Diploma
in
Electronics & Communication Engineering

Course Code:025030305
PCB Design Lab

Programme / Branch Name	Diploma in Electronics and Communication Engineering		
Course Name	PCB Design Lab	Course Code	025030305
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses   BSC: Basic Science Courses
ESC: Engineering Science Courses   PCC: Program Core Courses
OEC: Open Elective Courses   PEC: Program Elective Courses

1) Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				Evaluation Scheme			
L	T	P	Total Credit	CCE	SEE (Th)	SEE (Pr)	Total Marks
0	0	4	2	50	-	50	100

Legends:

L: Lectures   T: Tutorial   P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2) Prerequisite
✓ Basic knowledge of Electronic Components.

3) Rationale
This is a basic course for designing of PCB using software. PCB (Printed Circuit Board) designing is an integral part of each electronics product and this program is designed to make students capable to design their own projects PCB up to industrial grade.

4) Objectives
✓ To familiarize the electronic components and basic electronic instruments.

✓ To make familiar with PCB design and various processes involved.

✓ To provide in depth core knowledge in the fabrication of Printed.

✓ To provide the knowledge in assembling and testing of the PCB based electronic circuits.

5) Contents

Unit No.	Topics	Sub-Topics	Learning Outcomes	% Weightage	Hours
1	Schematic Capture	1.1. Introduction to OrCAD 1.2. Schematic capture 1.3. Schematic to layout transfer 1.4. Layout Printing	• Introduction to OrCAD schematic capture tool, Simulation of simple electronic circuit. • Schematic to layout transfer, Layout Printing.	10	4
2	PCB Design Process	2.1. Conception Level Introduction 2.2. Checking foot prints of the components 2.3. Tracing of Track, holes and layout.	• Conception Level Introduction: Specifying Parts, Packages and Pin Names, Libraries and • Checking foot prints of the components, Part list, Netlist, Making Netlist Files, • Routing Traces, Modifying Traces, Mounting Holes, Adding Text, PCB Layout, DRC, Pattern Transfer.	10	4
3	PCB Fabrication Process	3.1. Etching 3.2. Cleaning 3.3. Drying 3.4. Drilling	• Chemical process of the PCB • Final PCB processing	10	6
4	Assembling and Testing	4.1. Assembling of components 4.2. Testing of PCB	• Identifying the components and its location on the PCB, soldering of active and passive components • Testing the assembled circuit for correct functionality.	10	6
5	Mini Projects	5.1. Assembling of electronic circuit/system on PCB, test and show the functioning. (Any Five)	• Household or lab work usage projects use in daily work.	10	6

6) List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills that students can acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Sr. No	Practicals / Exercises	Key Competency	Hours
1	PCB Designing of Basic and Analog Electronic Circuits	Electronic Components	6
2	PCB Designing of Power Supplies	Electronic Components	6
3	PCB Designing of Different Sensor modules	Electronic Components	6
4	PCB Designing of Electronics Projects	Electronic Components	6

7) Execution Mode

- Every student should perform Project activity independently as assigned by the faculty based on interest of the student. Student can also choose any other similar activity with a prior approval from the concerned faculty.
- Project activities shall be carried out throughout the semester and present the project report at the end of the semester.
- Report-size shall be qualitative and not to exceed 6 pages
- Each of the activity can be carried out off-class; however, demonstration/presentation should be done during laboratory sessions.
- Assessment shall be made based on quality of activity, presentation/demonstration and report.
- Assessment is made based on quality of work as prescribed by the following rubrics table.

8) Model of rubrics for assessing student activity (for every student)

Rubrics Topic	Marks
1. Research, information gathering, and sharing of work	10
2. Design of PCB, Schematic	20
3. Layout design	20
4. Fabrication	20
5. Mounting component, testing, report and viva	30
Total Marks:	100

9) Reference Books

1) P-Cad 2002 Professional Tools for Board Layout Specialists, Altium Limited
2) Complete PCB design using OrCAD capture and layout by Kraig Mitzner, Newnes Publication, Oxford

10) Open Sources (Website, Video, Movie)

1) www.expresspcb.com/expresspcbhtm/download.htm
2) www.freepcb.com/
3) http://www.circuitstoday.com/simple-electronics-projects-and-circuits
4) http://www.buildcircuit.com/5-beginners-projects-that-work-in-the-first-attempt/