



# unitar

United Nations Institute for Training and Research

## Unitar Online Catalogue

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### GeoAI for Land Monitoring and Decision Support

United Nations Satellite Centre UNOSAT

Deadline: 29 Jul 2025

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|--------------------------|-------------------------------------------------------|
| Type:                    | Course                                                |
| Location:                | Thimphu, Bhutan                                       |
| Date:                    | 30 Jul 2025 to 31 Jul 2025                            |
| Duration:                | 2 Days                                                |
| Programme Area:          | Satellite Imagery and Analysis                        |
| Website:                 | <a href="https://unosat.org/">https://unosat.org/</a> |
| Price:                   | \$0.00                                                |
| Event Focal Point Email: | khaled.mashfiq@unitar.org                             |
| Partnership:             | National Land Commission Secretariat (891)            |

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### BACKGROUND

In today's increasingly complex risk landscape, climate-induced disasters, environmental degradation, and humanitarian crises call for more than reactive responses. They require proactive, data-driven systems capable of supporting anticipatory decision-making. UNOSAT addresses this need through its Frontier Analytics & Capacity Development Offering a comprehensive and modular suite of services that equips national governments and UN partners with advanced

geospatial intelligence, real-time decision-support tools, and sustainable technical capacity. This approach is grounded in field-tested experience, powered by CERN-hosted cloud infrastructure, and aligned with key global frameworks, including the Sendai Framework for Disaster Risk Reduction, Sustainable Development Goal 13 (Climate Action), and the Early Warnings for All (EW4ALL) initiative.

As Earth Observation (EO) data becomes more accessible and abundant, GeoAI the application of artificial intelligence to geospatial data offers transformative potential. It enables the automated classification of land cover, detection of temporal changes, and generation of actionable insights for planning and policy.

## EVENT OBJECTIVES

This two-day training is designed to strengthen the practical capacity of national stakeholders in Bhutan to apply GeoAI for land monitoring and sustainable development. Using cloud-based environments and open-source tools, participants will gain hands-on experience with radiometric correction, image super-resolution, deep learning segmentation, and temporal landcover classification. By enhancing these capabilities, Bhutan will be better equipped to integrate AI-powered satellite analysis into its land management and climate resilience efforts.

## LEARNING OBJECTIVES

At the end of the course, participants should be able to:

- Define key concepts and terminology related to GeoAI and remote sensing.
- Enhance image quality using super-resolution techniques.
- Demonstrate the use of deep learning models to segment features from imagery.
- Use deep learning models to produce consistent landcover classifications using Sentinel-2 Satellite Image.

## CONTENT AND STRUCTURE

The course introduces the application of GeoAI and satellite-based Earth Observation for land monitoring and sustainable development, with a focus on

Bhutan's national context. The training begins with foundational modules on GeoAI concepts, cloud-based tools, and remote sensing workflows. Participants will then engage in hands-on exercises to preprocess satellite imagery, apply image super-resolution, and extract land features using deep learning. The final modules will guide participants through generating multi-temporal landcover classifications and constructing an end-to-end GeoAI workflow to support decision-making and spatial planning.

## **METHODOLOGY**

This is a full-time, in-person training that combines short lectures, live demonstrations, and hands-on lab exercises using real satellite data and open-source tools. The course follows a modular structure and emphasizes applied learning, with approximately 60% of time dedicated to practical exercises and 40% to conceptual discussions. Participants will work in a cloud-hosted environment and engage in interactive sessions, including guided walkthroughs, small group work, and collaborative problem-solving. The course is designed to build skills incrementally, balancing theoretical foundations with real-world applications.

## **TARGETED AUDIENCE**

The course is intended for participants nominated by the National Land Commission Secretariat (NLCS) and other relevant agencies, who have prior knowledge of remote sensing and basic experience working with spatial data. Participants should be familiar with satellite imagery and have applied remote sensing techniques in their professional roles. Ideal candidates come from technical departments involved in land management, environmental monitoring, spatial planning, or disaster risk reduction. It is recommended that participating institutions nominate individuals who are motivated to apply GeoAI methods in their ongoing projects and contribute to institutional innovation in geospatial analysis.

## **ADDITIONAL INFORMATION**

Lab exercises will be based on ESRI ArcGIS pro software.