UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
ECE-425	Computer Aided Design for VLSI	6
Prerequisites	**Department**	**Semester**
ECE-111, ECE-220	Engineering	Fall or Spring
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr Stelios Neophytou	4th
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-face	N/A	None

Course Objectives:

The main objectives of this course are to:

- Provide the main principles of modern VLSI circuit design using computer tools.
- Present tool families and familiarize with popular design tools.
- Describe the basic algorithms used for modeling, design synthesis, simulation and analysis of ICs.

Learning Outcomes:

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

- Demonstrate the operation of the modern VLSI design/verification tools categories and its usage in integrated circuit fabrication.
- Use CAD tools to design and/or simulate a design of an integrated circuit.
- Identify the different algorithms used for automation (synthesis, simulation, floorplanning, and routing) of modern VLSI circuits.
- Discuss the main approaches followed for the verification and manufacturing testing of VLSI circuits.
- Design computer based tools for helping the design process of VLSI circuits.

Course Content:

- The Characteristics of Digital Electronic Design.
- Design Environments (system level, algorithm level, component level, layout level)

- Hierarchy and view representation. Connectivity and geometry representation.
- Synthesis tools for two level logic and hardware description languages.
- Static analysis tools including design rule checking and electrical rule checkers.
- Dynamic analysis tools for circuit level and logic level simulation.
- Functional and behavioural analysis. Event driven simulation.
- Programmable logic. Field programmable gate arrays (FPGAs) and Complex programmable logic devices (CPLDs).
- Manufacturing process and overview of the manufacturing cycles. Describe the steps and the CAD tools used at each step.
- Design Verification and manufacturing testing.
- Design for reliability and manufacturability.

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 / Readings:

Title	Author(s)	Publisher	Year	ISBN
Electronic Design Automation. Synthesis, Verification, and Test	L.-T. Wang, Y.-W. Chang, K.-T. (Tim) Cheng	Morgan Kaufmann	2009	978-0-12-374364-0

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Digital Integrated Circuits, 2nd Edition	J. M. Rabaey, A P. Chandrakasan, B. Nikolic	Prentice-Hall	2003	
Algorithms for VLSI Physical Design Automation, 3rd Edition	N. A. Sherwani	Springer	1999	
VLSI Physical Design Automation: Theory and Practice	S. M. Sait, H. Youssef	World Scientific Publishing Company	1999	

Synthesis and Optimization of Digital Circuits	G. De Micheli	Mac-Graw Hill	1994	