

## 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.

## 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
- Dielectric resonator antennas and metamaterials
- Surface Integral analysis of the dielectric resonator antenna
- Green's function analysis of the dielectric resonator antenna

## SPEAKERS

Faculty / domain experts from IIT, Kharagpur

## EXPERIMENTS

Use of HFSS simulation tool for antenna simulation and design. Familiarity with microwave measuring instruments including return loss and radiation pattern measurements.

### Course Schedule

9am to 7 pm with 1 hour lunch break (from 19<sup>th</sup> to 22<sup>nd</sup> December, 2022) and 9am to 1pm (23<sup>rd</sup> December 2022).

## Short term course on “Analysis and Design of Dielectric Resonator Antennas” December 19-23, 2022

### 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. In winter, Kharagpur is particularly pleasant with bright flowers all around with a mild and comfortable climate. 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. Rickshaws (Rs. 90), auto-rickshaws (share-basis) (Rs.20) and taxis (Rs.200) are available from the railway station. The Hijli railway station is also within walking distance from IIT Kharagpur. Taxis are also available from the Hijli railway station. Taxi service from both the railway stations to the guest house can be arranged by us on personal payment basis.

### Important dates :

**Last date for receiving application:  
December 15, 2022**

## COURSE COORDINATOR

Prof. Bratin Ghosh

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### Accommodation & food

Limited shared accommodation is available in the Institute guest houses VGH (*Visveswaraya Guest House*) on personal payment basis. The charges are as follows: **VGH:** Daily charges: Rs.400/- (Single Occupancy) for D/B AC Rooms and Rs. 600/- (Double Occupancy) for D/B AC Rooms; Rs.250/- (Single Occupancy) for D/B Non AC Rooms and Rs.300/- (Double Occupancy) for D/B Non AC Rooms. Rs. 250/- (per bed) for dormitory bed AC and Rs. 150/- (per bed) for dormitory bed Non AC. 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 and lunch are included in the course fee.** Course fee includes lecture notes and refreshments during the course.

### Eligibility for Participation

Teachers from Colleges / Institutions / Universities.  
Scientific Officers / Instructors / Technical Assistants  
/ Research Scholars 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.)

### How to apply

Use the link: <https://erp.iitkgp.ac.in/CEP/courses.htm> to apply ONLINE.



Payment if applicable is to be done **ONLINE** after being shortlisted for the program.

### Course fee:

- For Students: Rs.12,000/- (including application fees & all taxes)
- For Industry: Rs. 30,000/- (including application fees & all taxes)
- For Teachers/Others: Rs. 18,000/- (including application fees & all taxes)

(Course fees are non-refundable and non-transferable under any circumstances)

## Short term course

On

## “Analysis and Design of Dielectric Resonator Antennas”

December 19 -23, 2022

*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**

