

EE382V: VLSI Physical Design Automation

Instructor: [Prof. David Z. Pan](#)

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Office hours: TBD

Course description:

This course studies the fundamental of physical design, a key design implementation stage for VLSI and related areas. Physical design is the process of transforming structural representation of a VLSI system into layout representation. The objective of physical design automation is to carry out such transformation efficiently using computers so that the resulting layout satisfies topological, geometric, timing and power-consumption constraints of the design. This course focuses on various design automation problems in the physical design process of VLSI circuits, including: logic partitioning, floorplanning, placement, global routing, detailed routing, clock and power routing, and new trends in physical design. We shall also discuss the applications of a number of important optimization techniques, such as graph theory, network flow, Steiner tree, simulated annealing, generic algorithm, and linear/convex programming. Guest lecture(s) given by industry experts will further broaden the view of students.

Prerequisite:

Computer-Aided Integrated Circuit Design (460R) and Algorithms (360C). Or consent of instructor.

Textbooks and reader:

- Lecture Notes
- S. K. Lim, *Practical Problems in VLSI Physical Design Automation*, Springer, 2008 (recommended)
- C. J. Alpert, D. P. Mehta, S. S. Sapatnekar, *Handbook of Algorithms for Physical Design Automation*, Auerbach Publications, 2008 (recommended)
- S. M. Sait and H. Youssef, *VLSI Physical Design Automation: Theory and Practice*, World Scientific, 1999.
- T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein, "Introduction to Algorithms", MIT Press, 2009 (3rd edition)
- Selected research papers from the literature.

Grading Policy:

10% class participation, 25% homework assignment, 25% midterm, 40% project.

Lecture Outline (tentative):

1. Introduction
2. Partitioning
3. Floorplanning
4. Placement (global placement and detailed placement)
5. Routing (global routing and detailed routing)
6. Clock and Power Network
7. Emerging topics

College of Engineering Drop/Add Policy:

The Dean must approve adding or dropping courses after the fourth class day of the semester.

Students with Disabilities:

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY or the College of Engineering Director of Students with Disabilities at 471-4382.