ESE 556: VLSI Physical and Logic Design Automation

Instructor: Alex Doboli, Ph.D.

Schedule: Spring Semester (offered for the first time in spring 2002)

Goals: Upon completion of this course, the students will be able to develop *state-of the-art* CAD tools and algorithms for VLSI logic and physical design. Tools will address design tasks such as floorplanning, module placement and signal routing. Also, automated optimization of combinational and sequential circuits will be contemplated.

Textbooks:

1) S. Sait, H. Youssef, "*VLSI Physical Design Automation*", McGrawHIll, 1995.
2) Giovanni De Micheli, "*Synthesis and Optimization of Digital Circuits*", Mc-Graw Hill, 1994.
3) N. Sherwani, "*Algorithms for VLSI Physical Design Automation*", Kluwer, 1995.
4) Published papers will be provided in class.

Prerequisites:

B.S. in Computer Engineering/Science or Electrical Engineering

Topics:

1) *Physical Design Automation*:

- Introduction to Design Automation and CAD Tools
- Basic Data Structures and Algorithms
- Logic and Circuit Partitioning
- Floorplanning and Placement
- Global and Detailed Routing

2) *Logic Design Automation*:

- Two-Level Combinational Logic Optimization
- Multiple-Level Logic Optimization
- Sequential Logic Optimization
- Cell-Library Binding
- Integrated Logic and Physical Design Automation

Assignment Schedule and Grading:

Project 1 (*Physical Design Automation*: Partitioning, Floorplanning)	10%
Project 2 (*Physical Design Automation*: Placement, Routing)	20%
Project 3 (*Logic Design Automation*: Library Binding, Two/Multiple Level Logic Minimization)	20%
Midterm	20%
Final	30%