MHRD Scheme on Global Initiative on Academic Network (GIAN)

ADVANCE LEVEL COURSE
ON
"REMOTE SENSING IMAGE PROCESSING AND ANALYSIS"

Overview

Remote sensing can be defined as the collection of data about an object from a distance. Humans and many other types of animals accomplish this task with aid of eyes or by the sense of smell or hearing. Geographers use the technique of remote sensing to monitor or measure phenomena found in the Earth's lithosphere, biosphere, hydrosphere, and atmosphere. Remote sensing of the environment by geographers is usually done with the help of mechanical devices known as remote sensors. These gadgets have a greatly improved ability to receive and record information about an object without any physical contact. Often, these sensors are positioned away from the object of interest by using helicopters, planes, and satellites. Most sensing devices record information about an object by measuring an object's transmission of electromagnetic energy from reflecting and radiating surfaces.

Remote sensing imagery has many applications in mapping land-use and cover, agriculture, soils mapping, forestry, city planning, archaeological investigations, military observation, and geomorphological surveying, among other uses. For example, foresters use aerial photographs for preparing forest cover maps, locating possible access roads, and measuring quantities of trees harvested. Specialized photography using color infrared film has also been used to detect disease and insect damage in forest trees. The simplest form of remote sensing uses photographic cameras to record information from *visible* or *near* infrared wavelengths. In the late 1800s, cameras were positioned above the Earth's surface in balloons or kites to take oblique aerial photographs of the landscape. During World War I, aerial photography played an important role in gathering information about the position and movements of enemy troops. These photographs were often taken from airplanes. After the war, civilian use of aerial photography from airplanes began with the systematic vertical imaging of large areas of Canada, the United States, and Europe. Many of these images were used to construct topographic and other types of reference maps of the natural and human-made features found on the Earth's surface.

The proposed course deals with remote sensing image processing and analysis, and it is at an advanced level. It teaches theoretical aspects but also highlights successful applications of remote sensing image processing in various areas of engineering. Moreover it includes sessions for those participants who may not have a strong background in the field. The purpose of the 5 days' advance level course is to provide an intensive understanding of how to use the algorithms and to equip the participants with software tools for solving the practical problems.

Module	PATTERN RECOGNITION WITH APPLICATIONS			
	Duration: 16-11-2017 to 20-11-2017			
	Maximum number of participants for the course = 50			
Day1 (16.11.2017)	Lecture 1	Introduction to remote sensing, electromagnetic radiation; remotely sensed data: what it is, what it means		1 Hour
	Lecture 2	Data storage conventions, gray-scale and RGB representations		1 Hour
	Practical 1	Introduction to handling RS in a geospatial environment		2 Hour
Day 2 (17.11.2017)	Lecture 3	Radiometric & geometric corrections		1 Hour
	Lecture 4	Transformation, filtering, Feature extraction		1 Hour
	Practical 2	Radiometric and geometric correction of remotely sensed data; transformation, filtering and extraction of various types of features from sample data		2 Hour
Day 3 (18.11.2017)	Lecture 5	Spectral and Spatial analysis of RS data		1 Hour
	Lecture 6	Classification, indexes		1 Hour
	Practical 3	Spectral and spatial analysis		2 Hour
Day 4 (19.11.2017)	Lecture 7	Data/information fusion		2 Hour
	Lecture 8	Earth Observation Radar		
	Practical 4	Radar data processing examples		2 Hour
Day 5 (20.11.2017)	Lecture 9	Radar Interferometry and polarimetry - Applications of Remote Sensing		1 Hour

	Lecture 10	Enhancement of Remote Sensing Images	1 Hour
	Practical 5	Advanced applications of remote sensing image processing, enhancement of remote sensing images.	2 Hour
Date of Examination:	**MCQ Type Test**	**20th November, 2017**	**1 Hour**
Who can attend	• Executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories. • Students at all levels (B.Tech/MSc/M.Tech/Ph.D) or Faculty from reputed academic institutions and technical institutions.		

Registration process and Fee	• The applicant are required to get themselves register on GIAN web portal (http://www.gian.iitkgp.ac.in) to apply for any number of GIAN courses as and when necessary.
	• The course registration fee is separate. The participation fees (Demand draft drawn in favour of Director, NITK Surathkal, payable at Surathkal for taking the course is as follows:
	  ▪ Participants from abroad : US \$500
	  ▪ Industry/ Research Organizations: Rs 8000
	  ▪ Faculty Members from Academic Institutes: Rs 5000
	  ▪ Students/Research Scholars: Rs 2500
	• The above fee include all instructional materials, computer use for Practical and Assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation, if available, on payment basis.		

Foreign faculty: Prof. Fabio Dell'Acqua
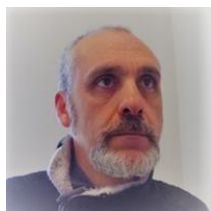
Fabio Dell'Acqua was born in Pavia, Italy, on 28th of March, 1971. He obtained his 5-year degree "cum laude" (hons.) in **Electronics Engineering** and his Ph.D. degree in **Remote Sensing** from the University of Pavia, Italy, in 1996 and 1999, respectively. In year 2000 he was **associate researcher** at the Division of Informatics, **University of Edinburgh, UK**. In 2001 he obtained a permanent position as an **assistant professor** at the Department of Electronics, University of Pavia, Italy.

From 2015 he is **Associate Professor of Remote Sensing** at the Department of Electrical, Computer and Biomedical Engineering, **University of Pavia, Italy**. He teaches courses in remote sensing at the University of Pavia, and at the International Risk and Emergency Management Master at the **UME** (Understanding and Managing Extremes) **School** in Pavia, Italy. He also taught courses at the **University of Florence** from year 2009 until year 2014. Every academic year he tutors on average around 5 undergraduate and/or master students for their final thesis activity. He has established strong links with companies with business in Remote Sensing applications. His research interests focus on radar data processing and radar/optical data fusion for risk-related applications. In this area he is/has been participating to, or leading, several research projects, both at national and international level.

From 2011 to 2015 he organized yearly editions of an **International Summer School on Data Fusion in Aerospace Applications**, which attracted up to 40 students from around the world. In February 2014, he co-founded a **University spin-off company**, named Ticinum Aerospace, to exploit commercially his research results in the use of EO data for risk management. In 2016 he started leading an H2020 MSCA-RISE exchange project, "EOXPOSURE" on the use of remote sensing for analyzing environmental disease spread factors. He is Life Member of the Technical and Scientific Board of the Lombardy Aerospace Industry Cluster. Currently, his publication records include 55 journal papers, over 160 conference papers, and 15 contributions to books. According to Scopus he is currently (Aug 2017) author of 145 papers, with a total of 1403 citations and an Hirsch index of 19 (excluding self-citations). According to Google Scholar, he is author of 226 papers with a total of 2435 citations and a Hirsch index of 23.

Host Faculty

Shyam Lal received B.Tech (with Hons.) in Electronics and Communication Engineering from Bundelkhand Institute of Engineering & Technology (Govt. Engg. Institute) Jhansi (U.P.), India and M.Tech (with Hons.) in Electronics and Communication Engineering from National Institute of Technology, Kurukshetra (Haryana), India in year 2001 and 2007, respectively and his Ph.D. degree in Electronics & Communication Engineering from Department of Electronics & Communication Engineering, Birla Institute of Technology, Mesra, Ranchi (Jharkhand), India in 2013. He was starting teaching career in the department of Electronics & Communication Engineering, Moradabad Institute of Technology, Moradabad (U.P.), India since 2001. He was promoted to Associate Professor in 2009 and left institute on 14th December 2013.

He is working as Assistant Professor in the department of Electronics & Communication Engineering,

National Institute of Technology Karnataka, Surathkal, Mangalore (Karnataka), India since 18th December 2013. He has more than 15 years of Teaching & Research experience. He has published more than 50 research papers in the area of Digital Signal & Image Processing and Wireless Communication & Computing at International/National Journals & Conferences. He has been Guest Editor of IJSISE, Inderscience Publishers. He is Member of IEEE, life member of ISTE, New Delhi, India, Life member of IAENG, Hong Kong and Life member of IACSIT, Singapore. His area of interest includes Digital Image Processing, Remote Sensing Image Processing, Medical Image Processing, Application of Optimization Algorithms in Signal Processing and Image Processing.

Advance Level Course
On
"Remote Sensing Image Processing And Analysis"

Organized by
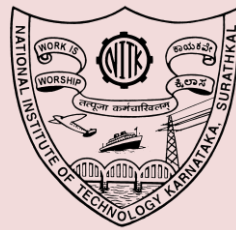
Department of Electronics & Communication Engineering, National Institute of Technology Karnataka, Surathkal

Supported by

GIAN

(Global Initiative on Academic Networks)
MHRD, GOVT. OF INDIA

Duration: 16-11-2017 to 20-11-2017

Venue: NITK Surathkal, Mangaluru

Last Date for sending filled registration form along with DD: 10-10-2017

Contact Address:
Dr. Shyam Lal
Course Coordinator
Department of Electronics and Communication Engineering, National Institute of Technology Karnataka, Surathkal, Mangaluru-575025 (Karnataka), India
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National Institute of Technology Karnataka, Surathkal

MHRD Scheme on Global Initiative on Academic Network (GIAN)

Advance Level Course
On
"Remote Sensing Image Processing and Analysis"
Duration: 16-11-2017 to 20-11-2017
<u>Registration Form</u>

1. **Name of applicant:**--

2. **Designation & Department:**---

3. **Mailing Address:** --

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4. **Tel: (Résidence):**--

      (Mobile):---

      (Office): --

5. **Email:**---

6. **Qualification:**--

7. **Experience: Teaching:**--

          and Industrial:--

8. **Comment on your exposure:** ---

9. **Fee Payment Details**

Amount Rs: --**Demand Draft No. :** ---------------------------------

Bank: ---**and Date:** --

10. **Category of participants:**

  [ ] Faculty/Student/Research scholar of NITK

  [ ] Faculty/Student/Research scholar of Outside NITK

  [ ] Industry/Research Organizations

11. **Require accommodation Facility? :**　　　　Yes / No

I agree to abide by the rules and the regulations governing the GIAN–MHRD Course and I will attend the course for entire duration.

Place:

Date:

                                                 Signature of the applicant

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Note:1. Filled registration form with Demand Draft should be send to the course coordinator.
    2. Demand draft drawn in favour of Director, NITK Surathkal, payable at Surathkal