18ECPE701	FPGA BASED SYSTEM DESIGN	L	T	P	C
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Course Objectives:

1. To study basic concepts of FPGA based systems.
2. To design Combinational and Sequential logics.
3. To know the concepts of architecture and large scale systems.

Unit I	FPGA BASED SYSTEMS	9	+	0

Introduction - Basic Concepts - Digital Design and FPGA's - FPGA Based System Design - VLSI Technology Behind FPGA/CPLD - Manufacturing Processes - CMOS Logic Gates - Wires - Registers and RAM -Packages and Pads.

Unit II	FPGA FABRICS	9	+	0

FPGA Fabrics - FPGA Architectures -SRAM Based FPGAs - Permanently Programmed FPGAs -Chip I/O-Circuit Design of FPGA Fabrics - Architecture of FPGA Fabrics.

Unit III	COMBINATIONAL LOGIC	9	+	0

Combinational Logic -The Logic Design Process - Hardware Description Languages - Combinational Network Delay - Power and Energy Optimization -Arithmetic Logic - Logic Implementation of FPGAs - Physical Design of FPGAs -The Logic Design Process.

Unit IV	SEQUENTIAL MACHINES	9	+	0

Sequential Machines - Sequential Machine Design Process - Sequential Design Styles - Rules For Clocking - Performance Analysis - Power Optimization.

Unit V	ARCHITECTURE AND LARGE SCALE SYSTEMS	9	+	0

Architecture - Behavioural Design - Design Methodologies - Design Example - Large Scale Systems - Busses-Platform FPGAs - Multi FPGA Systems - Novel Architectures

Total (L+T)= 45 Periods

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1	:	Understand the basic concepts of FPGA based systems.
CO2	:	Design Combinational logic.
CO3	:	Design Sequential logic.
CO4	:	Know the concepts of architecture and large scale systems.

Text Books:

1. Wolf, FPGA - Based System Design Wayne,1st Edition, Prentice Hall PTR, 2009.
2. Wayne Wolf, Modern VLSI Design: System-on-Chip Design 4th Edition, Prentice hall , 2008

Reference Books:

1. Stephen D. Brown, and ZvonkoVranesic, "Fundamentals of Digital Logic with Verilog Design, 2nd Edition," McGraw Hill, June, 2007.
2. CemUnsalan and Bora Tar, "Digital System Design with FPGA: Implementation Using Verilog and VHDL", Digital System Design with FPGA: Implementation Using Verilog and VHDL", McGraw Hill, June, 2007
3. Steve Kilts, "Advanced FPGA Design: Architecture Implementation and Optimisation", Wiley interscience, 2017.
4. Justin Rajewski, "Learning FPGAs: Digital Design for Beginners with Mojo and Lucid HDL", O'Reilly Media inc.

E-References:

1. https://theeye.eu/public/Books/robot.bolink.org/Logic%20and%20Computer%20Design%20Fundamentals%203e%20-%20Part%20I%20By%20Mano%2CKime.pdf
2. file:///C:/Users/admin/Downloads/FPGA-Based_System_Design_Wayne_Wolf_SAmp.pdf
3. http://ebook.pldworld.com/_eBook/FPGA%EF%BC%8FHDL/-Eng-/Digital%20Systems%20Design%20Using%20VHDL%20(Charles%20Roth).pdf