ANNAMACHARYA
INSTITUTE OF TECHNOLOGY & SCIENCES
An AUTONOMOUS Institution, New Boyanapalli, Rajampet – 516126

Department of Electronics and communication Engineering

INDUSTRIAL VISIT REPORT

U. R. RAO SATELLITE CENTRE (URSC) – ISRO, BENGALURU

ACADEMIC YEAR 2023–24

VISIT AT A GLANCE

Institution	Annamacharya University, Rajampet
Department	Electronics and Communication Engineering (ECE)
Host organisation	U. R. Rao Satellite Centre (URSC), Indian Space Research Organisation (ISRO), Bengaluru
Date stated in the supplied report	4 January 2023 – verification required
Participants stated in the supplied report	136 II B.Tech. ECE students and 6 faculty members
Transport stated in the supplied report	Three buses
Purpose	Academic exposure to satellite technology, remote sensing, navigation and satellite communication

1. INTRODUCTION

Industrial visits provide engineering students with an opportunity to connect theoretical concepts taught in the classroom with the practices followed in scientific and industrial organisations. For students of Electronics and Communication Engineering (ECE), a visit to a space research centre is especially valuable because satellites depend on electronic subsystems, communication links, antennas, onboard computers, power systems, sensors and ground-support infrastructure.

The Department of Electronics and Communication Engineering of Bharatanatyam University, Rajampet, planned the visit to the U. R. Rao Satellite Centre (URSC), Bengaluru, as part of the industrial-tour programme. The visit was intended to introduce students to India's satellite-development activities and to help them appreciate how electronics and communication engineering supports space-based services used in everyday life.

2. ABOUT ISRO AND URSC

The Indian Space Research Organisation (ISRO) is India's national space agency. Its space programme supports scientific research and practical applications such as telecommunications, television broadcasting, weather observation, navigation, earth-resource monitoring, disaster management and environmental studies. Satellite systems help collect information over large geographical areas and distribute data to users through appropriate ground infrastructure.

The U. R. Rao Satellite Centre (URSC), located in Bengaluru, is one of ISRO's major centres associated with satellite design, development, assembly, integration and testing. Satellite development requires coordinated work across several disciplines, including electronics, radio-frequency engineering, communication systems, control, mechanical design, thermal engineering, software and power management. A satellite must operate reliably in the space environment, where repair and routine maintenance are generally not possible after launch.

3. OBJECTIVES OF THE VISIT

- To understand the role of ISRO and URSC in India's space programme.
- To gain introductory knowledge of satellite design, development and applications.
- To relate ECE subjects such as communication systems, antennas, microwave engineering, digital electronics and signal processing to satellite technology.
- To understand the basic purpose of remote-sensing satellites and their uses in resource monitoring and disaster management.
- To learn how satellites exchange information with ground stations and support navigation-related services.
- To encourage professional awareness, technical curiosity, teamwork and lifelong learning.

4. DETAILS AND PROCEEDINGS OF THE VISIT

The supplied draft report states that the student group travelled from the Annamacharya campus, Rajampet, in three buses. It records 136 II B.Tech. ECE students and six faculty members as participants. According to that draft, the group departed Rajampet at approximately 11:00 p.m. on 3 January 2023, reached Bengaluru at about 6:30 a.m. on 4 January 2023, and arrived at the ISRO centre at approximately 1:00 p.m. after breakfast and onward travel.

The supplied material reports that permission was granted to visit the exhibition. Students received an introductory orientation to the centre and explanations relating to remote-sensing satellites, their operation and applications, navigation, and the way satellites communicate with Earth. The report also mentions explanations by former ISRO scientists. These details are based on the provided report text and should be cross-checked with the approved itinerary and departmental records.

5. TECHNICAL LEARNING AND ECE CONNECTIONS

5.1 Satellite communication

Satellite communication uses a space segment and a ground segment. A transmitting earth station sends a signal towards a satellite; the satellite's communication payload receives and processes or retransmits the signal, and a receiving station obtains it. The link depends on antennas, frequency allocation, transmitter power, receiver sensitivity, bandwidth, noise, propagation loss and accurate pointing. These concepts connect directly with communication systems, electromagnetic theory and antenna engineering.

5.2 Remote sensing and Earth observation

Remote-sensing satellites collect information about the Earth using sensors that detect reflected or emitted electromagnetic energy. The resulting data can support agriculture, water-resource assessment, land-use mapping, forest monitoring, urban planning and disaster response. Students can relate these applications to sensors, signal processing, image interpretation and data communication.

5.3 Navigation and positioning

Satellite-based navigation estimates a receiver's position and time using signals from multiple satellites. The receiver processes signal timing and navigation data to determine its location. This provides a practical context for studying digital receivers, synchronisation, signal processing and communication links.

5.4 Satellite subsystems and reliability

A satellite normally includes communication or mission payloads and supporting subsystems such as

electrical power, attitude determination and control, telemetry, tracking and command, onboard data handling and thermal control. These subsystems must work together reliably under demanding launch and space conditions. The visit provided a context for understanding why multidisciplinary design, testing and quality assurance are essential.

6. LEARNING OUTCOMES

- Students can describe the broad role of ISRO and URSC in satellite technology.
- Students can explain, at an introductory level, the relationship between satellites and ground stations.
- Students can identify applications of remote sensing and satellite-enabled navigation.
- Students can connect ECE fundamentals—antennas, communication systems, electronics and signal processing—with space applications.
- Students can recognise the importance of system integration, reliability, safety and teamwork in complex engineering projects.
- Students are encouraged to explore further study and career opportunities in communication, RF systems, satellite engineering and related fields.

7. INDICATIVE PO–PSO MAPPING

Outcome	Relevance
PO1 – Engineering Knowledge	Relates ECE fundamentals to satellite, antenna and communication systems.
PO2 – Problem Analysis	Encourages students to examine engineering functions and identify the principles behind them.
PO5 – Modern Tool Usage	Introduces technologies and technical systems used in space engineering.
PO6 – Engineer and Society	Highlights the societal value of communication, navigation, earth observation and disaster-management services.
PO10 – Communication	Supports preparation and presentation of technical observations in a structured report.
PO12 – Life-long Learning	Encourages continued learning about satellite and space technologies.
PSOs	Confirm the mapping against the exact approved PSO statements for the applicable ECE curriculum before final submission.

8. PHOTOGRAPHS – GLIMPSES OF THE VISIT



Figure 2: Students with banner at the time of departure

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Figure 1: II B.Tech (ECE) students and faculty members before departure from Rajampet



Figure 2: Students with banner at the time of departure



Figure 3: Entrance of U.R. Rao Satellite Centre (URSC), ISRO, Bengaluru



Figure 4: Main gate of U.R. Rao Satellite Centre (URSC), ISRO, Bengaluru

9. CONCLUSION

The industrial visit to URSC, ISRO, Bengaluru, was intended to enrich students' understanding of the practical applications of electronics and communication engineering in space technology. The subject areas recorded in the supplied material—remote sensing, navigation and satellite communication provide useful links between classroom learning and national space programmes. The experience can motivate students to pursue further technical study and develop thinking of engineering in society.

10. DOCUMENTATION AND VERIFICATION BEFORE SUBMISSION

Date verification is essential. The source report states that the visit took place on 4 January 2023, which falls in academic year 2022–23, whereas this document has been prepared under the requested heading of academic year 2023–24. Please verify the correct date and academic-year classification from the approved permission letter, attendance sheet and visit records before signing or submitting the report.

- Attach the approved permission letter and final itinerary.
- Verify the date, student strength, faculty participation and attendance.
- Add student feedback, certificates or acknowledgement from the host organisation, if available.
- Confirm PO–PSO mapping using the approved curriculum applicable to the participating batch.
- Retain only photographs and details authorised for official departmental documentation.

Prepared by	Verified by
Industrial Visit Coordinator Department of ECE	Head of the Department Department of ECE

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DETAILED PO–PSO MAPPING FOR NBA DOCUMENTATION

Activity: Industrial Visit to U. R. Rao Satellite Centre (URSC), ISRO, Bengaluru
Department: Electronics and Communication Engineering (ECE), Annamacharya University
Academic year: 2023–24. This report records the URSC visit described in the supplied source report; verify its date and academic-year classification before including it in the consolidated year

A. Activity Objectives

- Relate ECE fundamentals to satellite communication, antenna systems, remote sensing and navigation.
- Understand the broad functions of a satellite system and its ground segment.
- Recognise the societal applications of satellite-enabled communication, Earth observation and disaster management.
- Develop technical observation, documentation, teamwork and lifelong-learning skills.

B. Programme Outcomes (POs) Addressed

PO	Mapping rationale for the activity	Suggested level*
PO1 – Engineering Knowledge	Students relate communication systems, electromagnetic waves, antennas, electronics and signal processing to satellite systems.	3 – Moderate
PO2 – Problem Analysis	Students identify the functions of satellite payloads, ground stations and supporting subsystems and discuss the engineering principles involved.	2 – Low to moderate
PO5 – Modern Tool Usage	Students gain awareness of contemporary space-system technologies and the tools and infrastructure used in satellite development and operation.	2 – Low to moderate
PO6 – Engineer and Society	Students recognise the contribution of satellite services to communication, navigation, weather observation, resource monitoring and disaster response.	3 – Moderate
PO8 – Ethics	Students are expected to follow host-centre rules, safety instructions, confidentiality requirements and responsible documentation practices.	1 – Low
PO9 – Individual and Team Work	Participation in an organised group visit promotes coordination, discipline and collaborative learning.	2 – Low to moderate
PO10 – Communication	Students develop the ability to record technical observations and communicate the learning through a structured report.	2 – Low to moderate
PO12 – Life-long Learning	The visit motivates students to explore emerging satellite, RF, communication and space-engineering technologies.	3 – Moderate

C. Programme-Specific Outcomes (PSOs)

Important: The exact approved ECE PSO statements for the relevant regulation/batch were not included in the supplied circular or report. The following are provisional alignment descriptions only. Replace or confirm them against the official department-approved PSO wording before NBA submission.

PSO (verify official wording)	Mapping rationale	Suggested level*
PSO1 – ECE fundamentals and system design (provisional)	The visit connects communication engineering, antennas, RF/microwave concepts and electronics fundamentals with satellite communication and satellite subsystems.	3 – Moderate
PSO2 – Communication, signal processing and emerging technologies (provisional)	The visit introduces satellite links, navigation signals, remote-sensing data and space applications, supporting awareness of communication and signal-processing systems.	2 – Low to moderate

C. PO–PSO Alignment Matrix

Outcome	PSO1*	PSO2*	Overall relevance
PO1 – Engineering Knowledge	3	3	Strong
PO2 – Problem Analysis	2	1	Moderate
PO5 – Modern Tool Usage	2	2	Moderate
PO6 – Engineer and Society	3	2	Strong
PO8 – Ethics	1	1	Low
PO9 – Individual and Team Work	2	1	Moderate
PO10 – Communication	2	1	Moderate
PO12 – Life-long Learning	3	3	Strong

E. Evidence to Retain for NBA Verification

- Approved industrial-visit permission letter and communication with URSC/ISRO.
- Final itinerary, date confirmation, attendance sheet and participant list.
- Photographs with captions and, where available, host-centre acknowledgement or certificates.
- Student feedback or a brief post-visit reflection/learning assessment.
- Final report signed by the Industrial Visit Coordinator and verified by the Head of the Department.
- Approved ECE PO and PSO statements and the department's official PO–PSO mapping scale.

F. NBA Consolidation Note

For the circular dated 10.10.2026, the Industrial Visit Coordinator should include this activity in the consolidated industrial-visit list for the correct academic year, with the relevant POs and PSOs. Do not classify the visit under 2023–24 solely from the report title: the source report mentions 4 January 2023, which appears to fall in 2022–23. Cross-check the date against the permission letter, itinerary and attendance records before finalising the NBA evidence.

Prepared by	Verified by
Industrial Visit Coordinator Department of ECE	Head of the Department Department of ECE

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FINAL NBA ACTIVITY MAPPING – INDUSTRIAL VISIT

Activity: Industrial Visit – U. R. Rao Satellite Centre (URSC), ISRO, Bengaluru
Department: Electronics and Communication Engineering, Annamacharya University, Rajampet

1. Compact PO–PSO Matrix

Activity	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Industrial Visit	3	2	1	2	3	2	1	2	3	3	2	3	3	3

2. Justification for the Mapping

Outcome	Reason for mapping
PO1	Students relate theoretical ECE concepts—including antennas, communication systems, electronics and signal processing—to satellite and space-technology applications.
PO2	Students observe technical systems and discuss engineering functions, constraints and possible troubleshooting approaches.
PO3	The visit provides introductory awareness of how multidisciplinary engineering solutions are developed; detailed design activity is not directly assessed.
PO4	Students learn why testing, measurement, validation and reliability checks are important in satellite development, integration and operation.
PO5	Students gain awareness of modern satellite technologies, equipment, instruments and engineering tools used in space systems.
PO6–PO8	Students recognise the societal role of satellite services and the importance of professional responsibility, safety, ethics, confidentiality and environmental awareness where covered.
PO9–PO10	Group participation supports teamwork; students communicate observations through reports, discussions or presentations.
PO11	Students gain awareness of coordination, resource planning and project management in large, multidisciplinary engineering programmes, where explained during the visit.
PO12	Students identify emerging satellite, RF, communication and space technologies and opportunities for continuous learning.
PSO1	Students connect industrial and space-system applications with electronics and communication engineering fundamentals.
PSO2	Students observe the role of modern ECE hardware, communication systems, signal processing and associated software tools in satellite applications.

3. Evidence to Maintain for NBA

- Industrial-visit permission letter and approved programme schedule/itinerary.
- Student attendance sheet, participant list and visit photographs with captions.
- Student industrial-visit reports and, where available, certificates or host-organisation acknowledgement.
- Student feedback forms or post-visit assessment/learning reflection.
- PO–PSO mapping justification, assessment records and the consolidated industrial-visit activity entry.Official department-approved PO and PSO statements applicable to the participating batch.

4. Submission Notes

The matrix scores are the proposed values supplied for this activity and should be checked against the institution's approved PO–PSO definitions and mapping scale before final submission. PO3, PO4, PO7 and PO11 links should be retained only to the extent supported by the actual visit content and evidence. The PSO labels and descriptions must match the official ECE PSOs for the relevant regulation.