COURSE OUTLINE

GENERAL

SCHOOL	School of Science		
ACADEMIC UNIT	Department of Mathematics		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	ΣΤ16	**SEMESTER**	2ο
COURSE TITLE	Non linear programming		

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	6
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*	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

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 course aims to introduce students to the the fundamentals of non-linear optimization.
Upon successful completion of the course the student will be able to:
1. understand the basic principles of nonlinear optimization problems.
2. use some of the commonly used algorithms for nonlinear optimization (unconstrained

and constrained)
3. select the appropriate algorithm for a particular optimization problem.

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	*Others*
Production of new research ideas	

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

Introduction to unconstrained and constrained optimization, Lagrange Multipliers, Karush-Kuhn-Tucker conditions, Line Search, Trust Region, Conjugate Gradient, Newton, Quasi-Newton methods, Quadratic Programming, Penalty Barrier and Augmented Lagrangian Methods.

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*	Lindo/Lingo Software, Mathematica Email, class web.
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*	

Activity	***Semester workload***
Lectures	39
Independent study	78
study and analysis of bibliography, Fieldwork (6-7 set of homework)	33
Course total	**150**

as the hours of non-directed study according to the principles of the ECTS	
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.*	LANGUAGE OF EVALUATION: Greek METHODS OF EVALUATION: written work, oral examination (100%)

ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*
Bazarra, Sherali, and Shetty Nonlinear Programming: Theory and Algorithms, 3rd Edition, John Wiley & Sons, 2006.
Bertsekas D. Nonlinear Programming, Athena Scientic, 2004.
Γεωργίου Α. Βασιλείου Π.-Χ. Μη γραμμικές μέθοδοι βελτιστοποίησης, Εκδόσεις Ζήτη, 1996.
Παπαγεωργίου Μ. Μη γραμμικός προγραμματισμός. Ηλεκτρονικό σύγγραμμα
- *Related academic journals:*
Journal of Optimization Theory and Applications