



सत्यमेव जयते

Department of Science & Technology
Govt. of India

Summer School In Geospatial Science and Technology (Level 1)

21 April to 11 May, 2022

Organized by

Punjab Remote Sensing Centre,
Ludhiana, India

Supported by

National Geospatial Program,
Department of Science and
Technology, Government of
India, New Delhi

At

**Punjab Remote Sensing Centre,
Ludhiana, India**

Principal Investigator

Mr. Sashikant Sahoo

Scientist-SD

Punjab Remote Sensing Centre, Ludhiana

Punjab Remote Sensing Centre (PRSC)

Punjab Remote Sensing Centre (PRSC) an autonomous organisation under the Department of Agriculture, Government of Punjab, is the apex body in the state for all Remote Sensing (RS), Geographic Information System (GIS) and Global Positioning System (GPS) and related works. It is designated as a Nodal Agency by the Govt. of Punjab for geospatial needs of the state and also acts as the centralized hub for the geo-spatial data to all the user departments. PRSC has been setup under the umbrella of National Natural Resources Information System (NNRMS) under the technical guidance of ISRO NNRMS. The broad objectives of the Centre as given in the Memorandum and Rules of the association are:

- To undertake, promote, guide, co-ordinate and aid research and development in the field of remote sensing.
- To act as a nodal organization in respect of formulation and execution of projects on natural resource mapping and monitoring using remote sensing technology.
- To provide research and developmental support to the teaching and research organizations of the state in specified areas of remote sensing technology.
- To provide capacity building such as: organising training, lectures, seminars and symposia for advanced study and research in remote sensing technology and its applications.



Fig 1. Punjab Remote Sensing Centre (PRSC)

What is the Summer/Winter Schools (Level 1) 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 adaptation capacity of geospatial science and technology at across the country. The objective of the program is to build knowledge and various levels of governance in collaboration with academia and user agencies. The three week Summer/ Winter School in Geospatial technology is being conducted at two levels - Level 1 and Level 2. The 21-day summer/winter school in Geospatial Science and Technology (Level 1) supported by the National Geospatial Program (NGP) of the Department of Science and Technology, Government of India focuses on developing knowledge and capacity building in geospatial technologies through the use of open source geospatial software.

Who can apply?

Faculty members, scientists, technologists, researchers from academia, national institutions of research, smart city cells, municipal corporations and other government departments, personnel from non government organizations are eligible to apply. Only 2-3 seats are reserved for research scholars.

How to apply?

- Interested candidates should fill the online application form through the web link available on <http://dst-iget.in>.
- Selected candidates will be informed by mail.
- For any further queries write to dst-iget@bviier.edu.in or call on +91-20-24375684/24362155.
- Address all queries regarding the program to PI through email.

Important Information

Last date for registration: 31 March, 2022

Dates of the program: 21 April to 11 May, 2022

Mode of conduct: Offline Mode

(According to the situation of Pandemic, the mode of conducting the program will be changed to ONLINE)

No. of seats: 25

Registration Fees: Nil

Principal Investigator: Mr. Sashikant Sahoo, Scientist-SD
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For any queries contact:

- Mr. Sashikanta Sahoo, Principal Investigator, sksahoo@prsc.gov.in

Address: Punjab Remote Sensing Centre, PAU Campus, Ludhiana-141004, India.

Grading and Certification: Grading and Certification Participants will be assessed based on assignments completed during the course, a mini project that they are expected to complete, active participation during the training program as well as attendance.

Note: In case the program is conducted online due to COVID 19 restrictions, participants must ensure that they have a laptop and a strong internet connection.

Infrastructural facilities:

Punjab Remote Sensing Centre, located in Punjab Agricultural University (PAU) Campus at Ludhiana, Punjab over an area of four and half acre, has its own office building. Looking at future expansion of facilities five storey

building has been planned. Presently two floors with 32000 sq. ft. total covered area have been completed.

Lab Facilities Available at PRSC

The institute is having well equipped Geospatial Technology labs with advanced instruments such as high end workstations with all open source remote sensing and GIS softwares and professional softwares such as: ArcGIS, ERDAS, ENVI, eCognition and Hand-held GPS. PRSC has well equipped satellite image processing and GIS laboratory and Server room apart from visual interpretation, Cartographic, Photographic instruments and laboratory for soil & water testing and analysis.

Boarding & Lodging Facilities

The Institute has a well-equipped 10 bedded Hostel cum Guest house with canteen facility in its campus for the Training delegates and govt. officials. Participants can also use the serene environments of Punjab Agricultural University for a relaxing walk or run during their free time. Besides this, the institute has also the access to book the accommodation for the course participants at nearby guest houses of Punjab Agricultural University and CIPHET, Ludhiana. All the participants will be provided with shared accommodation in the guest house.

Boarding and Lodging will be taken care by the organising Institute. AC - III tier fare will be paid on the production of railway tickets. For travel by road, fare will be reimbursed on production of bus tickets. Travel by private car/vehicle will not be reimbursed. Course material will be provided as per the DST Norms. No DA will be provided to the participants. Any expenses other than the above will have to be borne by the participant.



Fig 2. Main Building



Fig 3. Conference Room

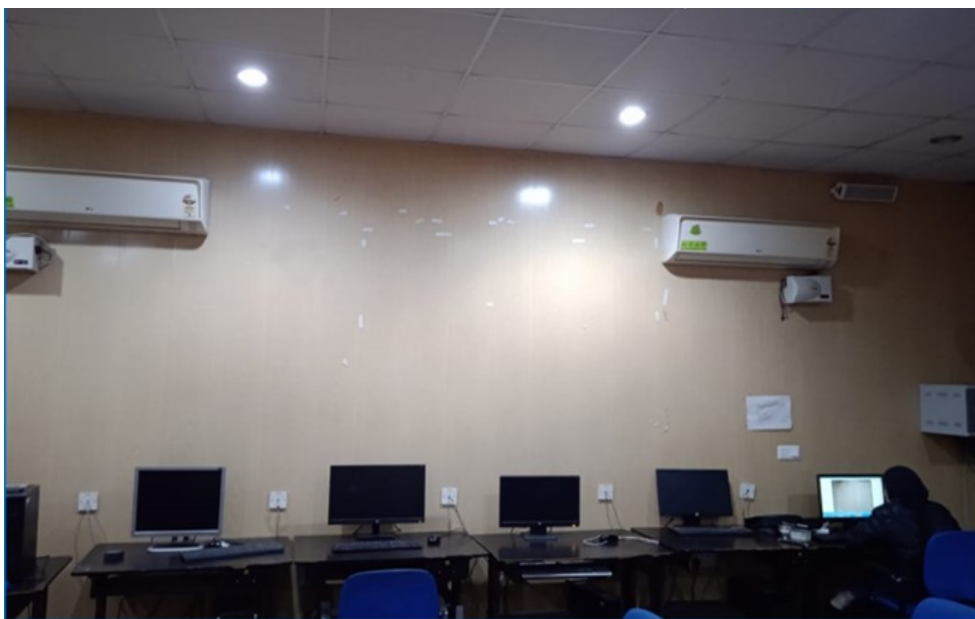


Fig 4. Training Lab



Fig 5. Training Room -cum- Lab



Fig 6. Image Processing lab



Fig 7. Soil & Water Laboratory



Fig 8. Auditorium



Fig 9. Training Cum Hostel at PRSC Campus

Program schedule for 21 Days Summer School in Geospatial Science and Technology (Level 1)

21 April to 11 May 2022

Day and Date	Morning Session – I 09:30 AM - 11:00 AM	Tea Break (11:00 to 11:30 AM)	Morning Session – II 11:30 AM - 1.00 PM	Lunch (1:00 to 2:00 PM)	Lab Session / Field Visit 2.00 PM - 5.00 PM
Day-1: 21.04.2022 (THURSDAY)	<p>Inauguration Ceremony & Introduction to participants about DST & PRSC <i>Chief Guest & DST REPRESENTATIVE</i></p> <p>Theory: 1 <i>Plenary talk by (Expert/Guest)</i></p>	T E A	<p>Theory: 2 Introduction to geospatial science and technology & Fundamentals of Geographical Information System (GIS) <i>Internal Expert, PRSC</i></p>	L U N	<p>Hands on session/Lab: 1 Introduction to QGIS and Acquisition of free satellite data <i>PRSC Team</i></p>
Day-2: 22.04.2022 (FRIDAY)	<p>Theory: 3 Introduction to data types in geospatial information (GI) <i>Internal Expert, PRSC</i></p>	B	<p>Theory: 4 Geographic co-ordinate systems and Map projections Scale factor and transformation, properties of map projections, Different types of projections, geo-referencing <i>Internal Expert, PRSC</i></p>	C H B	<p>Hands on session/Lab: 2 Working with projections using QGIS, Geo-referencing <i>PRSC Team</i></p>
Day-3: 23.04.2022 (SATURDAY)	<p>Theory: 5 Basic geodesy Concept and types of Geodetic datum such as: Spherical, ellipsoidal and geoidal earth <i>Internal Expert, PRSC</i></p>	R E A K	<p>Theory: 6 GIS Database Introduction to database and database management systems, importance, database creation, linking spatial and attribute data <i>Internal Expert, PRSC</i></p>	R E A K	<p>Hands on session/Lab: 3 Extracting data (vector and raster) <i>PRSC Team</i></p>
Day-4: 24.04.2022 (SUNDAY)	HOLIDAY	K	HOLIDAY	K	HOLIDAY

Day-5: 25.04.2022 (MONDAY)	<p>Theory: 7</p> <p>Digital Cartography: Cartographic evolution, Map elements and design</p> <p><i>Internal Expert, PRSC</i></p>	T E A	<p>Theory: 8</p> <p>Spatial Analysis in GIS – I: Queries, buffering and neighbourhood functions, map overlay, spatial analysis, multi-criteria analysis and network analysis</p> <p><i>Internal Expert, PRSC</i></p>	L U N	<p>Hands on session/Lab: 4</p> <p>Working with Spatial and Non-spatial Attribute data</p> <p>Minor Project work: Formation of Groups and assigned project works for each groups</p> <p><i>Internal Experts/Team, PRSC</i></p>
Day-6: 26.04.2022 (TUESDAY)	<p>Theory: 9</p> <p>Spatial Analysis in GIS - II: Spatial analysis, multi-criteria analysis and network analysis</p> <p><i>Internal Expert, PRSC</i></p>		<p>Theory: 10</p> <p>GIS Data Quality and Open source GIS and Cloud based Geoprocessing</p> <p><i>Internal Expert, PRSC</i></p>	C H	<p>Hands on session/Lab: 5</p> <p>Data exploration and Map preparation, Working with queries and spatial data analysis</p> <p><i>PRSC Team</i></p>
Day-7: 27.04.2022 (WEDNESDAY)	<p>Theory: 11</p> <p>Global Positioning System (GPS) - I: Fundamentals and Working principles of Global Navigation Satellite Systems (GNSS) and Indian Regional Navigation Satellite System (IRNSS)</p> <p><i>External Expert, Dept. of Space</i></p>	B	<p>Theory: 12</p> <p>Global Positioning System (GPS) - II: GNSS errors and biases, Methods of GNSS observations and GPS applications</p> <p><i>External Expert, Dept. of Space</i></p>	B	<p>Hands on session/Lab: 6</p> <p>Field exercise for collecting points using a hand held GPS and importing location data into QGIS Working with queries</p> <p><i>External Expert & PRSC Team</i></p>
Day-8: 28.04.2022 (THURSDAY)	<p>Theory: 13</p> <p>Concepts and Fundamentals of Remote Sensing (RS)</p> <p><i>External Expert, SAC, ISRO, Ahmedabad</i></p>	R E A	<p>Theory: 14</p> <p>Physics of Remote Sensing with Advanced Remote Sensing: Concept of Advanced Microwave, Hyperspectral RS with applications</p> <p><i>External Expert, SAC, ISRO, Ahmedabad</i></p>	R E A	<p>Hands on session/Lab: 7</p> <p>Understanding the image (histogram), Working with images, Introduction to SAGA</p> <p><i>External Expert/PRSC Team</i></p>
Day-9: 29.04.2022 (FRIDAY)	<p>Theory: 15</p> <p>Elements of visual interpretation</p> <p><i>Internal Expert, PRSC</i></p>	K	<p>Theory: 16</p> <p>Image rectification and restoration</p> <p><i>Internal Expert, PRSC</i></p>	K	<p>Hands on session/Lab: 8</p> <p>Image rectification and registration</p> <p><i>PRSC Team</i></p>

Day-10: 30.04.2022 (SATURDAY)	Theory: 17 Image classification Introduction to Supervised and Unsupervised classification methods, Validation and accuracy assessment <i>Internal Expert, PRSC</i>	T E A	Theory: 18 Image Quality Assessment and Statistical Evaluation <i>Internal Expert, PRSC</i>	L U N	Hands on session/Lab: 9 Unsupervised classification and Supervised classification <i>PRSC Team</i>
Day-11: 1.05.2022 (SUNDAY)	FIELD VISIT (Ground Truth Verification for Classification Accuracy Assessment)		FIELD VISIT (Ground Truth Verification for Classification Accuracy Assessment)	C H	FIELD VISIT (Ground Truth Verification for Classification Accuracy Assessment)
Day-12: 2.05.2022 (MONDAY)	Theory: 19 Introduction to image enhancements Contrast enhancements, Spatial filtering, Principal Components Analysis <i>External Expert, IIT BHU</i>	B	Theory: 20 Image filtering concepts and Digital change detection <i>External Expert, IIT BHU</i>	B	Hands on session/Lab: 10 Image Enhancement and Change detection <i>External Expert/PRSC Team</i>
Day-13: 3.05.2022 (TUESDAY)	Theory: 21 Understanding Terrain Data Introduction to DEM, DTM, DSM Satellite images and applications <i>Internal Expert, PRSC</i>	R E A	Theory: 22 Group exercise: Project Synopsis presentation by Groups for the project work (Methodology Final) <i>Director & Scientists of PRSC</i>	R E A	Hands on session/Lab: 11 Image classification and Accuracy assessment (Contd.) <i>PRSC Team</i>
Day-14: 4.05.2022 (WEDNESDAY)	Theory: 23 Introduction to Open Source GIS: Concepts and fundamentals with applications <i>External Expert, IIRS, ISRO, Dehradun</i>	K	Theory: 24 Introduction to WebGIS Open source Technology and demos <i>Internal Expert, PRSC</i>	K	Hands on session/Lab: 12 Hands on Training on GEE <i>External Expert, IIRS, ISRO, Dehradun / PRSC Team</i>

Day-15:5.05.2022 (THURSDAY)	Theory: 25 Introduction to Google Earth Engine (GEE) Introduction, Accessing EO datasets, Visualization and analysis <i>External Expert, IIRS, ISRO, Dehradun</i>	T E A	Theory: 26 WebGIS applications and Introduction to NSDI, SDI <i>External Expert, IIRS, ISRO, Dehradun</i>	L U N C H	Hands on session/Lab: 13 Exercise to create a webGIS; Understanding Geoserver <i>External Expert, IIRS, ISRO, Dehradun</i>
Day-16: 6.05.2022 (FRIDAY)	Theory: 27 Applications of Geospatial Technology in Natural Resource Management (Agriculture/Natural Resources) with specific case studies <i>Director, PRSC</i>		Theory: 28 Applications of Geospatial Technology in Climate Studies with specific case studies <i>External Expert, IIT, Roorkee</i>		Hands on session/Lab: 14 Demonstration of Punjab Web portal, ISRO's Bhuvan and Vedas Web Portal <i>Internal Expert/PRSC Team</i>
Day-17: 7.05.2022 (SATURDAY)	Theory: 29 Applications on RS/GIS in Planning (Urban/Rural) with specific case studies <i>Internal Expert, PRSC</i>		Theory: 30 Applications on Geospatial Technology in Water Resources Management with specific case studies <i>External Expert, SAC, ISRO, Ahmedabad</i>		Project work
Day-18: 8.05.2022 (SUNDAY)	Project work	B R	Project work	B R	Project work
Day-19: 9.05.2022 (MONDAY)	Project work	E	Project work	E	Project work
Day-20: 10.05.2022 (TUESDAY)	Project work	A	Project work	A	Project work
Day-21: 11.05.2022 (WEDNESDAY)	Introduction to the work of UNGGIM <i>DST, GoI Representative</i>	K	Evaluation & Final project presentation by participants (Group wise presentations) <i>DST Observer, Director and Scientists of PRSC</i>	K	Feedback & Valedictory Session: Interaction and feedback with DST Observer & Valedictory <i>DST Representative & PRSC Scientists</i>
