COURSE OUTLINE

1. GENERAL

SCHOOL	NATURAL SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	MAT_IC362	**SEMESTER OF STUDIES**	6th
COURSE TITLE	MICROCOMPUTERS		

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 Laboratories	4	6
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*	Elective course
PREREQUISITE COURSES:	Recommended prerequisite knowledge: INTRODUCTION TO COMPUTERS AND PROGRAMMING WITH FORTAN
TEACHING AND ASSESSMENT LANGUAGE:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	https://eclass.math.upatras.gr/courses/MATH_CMI106/ http://www.math.upatras.gr/~vrahatis/?section=courses

2. LEARNING OUTCOMES

Learning outcomes

Π 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 completing this course, students will be able to use the Assemply language as well as they will further develop the following skills:

- Understanding the von Neumann architecture units focusing mainly on the processor structure and its basic components (ALUs, registers, flags, etc.).
- Ability to apply Boolean Algebra design logic circuits.
- Ability to use simumulators like the GNUSim8085 simulator.

After successfully attending the course, the students will be able to use the Assembly language to provide algorithmic solutions to complex mathematical problems that require very high precision calculations or require very large numbers.

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.
- Working in an interdisciplinary environment.
- Promote free, creative and inductive thinking.

3. COURSE CONTENT

Computers and microprocessors. Numeral systems. Conversion and operations in different numeration bases. BCD arithmetic. Elements of Boolean Algebra. Logic circuits. Boolean operators and gates. Truth tables. Relationships between logic gates and Boolean expressions. Designing logic circuits. Half adder and full adder. Binary comparator. Memory circuits. Registers and counters. Families, technologies, characteristics and compatibility of integrated circuits. Microprocessor architecture and it's operation. Timing and control unit. Arithmetic logic unit. Microprocessors Programming. Assembly language programming.

Laboratory exercises in assembly language programming using simulators like the GNUSim8085 one and applications in solving mathematical problems.

4. TEACHING AND LEARNING METHODS - ASSESSMENT

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Face-to-Face Lectures
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Support of the learning process through the *eClass* platform. Usage of Assembly simulators like the GNUSim8085 one.
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 final examination which includes theory and problems solving. Minimum passing grade: 5 Maximum passing grade: 10

Activity	***Semester workload***
Lectures	26
Laboratory exercises	26
Solving suggested exercises	30
Personal study by the student	65
Final examination	3
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***150***

5. RECOMMENDED LITERATURE

(*in Greek*)

- Βραχάτης Μιχαήλ Ν. και Παπαδάκης Σπυρίδων Χ. *Μικροϋπολογιστές*. Εκδόσεις Παπασωτηρίου, 1995.
- Πεκμεστζή Κιαμάλ. *Συστήματα Μικροϋπολογιστών*. 2η Έκδοση, Εκδόσεις Συμμετρία, 1995.