



EEDG/CE 6375: Design Automation of VLSI Systems Fall 2018

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Office Hours TuTh 2-3:15 PM

References C.J. Alpert, D. P. Mehta, S. S. Sapatnekar, “Handbook of Algorithms for Physical Design Automation”, CRC Press, 2009.
A. B. Kahng, J. Lienig, I. L. Markov, J. Hu, “VLSI Physical Design: From Graph Partitioning to Timing Closure”, Springer, 2011.
Sherwani. N., *Algorithms for VLSI Physical Design Automation*, Kluwer Academic Publishers, third edition, 1999.
Sadiq M. Sait and Habib Youssef, *VLSI Physical Design Automation: Theory and Practice*, IEEE Press.
M. Sarrafzadeh and C. K. Wong, *An Introduction to VLSI Physical Design*, McGraw Hill Publications, 1996.
Bryan Preas and Michael Lorenzetti (editors), *Physical Design Automation of VLSI Systems*, The Benjamin/Cummings Publishing Company, Inc., 1988.
Bhatia D. Collection of Important PDA papers.
Sadiq M. Sait and Habib Youssef, *Iterative Computer Algorithms with Applications in Engineering*, IEEE Computer Society Press, 1999.
Dirk Stroobandt, *A Prori Wire Length Estimates for Digital Design*, Kluwer Academic Publishers, 2001.
Published papers and reports will be provided in the class.

Goals and Course Objectives: This course is designed to introduce students with Physical Design Automation (DA) of VLSI systems. DA related issues for the current state of the art will familiarize students with existing techniques in VLSI design. Data structures and algorithms related to DA will provide insight into design of CAD tools. The material will be presented in technology independent style and will prepare students for design and development of DA tools. One of the key goals is to prepare students for research in physical design automation of VLSI systems. After finishing this course, students will have,

- Understood the relationships between DA algorithms and various constraints posed by VLSI fabrication and design technology.
- Critical performance related parameters and their importance in DA tools will be introduced.
- Implemented a prototype DA tool and tested it using real life benchmark examples.
- Documented a well-analyzed report for communicating the results of the DA tool design project.

Key Topics

- An introduction to Design Automation and CAD tools
- Some Basic Data Structures and Algorithms
- Logic and Circuit Partitioning
- Placement, Assignment, and Floorplanning
- Routing - Global and Detailed
- Layout Optimizations

Homework Assignments: There will be assignments related to important topics in DA. Programming assignments will constitute major share. One can expect two to three extensive programming tasks related to developing a part of or a complete DA tool. Assignments (programs or otherwise) will be graded by the teaching assistant. Normally there will be deadlines associated with most of the assignments. In any case, students will be encouraged to complete the task. After all, the goal here is to learn as much as possible and a deadline should not imply that assignment is no longer due and the grade is lost.

Class Participation: Classroom participation is an important aspect of learning. It is a learning process for both the students and the instructor. Questions, even if they seem simple, should be asked. Some questions will generate new ideas or start a discussion. I welcome those. In past I have had some of the best questions from students who have co-op experience from industries using DA tools as well as from students who are new to the field. By questioning you do a favor to the instructor and classmates.

Grading Policy: Final grades in this course will be based on several homework assignments, programming projects, one exam, and a survey report. Any graded work can be disputed in writing *within one week* of the return of that work. Complete work will be re-graded.

The grading policy is:

Assignments:	20%
Projects:	40%
Group Survey Paper:	10%
Examination:	30%

Homeworks and projects will be done in groups of size at most two (2). For each homework, each student **MUST** attempt all questions **ALONE** and then discuss with his/her group member. Then the group will submit one combined solution for grading purpose. Both the group members must sign assignment. Both group members will get same grade for the homework assignment. It is possible that the TA or instructor will call one of the group members to explain the work. In such cases, the grade will depend on a combination of the quality of the submission and the explanation of the selected member. Each assignment, report, and exam will get correctness as well as quality grades.

Important Dates: Following dates for examinations are firm dates. There will be no make up examination.

Examination	November 15, 2018
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UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.