



iirs

Government of India
Department of Space
Indian Space Research Organisation
Indian Institute of Remote Sensing,
Dehradun

AI/ML for Geodata Analytics

IIRS Outreach Program



COURSE DURATION

03 August 2026 – 14 August 2026



ELIGIBILITY

UG/PG Students (Science & Engineering)
and Working Professionals



PROGRAMME HIGHLIGHTS

- Free individual registration
- Learn from experts at IIRS-ISRO
- Course Participation Certificate based on attendance
- Online examination and certificate available through approved IIRS Nodal Centres, as per IIRS guidelines



REGISTRATION LINK

<https://elearning.iirs.gov.in/edusatregistration/>

SCHEDULE & LECTURE DETAILS



L1	03 AUG 2026 1600 hrs	GIS Data analytics Introduction to Data Analytics, Data Collection methods, Data Cleaning, Exploratory Data Analysis, Data Visualization tools, Statistics for Data Analysis	Dr. Harish Chandra Karnatak
L2	04 AUG 2026 1600 hrs	Image Processing Methods Introduction to Digital Images, Image Enhancement and Restoration, Image Transforms, Image segmentation, Object Detection	Dr. Poonam Seth Tiwari
L3	05 AUG 2026 1600 hrs	Vector Data Processing Introduction to Vector Data, Source of Vector Data, Vector Data Analysis- Buffer, Overlay etc.	Dr. Kamal Pandey
L4	06 AUG 2026 1600 hrs	Concept of Data Science Overview of Spatial Data Science: Approaches and Tools	Shri. Pankaj Bodani, SAC
L5	07 AUG 2026 1600 hrs	Python for Image Processing Basic Image Operations, Image Enhancement (Brightness and contrast adjustment, histogram equalization) , Geometric Transformations (Scaling, translation, rotation, affine transformations), Image Filtering (Smoothing, sharpening, edge detection (Sobel, Canny, Laplacian)	Mr. Ravi Bhandari
L6	10 AUG 2026 1600 hrs	Machine Learning for geospatial analysis Basics of Machine Learning/ Implementing Machine Learning algorithm for geospatial data processing	Mr. Ravi Bhandari
L7	11 AUG 2026 1600 hrs	ANN and Deep Learning Introduction to AI in Geospatial Analysis, Introduction to Artificial Neural Networks (ANNs), Deep Learning Architectures for Geospatial Analysis: CNN, RNN, Geospatial Data Analysis Tasks: Image Classification, Object Detection and Segmentation (Instance and Semantic)	Dr. Poonam Seth Tiwari
L8	12 AUG 2026 1600 hrs	AI/ML for Agriculture Analytics Deep Learning Architectures for Geospatial Analysis: CNN, RNN, Geospatial Data Analysis Tasks: Image Classification, Object Detection and Segmentation (Instance and Semantic)	Dr. Anil Kumar
L9	13 AUG 2026 1600 hrs	Advances in AI/ML for Geo-data processing Case Examples for AI/ML for Agriculture Analytics	Shri. Nilay Nilesh, NESAC
L10	14 AUG 2026 1600 hrs	Generative AI and NLP for Geodata Analytics Fundamentals of Generative AI, Large Language Models (LLMs), Natural Language Processing (NLP) for Geodata, AI-powered Geospatial Analysis	Mr. Shubhangam Garg

भारत सरकार
अंतरिक्ष विभाग

भारतीय अंतरिक्ष अनुसंधान संगठन
भारतीय सुदूर संवेदन संस्थान , देहरादून

About IIRS

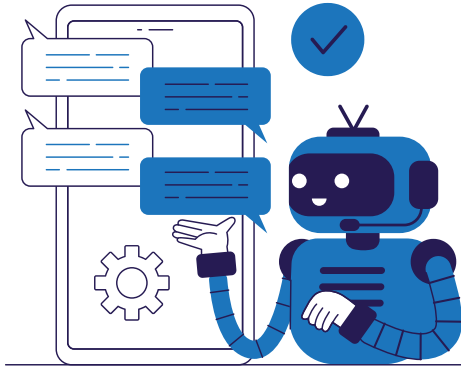
Indian Institute of Remote Sensing (IIRS) under Indian Space Research Organisation (ISRO), Department of Space, Govt. of India is a premier Training and Educational Institute set up for developing trained professionals in the field of Remote Sensing, Geoinformatics and GNSS Technology for Natural Resources, Environmental and Disaster Management. Formerly known as Indian Photo-interpretation Institute (IPI), founded in 1966, the Institute boasts to be the first of its kind in entire South-East Asia. While nurturing its primary endeavour to build capacity among the user community by training mid-career professionals, the Institute has enhanced its capability and evolved many training and education programmes that are tuned to meet the requirements of various target groups, ranging from fresh graduates to policy makers including academia.

IIRS also conducts e-learning programme on Remote Sensing and Geoinformation Science (<http://elearning.iirs.gov.in>).

IIRS Outreach Programme

The IIRS outreach programme, which was started in 2007 with 12 universities/ institutions has now grown substantially to 4000+ network institutes. The beneficiaries of the programme may include:

- Central/State/Private Universities & Academic Institutions
- Central & State Government Departments
- Forest Resource Professionals
- State Forest Departments/Forest Training Academies
- Research Institutes
- Geospatial Industries
- NGOs



Feedback Mechanism

IIRS takes continuous feedback from participating institutions to improve the quality of future courses.

Course Contents

The course will contain following broad topics:

- Introduction to AI/ML and DL
- Methods in Machine Learning: Supervised, Unsupervised and Reinforcement
- Deep Learning concepts through CNN, RNN, R-CNN, Faster RCNN, SSD, YOLO etc & their applicationsSpaceborne Lidar Systems
- Machine learning through Google earth engine
- Python for Machine/Deep Learning Models

About the Course

AI has been part of our imaginations and simmering in research labs since a handful of computer scientists rallied around the term at the Dartmouth Conferences in 1956 and birthed the field of AI. In the decades since, AI has alternately been heralded as the key to our civilization's brightest future. Artificial Intelligence is a program that can sense, reason, act and adapt. Machine Learning refers to algorithms whose performance improve as they are exposed to more data over time. Deep Learning is subset of machine learning in which multilayered neural networks learn from vast amounts of data. Advancements in computer processing and data storage made it possible to ingest and analyze more data than ever before. Also more and more data is being produced by connecting more devices and machines to the internet and streaming large amounts of data from those devices. All of these advancements brought artificial intelligence closer to its original goal of creating intelligent machines, which we're starting to see more and more in our everyday lives. From recommendations on our favourite retail sites to auto generated photo tags on social media, many common online conveniences are powered by artificial intelligence. The main applications of deep learning AI can be divided into computer vision, natural language processing (NLP), and reinforcement learning.

This course introduces the AI, ML and Deep learning alongwith data processing techniques and case examples in geospatial data processing. The course is scheduled from August 19-24, 2024.

Target Participants

The course is designed for Professionals willing to get acquainted with AI,ML and DL and use the technology geospatial applications, students & researchers of civil engineering, computer science, Data Analytics, geoinformatics, Geomatics etc.

Awards

IIRS has received national awards for excellence in training for outreach and e-learning programme during 1st National Symposium on Excellence in Training conducted during April 11-12, 2015 in New Delhi by Department of Personnel & Training (DoPT), Govt. of India in collaboration with United Nations Development Programme (UNDP).



Course Study Material

Course study materials like lecture slides, video recorded lectures, open source software & handouts of demonstrations, etc. will be made available through eclass. Video lectures will also be uploaded on e-class (<https://www.eclass.iirs.gov.in/login>).

Course Fee

There is no course fee for attending this programme.

Course Registration

- Course updates and other details will be available on URL <http://www.iirs.gov.in/Edusat-News/>
- **Registered through Nodal centres.** The participant's registration must be approved by the coordinator of nodal centres.
- The participants can register and see their application status through URL <https://elearning.iirs.gov.in/edusatregistration/>. In case, the application is pending for approval then participants are advised to contact the coordinator of respective nodal centre.
- **Registered as "Individual registrations"**-
- The participants with individual registration will be automatically approved. All the registered participants will get their login credentials for ISRO Learning Management System (LMS)- <https://isrolms.iirs.gov.in>

Course Funding & Technical Support

The programme is sponsored by Indian Space Research Organisation, Department of Space, Government of India.

Programme Reception

Programme can be received through e-class platform of IIRS-ISRO using internet connectivity. No specific hardware/software required. However, it is recommended good internet connectivity at user end. To run the programme in class room, following hardware will be required:

- Desktop computer with web camera microphone and output speakers or laptop with microphone camera and output speaker.
- Large display screen/projector/TV.

Important links

To participate in this programme the interested organizations/ universities/ departments/ institutes have to identify coordinator at their end. The identified coordinator will register online his/her institute as nodal center in IIRS website

(<https://elearning.iirs.gov.in/edusatregistration/coordinator>)

Award of Certificate

- **Registered through Nodal centres :** Based on 70% attendance students will be awarded a "Courses participation Certificate."
- **Individual Registration:** A "Course Participation" certificate will be given to everyone who devotes at least 70% of each session's hours to the course. The course participation certificate will be available for download in ISRO LMS.

**There are a limited number of seats.
Registration will be done on a first-come, first-served basis.**

CONTACT DETAILS

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Course Director

Dr. Kamal Pandey
Course Coordinator

IIRS DLP Team

Dr. Poonam S Tiwari
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IIRS Outreach Programme

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