Dept Number	CS 502	Course Title	Design and Analysis of VLSI Systems
Semester Hours	3	Course Coordinator	Mehdi Zargham
Catalog Description	The theory, technology, fabrication and design of digital integrated circuits as they are commonly used in modern digital computers. Topics include: techniques for solving problems occurring in VLSI and VLSI layouts, built-in self-testing, design for testability, and logic synthesis, and selected advanced topics.		

Textbooks

References

Course Learning Outcomes

Assessment of the Contribution to Program Outcomes

Outcome →	1	2	3	4	5	6	7	8	9	10
Assessed →		X	X		X					

Prerequisites by Topic

CS 401 and either 402 or consent of instructor.

Major Topics Covered in the Course

1. Design and Fabrication of VLSI devices
   fabrication materials, transistor fundamentals, fabrication of VLSI circuits, layout of basic devices, fabrication factors {5 classes}
2. Advances in VLSI Layout
   advanced research in circuit partitioning and placement, pin assignment and via minimization, over-the-cell and specialized routing, field-programmable-gate-arrays (FPGAs), multi-chip-modules (MCMs) {12 classes}
3. Design for Testability and Built-In Self-Test
   design for testability, compression techniques, built-in self-test concepts {12 classes}
4. Logic Synthesis
   multi-level logic synthesis, technology mapping in logic synthesis, retiming and resynthesis {5 classes}
5. Selected topics
   Two or more of the following topics: high level synthesis, formal verification, process/device simulation and modeling, and simulation {6 classes}