

ESD FDP - Plan & Structure

1. Introduction:

This program is aimed at providing online training to E&TC Faculty of SPPU, to empower them to conduct and supervise the labs under ESD. The contents and structure of the program are based on the SPPU ESD Lab Syllabus.

2. Objectives of the Program:

After this Program, the attending faculty:

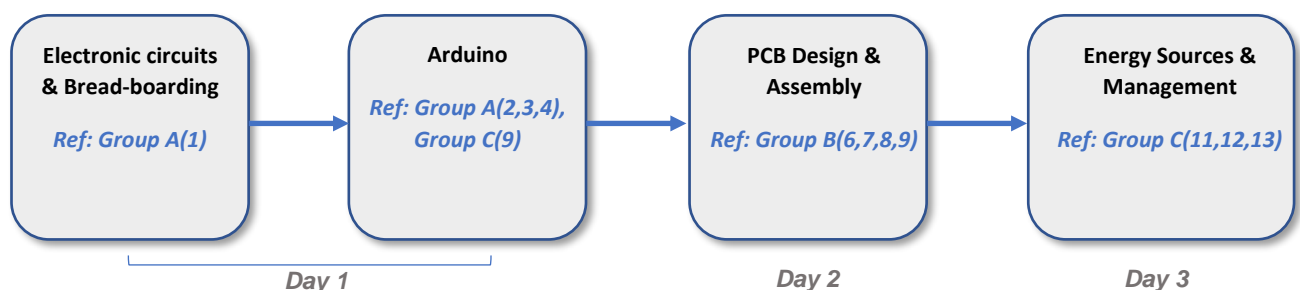
- a. will understand the drivers behind introduction of the ESD Lab for SE E&TC
- b. will be able to conduct and supervise the lab assignments, as described in the syllabus
- c. will have access to standardized Instructor's Manual, teaching aids and tools relevant to conduct of the listed practicals

3. Deliverables by CopperCloud:

- a. Online training and demonstrations
for all elements of the syllabus, except Group B (7) and (8)
- b. Assignments / hands-on exercises
- c. Instructor's Manual
(including procedures, circuit diagrams, source code, and lists of required materials, test equipment, accessories and tools)
- d. Repository of additional teaching aids
(including online study material, videos, references to hardware and software tools, etc)

4. Logical Training Flow:

The training has been organized in a logical flow, as indicated below:



5. Schedule

The tables below give the schedule for the FDP program. Please refer to the ESD Lab Syllabus for referring to listed practicals listed in Groups A, B and C, as mentioned in the plan below.

Day1: 23 June 2020: Breadboarding & Arduino

Time	Topic	Instructor	Equipment/Components/Tools
12.30am-1.00pm	Introduction to Syllabus	Dr. G R Patil	-
1.00 pm-1.45 pm	Group A (1): Electronic Components and Connections (Bread boarding)	Abhijeet (CopperCloud)	Breadboard, connecting wires , resistors, Capacitors, Diode , LEDS, Transistor(BC547),Relay, LDR, Multimeter,9v Battery.
1.45 pm-2.30 pm	Group A (2): Introduction and applications using Arduino	Abhijeet (CopperCloud)	Arduino UNO board, all others in Group A(1)
2.30 pm-2.45 am	-- Break --		
2.45 pm-3.30 pm	Group A (3): Using Sensors & Actuators and their interfacing with Arduino 45 (Motor Driver with relays , Reversible motor, SSR) Group C: (10) Assemble and utilize mechanical parts such as DC Motor, AC Motor, Stepper motor Solenoid, sensors etc., Connect assemble mechanical parts to form a working unit , Wire and form cables	Abhijeet (CopperCloud)	Small DC motor, Servo Motor, LDR light sensor, Relay (cube relay) / Relay module, SSR, DC Solenoid, AC bulb with wire and holder, all others in Group A(1).
3.30 pm-04.15 pm	Group A (4): Wireless Connectivity to Arduino Group A (2): MicroPython	Abhijeet (CopperCloud)	Arduino UNO board with Cable, ARDUINO IDE.
04.15 pm-04.30 pm	Q&A	Abhijeet (CopperCloud)	
After session	-- self-paced hands-on assignment (offline) --		

Day 2: 24 June 2020: PCB Design, Simulation and Assembly

Time	Topic	Instructor	Equipment/Components/Tools
1.00 pm-1.45 pm	Group B (9): Using Simulation software for design & testing of electronic circuits	Yogesh (CopperCloud)	PROTEUS 8.x (Software)
1.45 pm-2.30 pm	Group B (9): Drawing layout of PCB using PCB design software Group B (6): Single layer PCB design for a simple electronic Circuit	Yogesh (CopperCloud)	EAGLE 5.9.0 (Software), VIEW PLOT (Software)
2.30 pm-2.45 am	-- Break --		
2.45 pm-3.30 pm	Group C (9)(should be 10): Assemble and use various types of parts and surface mounted device parts, Assemble parts to standard determined by IPC-A-610, Work to correct sequences and tolerances, Accurately solder components using lead free solder to comply with industry standards	Abhijeet (CopperCloud)	SMD components, through-hole components, solder station, solder wire, associated soldering accessories (Please refer to parts list in next section)
3.30 pm-04.30 pm	Group C (7): Using test equipment for testing, fault finding & repair etc Group C (8): Use of measuring equipment for measurement of signals	Dr. G R Patil & Keysight Technologies	
04.30 pm-05.00 pm	Q&A	Abhijeet (CopperCloud)	
After session	-- self-paced hands-on (offline) --		

Day 3: 25 June 2020: Energy Management

Time	Topic	Instructor	Equipment/Components/Tools
1.00 pm-1.45 pm	Group C (13): Study of various solar power generation systems	Abhijeet (CopperCloud)	Solar panel, Multimeter.
1.45 pm-2.30 pm	Group C (12): Study & Use of various types of Batteries	Abhijeet (CopperCloud)	Small lead-acid battery, LiPo (L-PC001 OR 18650) Battery cell, TP Module, Super-capacitor.
2.30 pm-2.45 am	-- Break --		
2.45 pm-3.30 pm	Group C (11): Calculation of Power budget for an electronic circuit	Abhijeet (CopperCloud)	
3.30 pm-04.15 pm	Any spill-over from previous sections	Abhijeet (CopperCloud)	
04.15 pm-04.30 pm	Q&A	Abhijeet (CopperCloud)	
After session	-- self-paced hands-on (offline) --		

Day 4: 26 June 2020: Q&A and any revision or review of hands-on required

Time	Topic	Instructor	Equipment/Components/Tools
1.00 pm-1.45 pm	Discussion on assignments / hands-on	Dr. G R Patil & Abhijeet (CopperCloud)	
1.45 pm-2.30 pm	Recap & Q&A for the whole course	Dr. G R Patil & Abhijeet (CopperCloud)	
2.30 pm-2.45 am	-- Break --		
2.45 pm-3.30 pm	Overview of current industrial trends	Abhijeet (CopperCloud)	
3.30 pm-04.15 pm	Conclusion	Dr. G R Patil	

6. List of equipment/components required for each participant

COMPONENT NAME	VALUE/PART NO	Quantity
BREAD-BOARD	MB102 830 Points	1
CONNECTING WIRE SET	-	10 wires
RESISTOR	330E (1/4W)	4
RESISTOR	5K6 (1/4W)	4
RESISTOR	1K (1/4W)	4
DIODE	1N4007	4
LED	5MM-DIP	4
LDR/LDR MODULE	5MM-DIP	2
RELAY/RELAY MODULE	CUBE RELAY-5VDC	1
TRANSISTOR	BC547	2
SWITCH	TACTILE-PUSH BUTTON	1
ARDUINO UNO WITH CABLE	ATMEGA328P-PU- DIP	1
DC MOTOR	5VDC-	1
9V BATTERY WITH CONNECTOR	6F22-9V	1
Servo motor	TowerPro SG90	1

7. List of software to be installed on each participant's computer

- Arduino IDE (version 1.8 or higher)
- Eagle 5.9 or higher
- Proteus 8.x or higher
- View Plot

8. URL for online teaching aids (course contents, Instructors Manual, source code, other web urls): <https://github.com/coppercloud-iotech/sppu-esdlab-fdp-teachingaids>

