COURSE OUTLINE

(1) GENERAL

SCHOOL	OF SCIENCE		
ACADEMIC UNIT	PHYSICS DEPARTMENT		
LEVEL OF STUDIES	GRADUATE		
COURSE CODE	**M413**	**SEMESTER**	**1**
COURSE TITLE	Microprocessors-Microelectronics-Laboratory		

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**
	6	9
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*	Special background-skills development
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	https://ecourse.uoi.gr/course/view.php?id=1762

(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*

This course aims to introduce students to Microcontrollers and familiarize them with the machine language. It includes a series of laboratory exercises which form a complete set of experiments. These exercises, beyond being an essential scientific stepping stone, will also offer students a valuable practical asset useful for further research or careers. Upon completion of the course, students will:

- be able to programme a microcontroller system
- have acquired a thorough knowledge of the processes running on a microcontroller
- have understood the function of various input / output devices (keyboard, LCD display, etc.) and how such devices communicate with the uP
- have acquired knowledge of an integrated development environment (IDE) suitable for simulation, debugging and implementation of applications.

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

Working independently
Team work
Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making

(3) SYLLABUS

Introduction, basic definitions and concepts, development of microprocessors. Design characteristics, registers. Arithmetic-Logical unit, control unit, instructions execution, modes of operation, instruction look-ahead. Instruction types and timing diagrams. Units communication, dot classification, communication protocols with peripheral devices. Operation of principal memory systems, cache and virtual memory. Description of microprocessors. Microprocessor programming, Assembly language, machine language, AVR.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face teaching and laboratory assistance
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Course webpage is used to provide the students with the lecture notes and communication. IDE lab suite is used for simulation and debugging
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	26
Laboratory	52
Development practice at home	24
Self-study and analysis	45
Project	50
Examinations	3
Course total	***200***

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*	Laboratory (50%) Each laboratory exercise includes: -Code Development, Simulation, and Debugging. -µP/C programming and proper operation control on a development platform. -Delivery of source code and other files in electronic format. Project and presentation (50%) It involves developing a complex application The course is successfully completed when the grade in the individual assessments is at least pass.

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

ATTACHED BIBLIOGRAPHY

- Microchip AVR® Microcontroller Primer: Programming and Interfacing, Third Edition (Synthesis Lectures on Digital Circuits and Systems) 3rd Edition
- by Steven F. Barrett, Daniel J. Pack , Mitchell A. Thornton (2019)
- AVR Microcontroller and Embedded Systems: Using Assembly and C (Pearson Custom Electronics Technology) 1st Edition by Muhammad Ali Mazidi , Sarmad Naimi, Sepehr Naimi (2013)
- -https://www.microchip.com/doclisting/TechDoc.aspx
- -http://www.microdigitaled.com/AVR/AVR_book_v1.htm