EE 822: Advanced Logic Design

Textbook

1. M. Mano, Digital Design, 4th Edition, Prentice-Hall, 2006 (ISBN: 9780131989245)

Ed. S. Hassoun and T. Sasao, "Logic Synthesis and Verification", Kluwer Academic Publishers, 2002.(ISBN 0-7923-7606-4)

Handouts and research articles may also be used by the instructor.

Objective

2. This course offers to learn and use various tools for the analysis and synthesis of advanced logic design. A more advanced discussion of logic design, introducing data structures, algorithms and implementation issues will be discussed. In particular, students who successfully complete this course should have exposure advanced techniques for logic circuit optimization, evaluating different data structures for target applications and algorithms used in modern logic synthesis tool. Students will also get experience in several lab implementations of advanced logic design using ModelSim..

Course Outcome

4. This course will furnish the students with a comprehensive insight into advanced logic design including observers and related implementation issues. They would be to design and analyze basic and complex circuits & also test their performance. The course also features laboratory ex peRAInts which will enhance the students' practical experience of working hands on with computer systems. . It will enable students to undertake research projects and theses falling within the subject area of computer systems.

Course Outline:

Topics	Allocated Periods
The following is a tentative list of topics to be covered: **Introduction** • steps of design process • computational complexity • Boolean algebra, Boolean functions **Data structures** • cubes • Binary Decision Diagrams • Boolean networks	45

Algorithms • exact and heuristic two-level optimization • multi-level optimization, Boolean and algebraic decomposition, graph dominators • technology mapping **Non-traditional synthesis** • Galois field optimization • Multiple-valued logic optimization	