UNIVERSITY of NICOSIA

Course Code	Course Title	ECTS Credits
ECE-523	Testing and Diagnosis for VLSI Systems and Circuits	8
Department	**Semester**	**Prerequisites**
Engineering	Fall or Spring	ECE-420
Type of Course	**Field**	**Language of Instruction**
Elective	Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
2nd Cycle	1st	Dr Stelios Neophytou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of this course are to:

- Provide the necessary background for Digital Testing and Testable design
- Explain the various test generation approaches and describe the main algorithms proposed for ATPG.
- Provide strong theoretical background on delay testing and emerging testing issues.
- Discuss the major methodologies for fault diagnosis and early-stage fault identification.
- Describe different design-for-testability problems and possible solutions.

Learning Outcomes:

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

- Discuss the main fault models and test generation approaches used in the manufacturing process of VLSI design.
- Explain the basic processes of fault simulation, implication, justification, fault activation and propagation.
- Describe the general operation of an Automatic Test Pattern Generation process and discuss their major variations.
- Identify the major issues and discuss solutions for the problem of fault diagnosis in digital VLSI circuits.
- Discuss existing design-for-testability rules as well as identify the popular built-in-self test architectures and structures.
- Follow the trends in digital testing and fault diagnosis of future system-on-chip and multi-core systems.

Course Contents:

- Introduction to digital testing concepts and Fault models
- Combinational logic and fault simulation
- Test generation for combinational circuits
- Sequential and Functional test generation
- Delay fault testing
- Fault diagnosis

- Design for testability and Built-in self-test
- System-on-a-chip testing

Learning Activities and Teaching Methods:

Lectures, Project. Homework Assignments. Research literature review and presentation.

Assessment Methods:

Homework, Mid-Term, Project, Final Exam, Presentation.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
N. K. Jha, S. Gupta	Testing of Digital Systems	Cambridge University Press	2003	9780521773560

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Bushnell M. and Agrawal, V.	Essentials of Electronic Testing for Digital, Memory, and Mixed-Signal VLSI Circuits	Springer	2000	
N. A. Sherwani	Algorithms for VLSI Physical Design Automation, 3rd Edition	Springer	1999	
M. Abramovici, M. A. Breuer, A. D. Friedman	Digital Systems Testing & Testable Design	Wiley-IEEE Press	1994	