COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHYSICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	**502**	**SEMESTER**	**6,8**
COURSE TITLE	Digital Electronics		

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**
	5	4
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*	General background / special background, Skills development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES (in GREEK)
COURSE WEBSITE (URL)	http://ecourse.uoi.gr/course/view.php?id=9

(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 introduces students to the important concepts and basic skills of Digital Design and the related analysis of digital circuits
Upon successful completion of this course module students possess advanced knowledge, skills and competences in the subject of Digital Electronics that enable them to:

- Work on different numbering systems
- Design and analyze simple combinational and sequential circuits either with discrete gates or more complex IC
- Simulate and analyze digital systems by means of modern simulation software
- Have a solid background on various types of memory modules and the corresponding circuitry.
- Cooperate with fellow students as a team for the successful implementation of the laboratory exercises with the appropriate preparation of the procedures that must be followed, as well as the study of the relevant material for homework

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*
	Respect for difference and multiculturalism

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*	*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…* *…….*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Production of free, creative and inductive thinking

(3) SYLLABUS

1 NUMBER SYSTEMS AND CODES
2. DIGITAL ELECTRONIC SIGNALS AND SWITCHES
3. BASIC LOGIC GATES
4. PROGRAMMABLE LOGIC DEVICES: CPLDS AND FPGAS WITH VHDL DESIGN
5. BOOLEAN ALGEBRA AND REDUCTION TECHNIQUES
6. EXCLUSIVE-OR AND EXCLUSIVE-NOR GATES
7. ARITHMETIC OPERATIONS AND CIRCUITS
8. CODE CONVERTERS, MULTIPLEXERS, AND DEMULTIPLEXERS
9. LOGIC FAMILIES AND THEIR CHARACTERISTICS
10. FLIP-FLOPS AND REGISTERS
11. PRACTICAL CONSIDERATIONS FOR DIGITAL DESIGN
12. COUNTER CIRCUITS AND VHDL STATE MACHINES
13. SHIFT REGISTERS
14. SEMICONDUCTOR, MAGNETIC AND OPTICAL MEMORY (incl. RAM, ROM, PROM, EPROM, EEPROM)

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face lectures Real time practice
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of electronic presentation with multimedia contenting class, • Student support through the course webpage and the • departmental e-learning platform, • Electronic communication of instructors and students, • through the course webpage and bye-mail, • Use of special circuit simulation software.
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.*	

Activity	***Semester workload***
Lectures	20
Exercises	13
Laboratory experiments	20
study and analysis of bibliography	44
exams	3

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		
	Course total	***100***
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.*	Course grade = Final exam (80%) + Homeworks (20%) Final exam is at the end of semester based on Theory Lectures. Homeworks are prepared weekly and report on the analysis of experimental data obtained on each laboratory course	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. Digital Electronics, William Kleitz (8th Edition) Tziolas publishing, (translated in Greek) ISBN: 978-960-418-3388
2. Digital Electronics, Floyd (8th Edition) Ion publishing, (translated in Greek) ISBN:978-960-411-646-1
3. Electronic Principles, A. Malvino/Leach (7th Edition) Tziolas publishing (translated in Greek) ISBN: 978-960-8129-16-18
4. Laboratory Exercises on Digital Electronics, Kostarakis et al. Laboratory manual (In Greek)