REPORT

OF

IIRS-ISRO Outreach Program
on
"Space Exploration Technology – An Overview"

From

21st April 2025
To
25Th April 2025

DETAILS OF THE EVENT

Sl. No.	Description	Details
1.	Name of the Event	**IIRS ISRO Outreach Program on "Space Exploration Technology – An Overview"**
2.	Number of Participants	48
3.	Event Date	21st April 2025 to 25th April 2025
4.	Person in Charge	Mr. Sagar L Belgaonkar, Coordinator, IIRS ISRO DLP, AITM, Belagavi. Mr. Ravi B Tilaganji, Associate Coordinator, IIRS ISRO DLP, AITM, Belagavi.
5.	Name of the speaker	1. 21.04.2025 – "Space Science: A Basic Introduction" by **Dr. Tirtha Pritam Das**. 2. 23.04.2025 – "Space Technology: Spacecraft Systems" by **Mr. Avinash M**. 3. 24.04.2025 – "Ground Stations for Space Exploration" by **Mrs. Nandini Harinath**. 4. 25.04.2025 – "Space Technology: Transportation system" by **Shri Anuruph**. 5. 25.04.2025 – "Scientific Payloads for Solar Systems Explorations" by **Dr. Mehul R. Pandya**.

CONTENTS

Objectives of Program:

IIRS-ISRO Outreach Program On "Space Exploration Technology – An Overview"

a) To Create awareness regarding Space Exploration Technology.
b) To Create awareness regarding and concepts in Spacecraft Systems.
c) To Create awareness regarding and concepts in Spacecraft Transportation Systems.
d) To Create awareness of Scientific Payloads for Solar Systems Explorations.
e) To Understand the concepts of Ground Stations for space Exploration

Details of the Program:

IIRS-ISRO Outreach Program On "Space Exploration Technology – An Overview"

The Department of Civil Engineering AITM, successfully organized the **IIRS-ISRO Outreach Program On "Space Exploration Technology – An Overview"** from 21 April 2025 to 25 April 2025. Under the supervision of Mr. Sagar L Belgaonkar, Coordinator and Mr. Ravi B Tilaganji Associate Coordinator for IIRS ISRO DLP Courses.

Day-1 21.04.2025 session on **"Space Science: A Basic Introduction" by** Dr. Tirtha Pritam Das**.** the session highlighted the various points listed below:

- Space, Techniques and different domains in space exploration.
- Major themes of space exploration programs.
- Types of space exploration platforms.
- Instrumentation Techniques.
- Comparative Planetology.
- Indian Mars Orbiter Mission (MOM).
- Upcoming Astronomy Missions.

Link for the Session - https://www.youtube.com/watch?v=Tfrkx8nZ11Y

Day 2: **23.04.2025 – "Space Technology: Spacecraft Systems" by Mr. Avinash M. Project Director, Microsat-2C & India-Mauritius Joint Satellite, U. R. Rao Satellite Centre, ISRO, Bengaluru.**

the session highlighted the various points listed below:

- Satellite Applications – Touching Human Lives.
- Satellites as Special Machines.
- Satellite Configuration, what are satellites made up of.
    - Mechanical Systems.
    - Electrical Systems.
    - Spacecraft Orbits.
- Orbit Classification based on Height, Inclination.
- Small Satellites Design Philosophy.
- Space Debris.
- Indian Space Programs and Future ISRO Major space programs.

Link for the Session - https://www.youtube.com/watch?v=ZrOaouiw_EI

Day 3: 24.04.2025 – "**Ground Stations for Space Exploration**" by **Mrs. Nandini Harinath.**

the session highlighted the various points listed below:

- Ground Segment Overview.
- Low Earth Orbit to Martian Orbit Details.
- Evolution of Indian Satellites.
- Spacecraft operation at a glance and area Interfaces.
- ISRO Telemtery Tracking and Command Network (ISTRAC).
- Mission Operation Complex – MOX.
    - Houses MOX-1 and MOX-2.
- Control Room during Earth Bound Maneuver.
- TTC Stations supporting satellites.
- Ground stations components
- India a gateway to Deep Space. (IDSN Campus Overview).
- Ground Stations Worldwide., Types of Antenna Systems, Ground Station Network Area.
- Mission – Chandrayaan -3 (Specifications, Mission Trajectory, Ground Station Network for CH Support).

- Solar Mission – Aditya L1.

Link for the Session - https://www.youtube.com/watch?v=U35XaYTZbO8

Day 4: 25.04.2025 – "**Space Technology: Transportation system**" by **Shri Anuruph**.

the session highlighted the various points listed below:

- Spacecraft Transportation systems.
- R&D for Vertical Take off / Vertical landing (VTVL)
- Launch Vehicle design inputs.
- Launch Vehicle – The Technology Dimensions.
    - Navigation, Guidance & Control.
    - Liquid Propulsion systems.
    - Solid Propulsion systems.
    - Mission Design & Synthesis.
    - Aero-Structural Systems.
    - Aerospace Mechanisms.
- Solid Propulsion Process, Liquid Propulsion systems, Cryogenic Liquid Propulsion systems, Semi Cryogenic systems, Liquid Propellant Rocket Engines.
- Cryogenic Propulsion and Challenges in Cryogenic Engines, Major Challenges in Cryogenic Propulsion.
- Structures, Aerospace Materials Development, Materials for Aerospace systems – Requirements.
- Metallic Materials for launch Vehicle
    - Composite.
    - Steel.
    - Aluminum.
    - Titanium alloy.
    - Magnesium & Copper alloy.
    - Superalloys.
    - Thermal protection system.
    - Composites.
    - Special Materials & Coating.
    - Electronic Materials.

- Navigation, Guidance & Control.
- Sense, Compute and Control.
- Reusable Launch Vehicles.

Link for the Session - https://www.youtube.com/watch?v=_jm_pSrFrg8

Day 5: 25.04.2025 – "Scientific Payloads for Solar Systems Explorations" by **Dr. Dr. Mehul R.Pandya.**

the session highlighted the various points listed below:

- Brief about Scientific Payloads.
- Major Stages of development of space science instrument, launch & Operation.
- Major themes of Space Science and Exploration.
- Electromagnetic radiations with solar system.
- Major Techniques for EMR Detection.
  - Imaging.
  - Spectroscopy.
  - Polarimetry.
- Planck and Wien's Displacement law.
- Nobel Prize – COBE
- Hubble Space Telescope, Spectrographs, James Webb Space Telescope.
- Particles.
- Gravitational Waves.
- Remote sensing instruments & Observations.
  - Mars Colour Camera (MCC)
  - MOM-1
  - Optical & Infrared Imaging Spectrometer.
  - X-Ray Images.
  - X-Ray Spectrometers.
  - UV Imaging and Spectrometer.
  - Coronagraphs.
  - In-Situ observations
    - Magnetometers
    - Langmuir Probe.
    - Retarding Potential Analyzers /Particle Analyzer

    - Mass Spectrometer.
- Various Components involved in designing a space instrument
    - Electro-Optical Imaging Instrument.
    - Electro – Optical Camera Structure.
    - Optics.
    - Camera Electronics.
    - Detectors.

Link for the Session - https://www.youtube.com/watch?v=_BNzwT7mcTA

We Thank the Management, Principal & Director, Dean Academics, IQAC, Training and Placement officers, all HODs, Faculties of Department of Civil Engineering and Participants for giving us opportunity to host, Organize the IIRS ISRO Outreach Program at AITM.

1. Relevance to PO:

The following PO's are relevant to the Outreach Program.

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. Audience (Faculty and Students):

Faculty members and Students of Angadi Insititute of Technology and Managament, Belagavi.

3. Budget of the Event (Part of Budget or New):

4. **Details of Resource person/Speaker**

    1. **Dr. Tirtha Pritam Das.**
    2. **Mr. Avinash M.**
    3. **Mrs. Nandini Harinath.**
    4. **Shri Anuruph.**
    5. **Dr. Mehul R. Pandya.**

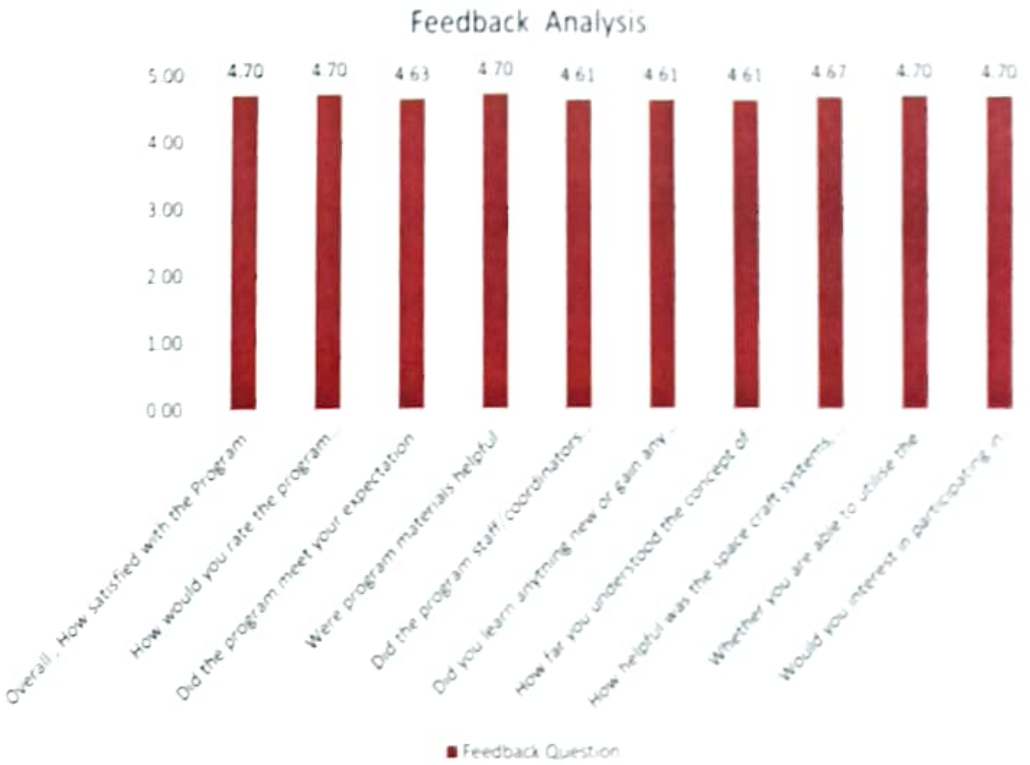
5. **Proposal Provided:**

    Mr. Sagar L. Belgaonkar, Assistant Professor and Head, Department of Civil Engineering.

6. **Fees of the Event, if Any:** No fees.

7. **Venue, Date and Time:**
    Seminar Hall-2, Second Floor, AITM.
    21.04.2025 to 25.04.2025, 3:30PM to 5:30PM.

8. **Feedback Methodology:**
    Feedback from Participants (Faculty and students).
    a) Feedback was provided and submitted by program participants.
    The analysis is carried out from the feedback form submitted by the participants.
    The analysis is done in MS EXCEL spreadsheet and is represented in graph.



Graph represents the analysis of the given feedback by the participants

9. Computation for Attainment of PO:

The following PO's are relevant to the Faculty Development Program (FDP)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Attainment	Assessment	
PO1	4.70	94%
PO2	4.70	94%
PO4	4.63	93%
PO5	4.70	94%
PO6	4.61	92%
PO7	4.61	92%
PO8	4.61	92%
PO9	4.67	93%
PO10	4.70	94%
PO12	4.70	94%

The table represents the attainment of POs based on the Feedback given by the participants

Attainment		
IIRS ISRO Outreach Program Feedback		
PO1 (Q1-10)	93.9%	3
PO2(Q 4,6,7,8,9)	94.1%	3
PO4(Q4,6,7,8,9)	92.6%	3
PO5(Q4,6,7,8,9)	94.1%	3
PO6(Q 4,5,6,7,8,9)	92.2%	3
PO7(Q4,7,8,9)	92.2%	3
PO8(Q2,4,6,7,8,9)	92.2%	3
PO9(Q2.5,6)	93.3%	3
PO10(Q1,2,3,4,5,6,,910,11,12)	93.9%	3
PO12 (Q 1,2,3,4,5,6,7,8,9,10,12)	93.9%	3

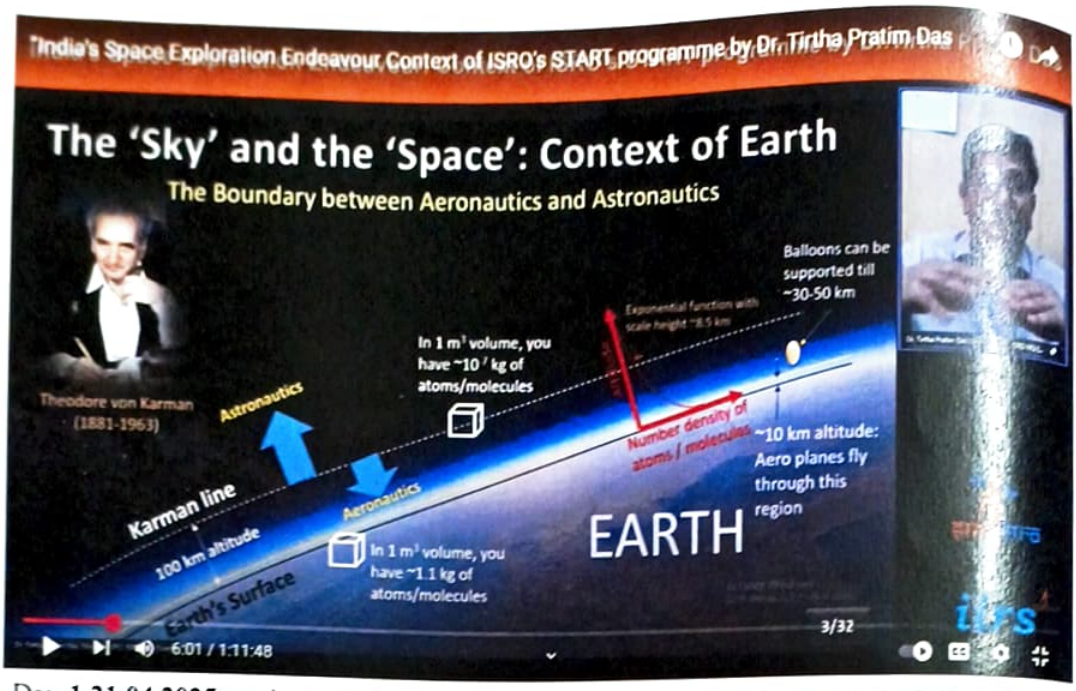
Note: PO attainment are represented in values from 1 to 3

1 – Slight

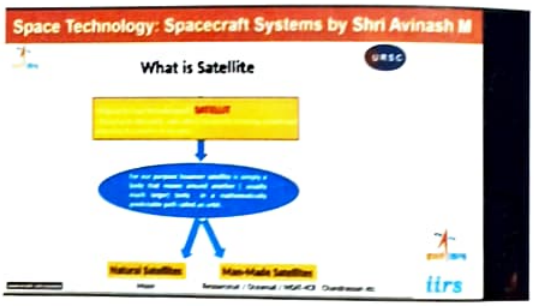
2- Moderate

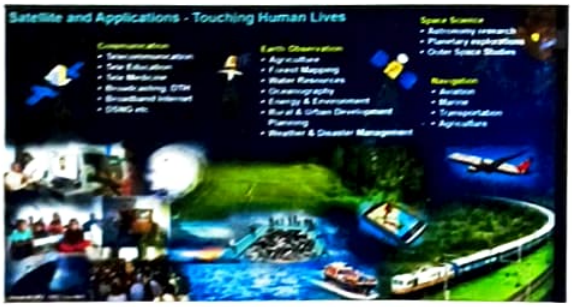
3 – High

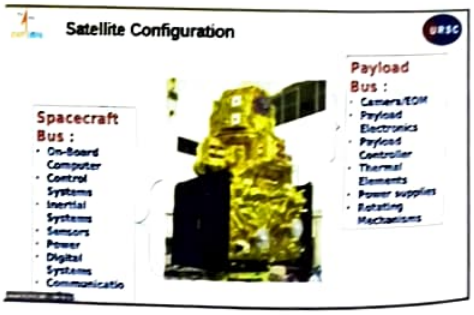
10. Photos of Faculty Development Program conducted for evidence:



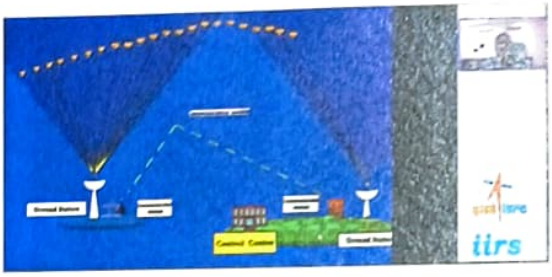
Day-1 **21.04.2025** session on **"Space Science: A Basic Introduction"** by Dr. Tirtha Pritam Das



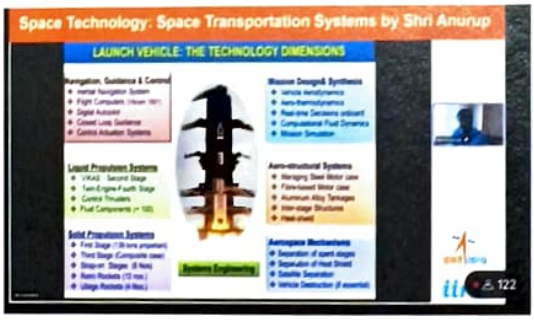




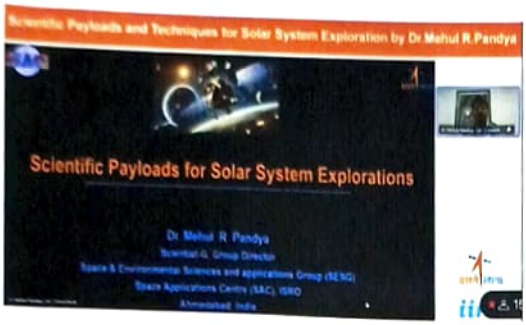
Day 2: 23.04.2025 – **"Space Technology: Spacecraft Systems"** by **Mr. Avinash M**. Project Director, Microsat-2C & India-Mauritius Joint Satellite, U. R. Rao Satellite Centre, ISRO, Bengaluru.

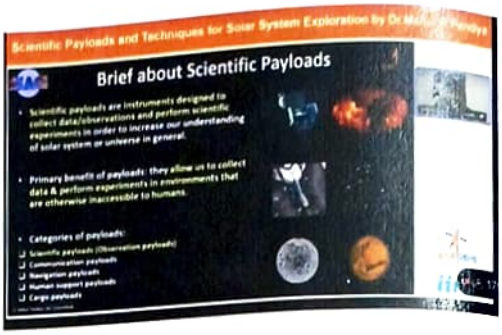


Day 3: 24.04.2025 "**Ground Stations for Space Exploration**" by **Mrs. Nandini Harinath**.



Day 4: 25.05.2025 "**Space Technology: Transportation system**" by **Shri Anuruph**.





Day 5: 28.03.2025 – **"Scientific Payloads for Solar Systems Explorations"**

by **Dr. Dr. Mehul R.Pandya.**

29/04/2025 29/04/2025 29/4/25

Coordinator **HOD** **IQAC** **Principal & Director**

[Mrs. Savgaon. L.B]

Head of the Department Civil Engineering
Angadi Institute of Technology And Management
Savagaon Road, Belagavi-590 009

Principal & Director
Angadi Education Found
Angadi Institute of Technology And Mana
Savagaon Road, Belagavi-59