

Course Code	Course Title	L	T	P	C
1156EC410	VLSI CAD- Logic	0	0	0	2

a) Course Category

Independent Learning Course – Massive Open Online Course

b) Preamble

This course gives a complete view of the critical algorithms, data structures & modeling assumptions used in Logic Synthesis and Logic verification

c) Prerequisite

Nil

d) Related Courses

VSD circuit design and SPICE

e) Course Outcomes

On successful completion of this course the student will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Describe Computational Boolean Algebra	K2
CO2	Construct BDD Applications	K2
CO3	Describe Algebra Representations: Satisfiability (SAT)	K2
CO4	Illustrate Logic Synthesis: 2-Level Logic	K2
CO5	Illustrate Logic Synthesis: Multilevel Logic	K2

f) Course Content

UNIT I Computational Boolean Algebra

Computational Boolean Algebra: Basics, Shannon Expansion: Another View, Boolean Difference, Cofactors and functions of cofactors

UNIT II ROBDDs

Binary Decision Diagrams, Ordering, Reduction, Sharing in BDDs, BDD Applications

UNIT III Algebra Representations: Satisfiability (SAT)

Conjunctive Normal Form (CNF), BCP: Boolean Constraint Propagation, Davis-Putnam-Logemann-Loveland Algorithm (DPLL), BDDs vs SAT Functionality

UNIT IV Logic Synthesis: 2-Level Logic

2-Level Logic: Basics, the Reduce-Expand-Irredundant Optimization Loop, One Step: Expand

UNIT V Logic Synthesis: Multilevel Logic

Multilevel Logic and the Boolean Network Model, Algebraic Model for Factoring, Algebraic Division, Role of Kernels and Co-Kernels in Factoring, Finding the Kernels

g) Learning Resources

Online resources

1. https://archive.org/details/academicorrents_ec1c86afebda42f4b36c34ae7b235ef0bd6b9d3