



ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY
(Unit of Alva's Education Foundation (R), Moodbidri)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Report of Technical Talk-II

Topic: "Exploring Antenna Innovations"

Resource Person: Dr. Karhik Rudramuni, Antenna Design Engineer,
Wipro Research lab, Bangalore.

Date: 15-06-2024

Time: 11:00AM to 1:00 PM.

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Shobhavana Campus, Mijar, Moodubidire - 574 225,
Mangalore, DK Karnataka State -INDIA.

 **EVIONICS**
Department of ECE

**DEPARTMENT OF ELECTRONICS & COMMUNICATION
ENGINEERING**

organises

"TECHNICAL TALK"

On

Exploring Antenna Innovations

DATE: 15 JUNE 2024
TIME : 11:00 AM ONWARDS

RESOURCE PERSON: DR. KARTHIK RUDRAMUNI
ANTENNA DESIGN ENGINEER
WIPRO REASEARCH LAB, BENGALURU

VENUE: CIVIL ENGINEERING SEMINAR HALL

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Department of ECE conducted the second technical talk of the even semester 2023-24 on **“Exploring Antenna Innovations”** by Dr. Karhik Rudramuni, Antenna Design Engineer, Wipro Research lab, Bangalore on 15/06/2024. A dedicated Design Researcher with extensive experience in RF Systems and Antenna Design, currently spearheading initiatives in the 5G Research Group at Wipro Technologies. He has a proven track record of innovative research contributions and practical applications in the field of Radio Frequency Engineering. He has work Experience as Design Researcher in 5G R&D Group, Wipro Technologies, Bengaluru. He is Leading the design and development of RF Power Amplifiers for high-efficiency performance in 5G networks. He worked as Radio Frequency Design Engineer In CIPL (deputed to Aeronautical Development Establishment-DRDO), Bengaluru. He Designed antennas for UAV Drones data link systems, contributing to advancements in TAPAS & RUSTOM UAVs. Conducted practical field testing and troubleshooting of SATCom Systems and other RF links.



Resource person started with Antenna Fundamentals such as Operating Frequency, Bandwidth, Radiation Pattern, Directivity, Gain, Efficiency and Polarization. He explained Antenna Design steps and pointed that engineering life is so basic that developers don't always pay adequate attention to the antenna choice.

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He explained following key advantages of antenna:

- Predictable antenna performance: IoT devices operate the same in the field as they do in the lab.
- Agility: A single product design can be easily re-tuned across multiple radio frequencies.
- Greater thermal latitude: Stable operations
- Less performance variance: Greater efficiency across the IoT frequency
- Real-world previews: Accurate in-field simulations prior to product manufacturing.

Resource person suggested that Antenna Innovations and new requirements are expanding the antenna applications by increased capacity demand, spectrum scarcity, and denser networks. Selecting the right antenna from the wide range available can yield significant increases in both capacity and spectrum efficiency.

He described that Antennas are now, more than ever, playing a key role in getting the most out of microwave links. The diverse set of antenna options and innovations discussed produce the positive impacts that decide choices of antennas can have on capacity, hop length, spectral efficiency, network densification. He advised students to do the following to enhance chances to get selected in core companies

- Do projects by own
- Acquire Skills
- Learn programming (Must)
- Do internship
- Learn Simulation tools (Matlab, Ltspice, ADS etc....)
- In his talk he described recent Advances and trends and highlighted a **Reconfigurable Intelligent Surface (RIS)** is programmable surface structure that can be used to **control the reflection** of electromagnetic (EM) waves by changing the electric and magnetic properties of the surface. He addressed Challenges and Future Directions such as,
 - **Bandwidth Limitations:** Increasing demand for higher data rates exceeds current spectrum allocations.
 - **Size and Form Factor:** Antenna size constraints in compact devices like wearables and IoT sensors.
 - **Interference and Crosstalk:** Mitigating signal interference in densely populated frequency bands.
 - **Environmental Factors:** Performance degradation due to weather conditions and physical obstacles.
 - **Integration with Advanced Technologies:** Ensuring compatibility with AI, IoT, and 5G/6G networks.
 - **5G and Beyond:** Antennas tailored for ultra-high-frequency bands and massive MIMO systems.

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- **IoT and Smart Cities:** Antennas optimized for low-power, long-range communication in IoT networks.



Finally Mr. Sudhakara HM, Associate Professor, department of ECE gave memento to the resource person and expressed gratitude for giving such an informative talk to the students.