UNIVERSITY of NICOSIA

# Course Syllabus

| Course Code | Course Title | ECTS Credits |
|---|---|---|
| ECE-111 | Digital Systems Lab | 2 |
| **Prerequisites** | **Department** | **Semester** |
| ECE-110 | Engineering | Fall, Spring |
| **Type of Course** | **Field** | **Language of Instruction** |
| Required | Engineering | English |
| **Level of Course** | **Lecturer(s)** | **Year of Study** |
| 1st Cycle | Dr Stelios Neophytou | 1st |
| **Mode of Delivery** | **Work Placement** | **Corequisites** |
| Face-to-face | N/A | None |

**Course Objectives:**

The main objectives of the course are to:

- Provide basic hands-on experience regarding digital circuits and digital concepts.
- Describe the basic implementation procedure of digital circuits
- Describe basic design and analysis concepts.
- Provide ability of using medium scale integration circuits to as well as computer software to built basic digital structures.

**Learning Outcomes:**

After completion of the course students are expected to be able to:

- Demonstrate the basic structure of a Medium Scale Integration (MSI) digital integrated circuit (IC) holding basic digital components (i.e, gates, flip-flops etc)
- Review the usage of data sheets of ICs.
- Analyze and utilize components to build combinational digital circuits that implement Boolean expressions.
- Analyze and utilize components to built sequential digital circuits.
- Identify and use the logic probe and logic pulser for troubleshooting.
- Analyze a digital circuit and test for correct functionality.
- Use computer software for designing, simulating and analyzing digital circuits.
- Identify the basic concepts of Hardware Description Languages and their basic structure.
- Utilize both behavioral and structural VHDL to design and simulate digital circuits.

**Course Content:**

- The Logic probe and the logic pulser;
- Digital circuit analysis and troubleshooting.
- Design of combinational logic circuits.
- Introduction of R-S latch as well as D, and J-K type flip-flops.
- Design of sequential logic circuits.
- Design and analysis of synchronous and asynchronous counters.
- Design and analysis of shift registers and parallel registers.
- Overview of HDL representation and implementation using Programmable Logic Devices.
- VHDL and schematic design entry tools for the design, simulation, verification and performance evaluation of digital logic.
- Realization and testing of combinational and sequential digital circuits, logic circuits by programming FPGAs.
- Final design projects include digital circuits consisting of multiplexers, decoders, counters, memories, etc.

**Learning Activities and Teaching Methods:**

Lab Presentations and Tutorials, Lab Assignments, Project.

**Assessment Methods:**

Lab Reports, Mid-Term, Project, Final Exam.

**Required Textbooks / Readings:**

| Title | Author(s) | Publisher | Year | ISBN |
|---|---|---|---|---|
| Laboratory manual with a set of experiments. | Engineering Department, University of Nicosia. | | 2008 | |
| ISE 10.1 Quick Start and In-Depth Tutorials | XILINX | | 2008 | |

**Recommended Textbooks / Readings:**

| Title | Author(s) | Publisher | Year | ISBN |
|---|---|---|---|---|
| Logic and Computer Design Fundamentals | Morris M. Mano, Charles R. Kime | Prentice Hall | 2007 | 013198926X |
| Digital Design, 4th Edition | M. M. Mano, M. D. Ciletti | Prentice Hall | 2006 | 0131989243 |
| Digital Fundamentals with VHDL | T. L. Floyd | Pearson Prentice Hall | 2002 | 0130995274 |