COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Department of Computer Engineering & Informatics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	CEID_NY361	**SEMESTER**	7th
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*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and Tutorials	3	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	total	3

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialised general knowledge
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/CEID1071/

(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, a student will be able to:

(1) implement the general model of an up to date microcomputer and their peripherals,
(2) obtain the knowledge and be able to program microcomputers of certain families, of current and future technologies,
(3) have the appropriate knowledge and background to design a microcomputer,
(4) design and program microcontrollers of alternative design families and technologies,
(5) integrate interconnections, of peripherals units, with microcomputers, microprocessors, and microcontrollers,
(6) evaluate the functionality and the performance, of microcomputers systems, and microcontrollers, via simulation tools.

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
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

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

Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Production of free, creative and inductive thinking

(3) SYLLABUS

- Microcomputer Structure
- Microcomputer systems architecture
- Central Processing Unit
- Memory elements
  - Static Memory (SRAM)
  - Dynamic memory and synchronous dynamic memory (DRAM & SDRAM)
  - Read Only Memory (ROM)
  - Addresses
  - Direct Memory Access (DMA)
- Command, machine and clock -cycle
- Input/output ports: parallel, serial
- Timers
- Counters
- Interrupt controllers
- Zilog Z80 Microprocessor
  - Arithmetic and Logic Unit (ALU)
  - Programmable registers
  - Addresses
  - Pins and timers
  - Instructions set
  - Interrupts
  - INT and NMI Interrupts
- INTEL microprocessors family
  - Evolution of family, architectures and technologies
  - Examples of microprocessors
  - Specifications
  - Registers
  - Pins and signals
  - Machine cycle and states
  - Commands: execution and timing
  - Initialization
  - Interrupts
  - Addresses & commands
  - Supported devices
- Microcontrollers
  - Evolution of architecture and 8-bit and 32-bit technologies
  - Examples of microcontroller families: ATMEL
  - Specifications - architecture
  - Clock
  - Memory units - addresses
  - Registers
  - Interrupts
  - Restart
  - Timers - Counters
  - Serial and Parallel Communication
  - Programming
  - RISC and CISC processors
- Modern and future applications
- Advanced topics and areas

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Wide use of ICT and more specifically:
・ The course is backed up by a homepage, providing all course materials. This web page is duly updated.
・ Course announcements are provided electronically and are available via: online news platform, and e-mail.
・ The communication with the students is performed electronically: via e-mail. An online course forum, is also supported, for questions/answers, comments etc.</td></tr>
<tr><td>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</td><td><table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Lectures</td><td>26 hours</td></tr><tr><td>Tutorials</td><td>13 hours</td></tr><tr><td>Study</td><td>45 hours</td></tr><tr><td>Exams</td><td>3 hours</td></tr><tr><td>Course total</td><td>87 hours</td></tr></table></td></tr>
<tr><td>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.</td><td>The students' assessment is supported in Greek, through a final written examination, twice in each academic year.
The examination is organized by development questions, short answer questions, exercises and problems solving. Within ten days of the examination, scores and indicative answers to the exam questions are announced, and posted electronically.
It is defined a day and an hour at which students can see their exams' papers about any questions and doubts they may have, as well as to express their disagreement in rating, if they so wish. Then the rating is validated and finalized.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

・ Nikolaos Chr. Petrellis, George F. Alexiou, «Microprocessors and Microcomputers Systems Design», ISBN: 9789604615001, Kleidarithmos Publisher.
・ Kemal Pekmentzi, "Microcomputers Systems, Volume I: Microprocessors 80x86 Pentium & Arm", ISBN: 9789602662687, S. Athanasopoulos Publisher.

- Related academic journals:

・ IEEE Micro,
・ IEEE Transactions on Computers,
・ IEEE Transactions on Circuits and Systems,
・ IEEE Transactions on VLSI Systems.