VLSI Design

R.Arun Pandiyan M.E

REguLatIon2021

VLSI - LABMANUAL

(ELECTRONICS AND COMMUNICATION ENGINEERING)

REGULATION – 2021

AUTHOR

Mr. R. ARUN PANDIYAN.,M.E.,

GENERAL GUIDELINES AND SAFETY NSTRUCTIONS

1. Sign in the log register as soon as you enter the lab and strictly observe your lab timings.
2. Strictly follow the written and verbal instructions given by the teacher / Lab Instructor. If you do not understand the instructions, the handouts and the procedures, ask the instructor or teacher.
3. **Never work alone!** You should be accompanied by your laboratory partner and / or the instructors / teaching assistants all the time.
4. It is mandatory to come to lab in a formal dress and wear your ID cards.
5. Do not wear loose-fitting clothing or jewels in the lab. Rings and necklaces are usual excellent conductors of electricity.
6. Mobile phones should be switched off in the lab. Keep bags in the bag rack.
7. Keep the labs clean at all times, no food and drinks allowed inside the lab.
8. Intentional misconduct will lead to expulsion from the lab.
9. Do not handle any equipment without reading the safety instructions. Read the handout and procedures in the Lab Manual before starting the experiments.
10. Do your wiring, setup, and a careful circuit checkout before applying power. Do not make circuit changes or perform any wiring when power is on.
11. Avoid contact with energized electrical circuits.
12. Do not insert connectors forcefully into the sockets.
13. **NEVER** try to experiment with the power from the wall plug.
14. Immediately report dangerous or exceptional conditions to the Lab instructor / teacher: Equipment that is not working as expected, wires or connectors are broken, the equipment that smells or "smokes". If you are not sure what the problem is or what's going on, switch off the Emergency shutdown.
15. Never use damaged instruments, wires or connectors. Hand over these parts to the Lab instructor/Teacher.
16. Be sure of location of fire extinguishers and first aid kits in the laboratory.
17. After completion of Experiment, return the bread board, trainer kits, wires, CRO probes and other components to lab staff. Do not take any item from the lab without permission.
18. Observation book and lab record should be carried to each lab. Readings of current lab experiment are to be entered in Observation book and previous lab experiment should be written in Lab record book. Both the books should be corrected by the faculty in each lab.
19. Special Precautions during soldering practice

    a. Hold the soldering iron away from your body. Don't point the iron towards you. b. Don't use a spread solder on the board as it may cause short circuit.

    c. Do not overheat the components as excess heat may damage the components/board.

    d. In case of burn or injury seek first aid available in the lab or at the college dispensary.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATION – 2021

EC3561 – VLSI LABORATORY

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PREFACE

This book on "**VLSI LABORATORY MANUAL (Electronics and communication Engineering)**" covers the complete syllabus prescribed by the Anna University, Chennai for the fourth semester **B.E/ B.Tech**. Degree course under **Outcome Based Education Credit System with the new regulation 2021**.

This book covers Basic combinational and sequential circuits, shift resistor, memories, finite state machine, counters and simulation of CMOS basic gates, CMOS inverter, counters, inverting amplifier, differential amplifier, and CS,CB,CC.

We hope that this book will be useful to both teachers and students. Finally we would request the readers to kindly send their valuable comments and suggestions towards the improvement of the manual and the same will be gratefully acknowledge.

Any suggestion from the reader for the betterment of this book can be droppedinto arunpandiyan126@gmail.com.

Mr. R. ARUN PANDIYAN.,M.E

ACKNOWLEDGEMENT

ANNAI MIRA COLLEGE OF ENGINEERINGAND TECHNOLOGY

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

LAB MANUAL
(Regulation - 2021)

Subject Code / Name **:** EC3561 / VLSI Laboratory
Semester/Year **:** V/III – ECE

PREPARED BY

Mr.R.ARUN

PANDIYAN.,M.E

Assistant Professor / ECE

APPROVED BY

Dr.V.SRIVIDHYA.M.E.,Ph.D

HOD / ECE

Department of Electronics and Communication Engineering

EC 3561 VLSI LABORATORY

List of Experiments

1. Design of basic combinational and sequential (Flip-flops) circuits using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA

2. Design an Adder ; Multiplier (Min 8 Bit) using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA

3. Design and implement Universal Shift Register using HDL. Simulate it using Xilinx/Altera Software

4. Design Memories 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 3-bit synchronous up/down counter using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA

7. Design 4-bit Asynchronous up/down counter using HDL. Simulate it using Xilinx/Altera Software and implement by Xilinx/Altera FPGA

8. Design and simulate a CMOS Basic Gates & Flip-Flops. Generate Manual/Automatic Layout .

9. Design and simulate a 4-bit synchronous counter using a Flip-Flops. Generate Manual/Automatic Layout

10. Design and Simulate a CMOS Inverting Amplifier.

11. Design and Simulate basic Common Source, Common Gate and Common Drain Amplifiers.

12. Design and simulate simple 5 transistor differential amplifier.

TOTAL = 45 PERIODS

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EC3561 - VLSI LABORATORY

Name : ………………………..

Register Number : ……………………….

Year & Branch : ………………………..

Semester : ……………………….

Academic Year : ……………………….

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<u>*Certificate*</u>

This is to Certify that the bonafide record of the practical work done by

……………………………… Register Number …………………… of III year

B.E (Electronics and Communication Engineering) in the

…………………………………………during the academic year 2023 – 2024 .

Signature of the lab incharge   **Signature of HOD**

Submitted for the university practical examination held on -----------------

Internal Examiner   **External Examiner**