A Report on Guest Lecture
"Fundamentals of Metasurface Design and Its Applications in Energy Harvesting and Sensing"
Organised By Department of Electronics & Communication Engineering
on 15.04.2024

Organized by: Dr. Mohit Kumar Singh, Assistant Professor, Department of ECE; Mr. Rishikesh Kumar Thakur, Assistant Professor, Department of ECE.
Resource Person Details: Dr. Rajan Agrahari, Assistant Professor, National Institute of Technology Patna, Patna-800005, Bihar.
Participants: Faculty members III & II Year ECE Students
Attendance: 35 participants
Venue: Scale-Up Room
Mode of conduct: Online
Report Received on 16.05.2024

Department of Electronics and Communication Engineering has organized a Webinar on "**Fundamentals of Metasurface Design and its Applications in Energy Harvesting and Sensing**" on 15/04/2024 (Monday) from 10:30 AM to 1:30 PM.

Welcome Address:

The event commenced promptly at 10:30 AM with a warm welcome address to all by Dr. Mohit Kumar Singh, Assistant Professor, Department of ECE, Madanapalle Institute of Technology & Science (MITS), Madanapalle. The resource person started the session by extending his hearty thanks to the participants, organizing members, HOD, Principal and Management for giving him opportunity to share his knowledge and experience. The primary objectives of the event titled "**Fundamentals of Metasurface Design and its Applications in Energy Harvesting and Sensing**" are to acquaint the audience with the foundational concepts of metasurfaces, focusing on their introduction and fundamental principles. The event aims to elucidate the process of metasurface design utilizing CST software, thereby enabling attendees to grasp the practical aspects of implementing metasurface technology. Furthermore, the event intends to shed light on the diverse applications of metasurfaces, particularly in the realms of RF energy harvesting and sensing, highlighting their potential as efficient devices in these domains. By providing insights into these key areas, the event seeks to enhance awareness and understanding among participants regarding the capabilities and significance of metasurfaces in contemporary technological landscapes.

Objectives of the Lecture

- To acquaint the audience with the foundational concepts of metasurfaces, focusing on their introduction and fundamental principles.
- Elucidate the process of metasurface design utilizing CST software, thereby enabling attendees to grasp the practical aspects of implementing metasurface technology.
- Focus on the diverse applications of metasurfaces, particularly in the realms of RF energy harvesting and sensing.
- Enhance the understanding among participants regarding the capabilities and significance of metasurfaces in contemporary technological landscapes.

Lecture Contents:

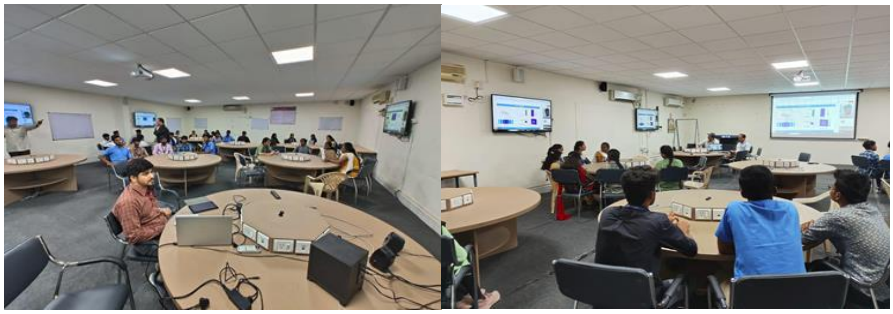
- In the lecture, the resource person meticulously navigated through the intricate landscape of metasurface technology, aiming to equip attendees with a comprehensive understanding of its principles and applications. The discourse commenced by elucidating the fundamental concepts underlying metasurfaces, delving into their unique properties and functionalities. Attendees were introduced to the concept of metasurfaces as artificially engineered materials, composed of subwavelength structures, capable of manipulating electromagnetic waves in unprecedented ways. Through detailed explanations and illustrative examples, the audience gained insight into the mechanisms through which metasurfaces interact with incident waves, enabling functionalities such as wave manipulation, beam steering, and polarization control.
- Furthermore, the lecture provided a deep dive into the practical aspects of metasurface design, emphasizing the utilization of advanced computational tools such as CST software. Attendees were guided through the process of conceptualizing, designing, and optimizing metasurface structures using simulation techniques, allowing for the exploration of various design parameters and configurations.

- Moreover, the resource person expounded upon the burgeoning applications of metasurfaces, with a particular focus on their role in RF energy harvesting and sensing. Attendees were presented with cutting- edge research and developments showcasing the potential of metasurfaces as efficient and versatile devices in these domains. From harvesting ambient RF energy for wireless communication systems to enabling high-performance sensing capabilities in diverse environments, metasurfaces were portrayed as transformative technologies with far-reaching implications.
- Throughout the lecture, interactive discussions and Q&A sessions provided opportunities for participants to delve deeper into specific topics, clarify doubts, and explore potential research directions. By the end of the session, attendees emerged with a newfound appreciation for the intricacies of metasurface technology and its transformative potential in energy harvesting and sensing applications. The lecture served as a catalyst for further exploration and innovation in this rapidly evolving field, inspiring attendees to harness the power of metasurfaces for future advancements in science and technology.

Inspiration and Motivation:

The resource person inspired and motivated attendees by emphasizing the transformative power of entrepreneurship in driving positive change and innovation. He conveyed a compelling message of empowerment, urging individuals to harness their creativity and ambition to pursue entrepreneurial ventures. By sharing success stories and illustrating how startups have overcome challenges to achieve remarkable growth, the resource person instilled a sense of possibility and resilience among the audience.

Moreover, he underscored the immense potential for impact inherent in startup initiatives like Startup India and seed funding, igniting enthusiasm for seizing these opportunities. Through their passionate delivery, the resource person fostered a can-do spirit, encouraging aspiring students to embrace risk-taking and persevere in the face of adversity. Overall, the lecture served as a catalyst for action, inspiring attendees to turn their innovative ideas into tangible enterprises and embark on the rewarding journey of entrepreneurship with confidence and determination.



Outcomes:

At the end of Program, Students were able to,

- Grasp a comprehensive understanding of metasurface technology, from its foundational principles to its practical applications in energy harvesting and sensing.
- They acquired knowledge of utilizing CST software for metasurface design, enabling them to conceptualize, simulate, and optimize various structures.
- Furthermore, students developed a keen awareness of the diverse capabilities of metasurfaces, particularly in the domains of RF energy harvesting and sensing, recognizing their potential to revolutionize technological landscapes.

Vote of Thanks:

The session was formally concluded with a vote of thanks delivered by Mr. Rishikesh Kumar Thakur, Asst. Professor, Department of ECE. In his address, he expressed sincere gratitude to the resource person for the time to share his expertise and knowledge.