

COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	732	SEMESTER	7 ^o
COURSE TITLE	Topics in operations research		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	CREDITS
lectures		3	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:	No		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	yes		
COURSE WEBSITE (URL)			

LEARNING OUTCOMES

Learning outcomes <i>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.</i> <i>Consult Appendix A</i> <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> <i>Guidelines for writing Learning Outcomes</i>
The course learning outcomes are: the introduction of the students to integer programming formulations, the introduction of the students to the dynamic programming methodology, the introduction of the students to techniques and tools for decision-making under uncertainty

Upon successful completion of the course the student / her will be able to:

1. model and solve integer programming problems and understand their differences with the linear programming problems.
2. understand the basic principles of dynamic programming
3. construct simple recursive dynamic programming equations
4. solve known optimization problems using dynamic programming
5. describe and handle decision making problems under uncertainty

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?

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

Working independently
Decision-making
Adapting to new situations
Production of free, creative and inductive thinking
Synthesis of data and information, with the use of the necessary technology

SYLLABUS

Integer linear programming (integer and mixed integer problems formulation, integer programming algorithms). Dynamic programming (Bellman principle of optimality, finite and infinite horizon problems, Applications on routing problems, Equipment-Replacement Problem, inventory problems, etc). Decision analysis (General characteristics of decision problems, decisions under uncertainty, decision trees, risk analysis)

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Lindo/Lingo Software, Email, class web	
TEACHING METHODS <i>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</i>	Activity	Semester workload
	Lectures	39
	Independent study	78
	Fieldwork (3-4 set of homework)	33

<i>workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>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</i>		
	Course total	150
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>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</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	LANGUAGE OF EVALUATION: Greek METHODS OF EVALUATION: Final exam (100%)	

ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. HAMDY ΤΑΝΑ, Επιχειρησιακή Έρευνα Εκδόσεις Α. Τζιολα & ΥΙΟΙ Α.Ε., 2011
2. Υψηλάντης Π. Μέθοδοι και τεχνικές λήψης αποφάσεων, "Εκδόσεις ΠΡΟΠΟΜΠΟΣ" ΚΙΜΕΡΗΣ Κ. ΘΩΜΑΣ, 2015.
3. Bellman, R.E.. *Dynamic Programming*, Princeton University Press, 1957, Princeton, NJ. Republished 2003
4. Bertsekas D. P. *Dynamic Programming and Optimal Control*, Vols. I and II, Athena Scientific, 1995, (3rd Edition Vol. I, 2005, 4th Edition Vol. II, 2012),
5. BERTSIMAS D. and J. N. TSITSIKLIS *Introduction to Linear Optimization*, Athena Scientific 1997
6. HADLEY G. *Linear Programming*, Addison-Wesley Publishing Company, INC, 1965
7. HILLIER F. S. and G. J. Lieberman. *Introduction Operations research*. The McGraw-Hill Companies, 2001
8. WINSTON W. L., *Operations research (Applications and algorithms)*. Duxbury Press (International Thomson Publishing) 1994.

- Related academic journals:

