

Course Brochure



सत्यमेव जयते
Department of Science and Technology
Ministry of Science and Technology
Government of India

**Natural Resources Data Management System (NRDMS),
DST sponsored**

A five days short-term course cum training programme on

InSAR: Theory, Processing and Application

12th – 16th August, 2019

Organized by



Geographic Information System (GIS) Cell
Motilal Nehru National Institute of Technology Allahabad
Prayagraj-211004, India

A five days short-term course cum training Programme on InSAR: Theory, Processing and Application

BACKGROUND

Due to strong potential and wide range of applications of Multi-temporal InSAR in deformation studies, GIS Cell is organizing a course on **InSAR: Theory, Processing and Application**. This five-day short-term course cum training programme will provide an opportunity to young researchers post-graduate students, scientists and research groups to understand the theory and processing of InSAR. This course will also provide a platform to exchange the requirements and issues related to applications and technology development in the area of multi-temporal InSAR.

OBJECTIVE

The objective of this five-day short-term course cum training programme is to help the young researchers to understand the theoretical concepts of InSAR, multi-temporal InSAR (advanced InSAR) and processing of SAR data for various deformation monitoring related activities. The course cum training programme aims at:

- To impart training in the next generation of researchers on InSAR basics;
- Explaining the InSAR principles, processing algorithms, various data products and their use in applications;
- Introducing open source tools and methods for the exploitation of SAR data, in particular the Sentinels, Envisat, Radarsat;

ABOUT MNNIT ALLAHABAD

The Institute was established as Motilal Nehru Regional Engineering College in the year 1961 and was later upgraded as a National Institute of Technology with the status of Deemed University on June 26, 2002. Now, this Institute is known as Motilal Nehru National Institute of Technology Allahabad. The foundation stone of the institute was laid by the first Prime Minister of India, Pt. Jawaharlal Nehru on the May 3, 1961 on a site spreading across 222 acres on the bank of the river Ganga. The Institute has very good infrastructure with state-of-art facilities in all the departments for teaching and research. Institute offers 9 UG and several PG programmes besides MBA, MCA, M.Sc. in Mathematics and Scientific Computing and Masters in Social Work. Doctoral programmes are offered in various disciplines of Technology, Science, Humanities and Management.

ABOUT THE GIS CELL

GIS Cell is an interdisciplinary department of the institute which was established in the year 2006. The Cell offers M.Tech. and Ph.D. programme in GIS and Remote Sensing. The Cell has faculty of its own as well as faculty from various other departments such as Computer Science and Engineering, Electronics Engineering, Civil Engineering and Mathematics, who are the members of GIS Cell. The master's programme in GIS and Remote Sensing was started in the year 2006. The yearly student intake of M.Tech. programme in GIS and Remote Sensing is thirty. The cell also has Ph.D. students under stipendry as well as non-stipendry categories. At present there are nineteen Ph.D. scholars in GIS cell.

COURSE CONTENT

Table 1: Course content for InSAR: Theory, Processing and Application

Sr. no.	Topics	Lecture
1.	Inauguration & Self Introduction Introduction to the course: objectives, programme and logistics	1
2.	Introduction to Radar remote sensing (motivation and challenges), types of space borne Radar sensors, Principle of Synthetic Aperture Radar (SAR), image formation and properties, SAR imaging geometry, speckle, SAR sensors.	1
3.	Introduction to SAR Interferometry (Interferogram generation and fringe interpretation, concept of Differential InSAR (DInSAR), Application in terrain motion estimation.	1
4.	Introduction to Polarimetry Basic and Introduction to advanced InSAR	1
5.	Mission, instruments and tools Various Earth observation mission worldwide and data access, SAR instruments, InSAR processing software tools: NEST, SNAP	3
6.	Introduction to different scattering mechanism, concept of Multi-temporal InSAR, Persistent Scatterer Interferometry (PS-InSAR), introduction to Stanford method for Persistent Scatterers (StaMPS)	3
7.	Small baseline subset approach (SBAS), Distributed Scatterers (DS), SqueeSAR, applications, challenges and limitations of existing MT-InSAR algorithm	2
8.	A novel approach for estimation of terrain motion: Similar Time-series Interferometric Phase (STIP), preparation of InSAR data stack for STIP processing in StaMPS environment	2
9.	Group Discussion	1
	Total lectures	15

Table 2: Laboratory exercises

1.	Introduction to Unix and Matlab	1
2.	Training on InSAR processing tools NEST and SNAP	2
3.	Processing InSAR stack with StaMPS	2
4.	Interpretation of MT-InSAR results	1
	Total labs	5

RESOURCE PERSON

The proposed courses will be coordinated by Dr. Ramji Dwivedi Assistant Professor, GIS Cell, MNNIT Allahabad. A couple of experts from IITs, research fellows working in InSAR would also be invited to deliver lectures on specialized topics and sharing their experiences.

TARGET GROUPS

In addition to Principal Investigator (PI) of various DST sponsored projects, teachers of Universities/colleges and other academic and research institutions, professional engineers, scientists and young researchers (M.Tech/ME, PhD students) from government and private organizations should also benefit from these courses depending upon their level of exposure in this technology area. Apart from the premier academic institutions in the country, various government organizations will be interested in the proposed course.

ELIGIBILITY FOR PARTICIPANTS

1. Senior Undergraduate, Post graduate, PhD students (JRF/SRF) and research scientists within India are invited to apply for the 5-day course cum training programme which will be held at the GIS Cell, MNNIT Allahabad, Prayagraj, UP during 12-16 August 2019.
2. The applications of all these candidates should be forwarded by the sponsoring authorities, namely the Institution/ Employer/ Research Supervisors/Head of the department of the candidates concerned.
3. All the applicants will submit their bio-data, present status of their research work (max 150 words) duly recommended by the Supervisor, a copy of the Registration certificate/ID card, a synopsis/note on their research work (max 400 words) along with their applications. The academic career of the candidate, as well as the recommendations of the supervisors in regard to their competence and motivation should be given due edge.
4. The official language of the training course is English.
5. **No participation fees will be charged for this course.**

SELECTION OF PARTICIPANTS

Selection of participants will be based on their bio-data, present status of their research work duly recommended by the Supervisor/HOD, a copy of the Registration certificate/ID card, a synopsis/note on their research work along with their applications. Only 25 participants will be considered for attending the programme.

SPECIAL MENTION: Accommodation and fooding (As per MNNIT Allahabad norms) to all the participants will be given by organizers without any cost. Limited shared accommodations may be available in the Hostels/ Executive Development Centre of the Institute on first come first served basis.

DURATION

The course will be organized from August 12-16, 2019. It will comprise 3 lectures in the forenoon (a total of 15 lectures, 1.15 hrs each). The afternoon will be used for laboratories (5 labs, 2.5 hrs each). No. of participants 25.

Interested person(s) should send the filled registration form to Course Coordinator on or before 10th July 2019. The applicants are also requested to kindly e-mail a scanned copy of the application. The contact details are:

Course Coordinator

Dr. Ramji Dwivedi

Assistant Professor, GIS Cell

Motilal Nehru National Institute of Technology Allahabad

Prayagraj - 211004, INDIA

Tel: +91-9454142973

Email: ramjid@mnnit.ac.in



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Registration form

Name (in Block Letters) _____

Date of Birth _____ Gender: Male/Female

Highest Qualification _____

Organization _____

Designation _____

(Senior Undergraduate/ Post Graduate/Ph.D. Research scholar/Post-Doctoral Fellow)

Address for Correspondence _____

Phone & Mobile _____

E-mail(s) _____

(Signature of Applicant)

Forwarded by:

Signature of Supervisor/HOD

Name of Supervisor/HOD:

Designation:

Affiliation:

Note: please enclose institute ID, recent Bio-data and present status of the research work