



STUDY TOUR REPORT
DEPARTMENT OF BIOTECHNOLOGY

1. **Event: Study Tour**
2. **Date and Duration: 5th-6th December 2024 (2 days)**
3. **Objective of the tour:** To have a learning experience on the cutting-edge research in biophysics, applied microbiology and applied biotechnology.

DAY 1: Visit to DAE-Saha Institute of Nuclear Physics, Kolkata.

Technical programme

1. Welcome address by Dr. Barun Maithy, Asst. Professor, DAE-SINP.

Dr. Barun Maithy presented the welcome address and discussed about the mission, vision and objective of DAE-SINP, Kolkata. He introduced the students about the various internship programmes offered by the institute which the students can avail.

2. Laboratory description by Dr. Shresta Basu, Asst. Professor, DAE-SINP.

Dr. Shresta Basu presented a detail account of lab visit and research expertise of different scientific groups working at DAE-SINP, Kolkata. She especially highlighted the research finding of the chemical Sciences division that is significantly contributing to biophysical and applied biotechnology research.

3. Laboratory visit

3.1. Chromatin dynamics laboratory

The Chromatin dynamics laboratory is led by Prof. Chandrima Das. Prof. Das informed the students about a specific class of proteins called chromatin “readers/effectors”, which are known to impact the epigenetic mechanisms in normal conditions as well as diseased states. Prof. Das demonstrated the crucial roles of these epigenetic regulators in maintaining chromatin landscape and plasticity especially under tumorigenic conditions.

3.2. Synthetic Biology Laboratory

The Synthetic Biology Laboratory led by Prof. Sangram Bagh demonstrated the first artificial neural network (ANN) with genetically engineered bacteria, where engineered bacteria work as artificial neuro-synapses and demonstrated complex computation. This work has significance in creating new technology platform for transforming engineered biological cells as ANN enabled hardware.

3.3. Single Molecule Biophysics Laboratory

The Single Molecule Biophysics Laboratory led by Dr. Padmaja P Mishra demonstrated interesting biophysical problems involving DNA, RNA and Proteins. Dr Mishra demonstrated the use of a single molecule FRET (smFRET) in exploring the dynamics of DNA to understand how DNA repair pathways are regulated to maintain genome integrity, as well as monitoring how other environmental factors also affect the secondary structure of the DNAs.

4. Concluding remarks

Dr. Padmaja P Mishra and Dr. Dulal Senapati presented the concluding remarks of the study tour. The two scientists encouraged the students to choose DAE-SINP as a launching pad for a future career ahead. They also opening encouraged the visiting faculty members to sign an MOU for future research collaboration and student exchange.

DAY 2: Visit to Central Food Laboratory, FSSAI, Kolkata.

Technical programme

1. Welcome address by Dr. Debadutta Mishra, Joint Director, FSSAI

Dr. Debadutta Mishra addressed the students and informed them about the role of FSSAI in food safety and regulation in India. Dr. Mishra enriched the students about the activities undertaken at the Central Food Laboratory, FSSAI, Kolkata.

2. Laboratory visit

2.1. Applied Microbiology

The applied microbiology laboratory led by Dr. Mishra primarily examine microbial contamination of packed food. Dr. Mishra demonstrated the usage of distinctive and state of the art facility for microbial growth, detection, analysis and characterization in different types of food samples.

2.2. Food toxicity detection laboratory

The food toxicity detection laboratory consisted of several high-end equipment for detection of finest contamination of heavy metal toxicity, elemental toxicity as well as various kinds of chemical toxicity. The scientist in charge demonstrated in the working principle of high-performance liquid chromatography (HPLC), Liquid chromatography-mass spectrometry and inductively coupled plasma mass spectrometry.

3. Concluding remarks

Dr. Debadutta Mishra presented the concluding remark for the study tour. He encouraged the students to undertake food analyst training to become a registered food checking officer. He also encouraged the students to become food ambassador by spreading awareness about the important of food safety and standards in India.

4. Participants Details (Indicate Numbers only and attach attendance sheet)

- i. Scientists/Faculty: 03**
- ii. Students: 20**

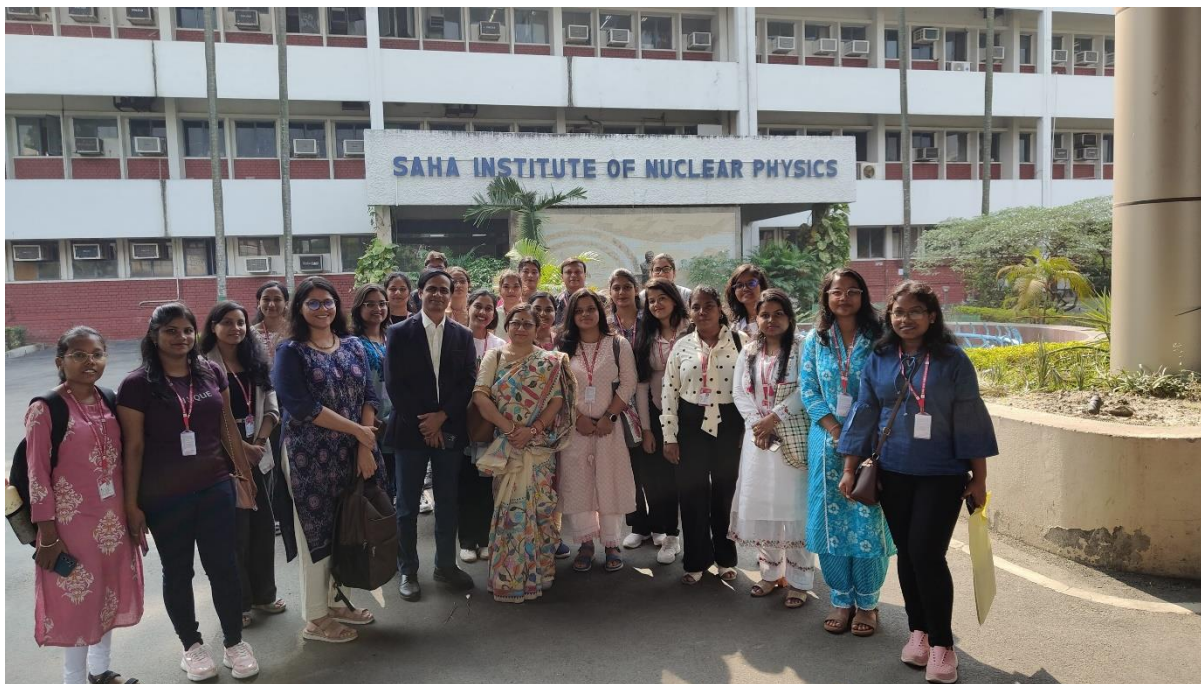
5. Outcomes of the tour:

The study tour to different institutions in Kolkata provided an excellent opportunity to the students to know about the various cutting-edge research in applied biotechnology. The tour also facilitated the exploration of different field in biotechnology where the students can pursue higher education or job opportunities. The dept through its faculty members also got an opportunity to discuss about the mutual research areas for collaboration and student exchange.

6. Recommendations (if any):

The department recommended that such study tour may be conducted on a regular basis to offer valuable insights and inspiration to the Master's students in their academic and professional futures.

7. Selected Photographs: Enclosed



Students and faculty members at the DAE-SINP, Kolkata



Demonstration of artificial neural network (ANN) in genetically engineered bacteria



Students and faculty members at the National Food Laboratory, FSSAI, Kolkata



Demonstration of the working principle of HPLC for detection of heavy metal contamination in food samples at FSSAI, Kolkata



Demonstration of the working principle of the ICP-MS system at FSSAI, Kolkata