

## IIRS Outreach Programme

The IIRS outreach programme, which was started in 2007 with 12 universities/ institutions has now grown substantially. Currently, 1000 universities / institutions spread across India covering 27 States and 3 Union Territories are networked with IIRS. The beneficiaries of the programme may include:

- Central/State/Private Universities & Academic Institutions
- Mining and geological organizations
- State Remote Sensing Departments
- Research Institutes
- Mineral explorations/ Mining Industries
- NGOs

## Feedback Mechanism

The participants can submit their feedback through online portal. Feedbacks are critically analyzed and implemented in next courses. For one to one feedback the participants and participating organizations are invited to attend annual IIRS User Interactive Meet (IUIIM) at IIRS Dehradun.



## Awards of Appreciation

IIRS has received national awards for excellence in training for outreach and e-learning programme during 1<sup>st</sup> 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).



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

## Contact Details

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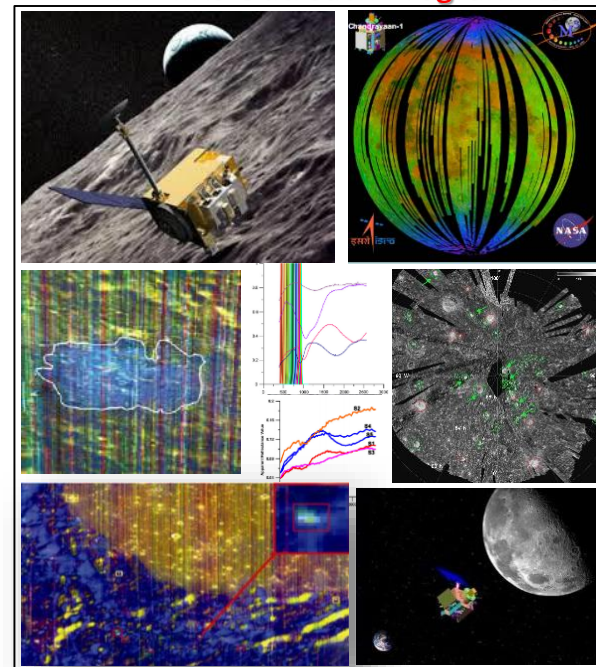
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## 44<sup>th</sup> IIRS Outreach Programme



## Remote Sensing of the Moon by Indian Lunar Missions with Emphasis on Spectroscopic Analysis

December 23, 2019



Organised by

**Indian Institute of Remote Sensing**  
Indian Space Research Organisation  
Department of Space, Govt. of India  
Dehradun

[www.iirs.gov.in](http://www.iirs.gov.in)

# About the Course

The Moon provides an excellent opportunity to study the uninterrupted solar-terrestrial processes and serves as a unique laboratory for understanding the evolution of terrestrial planets. Its airless surface has recorded the 4.6 billion years of history of the solar system in its purest form. The Moon has constantly been observed utilizing various remote sensors from Earth-based telescopes to highly sophisticated spacecrafts and advanced sensors. The past few decades of remote sensing aided by in-situ exploration of the lunar surface revealed by Apollo and Luna era provided critical inputs to characterize lunar surface and understand its evolution. These missions dramatically enhanced our understanding about the character and evolution of the solar system. With the advancement in techniques, the importance of high-resolution data is in demand in present day planetary sciences. The extracted information have helped not only in identification of various surface morphological and structural features but also in delineating surface topography, mapping surface composition and deriving reliable age estimates with much better resolution. Recently, high-resolution spaceborne imaging spectrometry in the visible and the near infrared has also contributed significantly to our current understanding of the geological, physical and chemical processes occurring over the planetary surfaces. Prior to Chandrayaan-1, laboratory based study of returned samples along with data analysis from various remote exploration missions have provided substantial knowledge regarding the formation and subsequent chemical and geological evolution of the Moon. However, some of the key questions of lunar science related with its surface evolution, radiation environment, permanently shadowed regions near the poles and presence of water/ice were yet to be understood fully. Chandrayaan-1 launched in October 2008, provided significant data in this regard with many new discoveries and findings. Pertinently, the success of Chandrayaan-1 orbiter mission provided a large impetus to implement the second approved Indian mission to the Moon, Chandrayaan-2, with an originally Orbiter-Lander-Rover configuration. Its enhanced capabilities will

enable better understanding of the origin and evolution of the Moon. The proposed workshop is envisaged to showcase the process, methods and salient findings of recent lunar missions with the main emphasis on Chandrayaan-1.

## Curriculum

- Overview of Indian Lunar Exploration Missions: A Journey to Chandrayaan-2
- Hyperspectral Remote Sensing and Processing Techniques
- Spectroscopy for Lunar Surface Composition
- Findings of Chandrayaan -1 and recent Lunar Missions

## Target Participants

The candidates who want to participate in the course should be a student of final year undergraduate course or postgraduate course (any year). Technical/ Scientific Staff of Central/ State Government/Faculty/researchers at university/institutions are also eligible to apply for this course. Applications of participants have to be duly sponsored by university/institute and forwarded through coordinators from respective centres.

## Course Study Material

Course study materials like lecture slides, video recorded lectures, open source software & handouts of demonstrations, etc. will be made available through IIRS ftp link. Video lectures will also be uploaded on YouTube Channel (<http://www.youtube.com/user/edusat2004>).

## Course Fee

**The Course is free of cost.**

## Course Registration

- Course updates and other details will be available on URL- <http://www.iirs.gov.in/Edusat-News/>.

- To participate in this programme the interested organizations/ universities/ departments/ Institutes has to identify a coordinator at their end. The identified coordinator will register online his/her Institute as nodal center in IIRS website.
- All the participants has to register online through registration page by selecting his/her organization as nodal center.

## Course Funding & Technical Support

The programme is sponsored by National Natural Resources Management System – Standing Committee on Training and Education (SC-T), Indian Space Research Organisation, Department of Space, Government of India

## Programme Reception

Programme can be received through Internet connectivity of 2Mbps or better. Following hardware and software set-up is required at user end:

### Hardware Requirements :

- High-end Computer/Laptop (Windows OS);
- Good quality web camera ;
- Headphone with Microphone;
- Speakers ;
- Large Display Screen (Projector or TV) .

### Software and Internet Requirements

- IIRS Learning Management System.

### Connectivity & Other configurations:

- NKN or any other high speed internet facility (preferably without firewall, with minimum of 2 Mbps bandwidth)
- Network requirements: Port 80 and RTMP (port 1935) protocol should be unblocked from user's computer and Firewall.

**Note:** Institutions/ universities have to bear total expenses for establishment of the classroom facility

## Award of Certificate

**Students and Working Professionals:** Based on 70% attendance.