



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

### **Objectives of the Course:**

Provide basic hands-on experience regarding digital circuits and digital concepts. Describe the basic implementation procedure of digital circuits as well as 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 Contents:**

- 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/Reading:**

Authors	Title	Publisher	Year	ISBN
ECE Department, University of Nicosia.	Laboratory manual with a set of experiments.		2008	
XILINX	ISE 10.1 Quick Start and In-Depth Tutorials		2008	

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
M. M. Mano, C. Kime	Logic and Computer Design Fundamentals, 4th Edition	Prentice Hall	2007	
M. M. Mano, M. D. Ciletti	Digital Design, 4th Edition	Prentice Hall	2006	
T. L. Floyd	Digital Fundamentals with VHDL	Pearson Prentice Hall	2002	