SEMESTER VI

EC1608   VLSI DESIGN LABORATORY

LIST OF EXPERIMENTS

Part I: Digital System Design using HDL & FPGA

1. Design an Adder (Min 8 Bit) using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA
2. Design a Multiplier (4 Bit Min) using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA
3. Design an ALU using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA
4. Design a Universal Shift Register using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA
5. Design Finite State Machine (Moore/Mealy) using HDL. Simulate it using Xilinx/ Altera Software and implement by Xilinx/Altera FPGA
6. Design Memories using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA
7. Compare pre synthesis and post synthesis simulation for experiments 1 to 6.

Part II: Digital Circuit Design

1. Design and simulate a CMOS inverter using digital flow
2. Design and simulate a CMOS Basic Gates & Flip-Flops
3. Design and simulate a 4-bit synchronous counter using a Flip-Flops Manual/ Automatic Layout Generation and Post Layout Extraction for experiments 7 to 9
4. Analyze the power, area and timing for experiments 7 to 9 by performing Pre Layout and Post Layout Simulations.by Xilinx/Altera FPGA
5. Compare pre synthesis and post synthesis simulation for experiments 1 to 6.

Part III Analog Circuit Design

1. Design and Simulate a CMOS Inverting Amplifier.
2. Design and Simulate basic Common Source, Common Gate and Common Drain Amplifiers.
3. Analyze the input impedance, output impedance, gain and bandwidth for experiments 10 and 11 by performing Schematic Simulations.
4. Design and simulate simple 5 transistor differential amplifier. Analyze Gain,
5. Bandwidth and CMRR by performing Schematic Simulations.

Part-IV Implementation of IOT applications using FPGA

1. Measurement and Analysis: Develop the acceleration and vibration measurement of an object and generate the analysis report.
2. Real-Time Tank Level Control: Prototype the RT tank level observation and automatic pump control using sensors and actuators.
3. Remote Monitoring using IoT: Monitor the ambient light intensity and transfer the data to the cloud using IOT protocol.

LIST OF EQUIPMENT

Sl. No.	Description of Equipment
1.	Xilinx ISE/Altera Quartus/ equivalent EDA Tools
2.	Xilinx/Altera/equivalent FPGA Boards
3.	Cadence/Synopsis/ Mentor Graphics/Tanner/equivalent EDA Tools
4.	Personal Computers
5.	NI myRIO FPGA board and Lab View software tool