MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE

(Deemed to be University under Section 3 of UGC Act. 1956)

NAAC **A+**, NIRF 25 (201-300), NBA Accredited (All eligible B.Tech, MBA & MCA Programs)

A Report on

Guest Lecture on "Hydrogen Research Trends and Technologies"

Organized by

Department of EEE in association with IEEE Student Branch Chapter and PES Student Branch Chapter (SBC64791N)

07.10.2025

Chief Coordinator: Dr. AV Pavan Kumar, Professor and Head, Department of EEE, MITS.

Coordinator: Dr. Vineet Kumar, Assistant Professor, EEE Department.

Attendees: 50 members (offline) and 04 (online)

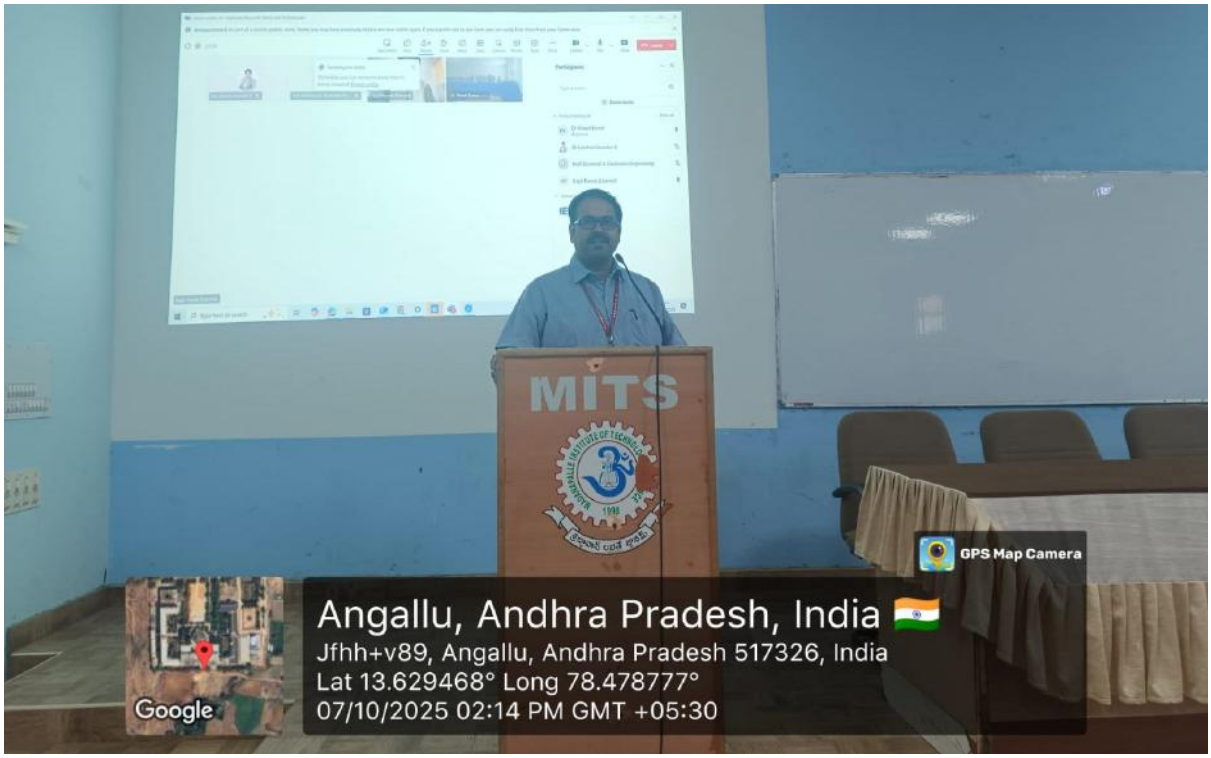
Venue: Seminar Hall **Time: 2:00 PM**

Background

The Department of Electrical and Electronics Engineering, Madanapalle Institute of Technology & Science (Deemed to be University), organized an insightful Guest Lecture on "Hydrogen Research Trends and Technologies" on 07 October 2025 as part of the IEEE Day 2025 celebrations.

The event was held in Seminar Hall – B in hybrid mode, in collaboration with the IEEE Student Branch Chapter and IEEE PES Student Branch Chapter (SBC64791N).

The lecture aimed to enrich students' and faculty members' understanding of emerging hydrogen-based energy technologies, their role in sustainable energy systems, and current research directions shaping the future of clean energy.



Speaker Details

Dr. Kapil Pareek, Ph.D., is currently Head & Assistant Professor at the Centre for Energy & Environment (CEE), Malaviya National Institute of Technology (MNIT) Jaipur.

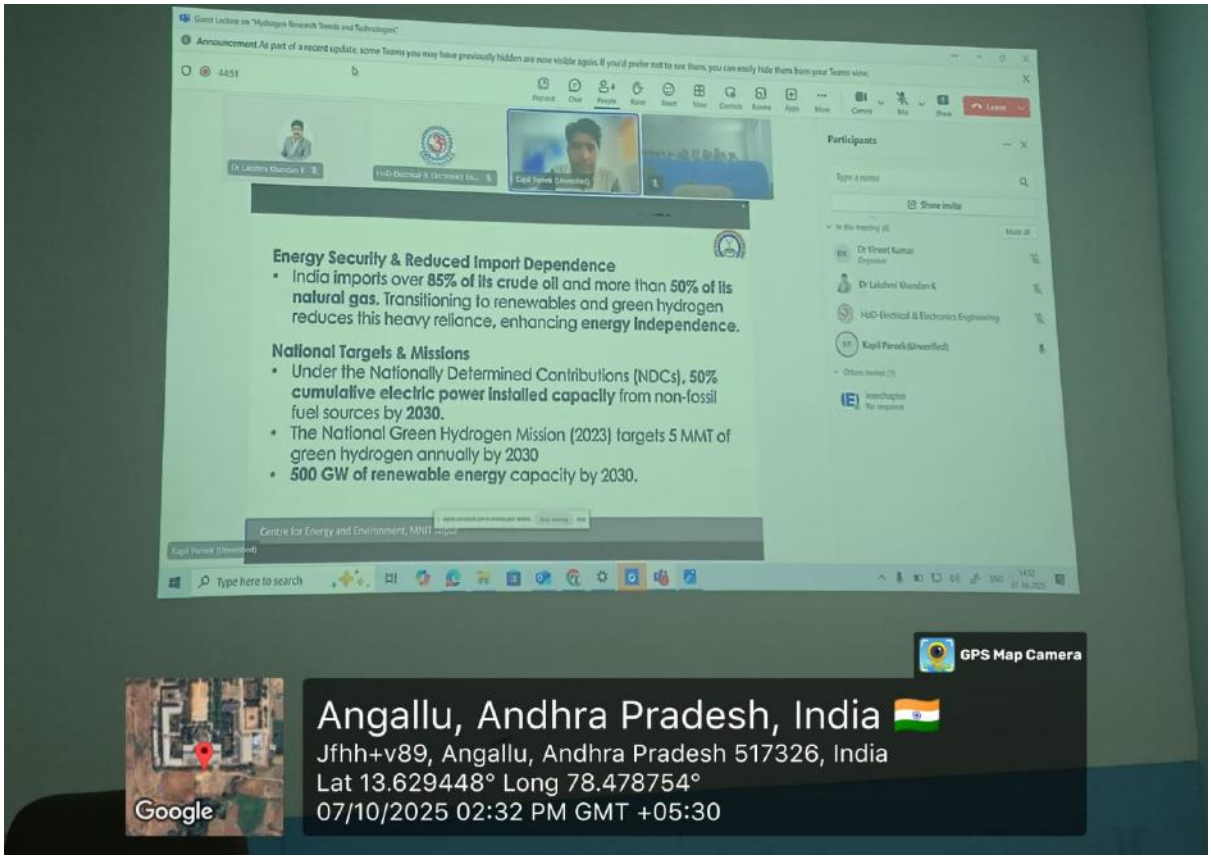
He obtained his Ph.D. in Hydrogen Storage from the National University of Singapore (NUS) and M. Tech in Materials Science & Engineering from IIT Kharagpur. With more than a decade of academic and research experience, Dr. Pareek has made significant contributions in the

domains of hydrogen energy, battery modeling and testing, fault detection, and machine learning applications in energy systems.

At MNIT Jaipur, he leads several sponsored projects focusing on energy storage, fuel cell technologies, and hydrogen production and storage systems. His research findings have been widely published in reputed international journals and conferences.

Detailed Summary of the Event

The session commenced at 2:00 PM with a brief welcome by Dr. Vineet Kumar, who highlighted the relevance of hydrogen energy in addressing global energy transition challenges. Following the welcome, Dr. A.V. Pavan Kumar, Professor and Head, Department of EEE, addressed the audience, emphasizing the importance of knowledge exchange under IEEE Day celebrations.



Dr. Kapil Pareek then delivered his expert talk on “Hydrogen Research Trends and Technologies.”

He began by introducing the fundamentals of hydrogen as a clean energy carrier, its production methods such as electrolysis, thermochemical, and biological routes, and its advantages over conventional fossil fuels.

The lecture delved deeply into:

- Hydrogen production technologies (green, blue, and grey hydrogen).
- Compressed hydrogen storage and safety mechanisms.
- Integration of hydrogen systems with renewable energy sources like solar and wind.
- Recent advances in fuel cell technologies and material innovations for hydrogen storage.

- Challenges in commercialization and future research directions to make hydrogen a mainstream energy solution.

The talk also included discussions on battery-hydrogen hybrid systems, AI-based optimization in energy storage, and India's national hydrogen mission.
An engaging Q&A session followed, during which participants interacted with the speaker on practical challenges in hydrogen adoption and research collaboration opportunities.

A vote of thanks was delivered by Dr. Vineet Kumar, expressing gratitude to the Chancellor and Vice Chancellor of MITS Deemed to be University for fostering a culture that encourages such events, and the Head of the EEE Department, Dr. A.V. Pawan Kumar, for his unwavering support and guidance in organizing the event, as well as to the faculty members, guest speakers, and student volunteers for their valuable contributions in making the event a grand success.

SDG Mapping

The guest lecture on "Hydrogen Research Trends and Technologies" directly aligns with the United Nations Sustainable Development Goals (SDGs), particularly **SDG 7** – Affordable and Clean Energy, by promoting the use of hydrogen as a sustainable and low-carbon energy carrier. It also supports **SDG 9** – Industry, Innovation and Infrastructure, **SDG 12** – Responsible Consumption and Production, **SDG 13** – Climate Action, and **SDG 17** – Partnerships for the Goals through its focus on innovative clean energy technologies,

responsible energy transition, and collaborative research between institutions for advancing sustainable energy systems.

POs Mapping

The event contributed significantly to several NBA Program Outcomes (POs) of the Electrical and Electronics Engineering program. It enhanced participants' understanding of engineering knowledge (**PO1**), problem analysis (**PO2**), and modern tool usage (**PO5**) in the context of hydrogen and renewable energy systems. The discussion on environmental impact and sustainability mapped strongly to **PO7** (Environment and Sustainability), while encouraging lifelong learning (**PO12**) and effective communication (**PO10**) through interaction with a domain expert.

Outcome of the Event

The event witnessed enthusiastic participation from students, faculty members.

- Participants gained a comprehensive understanding of hydrogen energy systems, including production, storage, and applications.
- The session encouraged students to explore research and project opportunities in hydrogen and renewable energy domains.
- Faculty members expressed interest in collaborative research and knowledge exchange with MNIT Jaipur in sustainable energy systems.
- The lecture enhanced the awareness of IEEE's global initiatives promoting green and clean technologies.

Overall, the event successfully contributed to promoting sustainable technology learning and inspiring future innovators in the field of smart and renewable energy systems.

Sample Copy of Participation Certificate

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MADANAPALLE - 517325, ANNAMAYYA DIST., ANDHRA PRADESH, INDIA

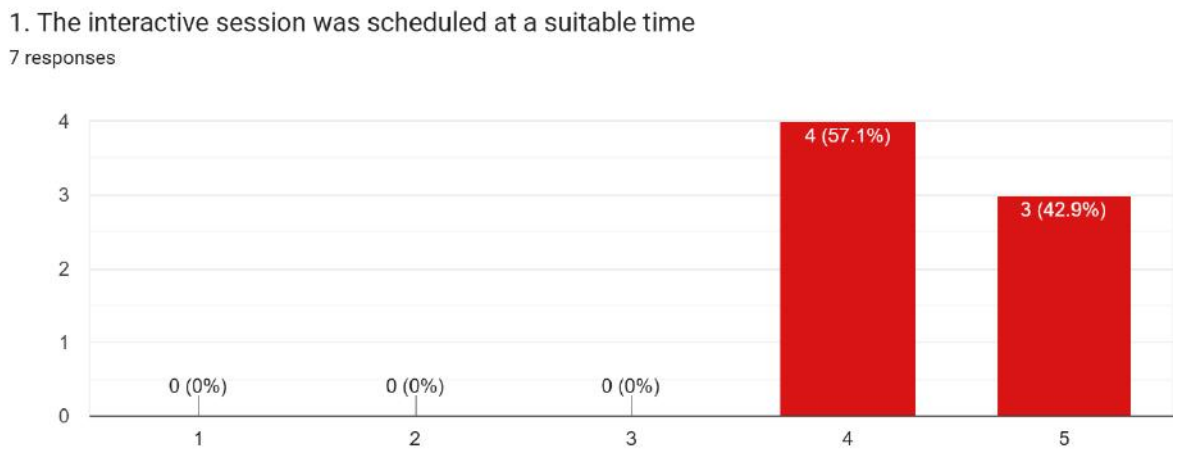
Certificate of Participation

This is to certify that VIJENDRAKUMAR MAHENDRAKUMAR VARDE, GIDC, GUJARAT has actively participated in the Guest Lecture on "Hydrogen Research Trends and Technologies" delivered by Dr. Kapil Pareek, Head & Assistant Professor, Center for Energy & Environment, MNIT Jaipur, organized by the Department of Electrical and Electronics Engineering, Madanapalle Institute of Technology & Science (Deemed to be University), in association with the IEEE Student Branch Chapter and PES Student Branch Chapter (SBC6479IN).

Dr. A. V. Pavan Kumar
HOD/EEE ,
MITS, Madanapalle

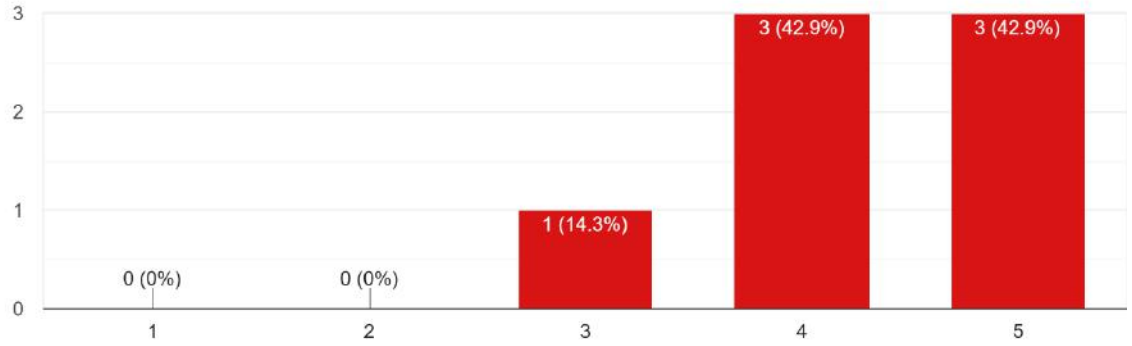
Dr. Vineet Kumar
Asst. Prof., EEE and
coordinator

Feedback:



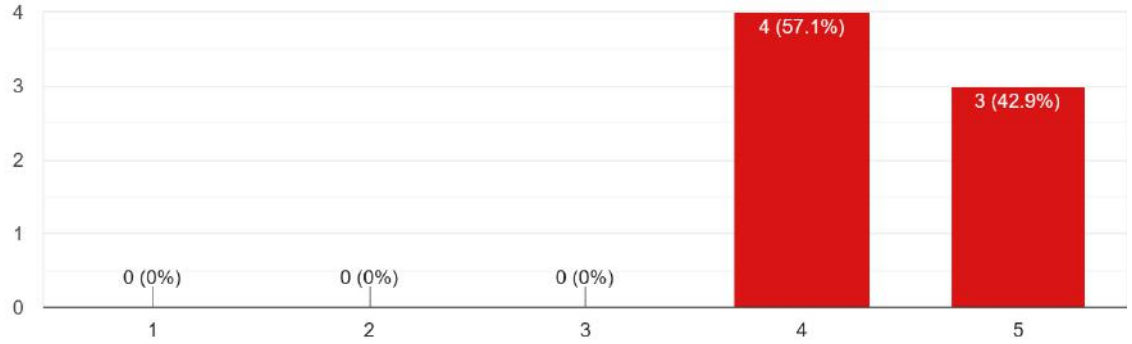
2. The interaction was useful and resource person explanation.

7 responses



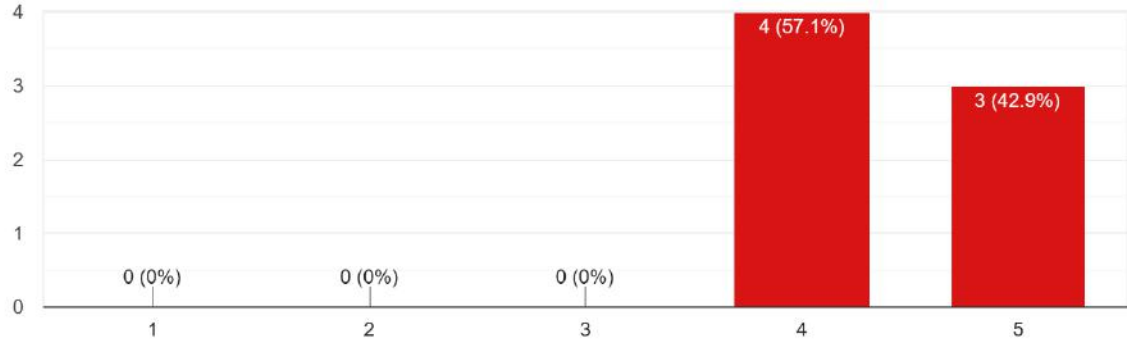
3. The information in the interaction was presented in a clear and organized manner.

7 responses



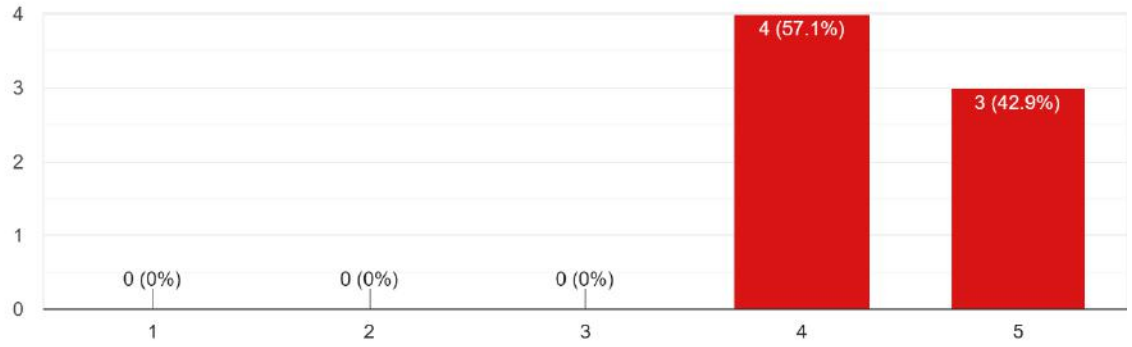
4. The presenter responded to questions an informative, appropriate and satisfactory manner.

7 responses



5. your impression of facilities provided by the institute for interaction.

7 responses



With regards,

Dr. Vineet Kumar

Assistant Professor, Department of EEE & Department IEEE/ISTE coordinator,

MITS, Madanapalle.