

Global Learning Semesters

Course Syllabus

Course: CENG-450 Introduction to VLSI Design

Department: Engineering

Host Institution: Intercollege, Nicosia, Cyprus



Course Summary		
Course Code	Course Title	Recommended Credit Hours
CENG-450	Introduction to VLSI Design	3
Semester Offered	Contact Hours	Prerequisites
Please contact us	42-45	CENG-300, CENG-280, EENG-350
Department	Level of Course	Language of Instruction
Engineering	Upper Division	English

Course Description

This course introduces the students to the design, layout, and testing of Very Large Integrated Circuits (VLSI). Emphasis is given on topics such as: MOS transistors, static and dynamic MOS gates, programmable logic array design, MOS circuit fabrication, design rules, resistance and capacitance extraction, power and delay estimates, scaling, MOS combinational and sequential logic design, register and clocking schemes, memory, data-path, and control unit design. The course also involves computer-aided circuit analysis and layout techniques.

Prerequisites

CENG-300, CENG-280, EENG-350

Topic Areas

1. Introduction to VLSI systems: overview of VLSI, VLSI design flow and hierarchy.
2. CMOS Fabrication Technology: fabrication process, layout design rules.
3. CMOS gates (inverter, NAND, NOR) and logic optimization.
4. Parasitics and performance evaluation: MOSFET capacitance, interconnection resistance and capacitance, estimating MOS delay models, switching characteristics, gate sizing.
5. High Level Logic Design: HDL
6. Clocking of VLSI systems: generation and distribution clocking strategies.
7. MOS memory, MOS decoders, MOS Adders.
8. Testing of Integrated Systems: Design for testability, layout for improved testability.
9. Power consumption, low-power design through voltage scaling, reduction of switched capacitance.

Readings and Resources

Required Textbook

- N. H. Weste and K. Eshraghian, Principles of CMOS VLSI Design, Addison-Wesley, 1994

Recommended Readings

- D. A. Pucknell and K. Eshraghian, Basic VLSI Design, Prentice Hall, 1995.
- L. A. Glasser and D. W. Dobberpuhl, The Design and Analysis of VLSI Circuits, Addison-Wesley, 1985.
- E. D. Fabricius, Introduction to VLSI Design, Mac-Graw Hill, 1991