MODULE OUTLINE

1. GENERAL INFORMATION

SCHOOL	SCHOOL OF SCIENCE AND TECHNOLOGY			
PROGRAM COURSE	INFORMATICS			
LEVEL OF STUDY	UNDERGRADUATE			
MODULE CODE	PLI-32	**YEAR OF STUDY**	4th	
MODULE TITLE	Linear Programming and Modelling			
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*			**HOURS**	**CREDIS**
Weekly teaching hours * 32 weeks			16-18	20 ECTS
COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	Scientific expertise Optional			
PREREQUISITE MODULES:	No			
LANGUAGE OF INSTRUCTION AND EXAMS	GREEK			
THE MODULE IS OFFERED TO ERASMUS STUDENTS	No (due to annual duration of the module)			
MODULE WEBSITE (URL)	https://www.eap.gr/education/undergraduate/computer-science/topics/#gram_prog Each module has its own space in the Learning Management System of EAP (http://study.eap.gr), with controlled access (use of code) for students and teaching staff.			

2. LEARNING OUTCOMES

Learning Outcomes
• *The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:*
The course has three discrete modules: 1) Modelling and Simulation 2) Foundations of Linear Programming 3) Game Theory

A) Acquired knowledge

Upon successful completion of the course the students should be able to:

- Make a distinction between emulation and simulation, whether some activity is deterministic or stochastic, formulate the equations that describe a physical system, construct a mathematical model
- Recognize the components of a Petri net and model a system with these, recognize the various simulation languages, know the various random number generation numerical methods and statistically analyze simulation results.
- Know the Simplex method for linear programming, the duality theory of linear programming, find the optimum solution through the dual program and perform sensititivy analysis, know the ellipsoid method and interior point methods as well as elements from Game Theory.

B) Applied knowledge

Upon successful completion of the course the students should be able to:

- Apply random number sampling techniques
- Model physical problems as linear programming problems
- Solve LP's with Simplex method
- Model a system with Petri nets
- Solve Game theory equilibrium problems

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,
Adapting to new situations
Decision-making
Individual/Independent work
Group/Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for diversity and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical thinking
Development of free, creative and inductive thinking
……
(Other…….citizenship, spiritual freedom, social awareness, altruism etc.) …….

- Decision making
- Group/Team work
- Project planning and management
- Introduction of innovative research
- Search for, analysis and synthesis of data and information by the use of appropriate technologies

3. MODULE CONTENT

The key subjects of the module are:
1. Modelling and Simulation
2. Linear Programming
3. Game Theory

4. TEACHING METHODS--ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	Distance education with five Group Counseling Meetings (OSS) during the academic year on weekends.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, Communication with students*	We use : Remote meetings tools (e.g. webex, zoom), Presentation software (e.g. power point), Python programming language Gurobi optimization software Additionally, the students use office automation tools, web browsers and e-reader for digital books.
MODULE DESIGN *Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc*	

Activity	***Annual Workload***
5 OSS (* 4 hours)	20
Solving Exercise Assignments (4 assignments x 25 hours	100
Examination	3
Individual study (34 weeks * 12 hours)	389-453
Total module workload (hours)	**512-576**

The study hours for each learning activity as well as the hours of selfdirected study are given following the principles of the ECTS.	
STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures.* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students*	Elaboration of written assignments during the academic year, the average of the grades of which participates in the formation of the final grade of module by 30%, if there is a passable in the final or repetitive examinations. In the final written exams the grade of the written assignments participates in the formation of the final grade of module by 70%. All the criteria are posted, both in each written assignment (in the LMS study.eap.gr), as well as in the general regulation of HOU at: https://www.eap.gr/education/study-regulations/

(6) SUGGESTED BIBLIOGRAPHY

- *Suggested bibliography:*

ΕΑΠ Publications:
Volume Α΄:Μοντελοποίηση και Προσομοίωση ΕΑΠ, Πάτρα 2001. ΠΛΗ32/1
Volume Β΄: Θεμέλια Γραμμικού Προγραμματισμού, ΕΑΠ, Πάτρα 2001. ΠΛΗ32/2
Volume Γ΄: Αλγόριθμοι Γραμμικού Προγραμματισμού και Θεωρία Παιγνίων, ΕΑΠ, Πάτρα 2001.

Additionally, the module features an extended compilation of complementary material in the university LMS platform

-Related scientific Journals:

1) I Optimization Letters
2) Combinatorial Optimization
3) Discrete Optimization