Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NECD546	VLSI Algorithms	3	0	0	3

Course Objective

The objective of this course is to introduce the students to the algorithms for VLSI circuits and systems.

Learning Outcomes

Upon successful completion of this course, the students will:

- Able to formulate floor partitioning.
- Able to implement multilayer routing.
- Able to do perfect compaction.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	General Graph Theory and Basic VLSI Algorithms, Partitioning, Problem Formulation, Classification of Partitioning Algorithms, Group Migration Algorithms, Simulated Annealing and Evolution, Other Partitioning Algorithms.	6	The students will be introduced to the basic concepts of VLSI algorithms along with partitioning algorithms.
2	Placement, problem formulation, simulation base placement algorithms, other placement algorithms	6	The students will learn different placement algorithms.
3	Floor planning, Constraint-based floor planning, floor planning algorithms for mixed block & cell design. General & channel pin assignment.	6	The students will learn the floor planning algorithms along with channel pin assignment.
4	Global Routing-Problem formulation, classification of global routing algorithms, Mazerouting algorithm, line probe algorithm, Steiner Tree based algorithms, ILP based approaches.	7	The students will learn the global routing algorithms for VLSI circuits and systems.
5	Detailed routing - problem formulation, classification of routing algorithms, single layer routing algorithms, two-layer channel routing algorithms, three-layer channel routing algorithms, and switchbox routing algorithms.	7	The students will learn the other complex routing algorithms for VLSI circuits and systems.
6	Over the cell routing and via minimization- two layers over the cell routers constrained and unconstrained via minimization.	5	The students will learn the cell routing algorithms.
7	Compaction- problem formulation, one-dimensional compaction, two dimension-based compaction, hierarchical compaction.	5	The students will learn about the compaction for VLSI circuits
	Total	**42**	

Text Books
1. NaveedShervani, "Algorithms for VLSI physical design Automation", Kluwer Academic Publisher, 2007.
2. Sabih H. Gerez, "Algorithms for VLSI Design Automation", Wiley, 2008.

Reference Books
1. Christophn Meinel and Thorsten Theobold, "Algorithm and Data Structures for VLSI Design", KAP 2002.
2. Rolf Drechsheler: "Evolutionary Algorithm for VLSI", Second edition, Gale Research Company, 2002
3. Trimburger, "Introduction to CAD for VLSI", Kluwer Academic publisher, 2002