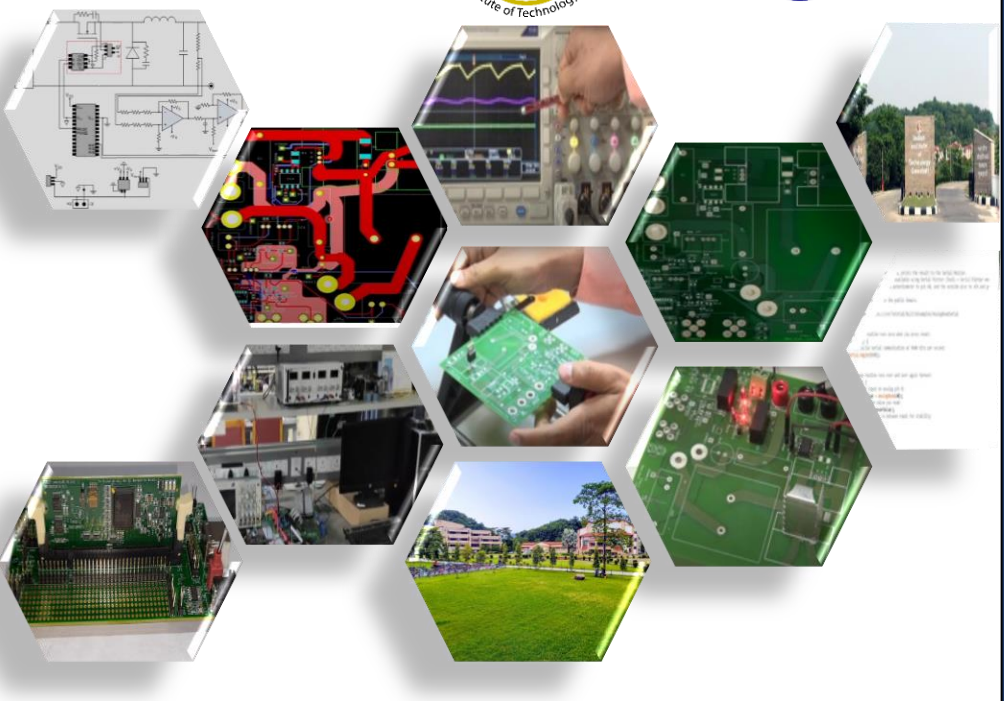


HANDS-ON TRAINING

on

POWER ELECTRONICS HARDWARE DESIGN WITH MICROCONTROLLER PROGRAMMING

JUNE 24 to JUNE 30

Event webpage: https://rb.gy/mok33

Application Link: https://forms.gle/pbPniMaxemrUP6jX8

Apply Before June 02, 2023

Limited No. of seats

- ❑ Learn Job relevant skills for hardware
- ❑ SERB certificate on completion
- ❑ Training in lab of IIT Guwahati
- ❑ Interaction with faculties of IIT Guwahati
- ❑ Training, travel, stay and food expenses, sponsored by SERB.

Sponsored by

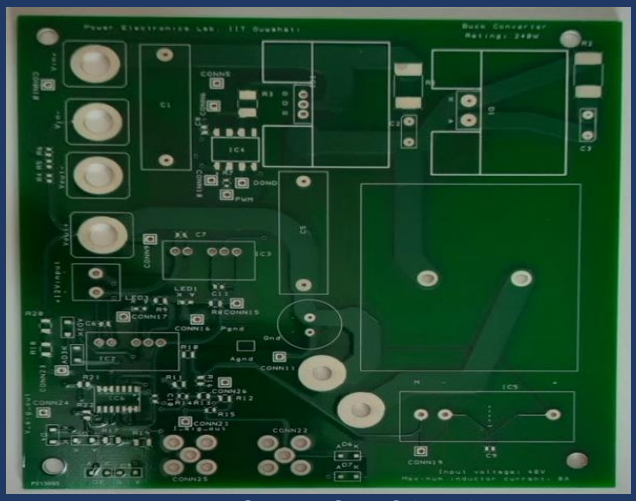
SERB under Accelerate Vigyan scheme

Organized by

IIT Guwahati

INTRODUCTION

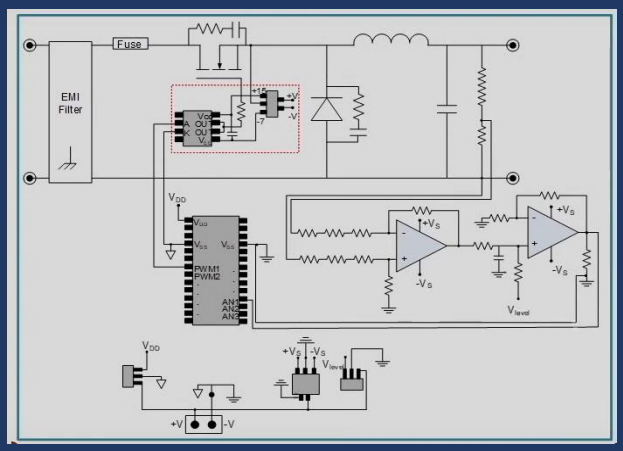
Power electronics is the electronics which is used to convert power from one form to another. It is the key technology in many applications like electric vehicles (EVs), renewable energies, power quality improvement, home appliances, power supply for different consumer electronics, battery charging, industrial drives, etc. In present times, knowledge and experience in power electronics hardware design is essential for engineers of disciplines like electrical and electronics engineering.



Printed circuit board (PCB)

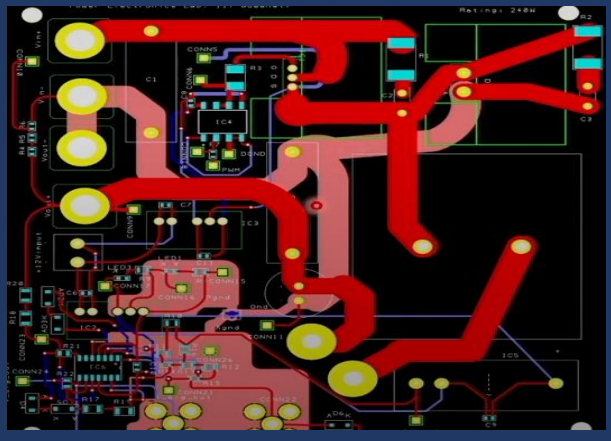
The workshop is going to give hands-on training on complete PCB designing – circuit simulation, making component library, good schematic practices, multi-layer PCB designing, making planes and polygons, DRC(design rule check) and ERC (electrical rule check) settings, cross-probing, layout rules, signal integrity, different types of grounds, routing mixed signal PCB and power electronic PCB, etc.

PCB Soldering

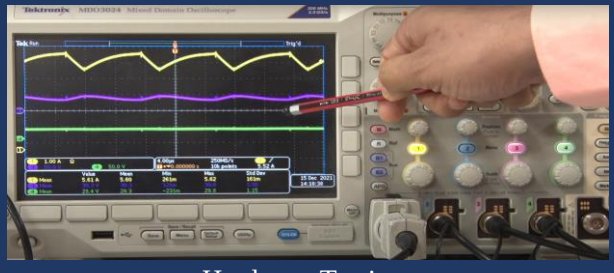


Schematic Design for PCB

PCB (printed circuit board) and hardware design are one of the main requirements for many power electronics-related jobs. Students are usually familiar with very novice methods of PCB and electronic hardware designing. However, industry-grade PCB and hardware designing require knowledge of several concepts and tools which are generally not covered in any undergraduate or postgraduate curriculum. This workshop intends to bridge this gap and give hands-on training on standard PCB and hardware designing methods required for industries.



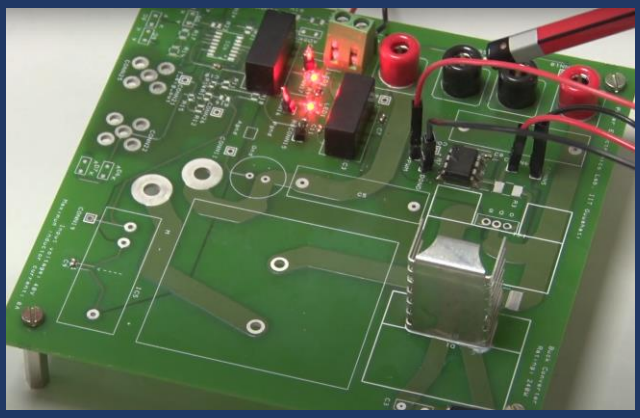
PCB Design



Hardware Testing

```
/*
  AnalogReadSerial

  Reads an analog input on pin 0, prints the result to the Serial Monitor.
  Graphical representation is available using Serial Plotter (Tools > Serial Plotter menu).
  Attach the center pin of a potentiometer to pin A0, and the outside pins to +5V and ground.

  This example code is in the public domain.

  https://www.arduino.cc/en/Tutorial/BuiltInExamples/AnalogReadSerial
*/

// the setup routine runs once when you press reset:
void setup() {
  // initialize serial communication at 9600 bits per second:
  Serial.begin(9600);
}

// the loop routine runs over and over again forever:
void loop() {
  // read the input on analog pin 0:
  int sensorValue = analogRead(A0);
  // print out the value you read:
  Serial.println(sensorValue);
  delay(1);  // delay in between reads for stability
}
```

Micro-controller programming



Hardware testing

For hardware designing, the workshop is going to provide knowledge of – various commonly used electronic components, their important specifications and how to read datasheets, how to understand big schematics, different packages and corresponding footprints of electronic components, resources to obtain examples of existing designs and finding components, how to avoid ground loops, etc.

The workshop is going to give hands-on training on soldering PCB, testing hardware, and how to use equipment like oscilloscopes, function generators, probes, etc. Further, knowledge of microcontroller programming is always helpful for power electronic designs.

Microcontroller Kit

Therefore, the workshop also intends to give hands-on training on introductory microcontroller programming.

WORKSHOP CONTENT

- Familiarity with electronic components
- Designing circuits & reading datasheets
- Circuit simulation using LT Spice
- Design of Schematic using Altium
- PCB design using Altium
- Training on design of multilayer, mixed signal and power electronics PCBs
- Familiarity with test equipment for power electronics
- Hardware testing
- Introduction to Microcontrollers
- Training on Arduino Programming

LIST OF INSTRUCTORS

Dr. Shabari Nath, Associate Professor, Dept. of Electronics & Electrical Eng., IIT Guwahati

Dr. Manas Khatua, Assistant Professor, Dept. of Computer Science & Eng., IIT Guwahati

Mr. Paban Bujor Barua, Technical Officer, Dept. of Electronics & Electrical Eng., IIT Guwahati

REGISTRATION & GUIDELINES

1. Interested students have to fill up their details in the application link, provided below (and at the end of this flyer). **The last date to fill up the form is June 2, 2023 (5:00 pm).**

   Application Link: https://forms.gle/pbPniMaxemrUP6jX8

2. Applicants shall be selected based on shortlisting criteria decided by an empowered committee of IIT Guwahati. The decision of which shall be final.

3. The first list of shortlisted candidates will be offered a seat in the Hands-on workshop by June 5, 2023.

4. The shortlisted candidates need to accept the offer, by submitting a Demand Draft (DD) of Rs. 4000/-. This deposit is for reserving the seat in the Hands-on workshop. The details of DD must be uploaded online within 2 days of receiving the offer.

5. If the shortlisted candidate fails to submit the details of DD within the stipulated time, it will be assumed that the candidate is not interested to attend the workshop. And the offer shall be given to the next candidate in the list of applicants.

6. **It must be noted that applicants are not being charged any fee for the workshop. The DD of Rs. 4000/- will not be encashed till June 30th 2023. AFTER SUCCESSFUL COMPLETION of the workshop by the candidate, DD SHALL BE RETURNED TO THE CANDIDATE ON 30th JUNE 2023, by hand at IIT Guwahati. The DD is taken only to ensure full participation and to avoid "no-show up by participants" and seats remaining vacant at the workshop.**

7. If a candidate after accepting the offer does not show up in the workshop or shows up and does not complete the workshop, then his/her DD will not be returned and shall be encashed by IIT Guwahati. Under no circumstances, the received DD shall be sent back via post.

8. **Candidates are supposed to send the DD only after they receive the offer and not at the time of application.**

9. Travel allowance (TA) will be given to participants as per GoI norms. Accommodation will be provided as per availability of hostels.

TARGET PARTICIPANTS

Research scholars and post graduate students with background in electrical or electronics or related areas. The applicant should be a bonafide student of an accredited institute/college/university in India.

CERTIFICATION

Participants attending all sessions successfully will be provided **SERB KARYASHALA** course completion certificate.

ABOUT THE DEPARTMENT

Department of Electronics and Electrical engineering (EEE) at IIT Guwahati offers B.Tech, M.Tech and P.hD. programs. The department offers bachelor's degrees in B. Tech in Electronics & Communication Engineering & B.Tech. in Electronics & Electrical Engineering. M.Tech degree are offered in five specializations: Signal Processing, VLSI, Communication Engg., Power Engg., Systems, Control and Automation, Microelectronics, Photonics and RF Engg.. Both B.Tech and M.Tech programs at dept. of EEE of IITG are designed to provide students with a strong theoretical and practical foundation in electrical and electronics engineering, enabling them to take up challenging careers in the industry or pursue higher studies. Dual [MS(Engg.)+PhD] and P.hD. degrees in all the major areas of faculty expertise are also offered. The program focuses on advanced research and development in these areas and trains students to become experts in their chosen field.

The Department ranks in the range of 201-250 worldwide as per QS ranking 2023.

ABOUT IIT GUWAHATI

IIT Guwahati is the only academic institution in India that occupied a place among the top 100 world universities – under 50 years of age – ranked by the London-based Times Higher Education (THE) in the year 2014 and continues to maintain its superior position even today in various International Rankings. IIT Guwahati gained rank 41 globally in the 'Research Citations per Faculty' category and overall 395 rank in the QS World University Rankings 2022 released recently. IIT Guwahati has retained the 7th position among the best engineering institutions of the country in the 'India Rankings 2021' declared by the National Institutional Ranking Framework (NIRF) of the Union Ministry of Education. IIT Guwahati has been also ranked 2nd in the 'Swachhata Ranking' conducted by the Govt. of India. Recently, IIT Guwahati has been ranked as the top-ranked University in 2019 for IT developers by Hacker Rank in the Asia-Pacific region

IMPORTANT DATES

Last Date of application: June 2, 2023 (5 pm)

Date of Notification to the first list of selected applicants: On or before June 5, 2023

Workshop dates: 24-30th June 2023

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Application Link:
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APPLICATION QR

Workshop Coordinator

Dr. Shabari Nath
Associate Professor
Department of Electronics & Electrical Engineering
IIT Guwahati

Email: pe.vigyan@iitg.ac.in

0361-258-3463