

High-End Workshop On Hands-on Training on the Design and Characterization of Microwave Circuits (File No: AV/KAR/2021/0182)

13th June 2022 to 23rd June 2022



Organized by:

Department of Electrical Engineering,
Indian Institute of Technology Jammu, J&K.

Funded by:

Science & Engineering Research Board (SERB)

Advisory Board

Chief Patron: Prof. Manoj Singh Gaur,
Director, IIT Jammu

Chairman: Prof. Suresh Devashyam,
Dean Academics, IIT Jammu

Convener (Event Organizer): Dr. Kushmanda Saurav,
Assistant Professor, EE Department, IIT Jammu

Guest Speakers

Prof. Shiban K. Koul, Professor Emeritus, IIT Delhi
Prof. Ananjan Basu, Professor, IIT Delhi

About the Institute

The Indian Institute of Technology Jammu was inaugurated on 6th August 2016, and welcomed the first batch of students into the campus in Paloura, Jammu. In 2018, IIT Jammu shifted the primary operations to the Main Campus in Jagti, Nagrota. The State Government, Jammu and Kashmir has provided land for the establishment of a permanent campus of the Indian Institute of Technology in Jammu, which consists of 400 acres. Currently the Phase 1 A of the main campus, spread across 25 acres, is operational. Phase 1 B and 1 C are undergoing construction. The main campus of the Institute is located on National Highway 44 and is about 15 kilometers from the Airport

About the Department

The EE department is one of the largest departments in the institute in terms of number of faculty members, students enrolled (including UG, PG and PhD) and research funding in the form of external funded projects. The department has made rapid strides during the last few years in all spheres of education and research. Our undergraduate program has a flavour of both electrical and electronics domain. We have research expertise in the area of Communications, Signal Processing, Machine Learning, RF/Microwave, Power Engineering, VLSI and Micro-electronics.

About the Karyshala Scheme

KARYASHALA is an effort by the Science and Engineering Research Board (SERB), Government of India via Accelerate Vigyan to improve research productivity of promising PG and Ph.D. students from universities and colleges through high-end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills.

About the Workshop

The event will be conducted as Karyashala intended towards Abhyaas mission scheme of Accelerate Vigyan, SERB in the offline mode during 13th to 23rd June 2022 at IIT Jammu. In the workshop, the hands-on training on the design, characterization, fabrication and measurement of microwave printed circuits will be carried out.

Participants: Eligibility Criteria

1. Only PG level students (i.e., the students pursuing their Masters or Ph.D. degree from a recognized university/institution) working in the relevant area of specializations are eligible to apply.
2. The relevant areas of specializations include (but are not limited to) RF and Microwaves, Antennas, Communication Systems, Electronics and Telecommunication and other related areas of research.
3. The applicants must produce a letter of authentication from their Supervisor/Head of the Department/Head of the Institute indicating their association with the institute and “No Objection Certificate (NOC)” for allowing their student to undergo training in the workshop, if selected. There is no dedicated format for the same however, it must be obtained on the institute/university letter head.

Participants: Desirable Qualification

1. Good academic record and experience in the relevant areas of specializations.
2. GATE score in relevant engineering stream.
3. Familiarization and understanding of Electromagnetic simulator like CST/HFSS/ADS etc.
4. Publication(s) in recognized national/international conferences and journals of repute.

Program Schedule

Day	Session	Topic
Day 1	Morning	Familiarization with the Microwave Network Analysis: S-parameters, Design equations for Microwave Filters and Couplers.
	Evening	
Day 2	Morning	Familiarization with an Electromagnetic Solver like Keysight ADS/ Ansys HFSS/ CST Studio Suite Study of Reflection characteristics of Transmission Lines terminated with Arbitrary Impedances using Smith Chart: Matched Line, Open Circuited, Short Circuited, Resistive Load (other than characteristic resistance), Inductive/Capacitive Terminations, Complex Load
	Evening	
Day 3	Morning	Impedance Matching using Quarter Wavelength Transformer for resistive termination, Single Stub and Double Stub Matching Technique for Transmission Line terminated with complex load. Two port analysis of Transmission Lines terminated with Impedances at Arbitrary Positions on Transmission Lines. Realization of band-pass or band-stop response using shunt/series LC elements terminations.
	Evening	
Day 4	Morning	Design and Characterization of Microwave Filters: Low Pass, High Pass, Band Pass, Band Reject. Ideal circuit and EM simulations for the actual layouts in microstrip environment.
	Evening	
Day 5	Morning	Design and Characterization of Microwave Couplers: Branch line, Coupled line, Rat Race. Ideal circuit and EM simulations for the actual layouts in microstrip environment.
	Evening	
Day 6	Morning	Design and Characterization of Power Dividers: Equal and Unequal Power Splitters. Ideal circuit and EM simulations for the actual layouts in microstrip environment. Familiarization with Microwave Amplifiers
	Evening	
Day 7	Morning	Design and Characterization of Microwave Amplifiers. EM and circuit co simulations for the amplifiers will be carried out. Familiarization with Microwave Mixers.
	Evening	
Day 8	Morning	Design and Characterization of Microwave Mixers. EM and circuit co simulations for the amplifiers will be carried out. Familiarization with Microstrip Antennas
	Evening	
Day 9	Morning	Design and Characterization of Microstrip Antennas. Reflection and radiation characteristics of linearly and circularly polarized antennas will be carried out.
	Evening	
Day 10	Morning	Familiarization with the equipment for measurement at microwave frequency: Vector Network Analyzer and Spectrum Analyzer. Hands-on training on the microwave measurements using Vector Network Analyzer and Spectrum Analyzer.
	Evening	
Day 11	Morning	Familiarization with the fabrication process of microwave printed circuit board (PCB): Wet etching using Photolithography and Dry etching using PCB Prototyping Machine for the design of PCB will be demonstrated.
	Evening	

Support Team

Dr. Abhishek Kumar Awasthi, Dr. Archana Rajput, Dr. Zamir A. Wani
Mr. Mehran Manzoor Zargar, Mr. Javid Ahmad Ganie
Mr. Ankit Pandey, Mr. Gazali Bashir, Miss. Suchitra Tiwari
Industry Experts from Keysight and Entuple Technologies

Contact Details of Event Organizer

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Registration and Guidelines

- The course will be completely free of cost for the shortlisted participants.
- The maximum number of participants is limited to 25.
- All the selected participants will be given accommodation in Institute hostel rooms with catering facilities.
- The participating students will be eligible for TA reimbursement for their journey to the host institute from their hometown/home institute, both ways, as per the GoI norms.
- The participants will be provided with the necessary stationary and consumables items for the workshop.
- A certificate regarding successful completion of workshop shall be issued to the participants.
- More details can be found in Accelerate Vigyan website.

Online Registration Link:

[Registration form for the Hands-on training on the design and characterization of microwave circuits - Google Forms](#)

- ❖ Please fill the Google form along with the requested details, scanned copies of certificates, resume and other supporting documents including the letter of authentication latest by **Sunday, 01st May 2022**.
- ❖ The applications will be screened and the candidates will be selected on merit basis.
- ❖ Only selected candidates will be informed by email, therefore the candidates must provide valid E-mail IDs while doing the online registration.
- ❖ The selected candidates will have to acknowledge and accept the offer for participating in the workshop through return email, failing which the waitlisted candidates may be called for the workshop.