Anekant Education Society's
Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati

Autonomous

Short Term Certificate Courses
Department of Electronics

PCB Designing & Circuit Simulation

Objectives

1. Know the basic concepts of printed circuit boards (PCBs), including types, materials, and fabrication processes and electronics components.
2. Learn the principles of electronic circuit design, including component selection, schematic representation and circuit analysis.
3. Develop skills in simulating electronic circuits to predict performance, validate designs, and troubleshoot issues using simulators.
4. Gain proficiency in using Proteus software for circuit simulation, PCB layout design, and component modeling.
5. Understand the steps involved in designing a PCB layout, including component placement, routing, and design rule checks.
6. Learn the processes of prototyping, testing, and iterating on designs to ensure functionality and reliability.
7. Ability to troubleshoot and debug circuits both in simulation and in physical prototypes.

Course Outcomes: On completion of the course, students will be able to

CO1: Students will be familiar with basic electronics components, concepts, including Ohm's Law, Kirchhoff's laws and component behavior.

CO2: Successfully create a functional electronic circuit schematic using Proteus, demonstrating an understanding of circuit components and their interactions.

CO3: Ability to perform circuit simulations to analyze voltage, current, and power characteristics, enabling prediction of real-world performance.

CO4: Design a complete PCB layout from a circuit schematic, adhering to industry standards and best practices for manufacturability.

CO5: Apply design rule checks (DRCs) to ensure the PCB meets electrical and mechanical specifications, minimizing errors in the final product.

CO6: Build a physical prototype based on the PCB design and conduct tests to verify the circuit's functionality against design specifications.

CO7: Students will be able to prepare comprehensive documentation of the design process, including schematics, layouts, and testing results and effectively presents findings.

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Head
Department of Electronics

Topic-I **10**

Introduction to Electronic components, Differentiation of electronic components Circuit designing technique, Component identification and testing, Introduction to PCB & Circuit Designing, Classifications of PCB, Single layer, multilayer. Material used for PCB fabrications. Basics of hardware and software, New and upcoming Technologies, Introduction to analog and Digital circuit design, Introduction to circuit simulation software.

Tpoic-II **08**

Introduction to Electronic design automation(EDA) tools for PCB designing: Brief Introduction of various simulators and PCB design software, Selecting the Components Footprints as per design, Msaking different circuits, Proteus Software Installation, Hands on PCB design software Designing of basic circuits on Proteus, Simulation of circuits on Proteus, Testing the Schematic for error, Making Board Layout, Auto routing and manual routing

Toipc III **08**

Design rules for PCB: Design rules for Digital circuit PCBs, Analog circuit PCBs, high frequency and fast pulse applications, Power electronic applications.

Development of PCB - Introduction to etching, Drilling, Soldering Methods, Safety Precautions, Different Methods of Soldering and tools.

Topic -IV **06**

Designing of Single and Dual Power supply, Relay Driver Circuit, IR Sensor module, Astable Multivibrator.

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