

**DON BOSCO INSTITUTE OF TECHNOLOGY, MUMBAI - 400 070**

Department of Electronics &amp; Telecommunication Engineering

**A.Y. 2022-23****Industrial Visit Report**

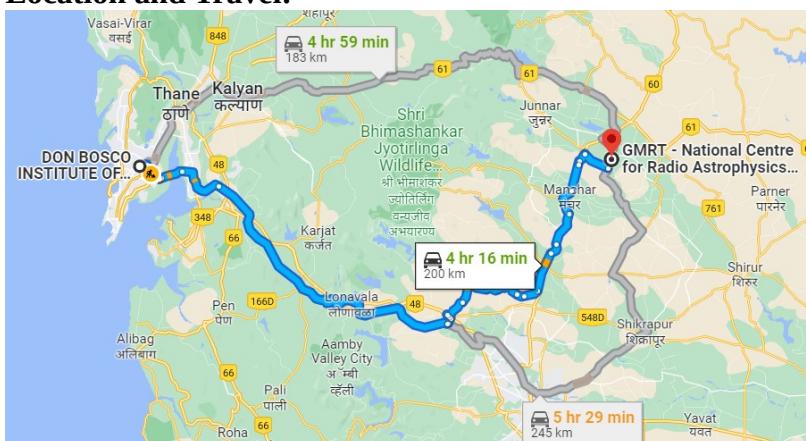
<b>Name of Industry Visited</b>	Giant Metrewave Radio Telescope (GMRT)
<b>Address of Industry</b>	A/P- Khodad, Narayangaon Tal- Junnar, Dist- Pune, Maharashtra
<b>Date of Industrial Visit</b>	27 <sup>th</sup> & 28 <sup>th</sup> February 2023
<b>Target Participants</b>	Students of TE (EXTC)
<b>Number of Participants</b>	Total = 50 46 students of TE (EXTC) 2 Staff members 2 Technical Staff
<b>Name of Courses for which Industrial Visit Organized</b>	1. Electromagnetics and Antenna 2. Discrete Time Signal Processing 3. Electronic Instrumentation & Control Systems 4. Computer Communication Networks 5. Image Processing and Machine Vision

<b>Name of Faculty Coordinator</b>	Dr. Satishkumar Chavan Ms. Hemalata Mote
<b>Name of Other staff members</b>	Mr. Kishore Badgujar Mr. Jiten Mahayvanshi
<b>Industrial Visit Objectives</b>	<ol style="list-style-type: none"> <li>1 To learn the concept of meter wave antenna</li> <li>2 To understand the usefulness of the technology for astronomical and extra-terrestrial research</li> <li>3 To look for the opportunity for final year project work</li> <li>4 To get exposure of the various science projects through exhibition</li> </ol>
<b>Expected Outcome</b>	<ol style="list-style-type: none"> <li>1 Students will know the concepts of steerable antenna and synchronous effect on the captured signal.</li> <li>2 Students will be able to explain the working of various blocks used in the acquisition of the signals and its control</li> <li>3 Students will be able to measure the wavelength of signal captured by a set of antennas</li> <li>4 Student will be able to think of the probable project based on the knowledge gained</li> <li>5 The interest that is generated to work on such high-end technology will help students to perform well to get in such organization.</li> </ol>
Event activities	<ol style="list-style-type: none"> <li>1. GMRT role in research.</li> <li>2. Observe the 45 meter antenna structure.</li> <li>3. Locations of 30 antennas</li> <li>4. Understand importance of multi antenna system</li> <li>5. Observe control mechanism of large antenna along with multiple antenna array as a single giant antenna</li> <li>6. Project Exhibition held at GMRT</li> </ol>

#### Schedule of Visit

S. N.	Activity	Day	Time
1	Travel from DBIT to Hotel Aryaa Regency, Ozar	Day 1: 27.08.2023	7.00am-1.00pm
2	Meal and Rest in		1.00pm-3.00pm
3	Visit to Shivneri Fort		3.00pm-6.00pm
4	Visit to GMRT	Day 2: 28.02.2023	9.00am – 2.00pm
5.	Travel Back to DBIT		2.00pm – 8.00 pm

#### Location and Travel:



## **Report:**

A total of 46 TE Electronics and Telecommunication Engineering Semester VI students visited GMRT on 27th & 28th February, 2023 along with Dr. Satish Chavan and Ms. Hemalata Mote and 2 Technical staff members visited GMRT, Khodad, Tal. Junnar, Dist. Pune, Maharashtra.

Science Day is celebrated at the Giant Metrewave Radio Telescope (GMRT) observatory at Khodad on 28<sup>th</sup> February every year. The GMRT, which is the world's most powerful telescope operating at low radio frequencies, was built and is being operated by the National Centre for Radio Astrophysics (NCRA) of the Tata Institute of Fundamental Research (TIFR). GMRT actively collaborates with national and international research institutions and participates in large-scale observational campaigns and surveys. The facility's rich dataset and contributions have made it an integral part of the global radio astronomy community, facilitating significant discoveries and advancements in the field.

Students got the opportunity to see a grand Science Exhibition, where children from the schools and colleges exhibited their science projects. In addition, there were exhibitions illustrating astronomical themes and concepts, exciting results obtained with the GMRT, various subsystems of GMRT and illustrative models. There were also exhibits and live demonstrations from various research institutes and science popularisation groups, as well as teaching institutions such as the University of Pune and various national laboratories. The site for GMRT, about 10 km east of Narayangaon town on the Pune-Nasik highway, was selected after an extensive search in many parts of India, considering criteria such as low man-made radio noise, availability of good communication, vicinity of industrial educational and other infrastructure and, a geographical latitude sufficiently north of the geomagnetic equator in order to have a reasonably quiet ionosphere and yet be able to observe a good part of the southern sky as well.

The main objective of this visit was to make students knowable about a practical implementation, functionality, and mechanism of antennas. They also get the knowledge of the Radio Telescope, its different components, hardware and software co-design.

After reaching there, students were guided by the staff member towards one of the big antennas. It was great to know that GMRT consists of 30 fully steerable gigantic parabolic dishes of 45m diameter each spread over distances of up to 25 km. Each antenna has a diameter of 45 meters and operates at frequencies ranging from 150 MHz to 1420 MHz. The antennas are arranged in a Y-shaped configuration, allowing scientists to conduct high-resolution imaging and spectroscopic observations. Students learned about the engineering principles behind antenna design, data acquisition, and signal processing. Students were given insights into the complex data processing and analysis techniques employed at GMRT. Research scholars at GMRT demonstrated the software systems and algorithms used to process the signals received by the antennas. Significance of Fourier transforms, image reconstruction, and various calibration techniques used to enhance the accuracy of the collected data, were also explained .

The large size of the parabolic dishes implies that GMRT will have over three times the collecting area of the Very Large Array (VLA) in New Mexico, USA which consists of 27 antennas of 25 m diameter and is presently the world's largest aperture synthesis telescope operating at centimetre wavelengths. At 327 MHz, GMRT will be about 8 times more sensitive than VLA because of the larger collecting area, higher efficiency of the antennas and a substantially wider usable bandwidth because of the low level of man-made radio interference in India.

## Photo Gallery:



## Project Exhibition at GMRT

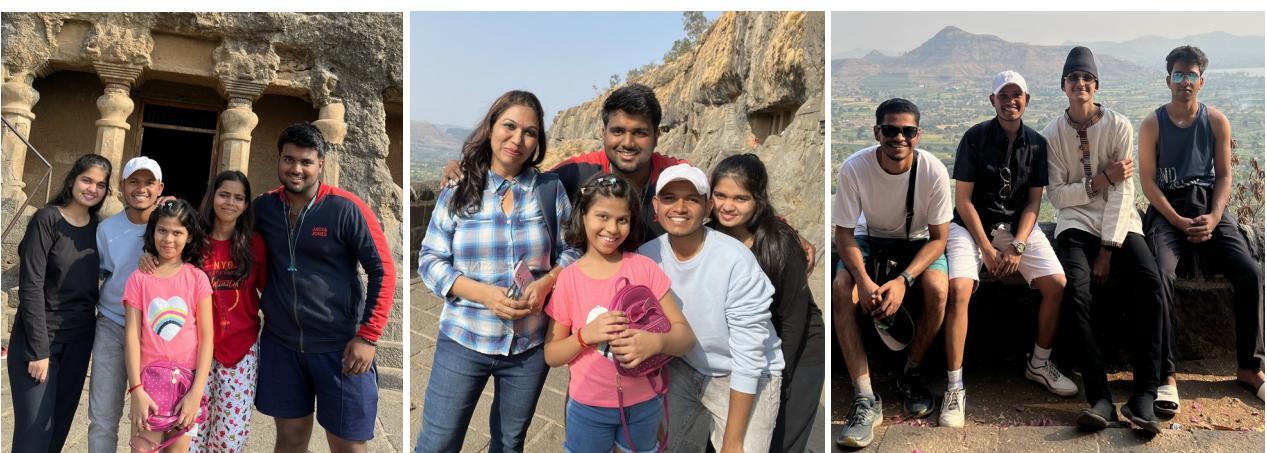


Research Scholars at GMRT explained the applications and functionality of GMRT observetory





Lenyadri Caves



## Shivaji Birthplace, Shivneri

