



GOVERNMENT OF INDIA
MINISTRY OF MINES
GEOLOGICAL SURVEY OF INDIA TRAINING INSTITUTE
HYDERABAD

Scheme: ITEC		Proposed Year: 2026-27		
Course Name	Duration	Maximum Seats	Minimum Seats	Stream
Remote Sensing and Digital Image Processing for Geoscientists	09-06-2026 to 29-06-2026	20	15	Geology, Geophysics, Geography

COURSE DETAILS

Course Name	Remote Sensing and Digital Image Processing for Geoscientists
Start Date	09-06-2026
End Date	29-06-2026
Aim & Objective	To enable Geoscientists and Technicians (International) to use remote sensing and image processing techniques as a tool to improve the understanding of geological and geographic phenomena and to explore earth resources.
Mode of Evaluation	Project Work and Presentations
Education Qualification	Graduate in any subject in Earth Science (Geology, Geophysics, Applied Geology, Mining Geology etc.,).
Work & Experience	Not applicable
Target Group	Geoscientists dealing with Geoscientific Studies / Research on Earth.

COURSE OVERVIEW

The course on Remote Sensing and Digital Image Processing (RS & DIP) is aimed to equip the trainees with the latest trends in remote sensing, its application in various fields and interpretation of different satellite imageries for geoscientific studies. The course includes series of lectures, demonstration and practical exercises on various techniques of RS & DIP viz concept of remote sensing, aerial photograph & interpretation concept, Digital image pre-processing techniques enhancement of satellite imagery, image correction, classification, change detection, thermal remote sensing and interpretation of satellite data etc, for the identification of potential areas of interest

The course includes, project work by individual trainees which will help in enabling the trainees to develop their skills in processing and interpretation of satellite data independently and to provide high level of confidence to trainee for independently carrying out assignments in the related fields in his/her country. The trainees will be encouraged to carry out project on the digital data pertaining to their area of interest.

GSITI has conducted 16 trainings since 2009 in Remote Sensing & Digital Image Processing for Geoscientists, out of it, 14 regular ITEC courses, a special ITEC course for Tanzania and one e-ITEC course from 2009 to 2025, total 235 participants from 62 different countries were benefitted.

COURSE CONTENT:

- **Basic Concepts:** Remote Sensing, Electromagnetic Spectrum, Digital Images, Pixel, Digital Number, Sensor & platforms and data acquisition from different agencies.
 - **Enhancement techniques:** Principle Component Analysis (PCA), Band Ratio & density slicing and Minimum Noise Fraction (MNF) techniques in mapping lithology and alteration zones using ASTER data.
 - **Digital Image Classification:** Unsupervised and supervised classifications for both pixel-based and object-based categorization in remote sensing analysis.
 - **Integration for Mineral Exploration:** Integration of diverse thematic maps and satellite imagery enriches interpretation, offering insights into geological features, terrain characteristics.
 - **Multispectral Alteration Mapping:** Hydrothermal alteration models for porphyry mineral deposits through ASTER, Sentinel-2, Landsat etc.,
 - **Change detection studies:** To monitor the landform, coastal changes through the satellite image processing techniques and the process involved.
 - **Interpretation:** Interpretation of satellite data for the identification of different lithology, structure and mineral assembles associated with various alteration zone to target critical minerals.
 - **Cultural/Heritage site visit:** Visit to Scientific organizations and Cultural Heritage sites to give exposure to various type of scientific studies as well as culture and tradition of India.
 - **Practical:** Practical on different satellite datasets will be carry out using ENVI and ArcGIS software which includes digital image processing, preparation of lithological and alteration maps.
- Project work and presentation:** Project work will be given to individual participants as per the theme of the training which will be evaluated during their project presentation.
