SSM Institute of Engineering and Technology

Sindalagundu post, Dindigul-624-002, Tamilnadu pH: 0451-2448800
(Approved by AICTE, Affiliated to Anna University, Chennai Accredited by NAAC)

Department of Electrical and Electronics Engineering

Organizes

Six days Technology Training Program on

✦ PCB Design and Fabrication ✦

For the IV year students of EEE

from(02.12.2019 to 07.12.2019)

Trained by

Er.S.P.Sarathy Retired employee from Schneider Electric System India Pvt, Ltd, Chennai

Co-ordinators	HoD	Principal
Mr.G.Satheeshkumar,AP/EEE	Dr.V.Vijaykumar	Dr.D.Senthilkumaran

ALL ARE INVITED

Dr.D.SENTHIL KUMARAN, M.E., Ph.D., (NUS)
Principal
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Trichy Road Dindigul 624 002.

SSM Institute of Engineering and Technology, Dindigul-02.

Department of Electrical and Electronics Engineering

CIRCULAR

03.10.2019

This is to inform that value added program on **PCB Design and Fabrication** is going to be conducted for IV year EEE students from 02.12.2019 to 07.12.2019 by Er.S.P.Sarathy Retired Employee from Schneider Electric System India Pvt. Ltd, Chennai. Henceforth interested students are informed to register their name to Mr.G.Satheesh Kumar, AP/EE on or before 24.10.2019.

Faculty Incharge

HoD/EEE

SSM Institute of Engineering and Technology * DINDIGUL

Dr.D.SENTHIL KUMARAN, M.E., Ph.D., (NUS)
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SSM Institute of Engineering and Technology

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

IV YEAR NAME LIST (2019-2020)

S.NO	REGISTER NO	NAME
1	922116105001	ABIRAMI R
2	922116105002	ANITHA K
3	922116105003	AZEEMA M
4	922116105004	BALA SANDEEP G
5	922116105005	BANUPRIYA N
6	922116105006	DEVA SALOMI PRIYAM R
7	922116105007	DHAMOTHARAN R
8	922116105008	DHARANI N
9	922116105009	GOKUL P
10	922116105010	GOPI V
11	922116105011	HUDSON SAMRAJ A
12	922116105012	JAYAKKRISHNAN S
13	922116105013	JEYASHREE P
14	922116105014	KALAISELVAN N
15	922116105015	KANNAN P
16	922116105016	KANNI PRAKASH D
17	922116105017	KARTHICK A
18	922116105018	MALATHI S
19	922116105019	MATHUMITHA B
20	922116105020	MOHAN RAJ S
21	922116105021	MYTHELI S
22	922116105022	PREETHI R
23	922116105023	PRIYADHARSHINI J
24	922116105024	RAMANI CHIARA D
25	922116105025	RANJITH BABU S
26	922116105026	RESHMA S K
27	922116105027	RISHYA DORA S
28	922116105028	SARAVANAN A
29	922116105030	SIMRIN BANU A
30	922116105031	SIVA SELVAM P
31	922116105032	SUBA LAKSHMI S
32	922116105033	SURIYA C R
33	922116105034	SURYA S R
34	922116105035	VIJAYALAKSHMI M C S
35	922116105036	VISHNU KUMAR S
36	922116105037	YOGA JOTHI C
37	922116105303	S.RUBAN RAJ
38	922116105304	M.SATHEESH KUMAR
39	922116105306	T.VEERAPANDI
40	922116105701	S.VASIM AKRAM

Class Incharge

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NAME LIST (2019-2020)

HANDS ON TRAINING ON PCB DESIGN AND MANUFACTURING

S.NO	REGISTER NO	NAME	SIGNATURE
1	922116105001	ABIRAMI R	Abirami
2	922116105002	ANITHA K	K. Anitha
3	922116105003	AZEEMA M	Azeema. A
4	922116105004	BALASANDEEP G	G. Bala s f
5	922116105005	BANUPRIYA N	N. Banupriya
6	922116105006	DEVA SALOMI PRIYAM R	R. deva
7	922116105007	DHAMOTHARAN R	R. Dhamotharan
8	922116105008	DHARANI N	N. Dharani
9	922116105009	GOKUL P	P. Gokul.
10	922116105010	GOPI V	V. Gopi
11	922116105011	HUDSUON SAMRAJ A	A. Huff
12	922116105012	JAYAKRISHNAN	Jaya Krishna.
13	922116105013	JEYASREE P	P. Jeyasree.
14	922116105014	KALAISELVAN N	N. Kalai
15	922116105015	KANNAN P	P. Kannan
16	922116105016	KANNIPRAKASH D	D. Kanni
17	922116105017	KARTHICK A	A. Karthick
18	922116105018	MALATHI S	S. Malathi
19	922116105019	MATHUMITHA B	B. Mathu
20	922116105020	MOHAN RAJ S	Mohan Raj S
21	922116105021	MY'THILI S	S. Mythili
22	922116105022	PREETHI R	Preethi
23	922116105023	PRIYADHARSHINI J	J. Priyadharshini
24	922116105024	RAMANI CHIARA D	D. Ramani
25	922116105025	RANJITH BABU S	Ranjith
26	922116105026	RESHMA SK	S.K Reshma
27	922116105027	RISHYA DORA S	Rishya Dora
28	922116105028	SARAVANAN A	Saravanan

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29	922116105030	SIMRIN BANU A	A. Simrinbanu
30	922116105031	SIVASELVAM S	S. Sivaselvam.
31	922116105032	SUBALAKSHMI S	S. Subalakshmi
32	922116105033	SURIYA CR	C.R. Suriya
33	922116105034	SURYA SR	SR. Surya
34	922116105035	VIJAYALAKSHMI MCS	MCS. Vijayalakshmi
35	922116105036	VISHNUKUMAR S	V. Shankumar
36	922116105037	YOGAJOTHI C	C. Yogajothi
37	922116105303	RUBAN RAJ S	Ruban Raj
38	922116105304	SATHISHKUMAR M	M. Sathish
39	922116105306	VEERAPANDI T	T. Veerapandi
40	922116105701	VASIM AKRAM S	Vasim Akram

Faculty In-charge

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SSM Institute of Engineering and Technology * DINDIGUL-624 002 *

Value added Course 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	922116105001	ABIRAMI R	/	/	/	/	/	/	/	/	/	/	/	/
2	922116105002	ANITHA K		/	/	/	/	/	/	/	/	/		/
3	922116105003	AZEEMA M	/	/	/	/	/	/	/	/	/	/	/	/
4	922116105004	BALA SANDEEP G	/	/	/	AB	/	/	/	/	/	/	/	/
5	922116105005	BANUPRIYA N	/	/	/	/	/	/	/	/	/	/	/	/
6	922116105006	DEVA SALOMI PRIYAM R	/	/	/	/	/	/	/	/	/	/	/	/
7	922116105007	DHAMOTHARAN R	/	/	/	/	/	/	/	/	/	/	/	/
8	922116105008	DHARANI N	/	/	/	/	/	/	/	/	/	/	/	/
9	922116105009	GOKUL P	/	/	/	/	/	/	/	/	/	/	/	/
10	922116105010	GOPI V	/	/	/	/	/	/	/	/	/	/	/	/
11	922116105011	HUDSON SAMRAJ A	/	/	/	/	/	/	/	/	/	/	/	/
12	922116105012	JAYAKKRISHNAN S	/	/	/	/	/	/	/	/	/	/	/	/
13	922116105013	JEYASHREE P	/	/	/	/	/	/	/	/	/	/	/	/
14	922116105014	KALAISELVAN N	/	/	/	/	/	/	/	/	/	/	/	/
15	922116105015	KANNAN P	/	AB	/	/	/	/	/	/	/	/	/	/
16	922116105016	KANNI PRAKASH D	/	/	/	/	/	/	/	/	/	/	/	/
17	922116105017	KARTHICK A	/	/	/	/	/	/	/	/	/	/	/	/
18	922116105018	MALATHI S	/	/	/	/	/	/	/	/	/	/	/	/
19	922116105019	MATHUMITHA B	/	/	/	/	/	/	/	/	/	/	/	/
20	922116105020	MOHAN RAJ S	/	/	/	/	/	/	/	/	/	/	/	/
21	922116105021	MYTHELI S	/	/	/	/	/	/	/	/	/	AB	/	/
22	922116105022	PREETHI R	/	/	/	/	/	/	/	/	/	/	/	/
23	922116105023	PRIYADHARSHINI J	/	/	/	/	/	/	/	/	/	/	/	/
24	922116105024	RAMANI CHIARA D	/	/	/	/	/	/	/	/	/	/	/	/

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Roll No.	Register No.	Name of the Student	2/12/19		3/12/19		4/12/19		5/12/19		6/12/19		7/12/19	
			FN	AN	FN	AN	FN		FN	AN	FN	AN	FN	AN
25	922116105025	RANJITH BABU	✓	✓	✓	✓	AB	AB	✓	✓	✓	✓	✓	✓
26	922116105026	RESHMA S K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
27	922116105027	RISHYA DORA S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
28	922116105028	SARAVANAN A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
29	922116105030	SIMRIN BANU A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
30	922116105031	SIVA SELVAM P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
31	922116105032	SUBA LAKSHMI S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
32	922116105033	SURIYA C R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
33	922116105034	SURYA S R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
34	922116105035	VIJAYALAKSHMI M C S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
35	922116105036	VISHNU KUMAR S	✓	✓	✓	✓	✓	✓	✓	AB	✓	✓	✓	✓
36	922116105037	YOGA JOTHI C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
37	922116105303	RUBAN RAJ S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
38	922116105304	SATHEESH KUMAR M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
39	922116105306	VEERAPANDI T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
40	922116105701	VASIM AKRAM S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Present	40	39	40	39	40	40	40	39	40	39	40	39
		Absent	—	01	—	01	—	—	—	01	—	01	—	01
		Signature												

Faculty Incharge

HoD/EEE

SSM Institute of Engineering and Technology • DINDIGUL-624 002 • A Unit

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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

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NAME LIST (2019-2020)

HANDS ON TRAINING ON PCB DESIGN AND MANUFACTURING

S.NO	REGISTER NO	NAME	MARK
1	922116105001	ABIRAMI R	16
2	922116105002	ANITHA K	14
3	922116105003	AZEEMA M	17
4	922116105004	BALASANDEEP G	13
5	922116105005	BANUPRIYA N	19
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11	922116105011	HUDSUON SAMRAJ A	13
12	922116105012	JAYAKRISHNAN	12
13	922116105013	JEYASREE P	16
14	922116105014	KALAISELVAN N	17
15	922116105015	KANNAN P	18
16	922116105016	KANNIPRAKASH D	20
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24	922116105024	RAMANI CHIARA D	18
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28	922116105028	SARAVANAN A	15

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29	922116105030	SIMRIN BANU A	17
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31	922116105032	SUBALAKSHMI S	18
32	922116105033	SURIYA CR	17
33	922116105034	SURYA SR	20
34	922116105035	VIJAYALAKSHMI MCS	19
35	922116105036	VISHNUKUMAR S	17
36	922116105037	YOGAJOTHI C	15
37	922116105303	RUBAN RAJ S	11
38	922116105304	SATHISHKUMAR M	12
39	922116105306	VEERAPANDI T	14
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Faculty In-charge

HOD/EEE

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Value added Course Summary (2019-2020)

Course Name	: PCB Design and Fabrication
Course Duration	: 48 Hours
Year offered	: IV year students -2019-2020
Course Instructors	: Mr. G. Satheeshkumar Assistant professor /EEE

Course Outcome: The student able to apply the tools and technique of PCB design and Fabrication and able to program and control.

Course Type : Self Framed / Collaboration with Industry

Assessment Mode

Attendance	: 48 Hours
Number of participants	: 40
Scheme of Exam	: MCQ offline

Course Coordinator

HoD

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Dindigul – Palani Highway, Dindigul – 624 002

Department of Electrical and Electronics Engineering

Value added Course on PCB Fabrication and Manufacturing

17/20

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

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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) $Z_{odd} = Z_{even}$

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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

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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

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Value added Course on PCB Fabrication and Manufacturing

15/20

Assessment Question

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

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Value added Course on PCB Fabrication and Manufacturing

19/20

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Department of Electrical and Electronics Engineering

Value added Course on PCB Fabrication and Manufacturing

16/20

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Value added Course on PCB Fabrication and Manufacturing

20/20

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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

*****

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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

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Department of Electrical and Electronics Engineering

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STUDENT FEEDBACK FORM

Year/Sem: IV / VII

Date: 07.12.2019

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