Session: 2024-25			
Part A - Introduction			
Subject	ELECTRONICS		
Semester	FOURTH		
Name of the Course	PCB DESIGNING and FABRICATION		
Course Code	B23-VOC-214		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	VOC		
Level of the course	100-199		
Pre-requisite for the course (if any)	NIL		
Course Learning Outcomes (CLO):	After completing this course, the learner will be able to: 1. Familiarize with the type of devices/components that may be mounted on PCB 2. Understand the PCB layout techniques for optimized component density and power saving. 3. Perform design and printing of PCB with the help of various image transfer and soldering techniques 4. Learn various soldering techniques for efficient PCB design 5. Understand the trends in the current PCB industry		
Credits	Theory	Practical	Total
	2	2	4
Contact Hours	2	4	6
Max. Marks: 100 (50 Theory + 50 Practical) Internal Assessment Marks: 15 Theory +15 Practical End Term Exam Marks: 35 Theory + 35 Practical		Exam Time: 3 Hours each for Theory & Practical	

Part B- Contents of the Course

Instructions for Paper- Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No. 1, which will be short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each Unit I to IV. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	**Electronics Components and Types of PCB**: Resistors, Capacitor, Inductor, Transformer, Speaker/Buzzer, Switches Diode, LED, Transistor, MOSFET and IC's. Single sided, Double sided and Multilayer boards, Plated through holes technology, Benefits and limitations of Surface Mount Technology (SMT).	8

II	**Layout :** Layout Planning: General rules of Layout, Resistance, Capacitance and Inductance, Conductor Spacing, Supply and Ground Conductors, Component Placing and mounting, requirement and package density, Layout check.	7
III	**Laminates and Photoprinting:** Properties of laminates, Types of Laminates, Manual cleaning process, Basic printing process for double sided PCB's, Photo resists, Wet film resists, Coating process for wet film resists, Exposure and further process for wet film resists, Dry film resists.	8
IV	**Etching and Soldering:** Introduction, Etching machine, Etchant system. Principles of Solder connection, Solder joints, Solder alloys, Soldering fluxes. Soldering & De-soldering tools and Techniques.	7
V	**Note:** A candidate is required to complete minimum 1 project out of the list provided (2-5) during course of study in this semester. **1.** To become familiar with PCB Design Software "**Express PCB**" for PCB design and assembling components. 2. Project1: Design, fabrication and testing of a 9 V power supply with zener regulator. 3. Project2: Design, fabrication and testing of INVERTER circuit. 4. Project3: Design, fabrication and testing of ADC circuit. 5. Project4: Design, fabrication and testing of DAC circuit.	60

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory 15 Marks** • Class Participation: **4 Marks** • Seminar/presentation/assignment/quiz/class test etc.: **4 Marks** • Mid-Term Exam: **7 Marks** ➢ **Practicum 15 Marks** • Class Participation:**05** • Seminar/Demonstration/Viva-voce/Lab records etc.: **10 Marks** • Mid-Term Exam:	**End Term Examination:** 35 Marks 35 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Walter C.Bosshart "PCB DESIGN AND TECHNOLOGY" Tata McGraw Hill Publications, Delhi. 1983
2. Clyde F.Coombs "Printed circuits Handbook" III Edition, McGraw Hill.
3. Printed Circuit Board –Design, Fabrication, Assembly & Testing, R.S. Khandpur, TATA McGraw Hill Publisher