**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | ENGINEERING |
| **ACADEMIC UNIT** | Department of Computer Engineering and Informatics |
| **LEVEL OF STUDIES** | Undergraduate |
| **COURSE CODE** | 23Y206 | **SEMESTER** | 3rd |
| **COURSE TITLE** | Digital Design 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** |
| Lab Exercises | 3 | 2 |
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| *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* | specialised general knowledge |
| **PREREQUISITE COURSES:** | Digital Design (ΝΝΥ107) |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | https://eclass.upatras.gr/courses/CEID1409/ |

1. **LEARNING OUTCOMES**

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| **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*
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| Upon conclusion of the course the students ought to be able to analyze, design and test fully functional VLSI circuits with SSI/MSI and Verilog HDL using the laboratory equipment and tools. |
| **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…**…….* |
| * Adapting to new situations
* Decision-making
* Production of free, creative and inductive thinking
* Working independently & Team work
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1. **SYLLABUS**

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| Introduction to Hardware description languages* Design combinational circuits with Verilog
* Design sequential circuits with Verilog

The laboratory exercises comprise:* Logic gates
* Using Arithmetic MSI
* Build complex circuits with MSI, ALU, etc.
* Counters, registers
* Design combinational and sequential circuits in Verilog
* Simulate combinational and sequential circuits with commercial tools
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1. **TEACHING and LEARNING METHODS - EVALUATION**

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| **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* | ICT methods are used in both teaching and communication with the students. Lecture slides and supplementary material are uploaded in the course’s web site.  |
| **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* |

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| ***Activity*** | ***Semester workload*** |
| Introduction to Lab Exercises | 13 |
| Laboratory exercises | 12 |
| Laboratory exercises Preparation | 30 |
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| Course total (25-30 hours per ECTS unit) | **55** |

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| **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.* | Language of evaluation: GreekFinal grade depends on the final laboratory examination and the evaluation of the laboratory exercises based on the functionality of the circuits and components in every exercise. |

1. **ATTACHED BIBLIOGRAPHY**

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| *- Suggested bibliography:** Digital Design: Principles and Practices, John F. Wakerly
* Digital Design, M. Morris Mano, Michael Ciletti
* Digital Logic Circuit Analysis and Design, Victor P. Nelson, H. Troy Nagle, Bill D. Carroll, David Irwin

*- Related Scientific Journals:** IEEE Transactions on Computers
* IEEE Transactions on Circuits and Systems I & II
* IEEE Transactions on VLSI Systems
* IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems
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