

Winter school in Geospatial Science and Technology (Level 1: Spatial Thinking)

20 November to 10 December 2024



Organized by

Punjab Remote Sensing Centre,
Ludhiana, India



सर्वज्ञ ज्ञान
Department of Science & Technology
Govt. of India

Supported by

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

Principal Investigator

Mr. Sashikant Sahoo, I/c Training & Capacity Building
Punjab Remote Sensing Centre, Ludhiana

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. The objective of the program is to build knowledge and various levels of governance in collaboration with academia and user agencies.

Level 1 (Spatial Thinking) Summer / Winter School In Geospatial Science and Technology

The 21-day summer/winter school in Geospatial Science and Technology (Level 1– Spatial thinking) 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.

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 Punjab Remote Sensing Centre, Ludhiana is one of the selected institutions for conducting the Level 1– spatial thinking Program.

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 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.



Punjab Remote Sensing Centre (PRSC)

Who can apply?

- Ph.D. and Research Scholars, from any streams/subjects related to geospatial technology from the Indian Universities, Academic and Research Institutes are eligible to apply.

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 after application write to dst.iget@bharativedyapeeth.edu or call on +91- 7559288803
- Address all queries regarding the program once selected to the PI, *Mr. Sashikant Sahoo*, skshoo@prsc.gov.in, +91-7009628425 (M), +91-161 2303484 (O)

Important Information

Last date for application: 31 October 2024

Date of intimation of selection: 3 November 2024

Dates of the program: 20 November to 10 December, 2024

Mode of conduct: Offline

No. of seats: 25

Registration Fees: Nil

Principal Investigator: Mr. Sashikant Sahoo, I/c Training & Capacity Building, Punjab Remote Sensing Centre, PAU Campus, Ludhiana-141004, India

Email: sksahoo@prsc.gov.in

Phone: +91-7009628425 (M), +91-161 2303484 (O)

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

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 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.

Laboratory

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 and 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.



Computer Lab



Training Room -cum- Lab



Conference Room



Hostel AC Room

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

Conducted by: Punjab Remote Sensing Centre, Ludhiana, India

20 November to 10 December, 2024

Day and Date	Morning Session – I 09:30 to 11:00 am	Tea Break	Morning Session – I 11:30 am to 1:00 pm	Lunch Break	Lab Session / Field Visit 2.00 - 5.00 pm
20 November 2024 Wednesday	<p>Inaugural Program : Welcome and Program Overview Introduction to the Training Program and Icebreaker Activities Theory: 1 Plenary talk by <i>DST Representative/Guest</i></p>	Tea Break 11:00 to 11:30 am	<p>Theory: 2 Understanding spatial thinking & SDGs: Spatial Intelligence, Spatial Concepts and SDGs Importance <i>Internal Expert, PRSC</i></p>	Lunch Break 1:00 to 2:00 pm	<p>Hands on session/Lab: 1 Introduction to QGIS and Acquisition of free satellite data <i>PRSC Team (Internal)</i></p>
21 November 2024 Thursday	<p>Theory: 3 Introduction to geospatial science and technology: Overview of GIS and components <i>Internal Expert, PRSC</i></p>		<p>Theory: 4 Spatial Perception and Cognition: Activities to enhance spatial perception and Introduce basic spatial concepts: distance, direction, scale, etc. <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 2 Practical Exercises on Spatial Perception and Q&A <i>PRSC Team (Internal)</i></p>
22 November 2024 Friday	<p>Theory: 5 Geographic co-ordinate systems and Map projections: Scale factor and transformation, Map projections, Different types of projections, geo-referencing <i>Internal Expert, PRSC</i></p>		<p>Theory: 6 Geospatial Data and Tools: Introduction to Geospatial Data and data types; Principles of effective data visualization <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 3 Working with projections using QGIS, Geo- referencing <i>PRSC Team (Internal)</i></p>
23 November 2024 Saturday	<p>Theory: 7 Remote Sensing and its Role in Spatial Analysis <i>Internal Expert, PRSC</i></p>		<p>Theory: 8 Interpreting Satellite Images and visual interpretation techniques <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 4 Practical exercises to develop visualization skills. Group discussions on challenges faced during visualization. <i>PRSC Team (Internal)</i></p>

24 November 2024 Sunday	<i>Holiday</i>				
25 November 2024 Monday	<p>Theory: 9 The power of maps: Maps as effective media for spatial thinking <i>Internal Expert, PRSC</i></p>	Tea Break 11:00 to 11:30 am	<p>Theory: 10 Setting up the mapping framework : Basics on map making <i>Internal Expert, PRSC</i></p>	Lunch Break 1:00 to 2:00 pm	<p>Hands on session/Lab: 5 Map Making in Q GIS: space, scale, pattern, and distance. <i>PRSC Team (Internal)</i></p>
26 November 2024 Tuesday	<p>Theory: 11 Maps for communication and decision-making <i>Internal Expert, PRSC</i></p>		<p>Theory: 12 Utilizing spatial thinking: Examining Patterns through Basic Cartography <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 6 Understanding the Fusion of Geographic Elements into Points, Networks, and Regions; Exploring Spatial Structures and Patterns <i>PRSC Team (Internal)</i></p>
27 November 2024 Wednesday	<p>Theory: 13 Spatial Analysis Techniques: Introduction to spatial statistics <i>Internal Expert, PRSC</i></p>		<p>Theory: 14 Spatial Analysis Techniques: spatial analysis methods (e.g., clustering, spatial autocorrelation) <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 7 Hands-on Exercise: Creating Maps using GIS Software and Analyzing spatial patterns <i>PRSC Team (Internal)</i></p>
28 November 2024 Thursday	<p>Theory: 15 Cartography and Map Design Principles <i>External Expert, PU, Chandigarh</i></p>		<p>Theory: 16 Spatial Relationships and Patterns <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 8 Group Exercise: Identifying Patterns in Urban and Natural Environments <i>External Expert, PU, Chandigarh & PRSC Team</i></p>
29 November 2024 Friday	<p>Theory: 17 GPS : Fundamentals and concepts and applications <i>Internal Expert, PRSC</i></p>		<p>Theory: 18 Techniques for collecting spatial data (e.g., GPS, remote sensing) <i>Internal Expert, PRSC</i></p>		<p>Hands on session/Lab: 9 GPS and Location-based activity and practical on Collecting and importing spatial data <i>PRSC Team (Internal)</i></p>
30 November 2024 Saturday	<i>Field Visit and Ground Truthing for sample collections using GPS</i>				
01 December 2024 Sunday	<i>Holiday</i>				

02 December 2024 Monday	Theory: 19 Network Analysis and Connectivity <i>Internal Expert, PRSC</i>	Tea Break 11:00 to 11:30 am	Theory: 20 Spatial Data quality and sources <i>Internal Expert, PRSC</i>	Lunch Break 1:00 to 2:00 pm	Hands on session/Lab: 11 <i>Internal Expert, PRSC</i>
03 December 2024 Tuesday	Theory: 21 Spatial Thinking in Urban Planning Discuss how spatial thinking contributes to urban development. Lecture by an urban planner sharing real projects. <i>External Expert, IIT Roorkee</i>		Theory: 22 3D Visualization and Virtual Reality <i>External Expert, IIT Roorkee</i>		Hands on session/Lab: 12 Group activity: Analyzing a city map for potential improvements. <i>External Expert, IIT Roorkee</i>
04 December 2024 Wednesday	Theory: 23 Spatial Analysis and Decision Making <i>Internal Expert, PRSC</i>		Theory: 24 Risk Assessment using Spatial Analysis <i>External Expert, IIRS</i>		Hands on session/Lab: 13 Group Activity: Disaster Management Simulation using Spatial data and analytical tools <i>External Expert, IIRS</i>
05 December 2024 Thursday	Theory: 25 National Geospatial Data Policy and NSDI concepts <i>Internal Expert, PRSC</i>		Theory: 26 Guest Lecture on Legal Aspects of Geospatial Technology <i>External Expert, NSDI, GoI</i>		Hands on session/Lab: 14 Discussion on Ethical Use of Location Data and the importance in the real world <i>External Expert, NSDI, GoI</i>
06 December 2024 Friday	Theory: 27 Google Earth engine and Applications in Geospatial environment <i>External Expert, IIRS</i>		Theory: 28 Case Studies in Spatial Analysis <ul style="list-style-type: none"> • Case study 1: Urban planning and land use analysis • Case study 2: Environmental impact assessment • Case study 3: Public health and disease mapping <i>External Expert, IISER, Mohali</i>		Hands on session/Lab: 15 <i>External Expert, IIRS and PRSC Team</i>
07 December 2024 Saturday	Theory: 29		Theory: 30 Groups for Collaborative Project		Hands on session/Lab: 16 GIS Analysis for Agriculture and Environmental related applications

	<p>Environmental Conservation and Spatial Analysis</p> <p>Explain how spatial analysis aids in environmental studies.</p> <p><i>External Expert, IIT Ropar</i></p>		<p>Divide participants into teams. Each team selects a relevant topic. Teams will work on collaborative projects using GIS software.</p> <p><i>Program Coordinator, PRSC & Scientists of PRSC</i></p>		<p><i>External Expert, IIT Ropar</i></p>
<p>08 December 2024 Sunday</p>	<p><i>Project Work</i></p>				
<p>09 December 2024 Monday</p>	<p><i>Project Work</i></p>				
<p>10 December 2024 Tuesday</p>	<p>Evaluation & Final project presentation by participants (Group wise presentations)</p> <p><i>DST Observer, Director and Scientists of PRSC</i></p>		<p>Concluding Discussion and Key Takeaways along with Feedback forms evaluation</p> <p><i>By Participants</i></p>		<p><i>Valedictory Session:</i> Interaction and feedback with DST Observer & Valedictory</p> <p><i>DST Representative & PRSC Scientists</i></p>