



**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 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**

**Mr.B.Marisekar,AP/EEE**

**HoD**

**Dr.P.Booma devi**

**Principal**

**Dr.Saravanan**

**ALL ARE INVITED**





## SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul – Palani Highway, Dindigul – 624 002

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

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### 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.

*B. Marisekar*  
Faculty Incharge

*P. R. D.*  
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) tools for 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)**

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Class Incharge

  
HoD/EEE






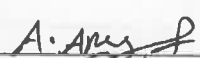
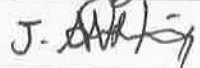


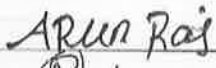


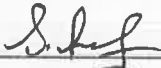
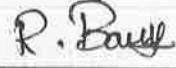

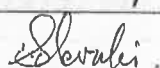

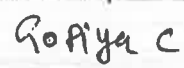


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Dindigul-Palani Highway, Dindigul-624002

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24	922115105024	KARUPPAIAH.M	M. Karupiah
25	922115105025	KAVITHA.R	Kavitha.R.
26	922115105026	KIRUTHIHA K	K. Kiruthi
27	922115105027	KISHOR C	C. Kishor
28	922115105028	MARIA MINISHA. S	S. Maria Minisha
29	922115105029	MASANADEVLI	I. Masanadevi
30	922115105030	MASI R	M. Rasi
31	922115105031	MOHAMEDABDULAYUB.M	M. Mohamed Abdulayub.
32	922115105032	MOHAMED SALMAN. S	S. Mohamed Salman
33	922115105033	MUSRATH N	N. Musrath
34	922115105034	MUTHU RAJ K	K. Muthu Raj
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58	922115105058	VISHNU. V	V. Vishnu
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60	922115105701	CYRIL VALAN.]	Cyril V.

  
Faculty In-charge

  
HOD/EEE





# Hands on Training Program on PCB Design & Fabrication

## Students Attendance Report

[illegible]

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			03/12/18		4/12/18		5/12/18		6/12/18		7/12/18		8/12/18	
			FN	AN	FN	AN	FN	AN	FN	AN	FN	AN	FN	AN
57	922115105057	VISHAL ADHITHYA.A	/	/	/	/	/	AB	AB	/	/	/	/	/
58	922115105058	VISHNU. V	/	/	/	/	/	/	/	/	/	/	/	/
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Present			60	59	60	60	59	58	59	59	59	60	60	59
Absent			-	21	-	-	01	02	01	01	01	-	-	21
Signature			[Signature]		[Signature]		[Signature]		[Signature]		[Signature]		[Signature]	

*B. [Signature]*  
Faculty Incharge 8/12/18

*P.B.D.*  
Hod/EEE



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Faculty In-charge

  
HOD/EEE



RegNo: 922415105058

## 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 Noise
- c) 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 Packag

- 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 supply line noise especially in TTI/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)  $Z_{\text{even}} > Z_{\text{odd}}$
- b)  $Z_{\text{odd}} \geq 0.5 Z_{\text{even}}$
- c)  $Z_{\text{odd}} \geq 0.8 Z_{\text{even}}$
- d)  $Z_{\text{odd}} = Z_{\text{even}}$



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  $\mu\text{m}$  thickness of standard copper foil? (Assume  $\rho = 1.7241 \times 10^{-6}$  (at 20° C))

- a) 118.2 m $\Omega$
- ☒ b) 138.2 m $\Omega$
- c) 172.4 m $\Omega$
- d) 192.4 m $\Omega$

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

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RegNo: 922115105001

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- a) Specification
- b) Schematic
- c) Manufacturing file
- d) Simulation

\*\*\*\*\*



RegNo: 922115105023

## 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

18  
20

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

Max. Marks. 20 Marks

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a) Iron Soldering  
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20. What is the first step in PCB design

- ~~a) Specification~~
- b) Schematic
- c) Manufacturing file
- ~~d) Simulation~~

\*\*\*\*\*



RegNo: 922115105043

## 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

Max. Marks: 20 Marks

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

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- a) Specification
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\*\*\*\*\*





RegNo: 92211510550

## 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

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20

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- b) Schematic
- c) Manufacturing file
- d) Simulation

\*\*\*\*\*



RegNo: 922115105016

## 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

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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 in PCB Design and Manufacturing

## STUDENT FEEDBACK FORM

Year/Sem: IV / VII

Date: 07/12/2018

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 improvements in 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

.....  
Signature of the student with name  
V. Ramya



# 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: 4 / 7

Date: 07 / 12 / 18

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Feel free to give QUALITATIVE comments too

.....  
M. Sindhu  
Signature of the student with name  
M. Sindhu



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Dindigul – Palani Highway, Dindigul – 624 002

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Value added course on PCB Design and Manufacturing

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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

Value added course on PCB Design and Manufacturing

## STUDENT FEEDBACK FORM

Year/Sem: VII - VII

Date: 07.12.18

Dear Student,

Thank you for your participation Value added Course on **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	✓				
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

.....  
  
Gobinath A. 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

Year/Sem: IV / VII

Date: 07.12.19

Dear Student,

Thank you for your participation Value added Course on **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		✓			
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

.....  
GURU SRI.K  
Signature of the student with name



# SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul - Palani Highway, Dindigul - 624 002

## CERTIFICATE

This is to certified that Mr./Ms. .... **VISHNU.V** ..... 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.

Principal



# SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul - Palani Highway, Dindigul - 624 002

## CERTIFICATE

This is to certified that Mr./Ms. .... Of

*J. BALAJI*

IV-EEE has successsfully 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.

Principal



# SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul - Palani Highway, Dindigul - 624 002

## CERTIFICATE

This is to certified that Mr./Ms. *GIPIYA.C* ..... 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.

A handwritten signature in dark ink, appearing to read 'G. Srinivasan', is written over a horizontal line.

Principal



# SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul - Palani Highway, Dindigul - 624 002

## CERTIFICATE

This is to certified that Mr./Ms. .... Of

**BAIZ. N**

IV-EEE has successfullly 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.

Principal



# SSM INSTITUTE OF ENGINEERING AND TECHNOLOGY

Dindigul - Palani Highway, Dindigul - 624 002

## CERTIFICATE

This is to certified that Mr./**Ms.** **AKILAN . N** ..... 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.

Principal