

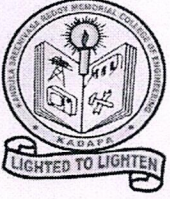
Certificate Course

On

PCB Design

10.08.2022 to 07.09.2022

Coordinator: K. Kalyan Kumar



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(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India – 516 005

Approved by AICTE, New Delhi & Affiliated to JNTUA,
Ananthapuramu.



Department of Electrical and Electronics Engineering

Lr. / KSRMCE / **EEE** / 2021 – 22 /

Date: 30.07.2022

To
The Principal,
K.S.R.M.College of Engineering (A),
Kadapa.

//THROUGH PROPER CHANNEL//

Sub: KSRMCE – (EEE) – Permission for Conducting a Certification Course on “PCB Design” for B.Tech II Semester Students – Request for Permission – Reg.

Respected Sir,

It is being brought to your notice that, I K. Kalyan Kumar, Assistant Professor from Department of EEE is organizing a Certification Course on “**PCB Design**” for B.Tech II Semester students, from 10-08-2022 to 07-09-2022. In this regard, I request you to kindly permit me to organize the above-mentioned certification course, for which kind of act we would be grateful to you sir.

The Resource persons of the Certification Course:
1. Mr. Rakesh Rajan, TAKEOFF Group, Tirupati.

Thanking you Sir,

Yours Faithfully
K. Kalyan Kumar
(K. Kalyan Kumar)
(Assistant Professor/EEE)

Forwarded to Principal sir

Amareddy

Permitted
V. S. S. Murthy

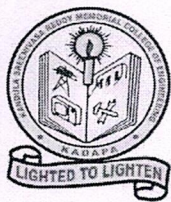


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Department of Electrical and Electronics Engineering

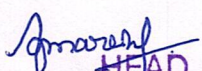
Cr./KSRMCE/(Department of EEE)/21-22

Date: 01.08.2022

Circular

It is hereby informed that the department of Electrical and Electronics Engineering is organizing a Certification Course on “**PCB Design**” for B.Tech II Semester students, from 10-08-2022 to 07-09-2022. In this Context, I request the students to register their names with the concerned coordinator on or before 05.08.2022 (Friday). The details of the Workshop are as follows:

Name of the Event	Certification Course
Name of the Course	PCB Design
Date(s) of the Course	10-08-2022 to 07-09-2022
Resource persons	Mr. Rakesh Rajan, TAKEOFF GROUP, Tirupati
Venue	SJ – Computer Centre
Faculty Coordinator	Sri K. Kalyan Kumar, Assistant Professor in EEE


HEAD
Head of the Department
Department of Electrical &
Electronics Engineering
K.S.R.M. College of Engineering
Kadapa -516003.

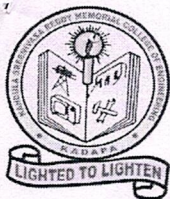


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Department of Electrical and Electronics Engineering

List of Registered Participants

Name of the Event	Certification Course
Name of the Course	PCB Design
Date(s) of the Course	10-08-2022 to 07-09-2022
Timings of the Course	03:00 PM to 5:00 PM
Resource persons	Mr. Rakesh Rajan, TAKEOFF GROUP, Tirupati
Venue	SJ – Computer Centre
Faculty Coordinator	Mr. K. Kalyan Kumar, Assistant Professor in EEE, KSRMCE

S.No	Roll Number	Name of the Student	Signature
01	219Y1A0201	Aluru Vijay Kumar	A. Vijay
02	219Y1A0203	Boddipalli Ajay	B. Ajay
03	219Y1A0204	Bogathi Anilkumar Reddy	B. Anilkumar
04	219Y1A0207	Busetty Bhargavi	B. Bhargavi
05	219Y1A0211	Chittiboyina Janasri	C. Janasri
06	219Y1A0213	Dande Mohan	D. Mohan
07	219Y1A0215	Duggireddy Charitha	D. Charitha
08	219Y1A0219	Ganigeri Hari Krishna	G. Hari Krishna
09	219Y1A0220	Guduru Manasa	K. Manasa
10	219Y1A0223	Kalluru Maneesha	K. Maneesha
11	219Y1A0224	Karna Sreenivasula Reddy	K. Sreenivasula
12	219Y1A0225	Karrevula Saitejaswini	K. Saitejaswini



S.No	Roll Number	Name of the Student	Signature
13	219Y1A0228	Kona Nandu	K. Nandu
14	219Y1A0229	Kondakindha Vijay Kumar	K. Vijay Kumar
15	219Y1A0231	Madduri Charitha	M. Charitha
16	219Y1A0232	Mani Mani Deepika	M. Deepika
17	219Y1A0233	Mekala Naga Divya	M. Naga Divya
18	219Y1A0234	Mekala Yaswitha	M. Yaswitha
19	219Y1A0235	Mittapalli Vemesh Kumar Reddy	M. Vemesh Kumar Reddy
20	219Y1A0236	Nallangari Sudharshan Reddy	N. Sudharshan Reddy
21	219Y1A0239	Pulakunta Somasekhar	P. Somasekhar
22	219Y1A0240	Rachaveeti Rajesh	R. Rajesh
23	219Y1A0242	Shaik Baba Faruk	Shaik Baba Faruk
24	219Y1A0243	Shaik Samiulla	S. Samiulla
25	219Y1A0245	Syed Afrin Sulthana	S. Afrin Sulthana
26	219Y1A0246	Syed Iershad Ameen	S. Iershad Ameen
27	219Y1A0247	Syed Mohammed Sahil	S. M. Sahil
28	219Y1A0250	Yarraguntla Sushma	Y. Sushma

Kalyan
Coordinator(s)

Anusha
Head of the Department
HEAD
Department of Electrical &
Electronics Engineering
K.S.R.M. College of Engineering
Kadapa -516003.

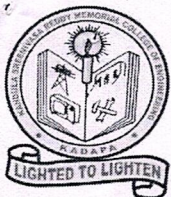


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Department of Electrical and Electronics Engineering

Certification Course on "PCB Design"

Modules

Timing: 03:00 PM to 5:00 PM

Module – 1: Printed circuit Board Design: Study of Packages of Electronic Components. History of Printed Circuit Boards. Various types of Printed Circuit Boards - Single Sided Boards, Double Sided Plated through Hole Boards, multilayer Boards..

Module – 2: Printed Circuit Board Design Methods: Rules for single and Double Sided Board. Schematic diagram Entry in PCB Design tool/S/W. Layout Design, Routing methods. Guideline for Artwork Generation. Generation of various Manufacturing Documents/ Output file generation. Component Library management in PCB Design tool.

Module – 3: Printed Circuit Board Manufacturing Methods: Method of Screen Printing for pattern transfer. Method of Wet film and Dry film for single and Double Sided Board Manufacturing. Method of Solder-mask and Legend Printings. Plating and Etching Techniques. Mechanical methods required in manufacturing of PCBs like punching, drilling, milling and routing.

Module – 4: PCB Assembly Techniques: Components Preparation Method-Lead Forming methods. Leaded through hole assembly and Surface Mount Assembly. Mixed Assembly Techniques of through hole and SMDs. Manual Assembly method, Semiautomatic and automatic Assembly method. Study of Tools used in the assembly process.

Module – 5: Practical /Tutorial: Based on theory- practical and Assignment in Design, Manufacturing and Assembly.

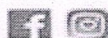
Kalyan
Coordinator(s)

Anurag
Head of the Department



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K.S.R.M. COLLEGE OF ENGINEERING, KADAPA**(AUTONOMOUS)****DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING****PCB Design****(Certification course)****Detailed Schedule:**

S.No	Date	Topic	No. of Hours
Module 1			
	10.08.2022	Study of Packages of Electronic Components	2
	11.08.2022	History of Printed Circuit Boards	2
	12.08.2022	Various types of Printed Circuit Boards Single Sided Boards	2
	13.08.2022	Double Sided Plated through Hole Boards, multilayer Boards	2
Module 2			
	15.08.2022	Rules for single and Double Sided Board	2
	16.08.2022	Schematic diagram Entry in PCB Design tool/S/W	2
	17.08.2022	Guideline for Artwork Generation	2
	18.08.2022	Generation of various Manufacturing Documents/ Output file generation	2
Module 3			
	22.08.2022	Method of Screen Printing for pattern transfer	2
	23.08.2022	Method of Wet film and Dry film for single and Double Sided Board Manufacturing	2
	24.08.2022	Method of Solder-mask and Legend Printings. Plating and Etching Techniques	2
Module 4			
	29.08.2022	Components Preparation Method-Lead Forming methods.	2
	30.08.2022	Leaded through hole assembly	2
	31.08.2022	Study of Tools used in the assembly process	2
Module 5			
	05.08.2022	Based on theory- practical	2
	06.08.2022	Assignment in Design	2
	07.08.2022	Manufacturing and Assembly.	2
Total			34

K. Kalyan Kumar
Course coordinators

Sri. K. Kalyan Kumar

Narayana
HOD

HEAD
Department of Electrical &
Electronics Engineering
K.S.R.M. College of Engineering
Kadapa -516003.



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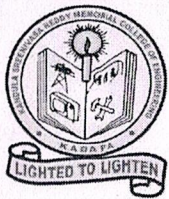


Department of Electrical and Electronics Engineering

List of Participants & Attendance Sheet

Roll Number	10/ 8	11/ 8	12/ 8	17/ 8	18/ 8	22/ 8	23/ 8	24/ 8	25/ 8	26/ 8	29/ 8	30/ 8	01/ 9	02/ 9	03/ 9	06/ 9	07/ 9
219Y1A0201	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0203	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P
219Y1A0204	P	P	P	P	A	P	P	P	P	P	P	P	P	P	A	P	P
219Y1A0207	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
219Y1A0211	P	P	P	P	A	P	P	P	P	P	P	P	A	P	P	P	P
219Y1A0213	P	P	P	P	P	P	P	A	P	P	P	A	P	A	P	P	P
219Y1A0215	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0219	P	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P
219Y1A0220	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0223	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0224	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0225	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0228	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0229	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
219Y1A0231	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P
219Y1A0232	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P





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Department of Electrical and Electronics Engineering

List of Participants & Attendance Sheet

Roll Number	10/8	11/8	12/8	17/8	18/8	22/8	23/8	24/8	25/8	26/8	29/8	30/8	01/9	02/9	03/9	06/9	07/9
219Y1A0233	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0234	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0235	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0236	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0239	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
219Y1A0240	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P
219Y1A0242	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
219Y1A0243	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0245	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0246	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P
219Y1A0247	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
219Y1A0250	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	P

Kalyan
Coordinator(s)

Agarwal
Head of the Department



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Department of Electrical and Electronics Engineering

Certification course on

Printed Circuit Board (PCB)

Course Duration : 10.08.2022 to 07.09.2022

Venue: SJ-Computer Center

Resource Person

Mr. Rakesh Rajan

TAKEOFF Group,

Tirupati

Faculty Coordinator

Mr. K.Kalyan Kumar

Assistant Professor,

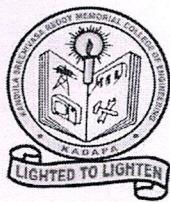


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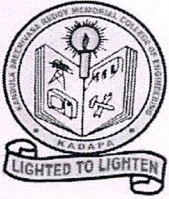
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Ananthapuramu.



Department of Electrical and Electronics Engineering

Activity Report

Name of the Event	Certification Course
Name of the Course	PCB Design
Date(s) of the Course	10-08-2022 to 07-09-2022
Target Audience	B.Tech II Semester Students
Number of Students Participated	34
Resource Persons	Mr. Rakesh Rajan, TAKEOFF Group, Tirupati
Organizer/Supporting Team	Mr. K. Kalyan Kumar
Report	<p>After the inauguration, the content flow, objectives and outcomes of this program were discussed. Students end up spending up to 50% of their project development time and money due to improper electronic component selection using trial & error methods for their minor & major projects.</p> <p>This Course is dedicated to training the students on the design and manufacturing of a Printed Circuit Board. This course is an invaluable resource for those who are learning PCB design. Designing a PCB is not something you will do in a couple of hours. It is a highly technical skill and it might take months or years to master it.</p> <p>This Course will provide an insight into the basics of PCB design, as well as some knowledge about more advanced topics. This is a 5-day program which focuses on advanced topics of PCB design along with Fabrication Process.</p> <p>Valedictory session was conducted on 07/09/2022 in which the students gave demonstrations of programs they developed and feedback of their overall learning experience. The department initiatives were shared by Dr. M. S. Priyadarshini (H.O.D) for all the participants. E-Certificates were provided to the students after completion of the course and feedback process.</p>



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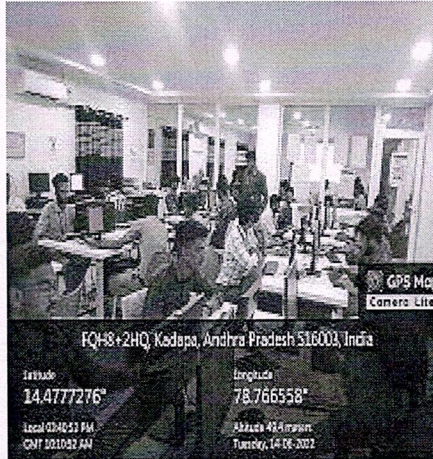
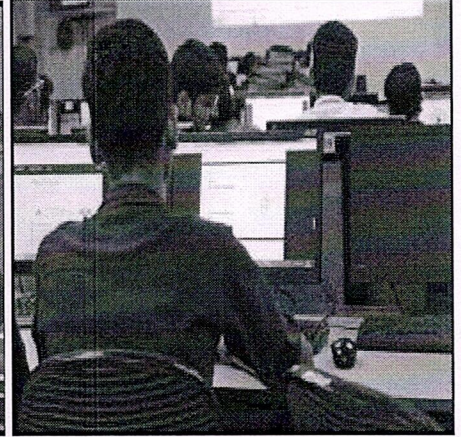
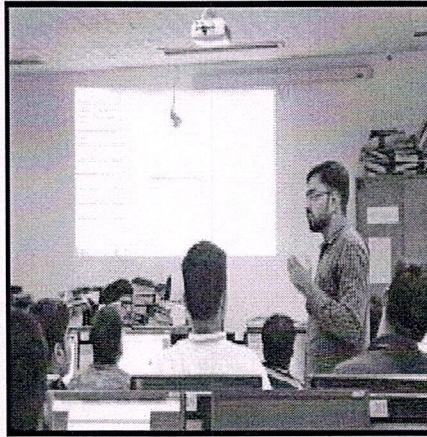
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Sample Photos



K. Kalayukumar
Coordinator(s)

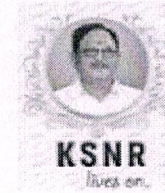
Srinivashe
Head of the Department
Department of Electrical &
Electronics Engineering
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Kadapa -516003.



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Department of E.E.E
COURSE COMPLETION CERTIFICATE
on
PCB DESIGN

This is to certify that **Dane Mohan (219Y1A0213)** has participated in "PCB Design" , During 10.01.2022 to 05.02.2022 organised by the Department of Electrical and Electronics Engineering, K.S.R.M. College of Engineering (Autonomous), Kadapa

Dr. K. Amaresh
HOD, EEE

Dr. V.S.S. Murthy
Principal



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Department of E.E.E

COURSE COMPLETION CERTIFICATE

on

PCB DESIGN

This is to certify that Kalluru Maneesha (219Y1A0223) has participated in "PCB Design" , During 10.01.2022 to 05.02.2022 organised by the Department of Electrical and Electronics Engineering, K.S.R.M. College of Engineering (Autonomous), Kadapa

Dr. K. Amaresh
HOD, EEE

Dr. V.S.S. Murthy
Principal

Feedback on Certification Course “Printed Circuit Board”

* Required

1. Roll Number *

2. Name of the Student *

3. Organization of Course and session planning by instructor. *

Mark only one oval.

☐ Good

☐ Very Good

☐ Excellent

4. Clarity in content delivery. *

Mark only one oval.

☐ Good

☐ Very Good

☐ Excellent

5. Content is relevant and useful *

Mark only one oval.

- ☐ Good
- ☐ Very Good
- ☐ Excellent

6. Adequate opportunity to interact with trainer *

Mark only one oval.

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ very Good
- ☐ Excellent

7. Overall rating *

Mark only one oval.

- ☐ Poor
- ☐ Good
- ☐ Very Good
- ☐ Excellent

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**Department of Electrical & Electronics Engineering
Feedback of students on Certification Course on "Printed Circuit Board"**

S.No	Roll Number	Name of the Student	Organization of Course and session planning by instructor.	Clarity in content delivery.	Content is relevant and useful	Adequate opportunity to interact with trainer	Overall rating
1	219Y1A0201	Aluru Vijay Kumar	Excellent	Excellent	Very good	Very good	Excellent
2	219Y1A0203	Boddipalli Ajay	Excellent	Very good	Excellent	Very good	Excellent
3	219Y1A0204	Bogathi Anilkumar Reddy	Very good	Very good	Good	Very good	Excellent
4	219Y1A0207	Busetty Bhargavi	Excellent	Very good	Very good	Excellent	Excellent
5	219Y1A0211	Chittiboyina Janasri	Good	Excellent	Very good	Very good	Excellent
6	219Y1A0213	Dande Mohan	Good	Good	Very good	Good	Very good
7	219Y1A0215	Duggireddy Charitha	Very good	Very good	Excellent	Good	Good
8	219Y1A0219	Ganigeri Hari Krishna	Excellent	Excellent	Excellent	Excellent	Excellent
9	219Y1A0220	Guduru Manasa	Very good	Very good	Very good	Very good	Very good
10	219Y1A0223	Kalluru Maneesha	Very good	Very good	Very good	Very good	Very good
11	219Y1A0224	Karna Sreenivasula Reddy	Very good	Excellent	Excellent	Excellent	Excellent
12	219Y1A0225	Karrevula Saitejaswini	Good	Good	Good	Good	Good
13	219Y1A0228	Kona Nandu	Excellent	Excellent	Excellent	Excellent	Excellent
14	219Y1A0229	Kondakindha Vijay Kumar	Very good	Very good	Excellent	Very good	Excellent
15	219Y1A0231	Madduri Charitha	Fair	Excellent	Excellent	Excellent	Excellent
16	219Y1A0232	Mani Mani Deepika	Excellent	Excellent	Excellent	Excellent	Excellent
17	219Y1A0233	Mekala Naga Divya	Very good	Very good	Excellent	Excellent	Excellent
18	219Y1A0234	Mekala Yaswitha	Very good	Excellent	Excellent	Very good	Excellent
19	219Y1A0235	Mittapalli Vemesh Kumar	Very good	Good	Very good	Very good	Excellent
20	219Y1A0236	Nallangari Sudharshan Reddy	Excellent	Very good	Excellent	Very good	Excellent

**K.S.R.M. COLLEGE OF ENGINEERING
(AUTONOMOUS)**

**Department of Electrical & Electronics Engineering
Feedback of students on Certification Course on "Printed Circuit Board"**

S.No	Roll Number	Name of the Student	Organization of Course and session planning by instructor.	Clarity in content delivery.	Content is relevant and useful	Adequate opportunity to interact with trainer	Overall rating
21	219Y1A0239	Pulakunta Somasekhar	Very good	Very good	Good	Excellent	Excellent
22	219Y1A0240	Rachaveeti Rajesh	Excellent	Excellent	Excellent	Excellent	Excellent
23	219Y1A0242	Shaik Baba Faruk	Excellent	Excellent	Excellent	Excellent	Excellent
24	219Y1A0243	Shaik Samiulla	Excellent	Very good	Excellent	Excellent	Excellent
25	219Y1A0245	Syed Afrin Sulthana	Very good	Fair	Very good	Very good	Very good
26	219Y1A0246	Syed Iershad Ameena	Good	Good	Good	Good	Good
27	219Y1A0247	Syed Mohammed Sahil	Excellent	Excellent	Excellent	Excellent	Excellent
28	219Y1A0250	Yarraguntla Sushma	Excellent	Excellent	Excellent	Excellent	Excellent

Kalyan
Coordinator
KKK

Narash
HOD
HEAD
Department of Electrical &
Electronics Engineering
K.S.R.M. College of Engineering
Kadapa -516003.

PCB Design

What is PCB

- ⦿ Printed Circuit Board
- ⦿ Electronic Board that connects circuit components
- ⦿ PCB populated with electronic components is a printed circuit assembly (PCA)
- ⦿ PCBs are rugged, inexpensive, and can be highly reliable
- ⦿ Mass manufacturing
- ⦿ Professional

Materials of PCB

- ◉ Conducting layers are typically made of thin copper foil.
- ◉ The board is typically coated with a solder mask that is green in color. Other colors that are normally available are blue and red.
- ◉ Unwanted copper is removed from the substrate after etching leaving only the desired copper traces or pathways

Parts of a PCB

- ⦿ Components
- ⦿ Pads
- ⦿ Traces
- ⦿ Vias
- ⦿ Top Metal Layer
- ⦿ Bottom Metal Layer

Components

- Components are the actual devices used in the circuit.
- This includes input/output connections.
- I/O ports, including power supply connections, are also important in the PCB design

Pads

- ⦿ Location that components connect to.
- ⦿ You will solder components to the pads on the PCB.
- ⦿ Pads will connect to traces.
- ⦿ Pads have an inner diameter and outer diameter.

Traces

- ⦿ Traces connect pads together.
- ⦿ Traces are essentially the wiring of the PCB.
- ⦿ Equivalent to wire for conducting signals
- ⦿ Traces sometimes connect to vias.
- ⦿ High current traces should be wide.
- ⦿ Signal traces usually narrower than power or ground traces

Vias

- ⦿ Pad with a plated hole connecting traces from one layer of board to other layers.
- ⦿ Attempt to minimize via use in your PCBs.
- ⦿ Some component leads can be used as vias.

Top Metal Layer

- ◉ Most of the components reside on the top layer
- ◉ Fewer traces on the top layer
- ◉ Components are soldered to the pads on the top layer of PCB
- ◉ Higher circuit densities

Bottom Metal Layer

- ⦿ Few components on this layer.
- ⦿ Many traces on this layer.
- ⦿ Most soldering done on this layer.

Jumpers

- ⦿ Often, many signal wires need to exist in too small of a space and must overlap.
- ⦿ Running traces on different PCB layers is an option.
- ⦿ Multilayer PCBs are often expensive.
- ⦿ Solution: use jumpers