



**JAYAWANT SHIKSHAN PRASARAK MANDAL's  
BHIVARABAI SAWANT INSTITUTE OF TECHNOLOGY  
AND RESEARCH, Wagholi Pune**  
(Approved by AICTE, NEW Delhi, Govt. of Maha. &  
Affiliated to Pune university)  
GAT.NO.720 (1), WAGHOLI, PUNE-NAGAR ROAD,  
PUNE-412207.



TE. NO. (020)27051170 FAX. NO. (020)27052590  
**Department of Electronics and Telecommunication**

**(NBA & NAAC Accredited)**



**Report on Industrial Visit @ GMRT, Khodad**

**Date: 28<sup>th</sup> February, 2023**

**Report Consists of activities conducted at GMRT :**

**1. Overview of GMRT station :**

- ✓ Visit to Science Project exhibition
- ✓ Visit to Astronomy project exhibition
- ✓ Interaction with the scientists from TIFR Mumbai

**2. Organisation Profile:**

The Industrial visit was carried out at GMRT on 28<sup>th</sup> February, 2023 for SEM VI and IV Electronics and Telecommunication Engineering Students. Prof. Sneha Dhere, Prof. Poonam Gawde, Prof. Meenakshi Annamalai, Prof. Suchipriya Malge, Prof. Y.S. Behendwar, Prof. Aniket Gunjal along with 107 students visited GMRT.

**3. Objective of Visit:**

<b>Industrial visit Objectives</b>	<b>Corresponding outcomes COs /POs mapping</b>
to know practical fundamentals, implementation, functionality, and mechanism of antennas	PO 1, CO5, CO 6, CO7, CO9, CO 10
the students need as also to get the knowledge of the Radio Telescope, different components involved, hardware software co-design, etc	CO4, CO8, CO 10

#### 4. Overview of Visit:

JSPM's Bhivarabai Sawant Institute of Technology and Research ,Wagholi (E&TC Dept) had organized an Industrial Visit on 28th February 2023 to GMRT Khodad

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.

#### 5. Brief Information about the Visit:

We started travelling from the college campus at 9:30 am by our college bus on 28<sup>th</sup> February 2023 along with our staff coordinators. We reached to the GMRT at 12 pm .

After reaching their 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. After introduction all students were shown the big antenna and were told about how it works and were guided about its various functionalities. The metre wavelength part of the radio spectrum has been particularly chosen for study with GMRT because man-made radio interference is considerably lower in this part of the spectrum in India. Fourteen of the thirty dishes are located more or less randomly in a compact central array in a region of about 1 sq. km.



**Figure : Begin journey from campus to GMRT**

The GMRT is the largest radio telescope in the whole world and hence has great appeal in astrophysics research. Astronomers from all over the world regularly use this telescope to observe many different astronomical objects such as galaxies, pulsars, supernovae, and sun and solar winds. The visit concluded with an interactive session for the students, where they got an opportunity to interact with the concerned authorities and gain more knowledge. It was a great learning experience for one and all.



**Figure : GMRT station along with Prof. Behendwar and students**

GMRT consists of 30 fully steerable gigantic parabolic dishes of 45 m diameter each spread over distances of upto 25 km. The number and configuration of the dishes was optimized to meet the principal astrophysical objectives which require sensitivity at high angular resolution as well as ability to image radio emission from diffuse extended regions. 14 of the 30 dishes are located more or less randomly in a compact central array in a region of about 1 sq km. The remaining 16 dishes are spread out along the 3 arms of an approximately 'Y'-shaped configuration over a much larger

region, with the longest interferometric baseline of about 25 km. 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. Apart from the novel low-cost design of the parabolic dishes, the instrument has state-of-the-art electronics systems developed indigenously and consisting of the following main sub units. • Antenna feeds at 6 different frequency bands between 50 MHz and 1500 MHz, having good polarization characteristics as well as simultaneous multiband operation. • Low-noise amplifiers, local oscillator synthesizers, mixers, IF amplifiers. • Optical fibres linking the entire array with the CEB. These are used both for the telemetry signals and local oscillator phase reference communication between the CEB and each antenna base. • A digital 2,30,000-channel FX-type correlator providing upto 128 spectral channels and covering a maximum bandwidth of 32 MHz



**Figure : Students divided into two groups for understanding Sessions**



**Figure : Students carefully attending the project exhibition.**

#### **6. Summary of the Visit:**

At the beginning of the visit one faculty of the training centre explained what GMRT exactly is and what are the functions of GMRT. Then after this introductory session all the students were divided into to groups to visit different projects arranged on the occasion of National Science Day 2023.

#### **7. Outcome of Visit:**

Students were able to elaborate structure, operation & applications of GMRT

**Subject Teacher**  
**Prof. Sneha Dhere**

**Head of Dept.**  
**Dr. Yogesh Angal**