UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
ECE-110	Digital Systems	6
Prerequisites	**Department**	**Semester**
None	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:

- Introduce fundamental digital concepts and principles that are commonly used in the analysis and design of digital systems
- Introduce and explain the operation of fundamental logic gates that comprise the building blocks of complex digital circuits
- Present and demonstrate through examples techniques and mathematical models/tools that are used in the analysis and design of logic circuits
- Design and test fundamental digital blocks that perform specific functions
- Introduce the concept of system-in-a-chip through the use of PLDs and FPGAs
- Use fundamental digital blocks for the design of more complex digital systems including registers, sequential counters, memories, A/D and D/A converters

Learning Outcomes:

After completion of the course students are expected to:

- Use and be able to apply the binary and hexadecimal number systems including operation of basic logic gates
- Be able to utilize digital design tools such as Boolean algebra and Karnaugh maps and analyze, design and optimize digital systems that perform important fundamental functions
- Determine the concept of state machines and be able to use appropriate techniques for the design of sequential circuits

- Be able to use digital fundamental building blocks (e.g., flip flops) for the design of more complex digital systems including shift registers, memories, A/D and D/A converters
- Interpret the importance and usefulness of Programmable Logic Devices including their major characteristics and methods of programming

Course Content:

- Digital concepts, pulse waveforms
- Binary and hexadecimal systems, basic arithmetic operations, digital codes
- Logic gates, Boolean algebra and rules, simplification of Boolean expressions
- SOP and POS minimization using Karnaugh maps
- Combinational logic circuits and digital system design
- Adders, comparators, decoders, encoders, code converters, multiplexers, demultiplexers, parity generators/checkers
- Latches, edge-triggered flip flops, flip-flop applications
- Introduction to Programmable Logic Devices
- Finite state machines and design of sequential circuits
- Counters, shift registers, and memories
- Analog-to-digital and digital-to-analog conversion

Learning Activities and Teaching Methods:

Lectures, homework assignments, in-class design examples.

Assessment Methods:

Midterm Exam, Homework Assignments, Final Examination(comprehensive)

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Thomas L. Floyd	Digital Fundamentals	Prentice Hall	2014	0132737965

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Morris M. Mano, Charles R. Kime	Logic and Computer Design Fundamentals	Prentice Hall	2007	013198926X
Daniel D. Gajski	Principles of Digital Design	Prentice Hall	1996	0133011445