UNIVERSITY of NICOSIA

Course Code	Course Title	ECTS Credits
ECE-410	Programmable Application Specific ICs	6
Department	**Semester**	**Prerequisites**
Engineering	Fall or Spring	ECE-111, ECE-220
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	4th	Dr Stelios Neophytou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

Provide an introduction to the design process of digital systems using field programmable integrated structures, such as PLDs, CPLDs, and FPGAs, and to provide a thorough understanding of the different Application Specific Integrated Circuit (ASIC) architectures, design methodologies, and design tools.

Learning Outcomes:

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

- Analyze the design of FPGAs and ASICs that are suitable for tasks which cannot be executed efficiently by general-purpose microprocessors.
- Design digital circuits in a technology-independent means using a mix of levels (behavior and structure).
- Demonstrate the operation of standard CAD tools, especially for logic synthesis.
- Analyze and compare different circuit implementation, both in high level and in physical level.
- Carry out a complete project using FPGAs that involves architectural tradeoffs and simulation.

Course Contents:

- Introductory concepts of Applications Specific Integrated Circuits.
- Overview of CMOS logic and logic design using CMOS technology.
- Design process of an ASIC's Library.
- Overview of programmable ASIC architectures.
- Design and interconnection of programmable ASIC logic and I/O cells.
- Programmable ASICs families' overview and comparison.
- Programmable ASIC design, verification, synthesis, analysis and testing software.
- Low-Level Design Entry.
- Principles of hardware description languages.
- Design process and performance analysis using VHDL.

- Logic and Physical simulation of programmable ASICs.
- ASIC testing and principles of designing testable ICs.

Learning Activities and Teaching Methods:

Lectures, Lab Presentations and Tutorials, Lab and Homework Assignments.

Assessment Methods:

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

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Michael John Sebastian Smith	Application-Specific Integrated Circuits	Addison Wesley	1997	0-201-50022-1

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
W. Wolf	FPGA-Based System Design	Prentice-Hall	2004	
Z. Salcic, A. Smailagic	Digital Systems Design and Prototyping: Using Field Programmable Logic and Hardware Description Languages	Springer	2000	
A. Rushton	VHDL for Logic Synthesis, 2nd Edition	John Wiley	1998	