

Date:

Practical No.18: Mini Project - Simulate, Design, Solder & Test PCB of Electronics Circuitry

A. Objective: Mini Project: Fabricate a complex electronic circuit (SMD components desirable) on PCB. (Apply all skills learned in this course: Schematic Design, Simulation, PCB Layout, Fabrication, Soldering of component & Functionality Testing)

B. Expected Program Outcomes (POs): PO1, PO2, PO3, PO4, PO7

C. Expected Skills:

- Familiarize Schematic and layout design flow using Electronic Design Automation (EDA) Tools.
- Prepare PCB Layout of electronic circuits by using PCB layout design tools

D. Expected Course Outcomes (COs): CO3

E. Practical Outcome (PRO): Mini Project: Fabricate a complex electronic circuit (SMD components desirable) on PCB. (Apply all skills learned in this course: Schematic Design, Simulation, PCB Layout, Fabrication, Soldering of component & Functionality Testing)

F. Expected Affective Domain Outcome (ADOs):

- Student may remember newly introduced concepts.
- Student shows the ability to solve problems.

G. Resources/Equipment Required:

Sr. No.	Instrument/ Equipment/ Components/Trainer kit	Specification	Quantity
1	PC with Internet	Minimum - Core i3, 4GB RAM, 500 GB HDD	1
2	PCB Designing Software	Open Source / Licensed	1

H. Recommended Safety Measures & Precautions:

- Do not add or remove any Software in Lab PC without prior permission.
- Take a backup of your project files after each lab.
- Do not delete or modify project files of other students.

I. Prerequisite Theory:

Mini Project helps you to explore and strengthen the understanding of fundamentals through practical application of theoretical concepts. Mini Project can help you to boost your skills and widen your horizon of thinking. It acts like a beginners guide to do larger projects later in their career. Here are some tips, which help you to come out with a successful Mini Project.

- Selection of Topic: Selection of topic is a huge and important task in a Mini Project. One should have a clear idea about one's subject strengths and the selected topic should be relevant to it. Always select the project that has value addition. As a graduate you should select a project which is either advantageous to a lot of people

or enhance your technical and managerial skills. Your project must play its role towards a positive growth/development in that specific field.

- Research about the selected topic online: Do some online research about the selected topic. Go through the research papers from different researchers around the world on the topics related to Mini Project. Find some websites containing the information about the materials used for Mini Project.
- Suggestions from subject experts: Go to the subject experts in your college and interact with them about the Mini Project topic. You can also meet many subject experts from various parts of India through social media and some discussion forums. This helps you in getting suggestions in different possible ways, through which you can get a clear idea on your Mini Project topic.
- Planning: After getting a clear idea about the topic, prepare a rough plan about procurement of resources, experimentation and fabrication along with your teammates. Make a rough schedule, adapt to it and distribute the work among your teammates. This will keep your Mini Project on track and individuals will come to know about their part in the Mini Project rather than any individual (leader) taking full responsibilities.
- Execution of plans: Make sure that the materials will be ready for the experimentation/fabrication by the scheduled time. Follow the schedule during experimentation/fabrication to get accurate and efficient results.
- Presentation: Experimentation/Fabrication does not make a Mini Project successful; one should be able to present the results in proper way. So it should be prepared in such a way that, it reflects the exact objective of your Mini Project. Some of the key features of drafting good mini projects report are:
 - o Facilitates quicker and easier way to communicate the information
 - o Can assist in selective reading
 - o Easier navigation to contents with numbered headings and sub headings
 - o Better explanations with figures, tables and charts

J. Program Logic - Flow chart / Algorithm / Pseudo-Code

K. Procedure / Source Code

L. Input-Output:

Paste snapshots of each phase – Schematic, Simulation, PCB Layout, Fabricated PCB and Soldered Complete PCB. Attach separate sheets if needed.

M. Conclusion:

N. Quiz:

- Describe difficulties you have faced in this project.

- Prepare and submit mini project report for work you have carried out in this experiment.

O. References:

- <https://www.skyfilabs.com/blog/6-steps-to-do-successful-mini-project>
- <https://www.elprocus.com/engineering-students-give-importance-to-mini-projects/>
- <https://chennai.vit.ac.in/importance-of-final-year-engineering-projects/>
- Student's Recommendation –

P. Assessment Rubrics:

Sr. No.	Criteria	Maximum Marks	Obtained Marks
1	Performance	5	
2	Troubleshooting	5	
3	Results & Conclusions	5	
4	Quiz Answers	5	
5	Viva-Voce	5	
	Total	25	

Faculty Sign with Date