SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

INDEX

Hands on Training in PCB Design and Fabrication

HoD/EEE

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CIRCULAR

18.06.2018

This is to inform that Hands on training program on **PCB Design and Fabrication** is going to be conducted for IV-year EEE students from 03.12.2018 to 08.12.2018 by Er.S.P.Sarathy, Former Schneider Electric System India Pvt. Ltd, Chennai. Henceforth interested students are informed to register their name to Mr.B.Marisekar, AP / EEE on or before 17.10.2018.

Faculty Incharge

HoD/EEE

PCB DESIGN AND FABRICATION

Syllabus

Module I: (9 Hrs)

Introduction to Printed circuit board: fundamental of electronic components, basic electronic circuits, Basics of printed circuit board designing: Layout planning, general rules and parameters, ground conductor considerations, thermal issues, check and inspection of artwork.

Module II: (6 hrs)

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

Module III: (10 hrs)

Introduction to Electronic design automation(EDA) toolsfor PCB designing: Brief Introduction of various simulators,SPICE and PSPICE Environment, 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 report of design, creating manufacturing data (GERBER) for design.

Module IV: (7 hrs)

Introduction printed circuit board production techniques: Photo printing, film- master production, reprographic camera, basic process for double sided PCBs photo resists, Screen printing process, plating, relative performance and quality control, Etching machines, Solders alloys, fluxes, soldering techniques, Mechanical operations.

Module V: (6 hrs)

PCB Technology Trends: Multilayer PCBs. Multiwire PCB, Flexible PCBs, Surface mount PCBs, Reflow soldering, Introduction to High-Density Interconnection (HDI) Technology.

Module VI: (7 hrs)

PCB design for EMI/EMC: Subsystem/PCB Placement in an enclosure, Filtering circuit placement, decoupling and bypassing, Electronic discharge protection, Electronic waste; Printed circuit boards Recycling techniques, Introduction to Integrated Circuit Packaging and footprints, NEMA and IPC standards.

Text Books:

1. Printed circuit board design, fabrication assembly and testing By R. S. Khandpur, Tata McGraw Hill 2006

Reference Books:

1. Printed circuit Board Design and technology, Walter C. Bosshart
2. Printed Circuits Handbook, Sixth Edition, by Clyde F. Coombs, Jr, Happy T.Holden,Publisher: McGraw-Hill Education Year: 2016

SSM Institute of Engineering and Technology

Sindalagundu post, Palani main road, Dindigul – 624002 , Tamilnadu.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

IV YEAR NAME LIST (2018-2019)

S.NO	REGISTER NO	NAME
1	922115105001	ABARNA. K
2	922115105002	AKILAN.N
3	922115105003	ANAND.T
4	922115105004	ANIT DAYANA. A
5	922115105005	ANTO HUBERT. J
6	922115105006	ANUSHA. K
7	922115105007	ARUN. S
8	922115105008	ARUN RAJ. K
9	922115105009	BAIZ. N
10	922115105010	BALAJI. J
11	922115105011	BHARATHIPERIYASAMY.S
12	922115105012	BOOMA. R
13	922115105013	DEEPAK RAJ. K.A
14	922115105014	DEVAKI. S
15	922115105015	DEVARAJ. S
16	922115105016	GOBIYA. C
17	922115105017	GOWSALYA.V
18	922115105018	GURU SRI. K
19	922115105019	JANANI. P
20	922115105020	JANSI. S
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22	922115105022	KARTHICK. R
23	922115105023	KARTHIKA. P
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29	922115105029	MASANADEVI. J
30	922115105030	MASI. R
31	922115105031	MOHAMED ABDUL AYUB.M
32	922115105032	MOHAMED SALMAN. S
33	922115105033	MUSRETH. N
34	922115105034	MUTHURAJ. K
35	922115105035	NARTHIGASREE. D
36	922115105036	NAVEEN ROMI. J

37	922115105037	NEWTONSLENDO. J
38	922115105038	PANDIPRIYANKA. M
39	922115105039	PRASANTH.I
40	922115105040	PRIYANKA.R.M
41	922115105041	RAJKUMAR. A
42	922115105042	RAMACHANDRAN. M
43	922115105043	RAMKUMAR. L
44	922115105044	RAMYA.V
45	922115105045	ROBERT RAJA.A
46	922115105046	SHARMILA. M
47	922115105047	SHRIVISHNUKUMAR. V
48	922115105048	SINDHU. M
49	922115105049	SOURAV PRASANNA. V
50	922115105050	SUNDAR RAJAN. K
51	922115105051	THAMARAI KANNAN. B
52	922115105052	THANGA PANDIAN. P
53	922115105053	VIDHYA. U
54	922115105054	VIGNESH.L
55	922115105055	VIGNESHWAR. E
56	922115105056	VIJAYPANDI. S
57	922115105057	VISHAL ADHITHYA.A
58	922115105058	VISHNU. V
59	922115105059	VIVEK KUMAR. G
60	922115105701	CYRIL VALAN.J

Class Incharge

HoD/EEE

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

Hands on Training in PCB Design and Manufacturing

STUDENT FEEDBACK FORM

Year/Sem:

Date:

Dear Student,

Thank you for your participation Hands on Training in **PCB Design and Fabrication**. We would like to hear from you - areas that you find useful and areas that you think we can do better. Your feedback will help us evaluate the effectiveness of this program and allow us to make improvementsin future.

S.No	Criteria	Rating				
		Excellent	Very good	Good	Fair	Satisfactory
1	Course content	✓				
2	Skill development		✓			
3	Motivation		✓			
4	Regularity and punctuality of trainer	✓				
5	Coverage of syllabus	✓				
6	Interaction		✓			
7	Individual attention			✓		
8	Outcome	✓				

Feel free to give QUALITATIVE comments too

.....

V. Ramya

Signature of the student with name

V. Ramya

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

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Feel free to give QUALITATIVE comments too

.....

M. Sindhu

Signature of the student with name

M. Sindhu

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

Value added course on PCB Design and Manufacturing

STUDENT FEEDBACK FORM

Year/Sem:

Date:

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6	Interaction			✓		
7	Individual attention		✓			
8	Outcome		✓			

Feel free to give QUALITATIVE comments too

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Anusha .

ANUSHA.K

Signature of the student with name

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

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5	Coverage of syllabus	✓				
6	Interaction	✓				
7	Individual attention		✓			
8	Outcome		✓			

Feel free to give QUALITATIVE comments too

.....

GOBIYA.C

Signature of the student with name

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

Value added course on PCB Design and Manufacturing

STUDENT FEEDBACK FORM

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6	Interaction			✓		
7	Individual attention	✓				
8	Outcome		✓			

Feel free to give QUALITATIVE comments too

.....

GURU SRI.K

Signature of the student with name

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Hands on Training Program on PCB Design & Fabrication

Students Attendance Report

Roll No.	Register No.	Name of the Student	02.12.2019		03.12.2019		04.12.2019		05.12.2019		06.12.2019		07.12.2019	
			FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	FN	AN
1	922115105001	ABARNA. K	/	/	/	/	/	/	/	/	/	/	/	/
2	922115105002	AKILAN.N	/	/	/	/	/	/	/	/	/	/	/	/
3	922115105003	ANAND.T	/	/	/	/	/	/	/	/	/	/	/	/
4	922115105004	ANIT DAYANA. A	/	/	/	/	/	/	/	/	/	/	/	/
5	922115105005	ANTO HUBERT. J	/	/	/	/	/	/	/	/	/	/	/	/
6	922115105006	ANUSHA. K	/	/	/	/	/	/	/	/	/	/	/	/
7	922115105007	ARUN. S	/	/	/	/	/	/	/	/	/	/	/	/
8	922115105008	ARUN RAJ. K	/	/	/	/	/	/	/	/	/	/	/	/
9	922115105009	BAIZ. N	/	/	/	/	/	/	/	/	/	/	/	/
10	922115105010	BALAJI. J	/	/	/	/	/	/	/	/	/	/	/	/
11	922115105011	BHARATHI PERIYASAMY.S	/	/	/	/	/	/	/	/	/	/	/	/
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18	922115105018	GURU SRI. K	/	/	/	/	/	/	/	/	/	/	/	/
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21	922115105021	JEYA SURYA. J	/	/	/	/	/	/	/	AB	/	/	/	/
22	922115105022	KARTHICK. R	/	/	/	/	/	/	/	/	/	/	/	/
23	922115105023	KARTHIKA. P	/	/	/	/	/	/	/	/	/	/	/	/
24	922115105024	KARUPPAIAH.M	/	/	/	/	/	/	/	/	/	/	/	AB

Roll No.	Register No.	Name of the Student												
			FN	AN	FN	AN	FN	A..	FN	AN	FN	AN	FN	AN
25	922115105025	KAVITHA.R	/	/	/	/	/	/	/	/	/	/	/	/
26	922115105026	KIRUTHIHA. K	/	/	/	/	/	/	/	/	/	/	/	/
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33	922115105033	MUSRETH. N	/	/	/	/	/	/	/	/	/	/	/	/
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43	922115105043	RAMKUMAR. L	/	/	/	/	/	/	/	/	/	/	/	/
44	922115105044	RAMYA.V	/	/	/	/	/	/	/	/	/	/	/	/
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46	922115105046	SHARMILA. M	/	/	/	/	/	/	/	/	/	/	/	/
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54	922115105054	VIGNESH.L	/	/	/	/	/	/	/	/	/	/	/	/
55	922115105055	VIGNESHWAR. E	/	/	/	/	/	/	/	/	/	/	/	/
56	922115105056	VIJAYPANDI. S	/	/	/	/	/	/	/	/	/	/	/	/

			FN	AN	FN	AN	FN	A	FN	AN	FN	AN	FN	AN
57	922115105057	VISHAL ADHITHYA.A	/	/	/	/	/	AB	AB	/	/	/	/	/
58	922115105058	VISHNU. V	/	/	/	/	/	/	/	/	/	/	/	/
59	922115105059	VIVEK KUMAR. G	/		/	/	/	/	/	/	/	/	/	/
60	922115105701	CYRIL VALAN.J	/	/	/	/	/	/	/	/	/	/	/	/
		Present	60	59	60	60	59	58	59	59	59	60	60	59
		Absent	-	01	-	-	01	02	01	01	01	-	-	01
		Signature												

Faculty Incharge 8/12/18

Hod/EEE

RegNo: .....

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

Value added Course on PCB Fabrication and Manufacturing

Assessment Question

Answer for all the questions (Each questions carry one mark) **Max. Marks: 20 Marks**

1. Which phenomenon is not reduced by the circuit paths of lowest impedances especially provided by power and return planes for shielding purposes?

a) Radiation
b) Convection
c) Noise
d) Crosstalk

2. High current circuits are purposely located or placed near the edge of PCB in accordance to the supply lines for _____

a) Removal of heat
b) Isolation of stray current
c) Reduction of path length
d) All of the above

3. Which among the below stated soldering methods is also renowned as 'High Frequency Resistance Soldering'?

a) Iron Soldering
b) Furnace Soldering
c) Torch Soldering
d) Electrical Soldering

4. Which among the below mentioned approaches belongs to the category of In-circuit Testing?

a) Impedance Testing
b) Component Testing
c) Apply Signal and check output
d) All of the above

5. Which type of solderability testing is carried out for the generation of solder sample due to immersion of wire or sheet metal specimen in a bath of molten solder?

a) Solder Bath Testing
b) Meniscus Rise Testing
c) Solder Iron Testing
d) None of the above

6. What is/are the necessity/ies to provide guarding to precision differential amplifiers?
a) To increase leakage resistance
b) To reduce capacitance between signal conductors & ground
c) Both a and b
d) None of the above

7. Which among the below mentioned assertions is not a way of cross-talk reduction while designing digital PCBs?
a) Decrease in the distance between conductors
b) Shielding of clock lines with guard strips
c) Reduction in the loop area of circuits
d) Avoid running of parallel traces for longer distances especially for asynchronous signals

8. Which among the below mentioned packages does not belong to the category of 'Small Outline Packa
a) SO
b) SOP
c) SOT
d) SON

9. Which among the below specified assertions is not a grounding consideration associated with ADC as well as DAC?
a) Analog side to analog ground
b) Digital side to digital ground
c) Use of separate power supply and connection of their ground leads to single point reference
d) Reduction of inductive loop area between power and return traces

10. Which among the below stated devices/equipments are preferred for elimination of ground and supp line noise especially in TTL/CMOS / ECL PCB designing?
a) Coupling capacitor
b) Decoupling capacitor
c) Snubber circuits
d) All of the above

11. Which among the below specified condition is precise in the crosstalk verification mechanism using logic flow in opposite direction with the limit of avoiding dangerous interference in digital PCB designing?
a) $Z_{even} > Z_{odd}$
b) $Z_{odd} \geq 0.5\ Z_{even}$
c) $Z_{odd} \geq 0.8\ Z_{even}$
d) $Z_{odd} = Z_{even}$

12. Which terminology of PCB represents a thin photo-sensitive polymer by supporting photographic pattern of single traces or IC pads for etching?

a) Prepreg
b) Etching
c) Photo-resist
d) Solder mask

13. Which problems are about to occur if PCB is not designed properly in a confined manner for digital circuits?

A. Diffraction
B. Refraction
C. Ground & Supply-line Noise
D. Electromagnetic Interference

a) A & B
b) B & C
c) C & D
d) A, B, C, D

14. Which among the following assists in obtaining the desired value of wave impedance in reflection phase while designing digital PCBs?

A. Width of signal lines
B. Distance between signal line and ground line
C. Signal Delays
D. Double Pulsing

a) A & B
b) B & C
c) C & D
d) A, B, C, D

15. What should be the resistance of 0.6 mm wide conductor with 15 cm length and 25 μm thickness of standard copper foil? (Assume $\rho = 1.7241 \times 10^{-6}$(at 20° C)

a) 118.2 mΩ
b) 138.2 mΩ
c) 172.4 mΩ
d) 192.4 mΩ

16. The actual cost of PCB can be evaluated on the basis of _____

a) PCB size & material
b) Number of layers
c) Vias on PCB
d) All of the above

17. Which factors contribute to the occurrence of mechanical stress?
a) Resonance
b) Cracked Solder Joints
c) Both a and b
d) None of the above

18. Which type of PCB requires minimum soldering on component side in order to avoid replacement oriented difficulties?
a) Single-sided PCB
b) Double-sided PCB
c) Both a and b
d) None of the above

19. What effects can be observed if the separate power and ground planes are provided with large conducting surfaces for better decoupling in PCB layouts?
a) Increase in self-inductance
b) Reduction in self-inductance
c) Stability in self-inductance
d) None of the above

20) What is the first step in PCB design
a) Specification
b) Schematic
c) Manufacturing file
d) Simulation

*****

SSM Institute of Engineering and Technology

Dindigul – Palani Highway, Dindigul – 624 002

CERTIFICATE

This is certified that Mr.N.BAIZ, IV year - Electrical and Electronics Engineering department has successfully completed the Hands on training in *PCB DESIGN & FABRICATION* on December 2018.

Principal