Overview

Exploration of natural resources buried under the earth surface is a well-known engineering activity. However, with the space exploration of planetary bodies, GPR technology promises to unravel the subsurface contents of extraterrestrial bodies. Moving one step further Radar Tomography promises to deliver images of the subsurface for better exploitation of subsurface resources. This is useful in providing excellent diagnostic capabilities in several important areas, including civil and industrial engineering, nondestructive testing (NDT), geophysical prospecting and biomedical Engineering. But to use it successfully, one needs to master the arts and sciences of microwave propagation, ultrawideband technique, radar principles and radar signal processing. The course aims to take a step forward to unravel the mysteries of this fascinating technology.

This course is organized in two modules that should be taken together. The topics in Module A will expose the participants to the entire gamut of GPR technology like Electromagnetic Properties of ground materials, GPR Antenna design, GPR Channel Modeling, GPR simulator, GPR Systems design and GPR Signal Processing.

In Module B Radar Tomography will be introduced as a technique for capturing a sub-surface scene by illuminating it with microwave. The topics will include Electromagnetic Inverse Scattering for 2D geometry, Regularisation Theory for solving non-linear problems, Engineering Model of Imaging Systems, Shape as well as Image Reconstruction paradigm and Hardware requirement for Microwave Tomography.

Course participants will learn these topics through lectures and interactive lessons. Also case studies and simulators will be shared to stimulate research motivation of participants.

Indian Institute of Technology Kharagpur (commonly known as *IIT Kharagpur* or *IIT KGP*) is an autonomous engineering and technology-oriented Institute of higher learning established by the Government of India in 1951. The first of the several IITs to be created, it is officially recognised as an *Institute of National Importance* by the Government of India and is regarded as one of the best engineering institutions in the world. It's organisational structure as well as its undergraduate admission process is shared by sister IITs. Among all IITs, IIT Kharagpur has the largest campus (2,100 acres), the maximum no. of departments and the highest student enrollment. It has the largest alumni diaspora spread across the globe and they were successful to create the celebrated 'IIT' brand.

You should attend if

— you are an electronics engineer or research scientist interested in designing ground penetrating radar and processing of microwave images for exploration.

— you are a geologist or geophysicist or non-destructive test engineer interested to learn applications of GPR and Radar Tomography in your profession.

— you are a student or a faculty from academic institution interested in learning how to do research in GPR system or subsystem or want to work with microwave imagery for scientific interpretation.

Course Level : Postgraduate / Research level of IIT Kharagpur.

Registration Form

Short Term Course on GROUND PENETRATING RADAR AND RADAR TOMOGRAPHY

October 17 - 28, 2016

Name:_____

Designation: _____

ORGANISATION _____

Highest academic Qualification _____

Address:_____

_____

Office Phone : _____

Mobile : _____

Email (Compulsory):_____

Registration Type : Online / Offline

Accommodation required: Yes / No

Accommodation Type : Single bedded AC room

Date:

Signature

Place:

No accommodation request will be accepted after 10th October, 2016.

Accommodation

Course participants need to bear their travel, food and accommodation cost. Accommodation in AC single room in Sir Ashutosh Mukherjee Guest House inside IIT campus for all the participants will be made available on receiving prior request from the participants, at least one week in advance. The charge is 400/- per day. Non-AC accommodation is not available in IIT campus during the course period.

Course Duration

October 17 - 28, 2016

Course Venue

Room No. F-301 (2nd Floor)
NKN Room, Dept. of E & ECE
Indian Institute of Technology
Kharagpur – 721302

Course Coordinator

Prof. Amitabha Bhattacharya

All communication should be addressed to:

Prof. A. Bhattacharya
Dept. of E & ECE
Indian Institute of Technology
Kharagpur -721 302
Email: amitabha@ece.iitkgp.ernet.in
Phone No. : 03222-283526(O), 283527(R)
Fax: 03222-283526(O)

The Faculty

Dr. Ilaria Catapano is a Research Scientist (level III), Institute for Electromagnetic Sensing of the Environment, NRC, Naples, Italy. Her research interests are

- Processing of data gathered by means of satellite, airborne and ground based radar systems for surface and subsurface surveys and image interpretation.
- Development and performance assessment of microwave imaging approaches for shape reconstruction and electromagnetic characterization of targets hidden in complex environments.
- Models and strategies for forward and inverse scattering problems.
- THz spectroscopy and imaging : measurement protocols and data processing.

Webpage : http://www.irea.cnr.it/en/index.php?option=com_comprofiler&task=userprofile&User=99&itemid=100

Dr. Amitabha Bhattacharya is an Associate Professor of Indian Institute of Technology, Kharagpur. His research interests are Microwave Imaging, Ground penetrating radar, High Power Microwaves and Microwave Stealth Technology.

Webpage : http://www.ecdept.iitkgp.erner.in/index.php/home/faculty/amitabha

Fees: The participation fees for taking the course is as follows:

Remote Participants : The course will be conducted from 5PM to 8PM. So, participants can remotely participate from NKN networked video conferencing facility by paying registration fee.

Industry/ Research Organizations:
Rs. 20,000/- (online) Rs 30,000/- (physical)
Academic Institutions:
Rs. 10,000/- (online) Rs. 15,000/- (physical)

The above fees include all instructional materials, computer usage for tutorials and assignments, 24 hr. free internet facility usage charges (physical attendance).

Fees to be paid by Demand Draft in favour of "CEP-STC, IIT Kharagpur" payable at KHARAGPUR, West Bengal, India.

Connectivity

Kharagpur is an important Railway junction in South Eastern Railway and it is well connected to almost all parts of the country. Kharagpur, 116 Km. west of Kolkata , is two hours motor drive from Kolkata along NH 6 and also is connected to Howrah by frequent local and express trains. The Institute is about 5 Kms. away from Kharagpur Railway Station. Taxis, Auto-rickshaws, cycle rickshaws are available as transport for coming to IIT Kharagpur campus from railway station. Cars can also be hired from Kolkata airport or Howrah/Sealdah/Kolkata/Santragachi/Shalimar railway station for coming to Kharagpur by contacting IIT Kharagpur travel agent M/S Krishna Travels (Tel. No. 03222 278754, 09475885764).

Short Term Course on
GROUND PENETRATING RADAR AND RADAR TOMOGRAPHY

A Continuing Education Programme
Indian Institute of Technology
Kharagpur – 721 302

October 17 - 28, 2016

Organized by

Electronics & Elect. Comm. Engg. Dept.
Indian Institute of Technology
Kharagpur – 721 302