COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Informatics and Computer Science		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE		**SEMESTER**	**7, 9**
COURSE TITLE	Constraint 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	1	
Class exercises	1	
Lab exercises		
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	4	5

COURSE TYPE general background, special background, specialised general knowledge, skills development	Special Background, Skills development
PREREQUISITE COURSES:	
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

Upon successful completion of the course, the students will be able to

- model a problem with the help of constraints
- • apply basic techniques for solving constraint problems
- • implement algorithms taught in the course
- • use software to solve real problems
- • understand the modern scientific literature on modeling issues and programming constraints

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
	Production of free, creative and inductive thinking

Working in an international environment Working in an interdisciplinary environment Production of new research ideas	…… Others… …….

- Autonomous work
- Generating new research ideas
- Promotion of free, creative and inductive thinking

(3) SYLLABUS

Models: what are they and why we need them. Constraint networks, basic definitions, relations and operators. Applications of constraint models, examples. Modeling methodology using constraints. Basic solving techniques: backtracking, forward checking, backmarking, etc. Constraint network consistency and techniques to achieve consistency of different levels: arc consistency, path consistency, k-consistency. Consistency and graphs. Intelligent techniques: backjumping, graph-backjumping, etc. Hybrid Algorithms. Solving Constraint Networks using a computer: IBM ILOG STUDIO, introduction to the CPLEX API and its programming via C/C++.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Lectures (live)
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Eclass platform for communicating with the students and publishing slides, lecture notes and exercises with solutions.
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: 39 Class exercises: 26 Home study: 60 Course total: **125**
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	Final exam

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. R. Drecter, Constraint Processing, Morgan Kaufmann,2013.
2. J. Hooker, Logic-based methods for optimization, John Wiley, 2000.
3. V. Chandru, J. Hooker, Optimization Methods for Logical Inference, J. Wiley, 1999.

- Related academic journals:

- Constraints