COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences		
ACADEMIC UNIT	Department of Informatics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	106	**SEMESTER**	1
COURSE TITLE	DIGITAL DESIGN		

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	3	5
Exercises	1	
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*	Background, Skill Development
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://moodle.cs.duth.gr/course/view.php?id=21

(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, students should be able to:

1. To recognize, apart from decimal, the other numbering systems such as binary, octal, hexadecimal and to represent any decimal number in one of the above systems.

2. Be able to convert a number from one system to another.

3. To represent the marked numbers in the binary system.

4. To take the "1's" and "2's" complements of a binary number.

5. To perform numerical operations in the binary system.

6. Distinguish a binary from a BCD number.

7. To get to know the binary codes.

8. To know the logic operations and logic gates OR, AND, EXOR, NOT, NOR, NAND, EXNOR.

9. To know positive and negative logic, representation of logic circuits.

10. Analyze and synthesize combinational logic circuits.

11. Minimize logical functions with truth tables, Boolean algebra rules, Karnaugh tables and the Quine-McCluskey method.

12. To know the manufacturing technologies of TTL, ECL, NMOS, PMOS, CMOS integrated circuits and their special characteristics.

13. To design combinational logic circuits.

14. To know the characteristics and learn to design circuits of encoders, decoders, multiplexers, demultiplexers, digital comparators and implement combinational logic circuits using them.

17. To analyze and design sequential logic circuits.

18. Know the characteristics and learn to design counter and register circuits and their use in the design of sequential logic circuits and systems.

19. To know the characteristics and structure of RAM and ROM memories as well as how memory chips can be connected in order to create memory modules of larger capacity or longer memory word lengths.

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, analysis and synthesis of data and information, using the necessary technologies
- Project planning and management,
- Promotion of free creative and inductive thinking.

(3) SYLLABUS

1. Number Systems - Binary codes.
2. Logic gates - Boolean Algebra.
3. Minimization of Logical Functions.
4. Digital Technology.
5. Simulation of Digital Circuits and Systems.
6. Analysis and Synthesis of Combinational Logic Circuits.
7. Design of Combinational Logic Circuits.
8. Design and Applications of Encoders, Decoders, Multiplexers, Decoders, Digital Comparators and Digital Circuits.
9. Flip - Flop and other related pulse circuits.
10. Analysis and Synthesis of Sequential Logic Circuits.
11. Design of Modern (Mealy-More) Sequential Logic Circuits.
12. Design and Applications of Digital Meters and Registers. RAM and ROM memories.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY
Face-to-face, Distance learning, etc.

Face-to-face

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students

Presentation with the help of slides, Course website with supporting and auxiliary material, Application of digital design simulation software, Communication by e-mail.

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	39 h
Tutorial Exercises: Selected, representative exercises are solved concerning different modules of the course.	13 h
Written Exams	14 h
Exercises	33 h
Individual Study	26 h
Course total	125 h (5 ECTS)

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

Written final exam (75%) including theory questions and problem-solving topics.

Delivery of one (1) Exercises Set (25%) during the semester.

The final examination of students with dyslexia or other disabilities takes place after consultation.

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

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. «Ψηφιακή Σχεδίαση με τη Γλώσσα VHDL, Αρχές και Πρακτικές», Δ. Πογαρίδη, Εκδόσεις ΔΙΣΙΓΜΑ, 2010.
2. «Digital Design and Computer Architecture», Sarah Harris, David Harris, Morgan Kaufmann Publishers.
3. «Ψηφιακή Σχεδίαση», M. Moris Mano, Εκδόσεις Παπασωτηρίου.
4. «Digital Systems, Principles and Applications», R.J. Tocci, N.S. Widmer, G.L. Moss, Pearson Education Inc.
5. «Digital Design, Principles & Practices», I.F. Wakerly, Prentice Hall International Inc.
6. «Digital Design», F. Vahid, John Wiley @ Sons Inc.
7. «Introduction to Digital Design Using VHDL», Joy Alinda Reyes, Diliman, 2003.
8. «Digital System Design with VHDL», M. Zwolinski, Prentice Hall, 2003.