Digital Electronics Design with VHDL

Course Code	20EC6501	**Year**	II	**Semester**	II
Course Category	**Honors**	**Branch**	ECE	**Course Type**	Theory
Credits	4	**L-T-P**	3-1-0	**Prerequisites**	DLD
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	use modern development tools to design complex digital circuits(L2)
CO2	Analyze syntax and behavior of the VHDL language (L4)
CO3	Design the combinational and sequential logic circuits using VHDL(L3)
CO4	Simulate and make a synthesis of designs using Field Programmable Gate Array (L3)

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				2					2		2	2	
CO2		2			2					2			2	
CO3	3		3		3					3			3	
CO4	2		2		2					2			2	
Avg.	2	2	3		2					2		2	2	

Syllabus		
Unit No.	**Contents**	**Mapped CO**
1	**Introduction to Hardware Description Languages** (HDL) and HDL based design, VHDL- Variables, Signals and constants, Arrays, VHDL operators	CO1, CO2
2	**Expressions and signal assignments**. Entities, architecture specification. Component instantiation. VHDL description of combinational networks, VHDL models for a multiplexer	CO1, CO3
3	**VHDL functions**, VHDL procedures, Packages and libraries, Compilation, simulation of VHDL code.	CO1, CO3

4	**Modeling flip-flops using** VHDL, Modeling a sequential machine, VHDL model for a counter, Synthesis of Combinational and sequential circuits.	CO1, CO3
5	**Designing with Programmable Logic Devices:** Read-only memories (ROM, EPROM, EEPROM/FLASH), Programmable logic arrays (PLAs), Programmable array logic (PLAs, Designing with FPGAs, Xlinx 4000 series FPGAs, using a one-hot state assignment	CO1, CO4

Learning Resources
Text Books
1. J.Bhaskar- VHDL Primer, Pearson Education Asia, 2001
Reference Books
1. Stephen Brown and Zvonko Vranesic, Fundamentals of Digital Logic with VHDL Design, Mc Graw-Hill Higher Education.
e-Resources
https://nptel.ac.in/courses/108106177 https://nptel.ac.in/courses/106102181