COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering
ACADEMIC UNIT	Department of Informatics and Computer Science
LEVEL OF STUDIES	Undergraduate

COURSE CODE		SEMESTER	7

COURSE TITLE	Theory of Computation

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	
Class exercises	1	
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	Background
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 familiar with the basic models of computation and be able to:
• prove equivalences and make deductions between computations
problems
• recognize unsolvable problems
• use theoretical analysis in solving computational problems

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
	Respect for difference and multiculturalism
	Respect for the natural environment
Adapting to new situations	Showing social, professional and ethical
Decision-making	responsibility and sensitivity to gender issues
Working independently	Criticism and self-criticism
Team work	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

Alphabets and Languages. Regular Expressions and Languages. Finite automata. Non-interpretation: automata and equivalences. Irregular languages and the Extraction Lemma. Context-independent grammars (CAGs), regular grammars. Stack automats and equivalence with GAS. Turing Machines, Decidability and Identifiability: the limits of computation. Classes of problems: P, NP , NP-complete, co-NP, reductions and hard problems.

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

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:
1. J.E. Hopcroft, J. Ullman, Introduction to Automata Theory, Languages and Computation, Addison-Wesley, Reading, 1979.
2. H.R. Lewis, C. Papadimitriou, Elements to the Theory of Computation, Prentice Hall 1980.
3. M. Sipser, Introduction to the Theory of Computation, PWS Publishing Company, Boston 1998.

- Related academic journals:

- Theoretical Computer Science
• Siam: Journal of Computing
• Journal of the ACM•
 Journal of Complexity