

<b>Course Code:</b>		<b>Course Title:</b> PRINTED CIRCUIT BOARD (PCB) DESIGNING	
<b>School/Centre:</b>		SENSE	
<b>Beneficiaries:</b> (UG/PG/Research)		UG/PG/Research	
<b>Course Objectives:</b>	<ol style="list-style-type: none"><li>1. Study the fundamental steps involved in PCB design.</li><li>2. Understand the concept of designing single layer and multilayer PCB.</li><li>3. Study the different design considerations of PCB Fabrication.</li><li>4. Obtain knowledge of various EDA tools for PCB designing.</li><li>5. Study various standards in PCB testing.</li></ol>		
<b>Course Outcomes:</b>	<ol style="list-style-type: none"><li>1. Understand the fundamental process in PCB design.</li><li>2. Understand the design and manufacturing techniques of PCB.</li><li>3. Create and Fabricate PCB using EDA tools.</li><li>4. Comprehend the standards involved in PCB design.</li><li>5. Evaluate and test the PCB for the designed circuits.</li></ol>		
<b>Units</b>	<b>Topics</b>		<b>Hours</b>
<b>1</b>	<b>Introduction :</b> PCB definition, Evolution of PCBs, PCB materials, PCB design tools, PCB development process, PCB soldering tools, soldering flux, soldering wires, and cleaning materials. <ul style="list-style-type: none"><li>• Introduction to Printed circuit board: Fundamental of electronic components.</li><li>• Basics of printed circuit board designing: Layout planning, general rules and parameters, ground conductor considerations, thermal issues, crosstalk, check and inspection of artwork</li></ul>		<b>6</b>
<b>2</b>	<b>Fundamentals of Printed Circuit Boards :</b> Components of PCB, Basic Electronic Circuits, Classification of PCBs, Manufacturing of PCBs, Single sided, double sided, Multilayer, and Flexible Boards, Challenges in PCB design and Manufacturing, Standards on PCB. <ul style="list-style-type: none"><li>• Study on types of PCB layers, through Hole and SMD Components.</li><li>• Schematic Creation and simulation of an electronic circuit</li><li>• Mapping Components of an electronic circuit</li></ul> Set Parameters for PCB Design.		<b>6</b>
<b>3</b>	<b>Layout Design Considerations:</b> General PCB design Consideration, Mechanical Design Consideration, Electrical Design Consideration, Conductor Patterns, Component Placement Rules, Fabrication and Assembly Consideration, Environmental Factors, Cooling Requirements and Package Density. <ul style="list-style-type: none"><li>• Create PCB Layout of a clamper circuit</li><li>• Create PCB Layout of a Full-wave Rectifier.</li></ul> Create PCB Layout of an ASTABLE MUTIVIBRATOR USING 555 IC		<b>6</b>
<b>4</b>	<b>Electronic Design Automation Tools</b> Introduction to Electronic design automation (EDA) tools for PCB designing: Brief Introduction of various simulators, Selecting the Components Footprints as per design, Making New Footprints, Assigning Footprint to components, Net listing, PCB Layout Designing, Auto-routing and manual routing. Assigning specific text (silkscreen) to design, creating design report, and creating manufacturing data (GERBER) for		<b>6</b>

	design. <ul style="list-style-type: none"> <li>• Create PCB Layout of Transistor Amplifier.</li> <li>• Create PCB Layout of RC Phase Shift Oscillator Circuit</li> <li>• Create PCB Layout of Summing Amplifier Using OPAMP</li> <li>• Create PCB Layout of full adder using half-adders.</li> </ul>	
<b>5</b>	<b>Quality, Reliability, and Acceptability Aspect</b> Quality assurance, Teasing for Quality Control, Quality Control Methods, Testing of Printed Circuit Boards, Reliability Testing, Acceptability of PCBs, and Useful Standards. <ul style="list-style-type: none"> <li>• Create PCB Layout of J-K flip flop.</li> <li>• Create PCB Layout of 4-BIT Binary Counter</li> <li>• Create PCB Layout of variable DC power supply.</li> </ul> Create PCB Layout of Temperature Sensing Circuit	<b>6</b>
<b>Total Course Duration</b>		<b>30</b>
<b>Date of Board of Studies in which it is recommended</b>		
<b>Date and number of Academic Council in which it is approved</b>		