

# **Technical Report of Laboratory Visit -M.Tech Students 2021-2023**

## **Department of Applied Physics**

Laboratory name: Central Research Laboratory -BEL Bengaluru

Date of Visit: 31/05/2022

Total number of students visited: 10

Specialization of M.Tech: LEOC, OCP, ST

We visited Central Research Laboratory Bharat Electronics Limited (BEL), a navratna PSU under the Ministry of Defence, Government of India. It manufactures state-of-the-art electronic products and systems for the Army, Navy and Air Force. BEL has also diversified into various areas like homeland security solutions, smart cities, e-governance solutions, space electronics including satellite integration, energy storage products including e-vehicle charging stations, solar, network & cyber security, railways & metro solutions, airport solutions, Electronic Voting Machines, telecom products, passive night vision devices, medical electronics, composites and software solutions.

After we reached BEL, a presentation was made to all the students about an overview of BEL and its various sections and their developed products.

The overview included the areas as- CRL Blue sky research

RF micro-waves

Embedded Computer system

Smart Computing SYSTEM

Radar Signal & data propagation

Sensor signal processing and VLSI

Electro optics & LASERS

Wireless and Networking

Artificial Intelligence

Machine Learning & Robotics

Cloud & data analysis

Cyber Security & Forensic

Data Diode

System hardening

#### LAB VISIT:

- **ELECTRO-OPTICS**

After the presentation, we visited electro-optics lab where the products developed on high-power fiber lasers were demonstrated. We have seen 100W, 400W and 1 kW high-power fiber lasers. We also interacted with them about the technical aspects of these designs.

- **INFRARED VIDEOGRAPHY**

A CCD-based IR sensor-dependent system was there. The intensity variation of the black & white images (as well as video) was the result of the degree of hotness of the object. This degree of hotness is proportional to the radiant radiation of the body.

Infrared videography setup was demonstrated live and an open system was explained how it worked and its application of deploying for border security.

#### DEVELOPED INDIGENOUS PRODUCTS

Various other products were demonstrated and explained and their display hall where we have interacted with various scientists. It was very insightful and motivating.

- Indigenously developed 5G mobile phones and laptops
- RADAR for border security
- Machine Learning-based intruders detection system with 99.99% accuracy
- System hardening for defence use
- Shooting accuracy measuring pressure(capacitive) sensors
- Commonwealth games button

