COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_IC101	**SEMESTER OF STUDIES**	2nd
COURSE TITLE	PROGRAMMING WITH PYTHON		

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*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures and Laboratory Exercises	5	7
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*	Background
PREREQUISITE COURSES:	
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	https://eclass.math.upatras.gr/courses/MATH_CMI109/

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*

The student will be able to implement programs in Python language. Particularly, the student:

- Acquires the ability to design the algorithm required to solve a problem.
- Combines the necessary Python commands / structures to implement the program to solve the problem.
- Understands the philosophy and principles of Object-Oriented Programming.

After successful completion of the course, the student will be able to:

- Design the algorithm to solve a clearly formulated problem and implement the corresponding Python code.
- Learn to use Python's mathematical libraries.

General Abilities

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	

- Search, analyze and synthesize data and information, using the necessary technologies.
- Decision making.
- Autonomous work.
- Promote free, creative and inductive thinking.

3. COURSE CONTENT

Number Systems in Digital Electronics, Logic circuits. Introduction to Python language, lists, dictionaries, tuples, flow control, loops, functions. Introduction to Object-Oriented Programming: objects and classes, class inheritance.

Laboratory exercise: Implement Python code for solving problems. Mathematical libraries. Introduction to TeX-LaTeX.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	PowerPoint slides Support Learning through the *eClass* platform.
TEACHING ORGANIZATION *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*	
STUDENT ASSESSEMNT *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*	**Assessment Language:** Greek **Assessment Language for Erasmus students:** English **Assessment methods:** ✓ Written examination: 70% ✓ Laboratory examination: 10% ✓ Exercises: 10% ✓ Mid-term examination: 10% Minimum passing grade: 5 Maximum passing grade: 10

Activity	***Semester workload***
Lectures	39
Laboratory exercises	26
Solving 3-4 exercises	40
Study for Midterm examination	30
Midterm Examination	2
Study for Final examination	35
Final Examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***175***

5. RECOMMENDED LITERATURE

(*in Greek*)

- Αβούρης Νικόλαος, Κουκιάς Μιχαήλ, Παλιούρας Μιχαήκ και Σγάρμπας Κυριάκος. *PYTHON. Εισαγωγή στους Υπολογιστές*. 3η Έκδοση, Εκδόσεις ΙΤΕ – Πανεπιστημιακές Εκδόσεις Κρήτης, 2016.
- Gaddis Tony. *Ξεκινώντας με την Python*. Εκδόσεις DaVinci, 2015.
- Guttag John V. *Υπολογισμοί και προγραμματισμός με την Python.* Εκδόσεις Κλειδάριθμος, 2015.

(*in English*)

- Downey Allen. *Think Python: How to Think Like a Computer Scientist*. Green Tea Press Needham, free online version.