COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Sciences		
ACADEMIC UNIT	Department of Informatics		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	307	**SEMESTER**	3
COURSE TITLE	ADVANCED DIGITAL DESIGN APPLICATIONS		

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	2	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:	105
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=19

(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 know and be able to use the Hardware Description Languages HDL (SystemVerilog) in the process of designing simple logic circuits and complex digital systems.

2. Know how to create simple combinational logic circuits using HDL languages.

3. Know how ROM, PAL, PLA, CPLD and FPGA programmable logic devices are architecturally structured.

4. To know how to create encoders, decoders, multiplexers, demultiplexers, digital comparators and numerical circuits to implement combinational digital systems with their use and the use of HDL languages.

5. To know how to create Flip-Flops, counters, registers and implement with their use and the use of HDL languages for sequential digital systems.

6. To know the RTL language and how it is used in the design of processors, its use and the use of HDL languages.

7. Know how to build microprocessors and RAM and ROM memory.

8. Know how complex digital systems and processors are designed.

9. To use industrial CAD/EDA tools to design, simulate and implement complex digital systems on FPGAs.

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. Design of Systems Based on an Information Transfer Corridor (Memory - Microprocessors - Communication Systems).
2. Programmable Logic Devices (ROM, PAL, PLA, CPLD, FPGA).
3. Introduction to HDL languages (SystemVerilog).
4. Description and implementation of digital circuits with HDL languages.
5. Examples of advanced digital design applications.
6. Use of industrial CAD/EDA tools to design, simulate and implement complex digital systems in FPGAs.
7. Dive into HDL languages for synthesis and control of digital circuits.

(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 support and auxiliary material, Contact by e-mail Use of a fully equipped laboratory with development FPGAs and EDA software application for simulation and implementation of digital designs.
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 h
Exercises: Selected, representative exercises are solved concerning different modules of the course.	13 h
Written Exams	14 h
Semester Exercises	46 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* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final exam (70%) includes theory questions and problem-solving topics. Delivery of two (2) Exercise Sets (30%) during the semester. The final examination of students with dyslexia od other disabilities takes place after consultation.

(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.*