



## DEPARTMENT OF ELECTRONICS ENGINEERING

### Report

# Interaction of Alumni – Students on “Next-Generation Electromagnetic Techniques”

**Date:** 18 November 2024

**Time:** 04:00 PM – 06:00 PM

**Venue:** Department of Electronics Engineering, MITS Gwalior

**Resource Person:**

**Ms. Shivi Tomar**

Junior Engineer, Indian Railways

## Introduction

The Department of Electronics Engineering, Madhav Institute of Technology & Science (MITS), Gwalior organized an Alumni–Students Interaction session titled “**Next-Generation Electromagnetic Techniques**” on 18 November 2024. The objective of the session was to expose students to emerging research trends and practical applications in electromagnetic engineering, particularly in absorber design and microwave technologies.

The interaction provided an excellent platform for students to learn from a distinguished alumna who is currently serving as a Junior Engineer in Indian Railways. The program aimed to bridge the gap between academic learning and real-world engineering applications while motivating students toward advanced research and innovation in electromagnetic systems.

## Objectives of the Expert Talk

The major objectives of conducting this alumni interaction were:

- To introduce students to advanced electromagnetic techniques and modern absorber design concepts.
- To provide exposure to emerging research areas in microwave and electromagnetic engineering.
- To enhance understanding of electromagnetic materials, composites, and shielding technologies.
- To encourage innovation and research orientation among students.
- To strengthen alumni engagement and mentorship within the department.



The session commenced at 04:00 PM with a warm welcome address delivered by the Student Coordinator **Soumya Dubey**, who greeted the dignitaries, faculty members, and participating students. The coordinator briefly highlighted the importance of alumni interaction programs in enhancing students' academic and professional perspectives.

Following the welcome address, Ms. Shivi Tomar was formally introduced to the audience. Her academic journey, professional achievements, and contributions in the field of engineering were shared before inviting her to begin the expert lecture.

### Expert Talk Highlights

Ms. Shivi Tomar delivered an insightful and technically enriching session focusing on **NextGeneration Electromagnetic Techniques for Absorber Design**. The lecture covered both theoretical foundations and practical engineering applications.

The key topics discussed during the session included:

#### 1. Characterization of Electromagnetic Composites and Nanocomposites

The speaker explained the importance of advanced materials in electromagnetic applications. She discussed:

- Properties of EM composites and nanocomposites
- Material characterization techniques
- Role of nanotechnology in improving electromagnetic absorption performance

Students gained valuable insights into how engineered materials contribute to improved shielding efficiency and absorber design.

#### 2. Electromagnetic Mixing Models

The session introduced various electromagnetic mixing models used to predict material behavior. The resource person emphasized:

- Effective medium theory
- Parameter estimation techniques
- Practical considerations in designing composite materials

These concepts helped students understand how theoretical modeling supports real-world engineering solutions.

#### 3. Electromagnetic Shielding Techniques



Ms. Tomar elaborated on the growing need for electromagnetic shielding in modern electronic systems. Key aspects discussed included:

- Shielding effectiveness measurement
- Applications in communication systems and transportation sectors
- Industrial relevance of EM shielding technologies

Practical examples from railway communication systems were also shared, making the discussion more relatable.

#### 4. Hybrid Optimization Strategies

The expert explained how optimization algorithms are employed to design efficient electromagnetic absorbers. Topics included:

- Multi-parameter optimization approaches
- Design challenges in microwave absorbers
- Integration of simulation tools with experimental validation

Students were encouraged to explore simulation-based design methodologies for research and development.

#### 5. Frequency-Selective Surfaces (FSS)

A detailed explanation of frequency-selective surfaces was provided, highlighting:

- Working principles of FSS structures
- Applications in antennas and radar systems
- Role in electromagnetic wave filtering and absorption

This segment generated significant interest among students pursuing microwave and antenna engineering.

#### 6. E-Waste Management and Sustainable Engineering

The speaker emphasized sustainable engineering practices by discussing:

- Environmental challenges posed by electronic waste
- Recycling and reuse strategies
- Importance of responsible technology development

This discussion broadened students' understanding of engineering responsibilities toward environmental sustainability.



## Outcomes of the Program

The Alumni–Students Interaction achieved significant academic and professional outcomes:

- Enhanced understanding of modern electromagnetic and microwave design techniques.
- Exposure to emerging technologies such as nanocomposites and frequency-selective surfaces.
- Increased awareness about sustainable engineering and e-waste management practices.
- Motivation among students toward research, innovation, and higher studies.
- Strengthening of alumni–student academic collaboration and mentorship culture.
- Development of curiosity and enthusiasm for advanced electromagnetic engineering concepts.

The program successfully fostered interest in microwave design and electromagnetic research, making the session informative, engaging, and intellectually enriching for all participants.

## Conclusion

The Alumni–Students Interaction on “**Next-Generation Electromagnetic Techniques**” proved to be a highly valuable academic activity. The expert talk provided students with practical exposure to cutting-edge technologies and industry perspectives beyond classroom learning.

The Department of Electronics Engineering extends sincere appreciation to **Ms. Shivi Tomar** for her insightful presentation and continued support to the institution. Such alumni engagement initiatives play a crucial role in inspiring students, promoting innovation, and preparing them for future technological challenges. The program concluded successfully at 06:00 PM with positive feedback from students and faculty members.



## Glimpses





## Details of participants

Attendance 19/11/24

S. No	Name	Enrollment No.	Signature
1	Pratik Yadav	0901EC231049	[Signature]
2	Saurabh Singh Bhadaniya	0901EC231114	[Signature]
3	Adarsh Singh	0901EC231055	[Signature]
4	Lakshendra Chatur Singh	0901EC231031	[Signature]
5	Samrat Dhaakad	0901EC231060	[Signature]
6	Rajyal Sarma	0901EC231093	[Signature]
7	Abhinav Pandey	0901EC231092	[Signature]
8	Siddhant Carpenter	0901EC231124	[Signature]
9	Pranav Jain	0901EC231089	[Signature]
10	Radhika Rajput	0901EC231078	[Signature]
11	Sonali Mahapatra	0901EC231110	[Signature]
12	Shivani Kaur	0901EC231120	[Signature]
13	Pratik Singh	0901EC231091	[Signature]
14	Janani Bhatnagar	0901EC231135	[Signature]
15	Saurabh Kumar	0901EC231139	[Signature]
16	Piyush Rajguruwari	0901EC231085	[Signature]
17	Vivek Bhatnagar	0901EC231129	[Signature]
18	Pooja Singh	0901EC231061	[Signature]
19	Rajeshwar Singh	0901EC231099	[Signature]
20	Ujjwal Singh	0901EC231113	[Signature]
21	Lokesh Singh Bhatnagar	0901EC231071	[Signature]
22	Hrudayansh Bansal	0901EC231094	[Signature]
22	Ankit Sharma	0901EC231083	[Signature]
24	Rishabh Singh	0901EC231070	[Signature]
25	Kuldeep Singh	0901EC231067	[Signature]
26	Harsh Prakash	0901EC231051	[Signature]
27	Deepanshu Bhatnagar	0901EC231088	[Signature]
28	Ashish Singh	0901EC231097	[Signature]
29	Krishna Vishwakarma	0901EC231066	[Signature]
30	Tejaswini Singh	0901EC231065	[Signature]
31	Krishna Singh	0901EC231089	[Signature]
32	Aman Singh	0901EC231073	[Signature]
33	Pranav Singh	0901EC231038	[Signature]
34	Prateek Singh	0901EC231072	[Signature]

[Signature]

Dr. Vikas Mahor

[Signature]

Dr. Laxmi Shrivastava