

SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sindalagundu Post , Dindigul -624-002, Tamilnadu pH 0451-24-8800 (Approved by AICTE, Affiliated to Anna University, Chennas Accredited by NAAC)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Or ganizes

Six days Hands on training program on

" PCB Design and Fabrication '

For the IV year students of EEE

from (03.12.2018 to 08.12.2018)

Trained by

Er.S.P.Sarathy, Former Schneider Electric System India Pvt, Ltd, Chennai.

Co-ordinator

HoD

Principal

Mr.B.Marisekar,AP/EEE

Dr.P.Booma devi

Dribaravanan

ALL ARE INVITED



Dr.D.SENTHIL KUMARAN, M.E., Ph.D., NUS Principal SSM Institute of Engineering and Technology Kuttathupatti Village, Sindalagundu (Po), Palani Road, Dindigul - 624 002.



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

Dr.D.SENTHIL KUMARAN, M.E., Ph.D., (NUS)

SSM Institute of Engineering and Technology Kuttathupatti Village, Sindalagundu (Po), Palani Road, Dindigul - 624 002





PCB DESIGN AND FABRICATION

Syllabus

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)

roduction to Electronic design automation(EDA) toolsfor PCB designing: Brief Introduction of various St. Julators, 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 dering, 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

1. Printed circuit Board Design and technology, water C. Bounds.
2. Printed Circuits Handbook, Sixth Edition, by Clyde F. Coombs, Jr, Happy T. Holden, Publisher:

On Dr. D. SENTHIL KUMARAN, M.E., Ph.D., [NUS] McGraw-Hill Education Year: 2016

Principal

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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 (2018-2019)

S.NO	REGISTER NO	NAME
1	922115105001	ABARNA. K
2	922115105002	AKILANN
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
21	922115105021	JEYA SURYA. J
22	922115105022	KARTHICK, R
23	922115105023	KARTHIKA. P
24	922115105024	KARUPPAIAH.M
25	922115105025	KAVITHA.R
26	922115105026	KIRUTHIHA. K
27	922115105027	KISHOR. C
28	922115105028	MARIA MINISHA. S
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

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D.SENTHIL KUMARAN, M.E., Ph.D., (NUS)
Principal

SSM Institute of Engineering and Technology Kuttathupatti Village, Sindalagundu (Fo), Palani Road, Dindigul 624 002.

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



P. P. Hod/EEE

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Dindigul-Palani Highway, Dindigul-624002

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NAME LIST (2018-2019)

S.NO	REGISTER NO	TRAINING ON PCB DESIGN AN NAME	SIGNATURE SIGNATURE
1	922115105001	ABARNA K	the state of the s
2	922115105002	AKILAN.N	ro. de.D.
3	922115105003	ANAND.T	T. AMS I
4	922115105004	ANIT DAYANA. A	1 1 0
5	922115105005	ANTO HUBERT. J	J. AHRAY
6	922115105006	ANUSHA K	& David
7	922115105007	ARUN S	A. Anusha
8	922115105008	ARUN RAJ K	1040 800
9	922115105009	BAIZ. N	ARUN Ras
10	922115105010	BALAJI.I	Bagi. I
1	922115105011	BHARATHI PERIYASAMY.S	200
2	922115105012	BOOMA R	P. Paul
3	922115105013	DEEPAK RAJ K A	A. Dooper
4	922115105014	DEVAKI S	Skvali.
5	922115105015	DEVARAJ S	
6	922115105016	GOPIYA C	S. dent Rofiya C C. Gwyf
7	922115105017	GOWSALYA C	
8	922115105018	GURU SRI K	C. Goey F Dr.D. SENTHIL KUMA

Dr.D.SENTHIL KUMARAN, M.B., Ph.D., 1998,

K. Gruster Special Principal

SSM Institute of Engineering and Treatments

Ruttathupatti Village, Sindalagur

Palant Road, Dindigul - 624, 224

	922115105019	JANANI P	Janvil P.
)	922115105020	JANSI. S	S. dunglay
1	922115105021	JEYASURYA S	8. Tyl
2	922115105022	KARTHICK R	R.KARTHICK.
3	922115105023	KARTHIKA. P	P. kallnika
24	922115105024	KARUPPAIAH.M	P. Karlhika M. Karungt
25	922115105025	KAVITHA.R	Landla.R.
26	922115105026	KIRUTHIHA K	k. kul
27	922115105027	KISHOR' C	C. Riskup
28	922115105028	MARIA MINISHA. S	S. Marice Hty
29	922115105029	MASANADEVI.I	1. Maly
30	922115105030	MASI R	690
31	922115105031	MOHAMEDABDULAYUB.M	M. Mohamerldaßdulagub.
32	922115105032	MOHAMED SALMAN. S	S. pungl
33	922115105033	MUSRATH N	S. rungf
34	922115105034	MUTHU RAJ K	YAR , (E)
35	922115105035	NARTHIGA SREE D	all omorgun-szagai
36	922115105036	NAVEEN ROMI. J	Devery
37	922115105037	NEWTONSALANDO J	Nouton
38	922115105038	PANDIPRIYANKA. M	M. Pargl
39	922115105039	PRASANTH I	Dougth I.
40	922115105040	PRIYANKA R M	M.P.
41	922115105041	RAJKUMAR. A	Righmat . A.
42	922115105042	RAMACHANDRAN. M	MRamachy 1
43	922115105043	RAMKUMAR. L	Range State of the
44	922115105044	RAMYA V	Dr.D.SENTHIL KUMARAN, M.E., Ph. Principal SSM Institute of Engineering and Tec

Kuttathupatti Village, Sindalagundu (Po;.
Palani Road, Dindigul - 624 002.

45	922115105045	ROBERT RAJA.A	Robert Roya. A.
46	922115105046	SHARMILA M	pr. Shap
47	922115105047	SHRIVISHNUKUMAR. V	Showshund
48	922115105048	SINDHU. M	ghen M.
49	922115105049	SOURAV PRASANNA. V	I. Soul
50	922115105050	SUNDAR RAJAN K	fr. Stroby
51	922115105051	THAMARAI KANNAN. B	Dansand Lang
52	922115105052	THANGA PANDIAN P	D. Shoul
53	922115105053	VIDHYA U	V. Vidhera
54	922115105054	VIGNESH.L	2. vig
55	922115105055	VIGNESHWAR. E	Vigneshwar
56	922115105056	VIJAYAPANDI.S	5. Vijayup + 171
57	922115105057	VISHAL ADITIYA A	A-VISHAL ADTTIYA
58	922115105058	VISHNU. V	V. Vishott.
59	922115105059	VIVEK KUMAR. G	Vereketemis & -
60	922115105701	CYRIL VALAN.]	cylil.

Faculty In-charge

HOD/EEE

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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	03.12	2018	04.12	.201g	0A	2.2018	05.1	2 · 2 olg	6 ₹ . 10	1.2019	08 /2	. 2019	
110.			FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	
l	922115105001	ABARNA. K	/	1	12		1	1	1	1	1	1	1	1	
2	922115105002	AKILAN.N	1	1	1	1	1	1	1	1 .	1	1	1	1 "	
3	922115105003	ANAND.T	1	(1	1	1	1-	1	1	1	1	1	1	
4	922115105004	ANIT DAYANA. A	1	1	/	1	1	1	1	1	1	1	1	1 -	
5	922115105005	ANTO HUBERT. J	1	1	1	1	1	1	1	1	-/	1	1	1	
6	922115105006	ANUSHA. K	1	1	1	1	1	1	- 1	1	1	1	1	1	
7	922115105007	ARUN. S	1	1	1	7	1	(1	1	1	7.	= /	1	
8	922115105008	ARUN RAJ. K	1	1	/	1-	1	1	1	1	1	1	1	1	
9	922115105009	BAIZ. N	1	1-	-	/	1	1	- 1	1	1	1	/ -		
10	922115105010	BALAJI. J	1	1	1	1	1	1	r	- / .	1	F	-(1	
11	922115105011	BHARATHI PERIYASAMY.S	1	1	1	1	1	(1	7	-1	/	1 -	1	
12	922115105012	BOOMA. R	1	1	1	1	1	- (1	1	1	2/	1	1	
13	922115105013	DEEPAK RAJ. K.A	1	1	1	1	1.	1	1 =	1	1	1	1	1	
14	922115105014	DEVAKI. S	1	1	1	-1	t	1	1	1	1	1	1	1	
15	922115105015	DEVARAJ. S	1	1	1	(1	1	19/	1	15	1	1	1	
16	922115105016	GOBIYA. C	1	= /	1	1	1	-	1	1	1	1	1	1	
17	922115105017	GOWSALYA.V	1	1	- 1	1	1	1	1	1 -	1	1	1	1	
18	922115105018	GURU SRI. K	= 1	3.7	1	1	::/	1	1	1	1	1	1	/	
19	922115105019	JANANI. P	/	1	7	1	1	1	_/=	1	1		1	1	
20	922115105020	JANSI. S	1	1	1	1	1	1	1	1	_ /=_	1	1 -	/	
21	922115105021	JEYA SURYA. J	(1	1	1	1	1	1	AB	- 1	1	1	1	
22	922115105022	KARTHICK. R	1	1	- (1 -	1	1	1	1	(1	D CENT	117 3	9-4167
23	922115105023	KARTHIKA. P	1	1	1	1.	1	1	1	1	1	1.6	D.SENTI	Princi	MAN, M.E.
24	922115105024	KARUPPAIAH.M	1	1	1	1	1	1	1	1	1	1	d lastitui	e si Endine	ring and

Kuttathupatti Village, Sindajes Palagi Road, Dindigus

Roll	Pagiatan No	Name of the Student	03/12	118	4/12	118	5/1	2/18	6/12	-[18	7/12	118	8/12	118
No.	Register No.	Name of the Student	FN	AN	FN	AN	FN	Acr	FN	AN	FN	AN	FN	AN
25	922115105025	KAVITHA.R	10	- 1	/	/	1	/	1			1	- /	/
26	922115105026	KIRUTHIHA. K	-/	1	1	/	1	1	1	-	1	1	-	/
27	922115105027	KISHOR. C	1	_	1	- /	1	1	,	_	1	1 -	1	/
28	922115105028	MARIA MINISHA: S	-	1	1	/	1	-	1	1	1	1	1	1
29	922115105029	MASANADEVI. J	1	1	1	1	-/	1	1	" /	1	/	/	1
- 30	922115105030	MASI. R	/	/	/	,	,	/	1	1	1	1	1	1
31	922115105031	MOHAMED ABDUL AYUB.M	1	1	1	1	1	1	1	/	1:	1	1	1
32	922115105032	MOHAMED SALMAN. S	1	7	1	/	AB	AB	1	-	/	1	1	1/
33	922115105033	MUSRETH. N	1		1	1	/	- /	1	1	1	1	/	/_
34	922115105034	MUTHURAJ. K	1, -		/	1		100	1	1	1	1	1	/
35	922115105035	NARTHIGASREE. D	1	1	1	1	1	1	1	1	1	1	1	7
36	922115105036	NAVEEN ROMI. J	1.	1	1	,	1	1	1	/	1	1	-	/
37	922115105037	NEWTONSLENDO. J	1	1	1	1	/		1	_	1	/		1
38	922115105038	PANDIPRIYANKA. M	/	1	1	/	1	1	1	1				1
39	922115105039	PRASANTH.I	1	/	/	10	1	/	1	1		1	1	/
40	922115105040	PRIYANKA.R.M	1	/	1	1	/	/	1	1		1	-	
41	922115105041	RAJKUMAR. A	/	/	. 1	1	1	1	1	1	AB	1	1	/
42.	922115105042	RAMACHANDRAN. M	/	1	1	1	1	-	1	1		1	1	
43	922115105043	RAMKUMAR. L	/	1	1	/	1	/		1		1	/	/
44	922115105044	RAMYA.V	/	1	/		1	/	1	1	1	-	-	1
45.	922115105045	ROBERT RAJA.A	1	1	1	2	1	/	1	10	1	1	1	/
46	922115105046	SHARMILA. M	1	1	1	1	1	, ,	,	1		1	,	/
47	922115105047	SHRIVISHNUKUMAR. V	/	/	/	1	1		1	1	1	7		/
48	922115105048	SINDHU. M	/	0.1	1	,	,	/	1	1		-	1	1
49	922115105049	SOURAV PRASANNA. V	-/	/	1	1	1	/		1	1	-/	/-	/
50	922115105050	SUNDAR RAJAN. K	/	/	,	/	1	/	* /	/		-		1
51	922115105051	THAMARAI KANNAN. B	1	AB	1	,	1	1		/	1	/		
52	922115105052	THANGA PANDIAN. P	-1 -	-	1	1	1	/		/	1	1	1 =	
53	922115105053	VIDHYA. U	1	1	1	1	1	1	1	_	1	- /	1	/
54	922115105054	VIGNESH.L	1	1	1	1	1	1	1	/	/	Dr.D.SEN	HIL KUM	RAN MR
55	922115105055	VIGNESHWAR. E	/	/	1	1	1	- /	1	_	1	100000000000000000000000000000000000000	Princ	ipal
56	922115105056	VIJAYPANDI. S	1	1	1	./	1	1	1	1	1		ite of Engin	ering and

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- 31			03	112/18	4/12	1/18	5/1	2/18	6/12	118	7/12	118	8112	4/18
		5	FN	AN	FN	AN	FN		FN	AN	FN	AN	FN	AN
57	922115105057	VISHAL ADHITHYA.A	1	1	_ /	1.	1	AB	AB	- 1	* /	1	/	1
58	922115105058	VISHNU. V	1	1 "	1	1	/	/	/	/	1	/	1	
59	922115105059	VIVEK KUMAR. G	/		1	/-	/	1	/	-		_		1
60	922115105701	CYRIL VALAN.J	1		1	-1	1	/	1	1	/	/	1	1
		Present	60	59	60	60	59	58	59	59	59	60	60	59
		Absent	-	١٥			01	02	ρl	pl	21	15	6	a/
		Signature	duy	M	Ky	XM	M	14	M	M	Ka	M	m	M

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Dindigul-Palani Highway, Dindigul-624002

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NAME LIST (2018-2019)

HANDS ON TRAINING ON PCB DESIGN AND MANUFACTURING

S.NO	REGISTER NO	NAME	MARK
1	922115105001	ABARNA K	15
2	922115105002	AKILAN.N	14
3	922115105003	ANAND,T	16
4	922115105004	ANIT DAYANA, A	16
5	922115105005	ANTO HUBERT. J	18
6	922115105006	ANUSHA K	15
7	922115105007	ARUN S	13
8	922115105008	ARUN RAJ K	12
9	922115105009	BAIZ. N	15
10	922115105010	BALAJI.I	14
11	922115105011	BHARATHI PERIYASAMY.S	13.
12	922115105012	BOOMA R	12_
13	922115105013	DEEPAK RAJ K A	13
14	922115105014	DEVAKIS	11.
15	922115105015	DEVARAJ S	15
16	922115105016	GOPIYA C	17
17	922115105017	GOWSALYA C	18
18	922115105018	GURU SRI K	lg Dr.D.SE



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19	922115105019	JANANI P	20
20	922115105020	JANSI. S	E 13
21	922115105021	JEYASURYA S	14
22	922115105022	KARTHICK R	15
23	922115105023	KARTHIKA. P	18
21	922115105024	KARUPPAIAH.M	16
25	922115105025	KAVITHA.R	16
26	922115105026	KIRUTHIHA K	19
27	922115105027	KISHOR C	18
28	922115105028	MARIA MINISHA. S	19
29	922115105029	MASANADEVI.1	13
30	922115105030	MASI R	12.
31	922115105031	MOHAMEDABDULAYUB.M	15
32	922115105032	MOHAMED SALMAN. S	16
33	922115105033	MUSRATH N	17
34	922115105034	MUTHU RAJ K	18
35	922115105035	NARTHIGA SREE D	19
36	922115105036	NAVEEN ROMI. J	16
37	922115105037	NEWTONSALANDO J	20
38	922115105038	PANDIPRIYANKA. M	13
39	922115105039	PRASANTH I	15
40	922115105040	PRIYANKA R M	14
41	922115105041	RAJKUMAR, A	14
42	922115105042	RAMACHANDRAN, M	12
43	922115105043	RAMKUMAR. L	20
44	922115105044	RAMYA V	11
45	922115105045	ROBERT RAJA.A	Dr.D.SEN



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46	922115105046	SHARMILA M	13
47	922115105047	SHRIVISHNUKUMAR. V	14
48	922115105048	SINDHU, M	15
49	922115105049	SOURAV PRASANNA. V	18
50	922115105050	SUNDAR RAJAN K	IT
51	922115105051	THAMARAI KANNAN. B	19
52	922115105052	TIIANGA PANDIAN P	18
53	922115105053	VIDHYA U	17
54	922115105054	VIGNESH.L	16
55	922115105055	VIGNESHWAR. E	18
56	922115105056	VIJAYAPANDI.S	16
57	922115105057	VISHAL ADITIYA A	17
58	922115105058	VISHNU. V	20
59	922115105059	VIVEK KUMAR. G	18
60	922115105701	CYRIL VALAN.]	17

Faculty In-charge

HOD/EEE

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Dindigul - Palani Highway, Dindigul 624 002

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Value added Course Summary (2018-2019)

Course Name

: PCB Design and Fabrication

Course Duration

: 48 Hours

Year offered

: IV year students -2018-2019

Course Instructors

: Mr. B.Marisekar

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

: 60

Scheme of Exam

: MCQ offline

Course Coordinator

HoD

Engineering

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RegNo: 922+157050

Marks: 20 Marks

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Dindigul - Palani Highway, Dindigul - 624 002

Department of Electrical and Electronics Engineering Value added Course on PCB Fabrication and Manufacturing

Assessment Ouestion

Answer for all the questions (Each questions carry one mark)

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 Noise
- d) Crosstalk
- 2. High current circuits are purposely located or placed near the edge of PCB in accordance to the supply lines for
- 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
- 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
- Apply Signal and cheek output
- d) All of the above,
- 5. Which type of solderability testing is carried out for the generation of solder sample A tofimmersion of wire or skeet metal specimen in a bath of molten solder?
- a) Solder Bath Testing
- Meniscus Rise Testing
- c) Solder Iron Testing
- d) None of the above

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- 6. What is a the necessity/ies to provide guarding to precision differential amplifiers? a) To increase leakage resistance 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 a) Decrease in the distance between conductors h) Shielding of clock lines with guard strips 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 Package a) SO b) SOP c) SOT drs0)
 - Which among the below specified assertions is not a grounding consideration associated with ADC as well as DAC?
 - a) Anal side to analog ground
- b) Digital side to digital ground
- 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
- Snubber-circuits
- All of the above
- 11. Which among the below specified condition is precise in the crosstalk verification mechanism using logic flow in apposite direction with the limit of avoiding dangerous interference in digital PCB designing?

a) Zeven > Zald

Jay Zodd 2 0/5 Zeven

e) $Z_{\text{odd}} \ge 0.8 Z_{\text{even}}$ d) $Z_{\text{odd}} = Z_{\text{even}}$



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12. Which terminology of PCB represents a thin photo-sensitiv	ve notymer by supporting photographic
pattern of single traces or IC pads for etching?	to bothmer of puppermis broadening
a) Prepreg	
b) Etching	
(C) Photo-resist	
d) Soldermask	•
d) Soldermask	
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 & B	
6) B & C	
c) C & D	
d) A, B, C, D	
and the second s	danslura of come immediance to mediantian who
14. Which among the following assists in obtaining the desired	a value of wave impedance in reflection phas
while designing digital PCBs?	
A. Width of signal lines	
B. Distance between signal line and ground line	
Signal Delays	
D. Double Pulsing	
2) A & B	
*h) B & C	
c) C & D	
A, B, C, D	
15. What should be the resistance of 0.6 mm wide conductor v	with 15 cm length and 25 µm thickness of
standard copper foil? (Assume $\rho = 1.7241 \times 10^{-6} (at 20^{\circ} C)$	
a) 1/8.2 mΩ	· · · · · · · · · · · · · · · · · · ·
β-)38.2 mΩ	
c) 172.4 mΩ	
d) 192.4 mΩ	
	6) 10
16. The actual cost of PCB can be evaluated on the basis of	1141
a) PCB size & material	17.11.
b Number of layers	200
c) Vias on PCB	DI.D.SENTHIL KUMARAN, M.E., Ph.D., (NUS)
d) All of the above	Principal
The state of the s	of Engineering and Technology
c) Vias on PCB d) All of the above	Kuttathupatti Village, Sindalagundu (Po) Palani Road, Dindigul - 624 002
SSM	Palani Koad, Dindigui oz i

- 17. Which factors contribute to the occurrence of mechanical stress?
- at 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 PCB1
- b) Double-sided PCB
- c) Byth 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 tayouts?
- a) Increase in self-inductance
- b) Reduction in self-inductance
- 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

Ownight Engineering

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RegNo: 922115105-004

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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 Mark

- 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

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
- by 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'?
- Tron Soldering
- Murnace Soldering

, Torch Soldering

- d) Electrical Soldering
- 4. Which among the below mentioned approaches belongs to the category of In-circuit Testing?
- a) Impedance Testing
- 6) 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 immersion of wire of sheet metal specimen in a bath of molten solder?
- a) Solder Bath Testing
- b) Meniscus Rise Testing
- 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
- by 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
- a) Decrease in the distance between conductors
- by 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 Package
- SOP
- e) SOT
- d) SON
- 9. Which among the below specified assertions is not a grounding consideration associated with ADC as well as DAC?
- 🗥 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
- Which among the below stated devices/equipments are preferred for elimination of ground and suppline noise especially in TTL/CMOS / ECL PCB designing?
- a) Coupling capacitor
- b) Decoupling capacitor
- c) Snubber circuits
- All of the above
- 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) Zeven > Zodd
- b) $Z_{\text{odd}} \ge 0.5 Z_{\text{even}}$
- c) $Z_{\text{odd}} \ge 0.8 Z_{\text{even}}$

d) Lodd = Zeven



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Principal

SSM Institute of Engineering and Technology Kuttathupatti Village. Sindalagundu (Po), Palani Road, Dindigul - 624 002.

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 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 & B b) B & C OC&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 h) B & C XC&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 $\rho = 1.7241 \times 10^{-6} (at 20^{\circ} C)$ 118.2 mΩ b) 138.2 mΩ c) 172.4 mΩ dr 192.4 ms2 16 The actual cost of PCB can be evaluated on the basis of PCB size & material b) Number of layers Dr.D.SENTHIL KUMARAN, M.E., Ph.D., (NUS) c) Vias on PCB d) All of the above Principal

SSM Institute of Engineering and Technology Kuttathupatti Village, Sindelagundu (Po), Palani Road, Dindigul - 624 002 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
- 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 Aducting surfaces for better decoupling in PCB layouts?
- a) Increase in self-inductance
- by Reduction in self-inductance
- c) Stability in self-inductance
- d) Now of the above
- (1) What is the first step in PCB design
- (a) Specification
- M Schematic
- c) Manufacturing file
- d) Simulation

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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

- 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 Noise
- d) Crosstalk

High cur	rent circuits are purposely	located or placed r	lear the edge of PCB	in accordance	to the supply
ines for					

- a) Removal of heat
- b) Isolation of stray current
- 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
- Torch Soldering
- d) Electrical Soldering
- Which among the below mentioned approaches belongs to the category of In-circuit Testing?
- a) Impedance Testing
- b) Component Testing
- eY 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 the to immersion of wire or sheet metal specimen in a bath of molten solder?
- a) Solder Bath Testing
- b) Meniscus Rise Testing
- 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) Yo increase leakage resistance
- 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
- (a) Decrease in the distance between conductors
- (a) 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
- Which among the below mentioned packages does not belong to the category of 'Small Outline Package
- a) SO
- b) SOP
- SOT
- d) SON
- 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
- (se 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 the noise especially in TTL/CMOS / ECL PCB designing?
- a) Coupling capacitor
- b) Decoupling capacitor
- Snubber circuits
- d) All of the above
- Which among the below specified condition is precise in the crosstalk verification mechanism using Togic flow in opposite direction with the limit of avoiding dangerous interference in digital PCB designing?
- a) $Z_{\text{even}} \ge Z_{\text{odd}}$
- b) Z_{odd} ≥ 0.5 Z_{even}
- c) $Z_{odd} \ge 0.8 Z_{even}$
- $Z_{odd} = Z_{even}$



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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

La Etching

- c) Photo-resist
- d) Solder mask
- 3. Which problems are about to occur if PCB is not designed properly in a confined manner for digital circuits?
- N Diffraction
- B. Refraction
- , C. Ground & Supply-line Noise
 - D. Electromagnetic Interference

A & B

b) B & C

CIC&D

d) A, B, C, D

- 4. 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

6 B & C

c) C & D

A, B, C, D

- 15. What should be the resistance of 0.6 mm wide conductor with 15 cm length and 25 μ m thickness of standard copper foil? (Assume $\rho = 1.7241 \times 10^{-6} (at 20^{\circ} C)$
- a) 118.2 mΩ
- to) 138.2 mΩ
- c) $172.4 \text{ in }\Omega$
- 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
- Vias on PCB
- d) All of the above



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raight Road, Dindigut 624 002

- 17/Which factors contribute to the occurrence of mechanical stress?
- Resonance
- b) Cracked Solder Joints.
- c) Both a and bo
- d) None of the above
- 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
- Both a and b
- d) None of the above
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- a) Increase in self-inductance
- b) Reduction in self-inductance
- ∠er Stabili∭ in self-inductance
- d) None of the above
- 24) What is the first step in PCB design
 - Specification
- (b) Schematic
- c) Manufacturing file
- 'd)&inulation



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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

- Which phenomenon is not reduced by the circuit paths of lowest impedances especially provided by power and return planes for shielding purposes?
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- 2. High current circuits are purposely located or placed near the edge of PCB in accordance to the supply
- mes for
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- b) Isolation of stray current
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- Which among the below stated soldering methods is also renowned as 'High Frequency Resistance Soldering'?
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- b) Furnace Soldering

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- (i) Electrical Soldering
- 4. Which among the below mentioned approaches belongs to the category of In-circuit Testing?
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- d) All of the above
- 5 Which type of solderability testing is carried out for the generation of solder sample due of inimersion of wire or sheet metal specimen in a bath of molten solder?
- a) Solder Bath Testing
- b) Meniscus Rise Testing
- Solder Iron Testing
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- 6. What is/are the necessity/ies to provide guarding to precision differential amplifiers?
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- 8 Which among the below mentioned packages does not belong to the category of 'Small Outline Package
- SO
- b) SOP
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- 9. Which among the below specified assertions is not a grounding consideration associated with ADC as vell as DAC?
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A & B

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- D. Double Pulsing
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A, B, C/D

- 15. What should be the resistance of 0.6 mm wide conductor with 15 cm length and 25 μ m thickness of standard copper foil? (Assume $\rho = 1.7241 \times 10^{-6}$ (at 20° C)
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c) 172.4 mΩ

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- 17. Which factors contribute to the occurrence of mechanical stress?
- a), Resonance
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- c) Both a and b
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- by Schematic
- c) Manufacturing file
- d) Simulation

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RegNo: 92211510550

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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?
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- d) None of the above



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- 6. What is/are the necessity/ies to provide guarding to precision differential amplifiers?
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- (e) Both a and b
 - d) None of the above

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
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- 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 Package
- a) SO
- by SOP
- 4) SOT
- d) SON

Which among the below specified assertions is not a grounding consideration associated with ADC as

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- a) Coupling capacitor
- b) Decoupling capacitor
- c) Snubber circuits
- 1) 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) Zeven > Zodd
- b) $Z_{odd} \ge 0.5 Z_{even}$
- c) $Z_{\text{odd}} \ge 0.8 Z_{\text{even}}$

V Zodd = Zeven



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Palani Road, Dindigul - 624 002.

12. Which terminology of PCB represents a thin photo-sensitive polyr	ner by supporting photographic
pattern of single traces or IC pads for etching?	
a) Prepreg	
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c) Photo-resist	
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12 MILL C. T. L. C.	
13. Which problems are about to occur if PCB is not designed properly	y in a confined manner for digital
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A. Dafraction	
B. Refraction	
Ground & Supply-line Noise	
16. Electromagnetic Interference	
A & B	
MB&C	
c) C & D	
d) A, B, C, D	
1.4 Which among the following exists in abtaining the desired value	of work immedance in reflection phase
14. Which among the following assists in obtaining the desired value	or wave impedance in reflection phase
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A. Width of signal lines	
B. Distance between signal line and ground line	
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	1 1 100 111
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16. The actual cost of PCB can be evaluated on the basis of	Alla
a) PCB size & material	. N D 1
	2 / Liv
c) Vias on PCB	DED SEMBER
d) All of the above	Dr.D. SENTHIL KUMARAN, M.E., Ph.D., (NUS)
() () ()	
	Ruttathungti Mu Bugineering and Technology
	Ruttathupatti Village, Sindulagundu (FD), Palani Road, Dindugul - 624 062.
ASC THEST	- 624 062
b) Number of layers c) Vias on PCB d) All of the above	

- Which factors contribute to the occurrence of mechanical stress?
- a) Resonance
- b) Cracked Solder Joints.
- c) Both a and b
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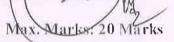
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Department of Electrical and Electronics Engineering Value added Course on PCB Fabrication and Manufacturing

Assessment Question

Answer for all the questions (Each questions carry one mark)



- I. Which phenomenon is not reduced by the circuit paths of lowest impedances especially provided by power and return planes for shielding purposes?
- a) Radiation
- ▶ Convection

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) Kemoval 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
- Furnace Soldering
- 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
- 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
- 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?
- 1) To increase leakage resistance
- b) To reduce capacitance between signal conductors & ground
- Both a and b
- d) None of the above
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Department of Electrical and Electronics Engineering

Hands on Training in PCB Design and Manufacturing

STUDENT FEEDBACK FORM

Year/Sem: W./ VII

Date: 67)12 2018

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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 improvements in future.

S.No	Criteria	Rating					
		Excellent	Very good	Good	Fair	Satisfactory	
1	Course content	V				ia .	
2	Skill development		V		2 1		
3	Motivation	27		-	10	5 4	
4	Regularity and punctuality of trainer		- A		*	-	
5	Coverage of syllabus	V					
6	Interaction	<u>+</u>			*		
7	Individual attention			V			
8	Outcome	J	(6)	×	1,		

Feel free to give QUALITATIVE comments too

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V. Ramya



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Department of Electrical and Electronics Engineering

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M. Sindhu



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* 3	Motivation				s .		
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5	Coverage of syllabus	1 -	/	-			
6	Interaction			-			
7	Individual attention				3		
8	Outcome	4				5 ¥	

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Year/Sem: 11 - VII Date: 07. 12.18

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Year/Sem: 1 / vii

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This is to certified that Mr./ AKALAN Of IV-EEE has successfully completed the Hands on Training program on PCB Design and Fabrication from 03.12.2018 to 08.12.2018 organized by Schneider Electric System India Pvt.Ltd, Chennai.



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