Indian Institute of Technology Kanpur भारतीय प्रौद्योगिकी संस्थान कानपुर

A DRDO-Sponsored Workshop

OF TECHNO

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under the aegis of

DRDO-Industry-Academia Centre of Excellence (DIA-CoE), IIT Kanpur, on Metamaterial Antennas & Applications

Outreach, IIT Kanpur



Organized by

Department of Electrical Engineering, IIT Kanpur

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About the Workshop

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This workshop offers a comprehensive exploration of metamaterial-based antennas, covering fundamental principles, various design approaches, and advanced implementation techniques. In recent years, metamaterials have emerged as a key solution for achieving compact and high-performance antenna designs. Participants will gain insights into diverse methodologies, including the transmission line approach, resonant structures, metamaterial-inspired designs, and metasurfaces, to enhance far-field antenna properties. Through expert-led sessions, this workshop will provide participants with the essential knowledge and technical expertise required to design metamaterial antennas for advanced applications.

About the Organizers

The Electrical Engineering Department was one of the first few departments with which IIT Kanpur started in 1960. Offering a comprehensive range of programs, including B.Tech, M.Tech, dual-degree (B.Tech + M.Tech), M.S. (R), eMasters and PhD across all Electrical Engineering specializations, the department upholds a distinguished tradition in both teaching and research, acknowledged globally. Research endeavours within the department encompass fundamental exploration, sponsored projects, and consultancy initiatives, all conducted with vibrant engagement from students, faculty, and research staff.

The RF and Microwave group is actively involved in addressing numerous research challenges for industries, defense, and space sectors. At present, the group is actively involved in a range of areas, including microwave antennas, absorbers, metamaterials, filters, power amplifiers, RF sensors, RF energy harvesting, RFID, microwave imaging and non-destructive testing, computational electromagnetics, EMI/EMC, monolithic microwave integrated circuits (MMIC), and millimeter and microwave circuits.



Learning Objectives

This three-day workshop is designed to provide participants with in-depth knowledge and practical insights into the following key areas of metamaterials:

- Fundamental aspects of Electromagnetic metamaterials and their applications.
- Design and analysis of compact metamaterial antennas and applications.
- Improvement of far-field antenna parameters through metamaterials and metasurfaces..
- Fabrication of metamaterials using additive manufacturing techniques.

Key Topics to be Addressed

- Electromagnetic Properties of Metamaterials Theory and Background: Resonant & Transmission Line Approach
- Compact Metamaterial Antennas
- Dual and Circularly Polarized Metamaterial Antennas
- Metasurfaces for Far-field enhancement
- Metamaterials using Additive Manufacturing
- Phased Array Antennas
- Antenna using Metasurface Reflector and Superstrate
- Multi-band and Wideband Metamaterial Inspired Antennas
- Multilayer MIMO Antenna based on Polarization Converter Metasurface.
- Fabrications of Metamaterial Antennas and Testing

Resource Persons

• Academia and Industries.

Registration Fee & Procedure

Category	Student Participant	Faculty Participant	Participant from Industry/ R&D
Registration Fee including 18% GST	INR 1180	INR 4130	INR 8260

• Register and pay for the workshop:

https://home.iitk.ac.in/~raghvendra/meta

- Full travel support to M.Tech/MSR final-year students[#].
- Travel support may be offered to PhD students, depending on their research profile.

The registration fee covers breakfast, lunch for three days, and a gala dinner on April 19, 2025.

On-campus accommodation is available upon request, on a paid basis. We are happy to assist with any arrangements you may need*.

*Subject to availability, [#]Reimbursement of 3AC train/bus fare.

