

INSTITUTE	FACULTY OF TECHNOLOGY
PROGRAM	MASTER OF TECHNOLOGY in ELECTRICAL ENGINEERING
SEMESTER	1
COURSE TITLE	COMPUTER AIDED PCB DESIGN
COURSE CODE	01EV1107
COURSE CREDITS	4

Objective:

- 1 The objective is to introduce learner to design of printed circuit boards and their manufacturing using Computer Aided Tools.

Course Outcomes: After completion of this course, student will be able to:

- 1 Distinguish the various terms of PCB design
- 2 Select, place, and connect circuit components in different layer.
- 3 Develop different layer required for manufacturing process.
- 4 Fabricate Printed circuit board for the given circuit.
- 5 Design of PCB with compliance to EMI and EMC concepts

Pre-requisite of course:None

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction to PCB Design The old days, PCB packages, standard, The schematic , Imperial and metric , working to grids, working from the top , tracks ,pads , via ,polygons , clearances	8
2	Component and placement & Design Create new project, Drawing the Schematic, Add the Components, Join Them Together, electrical rule check, laying rule check, Basic Routing, Finishing touches, Single sided design, Double sided design	10

Contents : Unit	Topics	Contact Hours
3	Layers Silkscreen, solder mask, mechanical layers, keep out, Layer alignment, Netlists, rats net, design rule checking, forward and backward annotation, multi-layer design, power planes, good grounding, good bypassing , high frequency design techniques, Double sided loading, auto routing ,auto placement	8
4	Introduction to PCB Fabrication & Assembly Steps involved in fabrication of PCB, PCB Fabrication techniques- single, double sided and multilayer, Etching: chemical principles and mechanisms, Post operations- stripping, black oxide coating and solder masking component assembly processes	8
5	EMI EMC Design for Printed Circuit Boards Introduction to EMI EMC , EMI Emissions Sources , Inductance, Ground, Shielding	8
Total Hours		42

Textbook :

- 1 Jumpstarting Your Own PCBs Learn How to Design and Make Customized Circuit Boards, Shawn Wallace, Maker Media, Inc San Francisco, -
- 2 Make your own PCBs with EAGLE from schematic Designs to Finished Boards, Simon Monak, Mc Graw Hill Education, -
- 3 PCB design Tutorial, David L. Jones, alternatzone.com, -

References:

- 1 PCB Design for real world EMI control, PCB Design for real world EMI control, Bruce R. Archambault, IBM corporation, Springer science + business Media LLC., -
- 2 Complete PCB design using ORCAD capture and PCB edito, Complete PCB design using ORCAD capture and PCB edito, Kraig Mitzner, Elsevier Inc., -

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
5.00	10.00	15.00	30.00	20.00	30.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc

Instructional Method:

- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and classroom.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 https://onlinecourses.nptel.ac.in/noc24_ee127/preview