

## IMPORTANCE AND SCOPE

Current microwave systems for transmission and radiation of electromagnetic waves have to meet the competing requirements of enhanced functionality, low loss, reduced size and weight and low cost. It is important to appreciate that many of the design goals in modern efficient and miniaturized systems are self conflicting. For example, incorporation of multiband or broadband characteristics involves increase in physical size, which may have to be carefully optimized in handheld and wireless systems where space is at a premium. Similarly, development of low-loss devices are crucial for successful operation at the Ka and Ku-bands and beyond. It might be mentioned that traditional technologies like the microstrip are prohibitively lossy at 20-30 GHz frequencies and beyond. The rectangular waveguide based designs, though satisfying the loss requirements, are comparatively bulky and difficult to effectively integrate with planar components.

Keeping the above in view, the design and analysis of efficient modern systems will be addressed with particular emphasis on low-loss guided structures and antennas. Reconfigurable antennas for mobile and wireless communication and current antenna miniaturization techniques for the realization of sub-wavelength radiating structures would be discussed.

In addition, metamaterials and their role in the design of systems with enhanced performance would be addressed. These include the design and realization of metamaterials, the design of electrically small antennas based on metamaterials and miniaturization of radiating structures based on the zeroth order resonance.

The concept of hybrid integration and its role in the design of efficient systems also needs attention for the realization of efficient systems. This is particularly important in view of the fact that the non-planar technology is inherently amenable to the design of high-Q passive devices while being not favoured for active integration, complementary to the planar technology. Realization of the radiation-less condition in modern hybrid structures and efficient feeds used for hybrid technology would also be addressed.

## KEY TOPICS TO BE ADDRESSED

- Basic electromagnetic theory
- Low loss antennas and guided structures
- Green's function analysis of antennas
- Metamaterials
- Reconfigurable antennas
- Hybrid structures and integration
- Radar and communication
- EMI/EMC

## TENTATIVE SPEAKERS

- Prof. Ajay Chakrabarty, IIT Kharagpur
- Prof. Bratin Ghosh, IIT Kharagpur
- Prof. Binay Kumar Sarkar, IIT Kharagpur
- Prof. Amitabha Bhattacharya, IIT Kharagpur
- Prof. Rajat Roy, IIT Kharagpur
- Prof. Kalyan Bandyopadhyay, IIT Kharagpur

## Important Dates

**Last date for receiving application: December 31<sup>st</sup>, 2009**  
**Intimation to the applicants: January 1<sup>st</sup>, 2010**  
**Course duration: January 18 to January 23, 2010**

## Short term course on Efficient Systems for Microwave Transmission and Radiation

January 18 -23, 2010

## Registration Form

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Sex (M/F): \_\_\_\_\_

ORGANISATION \_\_\_\_\_

Highest academic Qualification \_\_\_\_\_

Address: \_\_\_\_\_

Phone / Fax: \_\_\_\_\_

Email (Compulsory): \_\_\_\_\_

Accommodation required yes/No \_\_\_\_\_

Details of bank draft: Amount Rs \_\_\_\_\_

Draft No. \_\_\_\_\_ Dated: \_\_\_\_\_

Issuing Bank: \_\_\_\_\_

Date:

Signature

Place:

Recommendation and forwarding from the  
Organisation:

Signature with seal of the  
Head of the Organisation

## General Information

Situated at a distance of 116 Km from Kolkata, Kharagpur welcomes you with its green, calm and quiet campus, away from the din and bustle of city life. In the month of December and January, Kharagpur is particularly pleasant with bright flowers all around and a mild and comfortable atmosphere. 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. 30), auto-rickshaws (Rs. 50) and taxis (Rs.80) are available from the railway station.

## COURSE COORDINATOR

**Prof. Bratin Ghosh,**  
**Department of Electronics & Electrical**  
**Communication Engineering,**  
**Indian Institute of Technology,**  
**Kharagpur – 721 302**

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Mobile No. +91-9831064495

### Registration fees

Faculty/Scientists/Engineers

From Academic Institution /R & D

Organisation: Rs. 5000/-

From Industries/Private sector: Rs. 10000/-

Course fee includes lecture notes and refreshments during the course.

## Accommodation

Limited shared accommodation is available in the guest house (VGH) on personal payment basis. The charges are as follows : Daily charges : Rs. 60/- per bed + taxes as applicable (non-AC shared room). On prior intimation we will try to arrange accommodation with the corresponding charges.

## Eligibility for Participation:

Research personnels in R&D organisations/scientific officers and engineers working in cutting-edge technology from industries/faculties of educational institutes having exposure to microwave guided & radiating structures are eligible to participate.

## How to apply:

Interested persons may apply in the form given herewith alongwith the registration fee in the form of demand draft drawn in favour of 'CEP-STC, IIT Kharagpur', payable at Kharagpur. The application should be sent to the following address latest by December 31<sup>st</sup>, 2009. The total number of seats in this course is limited to 60. In view of the limited seats, selection will be made on first come first serve basis.

## Mailing address:

**Prof. Bratin Ghosh,**  
**Department of Electronics & Electrical**  
**Communication Engineering,**  
**Indian Institute of Technology,**  
**Kharagpur-721302,**  
**West Bengal**  
**Fax: +91-3222-255303/282299**

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January 18 -23, 2010

*A Continuing Education Programme of  
Indian Institute of Technology  
Kharagpur  
Prof. Bratin Ghosh*



Organized by

**Kalpna Chawla Space Technology Cell**  
**Indian Institute of Technology**  
**Kharagpur – 721 302, India**

