## IMPORTANCE AND SCOPE

The requirement for efficient and low-profile antennas has fuelled research work in the development of antenna structures with performances considerably enhanced over traditional antenna structures and methodologies. In this context, the development of the dielectric resonator antenna technology has taken significant strides in overcoming fundamental limitations in the design of broadband and efficient antenna structures.

It is well known that antenna structures like the microstrip patch suffer from reduced efficiency due to the stratified nature of the design, resulting in surface wave loss together with the presence of a conducting patch contributing to conductor loss in the antenna structure. The dielectric resonator antenna is ideally suited for low-loss applications due to the absence of conductors or surface-wave loss. Furthermore, the achievable bandwidth with the dielectric resonator topology of the order of 60% or more far exceeds that of broadband microstrip patch antenna configurations with typical bandwidths of 10 - 15% using parasitic patch loaded configurations. In addition, a noticeable feature of such bandwidth enhancement by the dielectric resonator antenna is that the wideband nature is accompanied by absolute stability of radiation characteristics across the large impedance bandwidth, making the radiation bandwidth identical to the impedance bandwidth. The above features of the dielectric resonator antenna make it an ideal choice for wideband low-profile applications with controlled radiation characteristics.

In spite of the potential of the dielectric resonator technology, analysis techniques for the dielectric resonator antenna have not received adequate attention particularly in the Indian context. This is particularly also significant as the analysis leads us to the in depth understanding of the modes of the antenna structure and their contribution to the dielectric resonator coupling problem. The course therefore also aims at introducing and investigating full-wave techniques for analysis of the antenna to offer a comprehensive coverage of the dielectric resonator antenna topic from the analytical, simulation and design aspects.

### General Information

Situated at a distance of 130 km from Kolkata, Kharagpur welcomes you with its green, calm and quiet campus, away from the din and bustle of city life. Historically, IIT Kharagpur started its journey in the “Hijli Detention camp”. Presently it houses a science and technological museum known as the Nehru Museum of Science and Technology. Also, the scenic township of Digha on the sea beach is only 120 km away from Kharagpur.

### Connectivity

Kharagpur is an important railway junction and is well connected to all parts of the country by rail service (SER). Numerous local & express trains are available from Howrah. The Institute is approximately 5 kms from the Kharagpur railway station with the bus stand adjacent to the railway station. Toto (Rs. 100), share auto-rickshaws (Rs. 20) and taxis (Rs.200) are available from the railway station.

## KEY TOPICS TO BE ADDRESSED

- Basic electromagnetic theory
- Planar and non-planar feeds to the dielectric resonator
- Wideband dielectric resonator antennas
- Circularly polarized dielectric resonator antennas
- Multiband dielectric resonator antennas
- Surface Integral analysis of the dielectric resonator antenna
- Green’s function analysis of the dielectric resonator antenna
- EMI / EMC
- Analysis and design of cylindrical antenna configurations
- Method of Moment analysis of antennas
- Microwave components

## EXPERIMENTS

Use of HFSS, CST simulation tool for antenna simulation and design. Familiarity with microwave measuring instruments including reflection coefficient and radiation pattern measurements.

## SPEAKERS

Faculty / domain experts from IIT, Kharagpur and other institutes

### Course Schedule

9 am to 6 pm with 1 hour lunch break each day. Fully offline mode.

**Important dates :**

**Last date for receiving application: May 15, 2026**

# Short term course on “Dielectric Resonator Antennas - Design and Analysis”

**June 08-12, 2026**

***A Continuing Education Programme of Indian Institute of Technology Kharagpur***

***Prof. Bratin Ghosh***

## Organized by

**Department of Electronics and Electrical Communication Engineering**
**Indian Institute of Technology**
**Kharagpur – 721 302, India**

## COURSE COORDINATOR


**Prof. Bratin Ghosh**

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### Eligibility for Participation

Teachers from Colleges / Institutions / Universities. Scientific Officers / Instructors / Technical Assistants / Research Scholars / Under Graduate and Post Graduate Students / Participants from Industries.

### How to apply

The course fee can be paid online through IIT Kharagpur web-portal by following the steps given below (candidates applying in a group can however pay their fees offline through demand draft drawn in favour of **'CEP-STC, IIT Kharagpur',** payable at **Kharagpur.**)

Use the link: **erp.iitkgp.ac.in/CEP/courses.htm**

to apply ONLINE.


Payment to be done after being shortlisted for the program.

### Course fee:

- For Students: Rs.10,000/- (including application fees & all taxes)
- For Industry: Rs. 20,000/- (including application fees & all taxes)
- For Teachers/Others: Rs. 15,000/- (including application fees & all taxes)

(Application fee of Rs. 2000/- is non-refundable under any circumstances)

### Accommodation & food

Limited accommodation is available in the Institute guest houses TGH (*Technology Guest House)* on personal payment basis. The charges are as follows: **TGH:** Daily charges: Rs.1500/- (Single Occupancy) for D/B AC Rooms and Rs. 2000/- (Double Occupancy) for D/B AC Rooms; On prior intimation we will try to arrange accommodation with the above charges. **Accommodation charges would have to be paid on personal payment basis. Breakfast, lunch and dinner are included in the course fee.** Course fee includes lecture notes and refreshments during the course.

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