

**Algorithms for VLSI Design (RP 4.2.27)**

VLSI Design Cycle:  
Design problem and design domains, levels of abstractions like algorithmic and system design, structural and logic design, transistor level design, layout design. Y diagram. Design flow for digital and analog VLSI design

Graph Algorithms and Computational Complexity:  
Basic definitions and data structures for representations of graphs, Examples of graph algorithms like depth-first search, breadth-first search, Dijkstra’s algorithm, computational complexity, complexity classes, NP completeness and NP hardness,

VLSI design simulations:  
Basic concepts and purpose of simulations, Gate-level modeling and simulations, compiler-driven simulation and event-driven simulations, Transistor-level modeling and simulation

High-level Synthesis:  
Hardware models for high-level synthesis, data flow graph, simple, conditional and iterative data flow, data flow graph representations, ideas of allocation, assignment and scheduling

Logic level synthesis and verifications:  
Introduction to combinational logic synthesis, binary decision diagrams, ROBDD, two-level logic synthesis

Partitioning and Floor planning:  
Problem formulations, classification of partitioning algorithms, Kernighan-Lin Algorithm, basic ideas of floor planning problem

Placement and Routing:  
Basic concept, problem formulation and algorithms of placement, global routing, maze routing algorithms, line probe algorithm, detailed routing.

Electronic design automation:  
Basic ideas and purpose, examples of commercially available EDA tools, computer-aided analog designs