(1) COURSE OUTLINE

GENERAL

SCHOOL	Polytechnic		
ACADEMIC UNIT	Computer Engineering and Informatics Department		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**CEID_NY202**	**SEMESTER**	**3rd**
COURSE TITLE			

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**
	4	4
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	TOTAL	4

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialized general knowledge
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/CEID1130/

(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*

Knowledge of the main classes of graphs, the fundamental relations used to describe a graph, and of typical applications thereof.
Understanding of basic questions and problems about graphs.
Knowledge of basic graph decomposition techniques.
Knowledge of computational methods for graphs.
Relevant theoretical skills.
Skills on solving computational problems for graphs.

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
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
Project planning and management
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
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Others…

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Search for, analysis and synthesis of data and information, with the use of the necessary technology Production of new research ideas Criticism and self-criticism Production of free, creative and inductive thinking

(3) SYLLABUS

Introduction to the basic concepts and techniques of graph theory, emphasizing precise mathematical descriptions. Uses of theory to design algorithms for graph problems, and to verify their correctness. Coverage: Paths, circuits, Euler walks. Notions of connectivity and biconnectivity, correlative notions of connected and biconnected components. Basic theory of trees. Spanning trees and their properties, fundamental cycles as basis of a vector space of subgraphs. Mathematical induction for graphs. Application of mathematical induction to selected problems (coloring, longest path, planarity). Design of recursive algorithms for graphs, using (bi)connected components decomposition. Application to selected problems. Recursive algorithms for trees, dynamic programming for trees. Iterative computation for trees. Tree centers.

(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 course web page to supplement teaching, and to communicate with students**
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: 26 Tutorials: 26 Non-directed study: 60 Course total: *112*
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.*	Written examination (in Greek), including brief questions on theory and simple problems to be solved. Evaluation is based on: extent of theoretical knowledge, precision and correctness of solutions. Answers to exam questions are published on the course webpage.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
Σ. Κοσμαδάκης, "Εισαγωγή στα Γραφήματα, Θεωρία – Ασκήσεις".
Kenneth H. Rosen "Διακριτά μαθηματικά και εφαρμογές τους, 7η Έκδοση".

- Related academic journals: