

# केन्द्रीय माध्यमिक शिक्षा बोर्ड

(शिक्षा विभाग, भारत सरकार के अधीन एक स्वतंत्र संगठन)

## CENTRAL BOARD OF SECONDARY EDUCATION

(An Autonomous Organization Under the Ministry of Education, Govt. of India)

CBSE/SE/DS(SP)/2024

Dated: 25.04.2024

### CIRCULAR

**Subject: - DST Sponsored 21 Days free Level-2 Geospatial Capacity Building Program in 'Developing Geospatial Solutions for Defense, Security and Intelligence' – reg.**

Multidisciplinary Centre for Geo-informatics (MCG), Delhi Technological University (DTU) is conducting a DST (Department of Science and Technology), GOI sponsored is offering free 21 days Geospatial Capacity building program in 'Developing Geospatial Solutions for Defense, Security and Intelligence' for working professionals, scientists, academia and school teachers from 27th May, 2024 to 19th June, 2024.

The salient features of this program is that it is free with duration of 21 days, limited TA/DA and accommodation shall be provided to the outstation candidates. The program is open to all the Defense and security personnel, working professionals (both Govt. & industry), faculty members, scientists, school teachers and researchers with sound experience in handling tools of geospatial technologies.

All the Heads of Schools affiliated to the Board are requested to disseminate this information among their teachers and encourage them to participate in the same.

The brochure of the program is attached at Annexure A.

For any queries and clarifications, please contact directly at Email – [kcchtphd@gmail.com](mailto:kcchtphd@gmail.com) or Mob – 9971862304.

*Biswajit Saha*

(Dr. Biswajit Saha)  
Director (Skill Education)

# केन्द्रीय माध्यमिक शिक्षा बोर्ड

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## CENTRAL BOARD OF SECONDARY EDUCATION

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Copy to the respective Heads of Directorates, Organizations and Institutions as indicated below with a request to disseminate the information to all the schools under their jurisdiction:

1. The Commissioner, Kendriya Vidyalaya Sangathan, 18, Institutional Area, Shaheed Jeet Singh Marg, Delhi-110016.
2. The Commissioner, Navodaya Vidyalaya Samiti, B-15, Sector-62, Institutional Area, Noida - 201309
3. The Director of Education, Directorate of Education, Govt. of NCT of Delhi, Old Secretariat, Delhi - 110054.
4. The Director of Public Instructions (Schools), Union Territory Secretariat, Sector 9, Chandigarh - 160017
5. The Director of Education, Govt. of Sikkim, Gangtok, Sikkim - 737101
6. The Director of School Education, Govt. of Arunachal Pradesh, Itanagar - 791 111
7. The Director of Education, Govt. of Andaman & Nicobar Islands, Port Blair - 744101
8. The Director, Central Tibetan School Administration, ESSESS Plaza, Community Centre, Sector 3, Rohini, New Delhi
9. The Secretary, Sainik Schools Society, Room No.101, D-1 Wing, Sena Bhawan, New Delhi-110001
10. The Additional Director, General of Army Education, A - Wing, Sena Bhawan, DHQ, PO, New Delhi - 110001
11. The Secretary, AWES, Integrated Headquarters of MoD (Army), FDRC Building No. 202, Shankar Vihar (Near APS), Delhi Cantt - 110010
12. The Secretary, Eklavya Model Residential Schools (EMRS), Ministry of Tribal Affairs, Government of India
13. The Chairman, Odisha Adarsha Vidyalaya Sangathan, N-1/9, Near Doordarshan Kendra, PO Sainik School Nayapalli, Bhubaneswar, Odisha-751005
14. The Deputy Secretary to Chairman, CBSE - for kind information of the Chairman, CBSE
15. All the Heads of Department/ Directors of the Board
16. All the Regional Directors/Regional Officers/Head-COEs, CBSE with the request to send this circular to all the Heads of the affiliated schools of the Board in their respective regions for compliance
17. Director (Media & Public Relations), CBSE - with a request to give wider publicity to this notification.
18. Joint Secretary (IT), CBSE, Rouse Avenue with the request to upload this notification on the CBSE Academic website
19. Incharge, Hindi Cell, CBSE HQ - for Hindi Translation of this notification

Director (Skill Education)

# Summer School In Geospatial Science & Technology (Level 2)

Theme: Developing Geospatial Solutions for Defence, Security  
and Intelligence

27 May - 19 June 2024



**Organized by**  
Multidisciplinary Centre  
for Geoinformatics,  
Delhi Technological  
University,  
New Delhi, India

**Supported by**  
National Geospatial  
Program,  
Department of Science &  
Technology,  
Government of India,  
New Delhi



## **Patron**

Professor Prateek Sharma, Hon'ble Vice Chancellor,  
Delhi Technological University, New Delhi

## **Principal Investigator**

Dr. K.C. Tiwari, Professor, Multidisciplinary Centre of  
Geoinformatics, Delhi Technological University, New Delhi

## **Summer/Winter School Capacity Building Program in Geospatial Science and Technology**

Recently knowledge has been identified as the most important driving factor for India's sustainable economic growth. India has adopted a new information regime for sustainable economic growth through its 'Digital India' program to support good governance, sustainable development goals and empowerment of its citizens. Over the last three decades, the widespread adoption of geospatial technologies into various sectors have proven to be an effective enabler to meet these challenges. The capacity building program initiatives of the National Geospatial Program (NGP) erstwhile Natural Resource Data Management System (NRDMS) Department of Science and Technology, Government of India to develop national capacity for geospatial science and technology development through diverse programs in collaboration with various partner organizations. The three week program is being conducted at three levels, Level 1 (Standard), Level 1 (Spatial thinking) and Level 2. In addition there is a three day Geo Innovation Challenge Program. The objective of the program is to build knowledge and various levels of governance in collaboration with academia and user agencies and user agencies and foster innovation.

### **Level 2 Summer / Winter School In Geospatial Science and Technology**

This three week program is a theme specific advanced training being implemented by eight institutions across the country. A one week online refresher session will be held prior to the commencement of the three week program. The 21-day summer/winter school in Geospatial Science and Technology (Level 2) supported by the Natural Resource Data Management System of the Department of Science and Technology, Government of India focuses on developing knowledge and capacity building in geospatial technologies through the use of geospatial software.

## About the National Geospatial Program of the Department of Science and Technology, Government of India

In the heart of India's technological advancement lies the National Geospatial Programme (NGP) of the Department of Science and Technology, Government of India. The Geospatial Capacity Building Program initiated in 2010 has over the years flourished, fostering capacities in geospatial science, technology, solutions, and entrepreneurship. Its transformative journey initiated with a modest ambition has evolved into a robust program, igniting minds and expanding horizons.

For a decade, the Geospatial Capacity Building Program under DST has been a cornerstone, conducting 166 comprehensive three-week programs conducted as Summer and Winter Schools in Geospatial Technologies at a basic (Level 1) and advanced level (Level 2). The 2024 cycle includes a 11 three week Level 1-(Standard) programs, 4 three week Level 1-(Spatial Thinking) programs, 8 Level 2-(Advanced) three week programs and 7 Geo Innovation Challenge Programs being conducted by various Universities across India selected through a stringent process by the DST.

The sessions at these programs comprise classroom, lab, fieldwork, and mini-projects. Central to this success is a structured curriculum and the advocacy of open-source software. The dedicated portal, <https://dst-iget.in>, is a reservoir of learning materials, connecting educators, professionals, and scientists, and catalyzing India's geospatial domain. The NGP-DST's geospatial capacity building program is coordinated nationally by the Bharati Vidyapeeth Deemed University, Department of Geoinformatics, Institute of Environment Education and Research, Pune.

The Delhi Technological University, New Delhi, is one of the selected institutions for conducting the Level 2 Program.

## **Delhi Technological University, New Delhi**

With a history stretching over 75 years, providing an academic milieu amid adequate space for ingenious research as an integral part of curriculum design, Delhi Technological University (DTU) is strongly identified with engineering education in India. The University has been a forerunner, and led the way in reform movement maintaining a compatibility with values and professional morality. DTU takes pride in being one of the major contributors in planning and construction of India's infrastructure. In DTU, we endorse and cultivate the purity of mind as the strongest currency, with an impressive resolve to renovate and upgrade our knowledge infrastructure. DTU aspires to be ranked amongst the leading universities globally. Consequently, DTU's mission is to edify individuals to be competitive not only in India, but all over the world. [Visit us on: http://www.dtu.ac.in/](http://www.dtu.ac.in/).

## **Department of Civil Engineering**

Multidisciplinary Centre for Geoinformatics (MCG) was established at DTU on 5th March 2019 with a vision to excel in the field of Geospatial education, research and consultancy. It is currently running Ph.D and an AICTE approved M.Tech program in Geoinformatics. [Visit us on: http://www.dtu.ac.in/Web/Departments/MCG/about/index.php](http://www.dtu.ac.in/Web/Departments/MCG/about/index.php).



*Delhi Technological University, New Delhi*



### Who can apply?

- Faculty members, scientists, technologists, researchers from academia, national institutions of research, smart city cells, municipal corporations and other government departments are eligible to apply.
- Personnel from non government organizations (NGO)
- School Teachers
- Only 2-3 seats are reserved for research scholars. Only candidates who have a high degree of experience with geospatial technologies should apply for these advanced programs.

No basics will be covered in the Level 2 program. Candidates who have no knowledge of geospatial technologies should apply for the Level 1 program.

### How to apply?

- Interested candidates should fill the online application form through the web link available on <http://dst-iget.in>. Kindly keep a digital copy of your photograph, LinkedIn Id / ORCID Id / Researchgate Id / Google Scholar Id (atleast one is needed) and deputation letter (format available on <http://dst-iget.in> website) handy while filling in the form.
- For any further queries write to [dst-iget@bharativedyapeeth.edu](mailto:dst-iget@bharativedyapeeth.edu) or call on 7559288803
- Address all queries regarding the program **once selected** to the PI, *Dr. K.C. Tiwari, kcchtphd@gmail.com. Dr Raju Sarkar, Professor (Coordinator), rajasarkar@dce.ac.in, 7678120434*

## **Theme of the Level 2 program: Developing Geospatial Solutions for Defence, Security and Intelligence**

India got its Independence in 1947 and is a thriving democracy today with its geographical borders intact. But for the Defence Forces of this Country, this nation called India would have long disintegrated. The country has witnessed four major wars with its adversaries – namely Pakistan and China and several localized conflicts such as Kargil War. There have been long periods of secessionist movements in India such as Khalistan movement, ULFA movement, NSCN movement etc. The country has also witnessed numerous terrorists' incidents including hijacking. Recently, there has been an attempt to nibble away Indian territory at Galwan. It is the larger will of the citizens of this country and the sacrifice of soldiers which has kept the nation together. Fortunately in past few decades, the country has been witnessing a high trajectory of progress both economically and technologically.

This is the driving urge behind the proposed L2 Course on “Developing Geospatial Solutions for Defense, Security and Intelligence”. The objective of this course is not only to increase knowledge about the subject but also to involve the faculty, researchers, students and all other stakeholders to understand the gravity of security and intelligence of a nation fast growing in stature, and also to get them involved in developing solutions relevant to Defense Forces. The content of the course is designed to develop skills such that the participants can subsequently innovate and contribute to the requirements of those engaged in security and intelligence of the country.

### **Important Information**

**Last date for registration:** 30 April 2024

**Date of intimation of selection:** 3 May 2024

**Date of online orientation:** 18 May 2024

**Dates of the program:** **27 May – 19 June 2024**

**Mode of conduct:** Offline

**No. of seats:** 25

**Registration Fees:** Nil

**Principal Investigator:** Dr. K.C. Tiwari, Professor, Multidisciplinary Centre for Geoinformatics, Delhi Technological University, New Delhi, India

**Email:** kcchtphd@gmail.com

### **For any queries contact**

Dr. K.C. Tiwari, Professor, (PI), kcchtphd@gmail.com, Dr Raju Sarkar, Professor (Coordinator), rajasarkar@dce.ac.in, 7678120434 and Dr Rubeena Vohra (Coordinator), rubeena.vohra@gmail.com, 9971987291

### **Address**

Multidisciplinary Centre for Geoinformatics, Delhi Technological University, New Delhi

## **Certificate**

Certificate of participation will be awarded to each participant only after attending the full course.

## **Travel and Lodging**

Each participant will be reimbursed with 3 AC train fare. Lodging and boarding on a double sharing basis will be provided by the host institution.

## **Infrastructure and Facilities**

### **Laboratory**

Well-equipped GIS Laboratory

### **Lodging and Boarding**

The institute has twin-sharing boarding and lodging facilities. Breakfast and lunch will be arranged in the canteen.



*Multidisciplinary Centre for Geoinformatics*



*Computer Lab*



*Guest Room*

**Deputation Letter (Format) for DST Summer/Winter School/ Geoinnovation Program 2024-25 (Prospective participant must submit this on the letterhead of the respective institution where they are working)**

This is to state that Dr./Mr./Ms. \_\_\_\_\_ working at \_\_\_\_\_ ( name of the institute) as \_\_\_\_\_ (Designation), since \_\_\_\_\_ ( year ) is being deputed/nominated to \_\_\_\_\_ (program name in detail) from -----( date, month, year) to----- ( date, month, year) . He/she will be relieved from his/her duties during this period.

**Signature and Seal (Head of the Institute)**

## Program Schedule for 21 Days Summer School in Geospatial Science and Technology (Level 2)

Conducted by Delhi Technological University, New Delhi

Theme: **Developing Geospatial Solutions for Defence, Security and Intelligence**

**27 May to 19 June 2024**

Date and Day	Session	Time	Session details	
Week 1				
Day 1 27 May 2024	Morning Session	0900-1100	Registration and Inauguration	
		1100-1200	<b>Session: Theory</b> <b>Why study TD (Target Detection) in the Indian context?</b> Targets, target detection problem; the difference between natural and man-made targets; the difference between target detection and classification, HUMINT, COMINT, and GEOINT <b>Resource Person:</b> Prof KC Tiwari	
		1200-1300	<b>Session: Theory</b> Types of targets and different types of categorizations (based on RS, Location etc), Surface target detection, subsurface target detection, underwater and aerial target detection, camouflages target detection, change detection, and target detection process. <b>Resource Person:</b> Dr Rubeena Vohra	
		1300-1400	<b>Lunch Break</b>	
	Afternoon Session	1400-1530	<b>Session: Hands-on</b> Identification of data sets for TD. Review Registration and Acquisition of free satellite data from Bhuvan, USGS, ESA <b>Resource Person:</b> Ms Dyvavani	
	1530-1700	<b>Session: Hands-on</b> Acquiring topo-sheets from SOI, ordering of IRS data <b>Resource Person:</b> Ms Kamini		
Day 2 28 May 2024	Morning Session	0900-1100	<b>Session: Theory</b> <b>Data, and Software</b>	

			Datasets for target detection- Optical data (including hyperspectral data), thermal data, LIDAR data, SAR data, and Sources of data (satellites/aerial/UAV). <b>Resource Person:</b> Prof KC Tiwari	
		1100-1200	<b>Session: Theory</b> Challenges and constraints in TD – challenges due to limitations of data acquisition, visualization, and interpretation, varied terrain, weather, lack of appropriate data, resolution of data, size of target, etc. Understanding imitations and exploiting the advantages of each dataset <b>Resource Person:</b> Dr Poonam Vishwas	
		1200-1300	<b>Session: Theory</b> Review of QGIS interface and functions & ENVI/ ArcGIS. Review MATLAB/ Python <b>Resource Person:</b> Ms Shagun Jain	
		1300-1400	<b>Lunch Break</b>	
		Afternoon Session	1400-1530	<b>Session: Hands-on</b> Introduction to QGIS interface and functions <b>Resource Person:</b> Ms Dyvavani Krishna
			1530-1700	<b>Session: Hands-on</b> Georeferencing of images <b>Resource Person:</b> Ms P
Day 3 29 May 2024	Morning Session	0900-1100	<b>Session: Theory</b> <b>Issues and Problems in Target Detection</b> Target enhancement requirements, morphological feature extraction, target detection process, accuracy assessment <b>Resource Person:</b> Dr Rubeena Vohra	
		1100-1200	<b>Session: Theory</b> Types of resolutions and spatial resolutions necessary for analysis, spectral variability, dimensionality reduction and loss of information <b>Resource Person:</b> Prof KC Tiwari	
		1200-1300	<b>Session: Theory</b> <b>Application areas</b> – engineered surfaces and materials, urban applications, terrain studies, hydrological and environmental applications, thermal TD	



			<i>Resource Person: Dr Rubeena Vohra</i>
			<b>Lunch Break</b>
	<b>Afternoon Session</b>	<b>1400-1530</b>	<b>Session: Hands-on</b> Dimensionality reduction using PCA, MNF <i>Resource Person: Ms Dyvavani</i>
	<b>1530-1700</b>	<b>Session: Hands-on</b> Dimensionality reduction using ICA <i>Resource Person: Ms Kamini</i>	
<b>Day 4 30 May 2024</b>	<b>Morning Session</b>	<b>0900-1100</b>	<b>Session: Theory</b> <b>Common approaches and steps in TD</b> Defining the specific problem, strategy formulation, selection of data and approaches, data pre-processing, selection of algorithms, fusion strategies, Fusion and use of morphological features in TD, AI/ML Algorithms <i>Resource Person: Prof KC Tiwari</i>
		<b>1100-1200</b>	<b>Session: Theory</b> <b>TD in single images</b> Target detection in Photos and Single Images/ PAN/ Multispectral Images / Optical Images (Feature selection and extraction methods, histogram manipulation <i>Resource Person: Dr Shalini Gakhar</i>
		<b>1200-1300</b>	<b>Session: Theory</b> Elements of Image Interpretation in different types of data <i>Resource Person: Dr Shalini Gakhar</i>
		<b>1300-1400</b>	<b>Lunch Break</b>
	<b>Afternoon Session</b>	<b>1400-1530</b>	<b>Session: Hands-on</b> Elements of image interpretation- Visual interpretation of surface features on optical imagery <i>Resource Person: Dr Shalini Gakhar</i>
		<b>1530-1700</b>	<b>Session: Hands-on</b> Visual interpretation of surface features on hyperspectral imagery <i>Resource Person: Ms Dyvavani</i>

Day 5 31 May 2024	Morning Session	0900-1100	<b>Session: Theory</b> <b>Target classification Vs Target detection algorithms,</b> Supervised and Unsupervised classification, Spectral matching and Anomaly detection: <b>Resource Person: Prof Raju Sarkar</b>
		1100-1300	<b>Session: Theory</b> Unsupervised algorithms: Deep learning methods (AI, CNN, SVM ML, autoencoder ), thresholding etc performance evaluation parameters: confusion matrix, ROC, Kappa coefficient extraction targets and accuracy assessment <b>Resource Person: Prof Raju Sarkar</b>
		1300-1400	<b>Lunch Break</b>
	Afternoon Session	1400-1530	<b>Session: Hands-on</b> Supervised image classification-based TD on Hyperspectral data <b>Resource Person: Ms Dyvavani</b>
		1530-1700	<b>Session: Hands-on</b> Unsupervised image classification on hyperspectral data <b>Resource Person: Ms Kamini</b>
Day 6 01 June 2024	Morning Session	0900-1100	<b>Session: Theory</b> <b>TD in Hyperspectral Data (Full Pixel)</b> Introduction -hyperspectral remote sensing, Imaging spectroscopy–working principles of imaging spectrometers – hyperspectral sensors, _ detection spectra, applications of hyperspectral imagery, mineral and vegetation mapping. <b>Resource Person: Dr Dwijndra Pandey</b>
		1100-1200	<b>Session: Theory</b> <b>Issues and problems of TD in hyperspectral data</b> Spectral properties of materials, statistical models for spectral data <b>Resource Person: Dr Dwijndra Pandey</b>
		1200-1300	<b>Session: Theory/ Hands-on</b> <b>Data preprocessing for TD in Hyperspectral Images</b> Linear spectral transformations (Dimensionality reduction techniques: Principal Component Analysis (PCA), Maximum Noise Fraction (MNF) etc.) signal detection theory, hyperspectral data exploitation.

			<i>Resource Person: Dr Dwijndra Pandey</i>
		<b>1300-1400</b>	<b>Lunch Break</b>
	<b>Afternoon Session</b>	<b>1400-1530</b>	<b>Session: Hands-on</b> Spectral indices for land surface features <i>Resource Person: Dr Dwijndra Pandey</i>
		<b>1530-1700</b>	<b>Session: Hands-on</b> Hyperspectral data processing, spectral indices for extraction of engineered surfaces <i>Resource Person: Ms Dyvavani</i>
<b>02 June 2024</b>			<b>Holiday</b>
<b>Day 7 03 June 2024</b>	<b>Morning Session</b>	<b>0900-1100</b>	<b>Session: Theory</b> <b>Sub-pixel target detection and enhancement:</b> Subpixels, Mixed pixels and strategies to solve them <i>Resource Person: Dr Gopinadh</i>
		<b>1100-1300</b>	<b>Session: Theory</b> Linear mixture model, end-member determination techniques, least square computation, Spectral mixture analysis. <i>Resource Person: Dr Gopinadh</i>
		<b>1300-1400</b>	<b>Lunch Break</b>
	<b>Afternoon Session</b>	<b>1400-1530</b>	<b>Session: Theory</b> Spectral unmixing algorithms and functions <i>Resource Person: Ms Kamini</i>
		<b>1530-1700</b>	<b>Session: Theory/ Hands-on</b> Spectral unmixing algorithms and functions-II <i>Resource Person: Ms Prachi</i>
		<b>Week 2</b>	
<b>Day 8 04 June 2024</b>	<b>Morning Session</b>	<b>0900-1100</b>	<b>Session: Theory</b> <b>Target Enhancement and Super-resolution</b> Why target enhancement, strategies and algorithms for target enhancement, types of algorithms, usefulness in TD and classification <i>Resource Person: Dr Amrita Bhandari</i>

		<b>1100-1200</b>	<b>Session: Theory</b> Super-resolution techniques for target enhancement <b>Resource Person:</b> <i>Dr Amrita Bhandari</i>	
		<b>1200-1300</b>	<b>Session: Theory</b> Pixel swap and Euclidean distance algorithms for Target enhancement <b>Resource Person:</b> <i>Prof KC Tiwari</i>	
		<b>1300-1400</b>	<b>Lunch Break</b>	
		<b>Afternoon Session</b>	<b>1400-1530</b>	<b>Session: Theory</b> Super-resolution using Euclidean distance-based algorithm <b>Resource Person:</b> <i>Prof KC Tiwari</i>
			<b>1530-1700</b>	<b>Session: Theory/ Hands-on</b> Super-resolution using Euclidean distance-based algorithm (Continue) <b>Resource Person:</b> <i>Prof KC Tiwari</i>
<b>Day 9</b> <b>05 June 2024</b>	<b>Morning Session</b>	<b>0900-1100</b>	<b>Session: Theory</b> <b>TD using Thermal RS</b> Thermal remote sensing; Introduction: Laws and definitions; Thermal emission characteristics, Physics behind thermal mapping (including thermal inertia); Errors, and assumption in thermal remote sensing; Modelling Thermal data; Processing and Analysis: Radiometric Calibration of Satellite and Airborne Thermal data; TIR Image processing; Emissivity; databases- visual and quantitative image interpretation of TIR data <b>Resource Person:</b> <i>Dr TB Rawat (DRDO)</i>	
		<b>1100-1200</b>	<b>Session: Theory</b> Data fusion, Applications of thermal imagery, UHI and coal mine fire mapping <b>Resource Person:</b> <i>Dr TB Rawat (DRDO)</i>	
		<b>1200-1300</b>	<b>Session: Theory</b> TD in Thermal images, challenges and steps <b>Resource Person:</b> <i>Dr TB Rawat (DRDO)</i>	
		<b>1300-1400</b>	<b>Lunch Break</b>	
	<b>Afternoon Session</b>	<b>1400-1530</b>	<b>Session: Hands-on</b> Land surface temperature and emissivity assessment	

			<b>Resource Person:</b> Ms Dyvavani
		1530-1700	<b>Session: Hands-on</b> TD in thermal images <b>Resource Person:</b> Ms Kamini
Day 10 06 June 24	Morning Session	0900-1100	<b>Session: Theory</b> <b>Microwave remote sensing,</b> _ Introduction: Active and passive microwave systems – basic principle, of Radar/SAR (Geometric and statistical properties and imaging geometry) –Radar Relief displacement (Foreshortening, Layover, Shadow & Speckle) <b>Resource Person:</b> Dr Poonam Vishwas
		1100-1200	<b>Session: Theory</b> SAR Processing and interpretation: Filters, Radar interferometry and Polarimetry <b>Resource Person:</b> Dr Kaustubh
		1200-1300	<b>Session: Theory</b> Applications of microwave remote sensing –flood mapping, TD in microwave issues. <b>Resource Person:</b> Mr Sanjay Singh
		1300-1400	<b>Lunch Break</b>
	Afternoon Session	1400-1530	<b>Session: Theory</b> TD using SNAP Microwave module <b>Resource Person:</b> Mr Sanjay Singh
		1530-1700	<b>Session: Theory</b> TD using ENVI Microwave module <b>Resource Person:</b> Dr Kaustubh
Day 11 07 June 24	Morning Session	0900-1100	<b>Session: Theory</b> <b>TD in UAV Data</b> Introduction: Principles and geometry, sensors and aerial platform; processing and interpretation- quality control, information extraction. <b>Resource Person:</b> Dr Shalini Gakhar

		1100-1200	<p><b>Session: Theory</b>  <b>DEM Applications</b>  Introduction; data acquisition and sources; resolution and scale, interpolation, 3D visualization, DEM derivatives  <b>Resource Person:</b> <i>Mr Sebastian</i></p>	
		1200-1300	<p><b>Session: Theory</b>  <b>Terrain Intelligence</b>  Terrain analysis, terrain data sources, landform classification, military operations.  <b>Resource Person:</b> <i>Mr Anmol</i></p>	
		1300-1400	<b>Lunch Break</b>	
		Afternoon Session	1400-1530	<p><b>Session: Theory/ Hands-on</b>  UAV data processing  <b>Resource Person:</b> <i>Ms Dyvavani</i></p>
			1530-1700	<p><b>Session: Theory/ Hands-on</b>  Line of Sight assessment using DEM  <b>Resource Person:</b> <i>Mr Anmol</i></p>
Day 12 08 June 24	Morning Session	0900-1100	<p><b>Session: Theory</b>  <b>Alternative Approaches/ Strategies</b>  Assess and exploit the impact of various parameters in target detection and identification of the most suitable spectral wavelengths for target detection. The exploitation of spectral indices such as NDVI, NDWI, MBI etc for target detection  Data fusion at pixel, feature, and decision levels, shadowed target detection and identification using decision level fusion of Hyperspectral data with LiDAR data, Change detection strategies  <b>Resource Person:</b> <i>Prof KC Tiwari</i></p>	
		1100-1200	<p><b>Session: Theory</b>  Morphological features and its usage in TD  <b>Resource Person:</b> <i>Dr Shalini Gakhar</i></p>	
		1200-1300	<p><b>Session: Theory</b>  Comparison of TD algorithms  <b>Resource Person:</b> <i>Dr Shalini Gakhar</i></p>	

	Afternoon Session	1300-1400	Lunch Break
		1400-1530	<b>Session: Hands-on</b> TD using spectral matching/ICA <b>Resource Person: Dr Shalini Gakhar</b>
		1530-1700	<b>Session: Hands-on</b> Terrain information extraction <b>Resource Person: Mr Anmol</b>
9 June 24		Holiday	
Day 13 10 June 24	Morning Session	0900-1300	<b>Session: Theory</b> <b>TD Applications</b> Spectral matching/Anomaly detection and ICA based Surface target detection and enhancement <b>Resource Person: Prof KC Tiwari</b>
			<b>Session: Theory</b> Camouflaged targets detection using ICA based detection in Hyperspectral data followed with LiDAR data processing <b>Resource Person: Prof KC Tiwari</b>
			<b>Session: Theory</b> Subsurface TD (Mine detection) in Microwave data using different methods and shape identification <b>Resource Person: Prof KC Tiwari</b>
	Afternoon Session	1300-1400	Lunch Break
		1400-1530	<b>Session: Hands-on</b> TD of camouflaged objects using visual image interpretation <b>Resource Person: Ms Kamini</b>
		1530-1700	<b>Session: Hands-on</b> TD of camouflaged objects in hyperspectral data <b>Resource Person: Ms Dyvavani</b>

Day 14 11 June 2024	Morning Session	0900-1000	<b>Session: Theory/ Hands-on TD Applications</b> Occluded targets using shape based contour methods on LiDAR data. <b>Resource Person:</b> Prof KC Tiwari	
		1000-1100	<b>Session: Hands-on</b> Detection and Identification of Engineered surfaces in hyperspectral data <b>Resource Person:</b> Prof Raju Sarkar	
		1100-1200	<b>Session: Hands-on</b> Morphological indices-based object urban features/object extraction Terrain studies and trafficability <b>Resource Person:</b> Prof Raju Sarkar	
		1200-1300	<b>Session: Theory</b> <b>Future scope of TD studies</b> Sensor development, underwater TD enhancement, automation <b>Resource Person:</b> Prof KC Tiwari	
		1300-1400	<b>Lunch Break</b>	
	Afternoon Session	1400-1700	Open- Discussion session	
<b>Week 3</b>				
Day 15 12 June 2024	Morning Session	9:00-13:00	<b>Project Work-</b> Minor projects to be done by the participants with data available (Groups of 4-5 students for each of the projects) <b>Resource Persons:</b> Prof KC Tiwari, Prof Raju Sarkar, Dr Rubeena Vohra. Dr. Dwijendra, Dr. Shalini Singh, Dr. Amrita Bhandari, Dr. Poonam Vishwas	
			<b>Lunch Break</b>	
	Afternoon Session	1400-1700	<b>Project Work-</b> Minor projects to be done by the participants with data available	
Day 16 13 June 2024	Morning Session	9:00-13:00	<b>Project Work-</b> Minor projects to be done by the participants with data available <b>Resource Persons:</b> Prof KC Tiwari, Prof Raju Sarkar, Dr Rubeena Vohra. Dr. Dwijendra, Dr. Shalini Singh, Dr. Amrita Bhandari, Dr. Poonam Vishwas	
			<b>Lunch Break</b>	



	Afternoon Session	1400-1700	Project Work- Minor projects to be done by the participants with data available
Day 17 14 June 2024	Morning Session	9:00-13:00	Project Work- Minor projects to be done by the participants with data available <b>Resource Persons:</b> Prof KC Tiwari, Prof Raju Sarkar, Dr Rubeena Vohra. Dr. Dwijendra, Dr. Shalini Singh, Dr. Amrita Bhandari, Dr. Poonam Vishwas
			<b>Lunch Break</b>
	Afternoon Session	1400-1700	Project Work- Minor projects to be done by the participants with data available
Day 18 15 June 2024	Morning Session	9:00-13:00	Project Work- Minor projects to be done by the participants with data available <b>Resource Persons:</b> Prof KC Tiwari, Prof Raju Sarkar, Dr Rubeena Vohra. Dr. Dwijendra, Dr. Shalini Singh, Dr. Amrita Bhandari, Dr. Poonam Vishwas
			<b>Lunch Break</b>
	Afternoon Session	1400-1700	Project Work- Minor projects to be done by the participants with data available
16 June 2024			<b>Holiday</b>
Day 19 17 June 2024	Morning Session	9:00-13:00	Project Work- Minor projects to be done by the participants with data available <b>Resource Persons:</b> Prof KC Tiwari, Prof Raju Sarkar, Dr Rubeena Vohra. Dr. Dwijendra, Dr. Shalini Singh, Dr. Amrita Bhandari, Dr. Poonam Vishwas
			<b>Lunch Break</b>
	Afternoon Session	1400-1700	Project Work- Minor projects to be done by the participants with data available
Day 20 18 June 2024	Morning Session	9:00-13:00	Project Work- Minor projects to be done by the participants with data available <b>Resource Persons:</b> Prof KC Tiwari, Prof Raju Sarkar, Dr Rubeena Vohra. Dr. Dwijendra, Dr. Shalini Singh, Dr. Amrita Bhandari, Dr. Poonam Vishwas
			<b>Lunch Break</b>
	Afternoon Session	1400-1700	Project Work- Minor projects to be done by the participants with data available
Day 21 19 June	Morning Session	0900-1300	Presentation and Evaluation of Projects
		1300-1400	<b>Lunch Break</b>
	Afternoon Session	1400-1700	Valedictory Session

