COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF ELECTRONICS ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	2604003	**SEMESTER**	4
COURSE TITLE	Architecture and Organization of Microcomputers II		

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 (ECTS)**
Lectures	2	4
Laboratory	2	
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 Course
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in English)
COURSE WEBSITE (URL)	http://electronics.teipir.gr/personalpages/vasiliadis/MIKROYPOLOGISTES_II/A_O_MIKROYPOLOGISTWN_II.html http://electronics.teipir.gr/personalpages/vasiliadis/ERG_MIKROYPOLOGISTWN_II/MIKROYPOLOGISTES_II.html

(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 this course module students possess advanced knowledge, skills and competences in the subject of Architecture and Organization of Microcomputers that enable them to:

- Describe by block diagrams the inner architecture and organization of 16, 24, and 32-bit microprocessors,
- Select the appropriate implementation of a microcomputer system for the needs of the specific application addressed,
- Use appropriate tools to program a microprocessor in machine language or in symbolic language,

- Interpret and check the validity of the results of the programs developed, both at the system and at the user level,
- Analyse microcomputer system applications problems and construct solutions (design microcomputer systems) under technical and budget constraints,
- Collaborate in a team for the integral addressing (analysis – synthesis) of complex microcomputer systems design and development methods at the hardware and at the software level, for the assessment of alternative solutions and for decision making towards implementation.

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*
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	*……*
Production of new research ideas	*Others…*
	…….

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Project planning and management

(3) COURSE CONTENT

Lectures

1. Principles of the structure of the 16, 24 and 32 bits microprocessors
2. Internal organization, registers, units
3. Protected and real mode of operation
4. Memory models
5. Descriptors
6. Instruction set I
7. Instruction set II
8. Assembly programming I
9. Assembly programming II
10. Hardware and software interrupts
11. Cache and secondary memory of the microcomputer system
12. Ports and peripheral devices
13. Operating systems

Laboratory Experiments:

1. Introduction, safety regulations
2. I/O instructions

3. Interrupts
4. Stepper motor operation
5. D/A operation
6. Debug I
7. Debug II
8. Debug III
9. Assembler I
10. Assembler II
11. Assembler III
12. Subroutines
13. Integrated project

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face to face lectures</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>• Use of electronic presentation with multimedia content in class,
• Student support through the course webpage and the departmental e-learning platform,
• Electronic communication of instructors and students, through the course webpage and by e-mail.
• Use of special software for programming and simulation in the lab.</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>Lectures, Laboratory experiments, study.

<table><tr><th>Activity</th><th>Semester workload (hours)</th></tr><tr><td>Lectures</td><td>26</td></tr><tr><td>Study for lectures</td><td>26</td></tr><tr><td>Laboratory experiments</td><td>26</td></tr><tr><td>Report on lab experiments</td><td>26</td></tr><tr><td>Study and preparation for exams</td><td>16</td></tr><tr><td>Course Total</td><td>120</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</td><td>Final grade = Theory part grade x 60% + Lab part grade x 40%

Theory Part grade:
Final written exam (60%)
Midterm exam (30%)
Participation (10%)

Final Exam includes
• Problem solving on microprocessor operation</td></tr>
</table>

students.	• Design of memory interface circuits and peripherals, • Symbolic language programming • Programming of peripheral units, • Interpretation of given code and assessment of its results. ***Lab part grade:*** Average of all grades received at each weekly Lab Experiment

(5) ATTACHED BIBLIOGRAPHY

Essential reading

1. Computer System Architecture, Morris Mano, Prentice Hall.
2. Computer Organization and Architecture, Stallings, Prentice Hall.
3. Essentials of Computer Organization and Architecture, Null & Lobur, Jones & Bartlett Publ.

Recommended Books

1. HENNESSY, J. and D. PATTERSON, Computer Architecture-A Quantitative Approach, Morgan-Kaufmann Publishers.
2. WILLIAMS, R., Computer Systems Architecture, Pearson Education.
3. BREY, B., The Intel Microprocessors, Prentice Hall (Pearson Education).
4. SINGH, A. and W. TRIEBEL, 16 bit and 32-bit Microprocessors, Architecture, Software and Interfacing Techniques, Prentice Hal