company, 1998

- Related academic journals:
European Journal of Operational Research, etc…..