Synthetic Aperture Radar (SAR) and Remote Sensing Training Course

Professional Development Training Course Outline

Category	Defense and Security	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Synthetic Aperture Radar (SAR) and advanced remote sensing technologies are transforming the way governments, research institutions, and private-sector organizations monitor the environment, manage natural resources, and support data-driven decision-making. With its ability to penetrate clouds, operate day and night, and capture high-resolution imagery, SAR has become a powerful tool for climate monitoring, land-use mapping, disaster management, and agricultural analytics. Synthetic Aperture Radar (SAR) and Remote Sensing Training Course is designed to equip participants with the technical competencies, analytical skills, and applied knowledge required to understand SAR systems, interpret radar imagery, and integrate remote sensing products into operational workflows.

As global demand increases for near-real-time analytics, geospatial intelligence, and Earth observation data, mastering SAR and remote sensing tools has become essential for institutions seeking accuracy, innovation, and operational resilience. The course provides hands-on exposure to radar processing, geospatial modelling, feature extraction, terrain analysis, and change detection using industry-leading GIS platforms. Through practical activities, scenario simulations and case studies, participants will learn how to convert SAR data into actionable insights for strategic planning, monitoring, and decision support in multiple sectors.

Programme Curriculum

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Course Objectives

1. Understand the foundational principles of synthetic aperture radar and remote sensing technologies.
2. Analyze SAR imaging mechanisms, radar frequencies, and signal behavior in different environments.
3. Utilize trending geospatial analytics tools for SAR image processing and interpretation.
4. Apply advanced techniques for terrain analysis, feature extraction and land-use classification.
5. Evaluate climate, environmental and agricultural applications of SAR data.
6. Assess disaster response and early warning capabilities enabled by radar systems.
7. Integrate SAR datasets with optical imagery and GIS platforms for comprehensive analysis.
8. Conduct change detection and time-series analysis using trending geospatial workflows.
9. Implement cloud-based remote sensing platforms for scalable processing.
10. Strengthen institutional capacity in geospatial intelligence and Earth observation.
11. Improve analytical accuracy through noise reduction and SAR calibration techniques.
12. Apply remote sensing outputs to policy development, planning and operational decision-making.
13. Develop data-driven geospatial solutions for complex environmental and development challenges.

Organizational Benefits

- Enhanced decision-making using high-resolution radar-based intelligence
- Improved monitoring and evaluation of environmental and development programs
- Increased accuracy in land-use mapping and resource management
- Strengthened disaster preparedness and response capabilities
- Access to advanced spatial analytics for climate and agricultural planning
- Improved operational efficiency through automated geospatial workflows
- Better integration of satellite data into policy and planning frameworks
- Enhanced technical capacity in remote sensing technologies
- Competitive advantage through advanced geospatial insights
- Reduced dependency on external consultants for spatial data analysis

Target Audiences

- Geospatial analysts and GIS specialists
- Environmental and climate monitoring professionals
- Disaster risk management and emergency response teams
- Agricultural and natural resource management planners
- Remote sensing and Earth observation researchers
- Government technical departments and regulatory agencies

- Development program managers and evaluators
- Space science and satellite technology practitioners

Course Duration: 10 days

Course Modules

Module 1: Fundamentals of Synthetic Aperture Radar

- Understand radar systems, signal properties and electromagnetic principles
- Explore SAR imaging geometry and platform configurations
- Identify radar frequencies, wavelengths and polarization types
- Interpret SAR images using basic analytical techniques
- Review applications across environmental and operational fields
- Case Study: National-level mapping using L-band SAR

Module 2: Principles of Remote Sensing

- Review optical, thermal and radar remote sensing technologies
- Understand electromagnetic spectrum interactions
- Compare SAR and optical imagery capabilities
- Explore multispectral and hyperspectral concepts
- Integrate remote sensing datasets for analytical accuracy
- Case Study: Multi-source remote sensing in land-use mapping

Module 3: SAR Data Acquisition & Satellite Missions

- Explore major SAR satellite missions and platforms
- Review radar acquisition modes and resolutions
- Understand data formats and data access portals
- Select appropriate SAR datasets for sector applications
- Examine satellite tasking and revisit cycles
- Case Study: Sentinel-1 data for operational monitoring

Module 4: SAR Image Processing Techniques

- Apply preprocessing steps including calibration and noise removal
- Conduct radiometric and geometric corrections
- Create image mosaics and stacked datasets
- Utilize trending image-processing software for SAR workflows
- Optimize processing accuracy through advanced algorithms
- Case Study: SAR preprocessing workflow for national flood mapping

Module 5: Interpretation of SAR Imagery

- Analyze backscatter signatures and surface interactions
- Interpret water, vegetation, urban features and bare soil patterns
- Identify common distortions including layover and shadow
- Utilize interpretation keys for various terrains
- Perform manual and automated interpretation tasks
- Case Study: SAR feature extraction for agricultural fields

Module 6: Terrain Analysis & Digital Elevation Models

- Understand interferometric SAR (InSAR) concepts
- Generate elevation models from radar data
- Apply DEMs in hydrological and environmental modelling
- Validate accuracy through ground-truthing
- Integrate terrain products into GIS applications
- Case Study: DEM generation for watershed planning

Module 7: Statistical & Machine Learning Methods in SAR

- Apply classification algorithms for SAR imagery
- Use machine learning tools for segmentation and feature extraction
- Optimize analytical accuracy through training datasets
- Integrate optical and radar datasets for hybrid models
- Perform supervised and unsupervised classification
- Case Study: Machine learning-based land-cover classification

Module 8: Environmental & Climate Applications of SAR

- Map wetlands, forests and sensitive ecosystems
- Monitor deforestation and environmental degradation
- Track climate-driven changes in land surfaces
- Assess water resource dynamics through radar detection
- Use SAR for biodiversity and conservation monitoring
- Case Study: Forest canopy mapping using radar datasets

Module 9: Agricultural Monitoring & Food Security

- Monitor crop conditions and biomass changes
- Use radar for precision agriculture and yield estimation
- Detect soil moisture and crop stress indicators
- Support food security programs with radar intelligence
- Integrate SAR with field-level agricultural surveys
- Case Study: Radar-assisted crop monitoring for food security programs

Module 10: Disaster Management & Emergency Response

- Use SAR for flood, landslide and earthquake assessment
- Detect rapid environmental changes using near-real-time radar
- Support emergency response and resource allocation
- Develop hazard exposure and vulnerability maps
- Integrate SAR into early warning systems
- Case Study: SAR-supported rapid flood assessment

Module 11: Urban and Infrastructure Monitoring

- Analyze urban expansion using radar datasets
- Detect structural deformation using InSAR
- Monitor roads, buildings and transport networks
- Support urban planning and infrastructure management
- Identify unauthorized construction and land-use changes

- Case Study: InSAR monitoring of urban subsidence

Module 12: Coastal and Marine Applications

- Map coastlines and shoreline changes
- Detect oil spills and maritime hazards
- Monitor fishing zones and illegal activities
- Support marine ecosystem and habitat protection
- Analyze tidal and wave patterns
- Case Study: SAR detection of coastal erosion

Module 13: Time-Series Analysis & Change Detection

- Perform temporal analysis using radar archives
- Monitor land-use transitions and environmental change
- Detect anomalies through multi-date datasets
- Integrate cloud platforms for automated processing
- Validate change-detection outputs
- Case Study: Multi-year change detection using SAR

Module 14: Integration of SAR With GIS Platforms

- Import and manage SAR data within GIS systems
- Combine radar outputs with spatial layers for modeling
- Build geospatial dashboards and monitoring tools
- Develop spatial decision-support systems
- Automate workflows using GIS extensions
- Case Study: GIS-based SAR dashboard for environmental monitoring

Module 15: Operationalizing SAR Solutions in Institutions

- Develop institutional SAR strategies and work plans
- Build internal capacity through training and workflows
- Integrate SAR analytics into policy and operations
- Establish partnerships for sustainable data access
- Develop long-term geospatial investment plans
- Case Study: Institutional adoption of SAR monitoring program

Training Methodology

- Instructor-led theoretical presentations
- Hands-on SAR and GIS software demonstrations
- Practical exercises with real SAR datasets
- Group discussions and peer-based learning
- Case study analysis for applied understanding
- Action planning for institutional implementation

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now