SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES, Chittoor
UGC AUTONOMOUS
(Approved by AICTE, Affiliated to JNTUA, Accredited by NBA (EEE & MCA)

DOMAIN SPECIFIC WORKSHOP

Six Days Domain Specific Workshop on

"Smart Hybrid Electric Vehicle Systems"

Organized by

Department of Mechanical Engineering

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES, Chittoor
UGC AUTONOMOUS
(Approved by AICTE, Affiliated to JNTUA, Accredited by NBA (EEE & MCA)

Conducted during 8th- 13th, Dec 2025

ABOUT THE COLLEGE:

Sreenivasa Institute of Technology and Management Studies (SITAMS) was established in the year 1998-99 under Srinivasa Trust by a prominent industrialist late Dr.D.K.Audikesavulu, Ex.M.P, Former TTD Chairman. Over the last 20 years, SITAMS has made remarkable progress in teaching, research and consultancy in the field of technical education and management studies under the Chairperson Late. Smt. D.A.Sathyaprabha (W/o Late Dr.D.K.Audikesavulu), MLA, Chittoor.(2013-2021) and Chairman Shree K.Ranganatham, former Advisor for Power Sector, Govt of Andhra Pradesh. SITAMS, a pioneer of value based education, offers both U.G. (ECE, CSE, CSE(AIML), CSE(AI), CSE(DS), EEE, Civil & Mechanical) and P.G. (MBA, MCA & M.Tech.), courses under JNTUA, Anantapuramu and is approved by AICTE, New Delhi. The college got 2(f) and 12(b) status by the UGC in the year 2013, Autonomous in the year 2013-14 and NAAC accredited.

The Chairperson and the members of the Governing Body have felt the need of preparing a strategic development plan for the institution in a formal written document format. The mandate was given to the Principal to develop strategic plan 2024-2029 for the institution. The management & top leadership team met and brain stormed on SWOT and stake holders expectations. The Leadership team met a number of times, deliberated in detail and arrived at vision, mission, quality policy and core values for SITAMS. Environment scanning was done keeping vision in mind. The team also discussed about Institutes strategic High Level Goals (USG/HLG) to be achieved by 2029.

Academic institutions have been the bedrock for research for a very long time. At these places, the good teaching-learning and research go hand-in-hand. They are the two sides of the same coin. It is evident that for effective teaching, research is essential. The learning outcomes for the students who undergo research-based teaching are better and leading to a high rate of progression to higher education, research and career. The institution though predominantly a teaching-learning institution has been considering research as one of its prime growth verticals. Thus a conscious effort is made to prepare an objective policy to promote, monitor and evaluate development of the Institute.

Institution strategic goals formed the main theme for arriving at strategies, sub strategies and road to accomplish them. Each Strategy was deliberated and sub-strategies were arrived towards implementation plan. Implementation plan worked out all details such as budget, resources needed and leaders responsible to implement with time lines. This implementation is separately maintained by the head of the institution.

Departments play a pivotal for the institution; hence each department worked out on their vision, mission and short, mid & long term goals. The implementation plan for the departments also reflected all details such as budget, resources needed as well as leader responsible with time lines. HODs form the core team for implementing departmental goals under the guidance of Deans/ Principal.

Strategic Development Plan emphasizes on evaluation measures, monitoring team along with deviation steps if any over a period of time. The evaluative components for each stake holder are clearly spelt out along with periodicity of performance evaluation reviews.

ABOUT THE DEPARTMENT:

The Department of Mechanical Engineering was established in the year 2012 with an intake of 60 and the number increased to 120 in 2013 and 90 in 2018. The department is accredited by the National Board of Accreditation (NBA) for a period of three years from 2019-20 to 2021-2022. The department also offers M.Tech (Product Design) program from 2020. The department is headed by Dr. N SATISH KUMAR Ph.D. Mechanical Engineering is a fast growing discipline in tune with the demands in the core areas of infrastructure and Manufacturing. The department has well equipped laboratories with an emphasis on practical approach and skills for an outcome based learning. The department has well qualified, knowledgeable and dedicated faculty.

The goal of Mechanical Engineering department is to enable students for their entry into the Mechanical Engineering profession, and is designed to meet a carefully planned set of educational objectives. We strive to prepare our students for an un comparable employability in the area of Mechanical Engineering.

A Technical Association named as “MEDA-Mechanical Engineering Department Association” was established with the objective of exploring new areas of Research and sophisticated smart technologies in the industry. To fulfil this objective a series of technical workshops, seminars, technical fests and guest lectures are being conducted every year. The students are encouraged to present papers and participate in various technical events at the National level.

ABOUT WORKSHOP

Smart Hybrid Electric Vehicle (S-HEV) systems blend a traditional gasoline engine with electric power via an Integrated Starter Generator (ISG) and dual batteries, enabling features like **Auto Start-Stop** (engine off at idle), **Regenerative Braking** (capturing energy during deceleration), and **Torque Assist** (electric boost during acceleration) for better fuel efficiency and performance without needing a plug. These systems intelligently manage both power sources to reduce fuel use and emissions, making them efficient for city and highway driving.

OBJECTIVES OF THE WORKSHOP:

The primary objectives of smart hybrid electric vehicle (SHEV) systems are to improve fuel efficiency, reduce emissions, and enhance overall vehicle performance and safety **by intelligently managing the power flow between an internal combustion engine and an electric motor.**

RELEVANCE

"Smart" hybrid electric vehicle (HEV) systems are highly relevant as a practical, transitional solution in the global shift toward sustainable transportation. They offer a balance of improved fuel efficiency, reduced emissions, and the driving range of conventional vehicles, without the need for external charging infrastructure.

BENEFITS

Smart Hybrid Electric Vehicle (SHEV) systems offer major benefits by blending electric assist with gasoline power for **superior fuel efficiency** (saving money), **reduced emissions**, and a **smoother, quieter ride**, especially in city traffic, thanks to features like auto start-stop and regenerative braking that charge a battery, making them a practical, affordable bridge to full EVs without range anxiety or complex charging needs.

OUTCOMES

Smart hybrid electric vehicle (SHEV) systems offer a transitional solution in the shift toward sustainable transport, providing a balance of improved fuel economy, reduced emissions, and enhanced driving performance compared to conventional internal combustion engine (ICE) vehicles. .

CHAIRMAN

Sri. K.Ranganatham

Sreenivasa Institute of Technology and Management Studies (Autonomous), Chittoor, A.P, India.

CONVENOR

Dr. N.Venkatachalapathi

Principal, SITAMS,

Chittoor

COORDINATOR

Dr. N.Satish Kumar

Associate Professor & HOD

Department of Mechanical Engineering, SITAMS Chittoor

ORGANIZING COMMITTEE

S.No	Name	Designation
1	Dr. S.Rajesh	Professor
2	Mr.R.Satheesh	Associate Professor
3	Mr.D.Raju	Assistant Professor
4	Mrs.K.Santhosh Priya	Assistant Professor
5	Mr.A.S.Praveen	Assistant Professor
6	Mr.G.Narasimhulu	Assistant Professor

AIM AND OBJECTIVES OF THE EVENT

Aim:

The primary aim of smart hybrid electric vehicle (s-HEV) systems is to optimize the balance between a conventional internal combustion engine (ICE) and an electric motor to improve fuel efficiency, reduce emissions, and enhance overall vehicle performance**.**

Objectives:

The primary objectives of smart hybrid electric vehicle (SHEV) systems are to improve fuel efficiency, reduce environmental emissions, and enhance overall vehicle performance by intelligently combining an internal combustion engine (ICE) with an electric propulsion system.

Outcome of the Event

Smart hybrid electric vehicle systems yield significant benefits in fuel efficiency, reduced emissions, and enhanced performance**. These systems intelligently combine a traditional internal combustion engine (ICE) with an electric motor and a battery to optimize power delivery and energy consumption across various driving conditions. Speaker Schedule Overview**

Day 1: Dec 2025

- **8th Dec Inauguration Function**: 9:30 AM – 11:00 AM

Address the gathering by Dr.K.L.Narayana, Advisor, SITAMS

Address the gathering by Dr.N.Venkatachalapathi, Principal,

Address the gathering by Dr.N.Satish Kumar, Program Co-ordinator,

- The inaugural ceremony of the Domain Specific Workshop on **"Smart Hybrid Electric Vehicle Systems"** commenced on 8th **Dec 2025** at **Sreenivasa Institute of Technology and Management Studies (Autonomous), Chittoor**.
- The Chief Guest, **Dr. K.L.Narayana**, Retd. Professor, delivered an insightful address on the integration of technology in academia. He emphasized the transformative role of technology in enhancing teaching methodologies and research practices, inspiring students to embrace innovative tools for academic excellence.
- The event set the tone for a productive and enriching Six-day program, fostering collaboration and knowledge-sharing among students.

Day 1: 8th Dec 2025

- **Session 1:**
- **Topic: Role of Electric Vehicles in Modern Society and Their Impact on Future Mobility**
- **Speaker: Dr.K.L.Narayana Retd Profressor & Principal ,S,V.University,Tirupati**

  Time: 11:00 AM – 12:30 PM

Electric Vehicles (EVs) play a vital role in modern society by offering a clean, efficient, and sustainable alternative to conventional fossil fuel–based transportation systems. With the rapid increase in air pollution, fuel costs, and global warming, EVs have emerged as an eco-friendly solution that significantly reduces greenhouse gas emissions and dependence on petroleum resources. In urban areas, EVs help improve air quality by eliminating tailpipe emissions, thereby contributing to better public health. Their high energy efficiency, low maintenance cost, and quiet operation make them highly suitable for daily commuting and city transport.

In the present scenario, governments across the world are promoting electric mobility through subsidies, tax benefits, and the development of charging infrastructure. The integration of smart grids, renewable energy sources, and advanced battery technologies has further accelerated the adoption of EVs. Features such as regenerative braking, fast charging, and intelligent energy management systems have improved vehicle performance and user convenience.

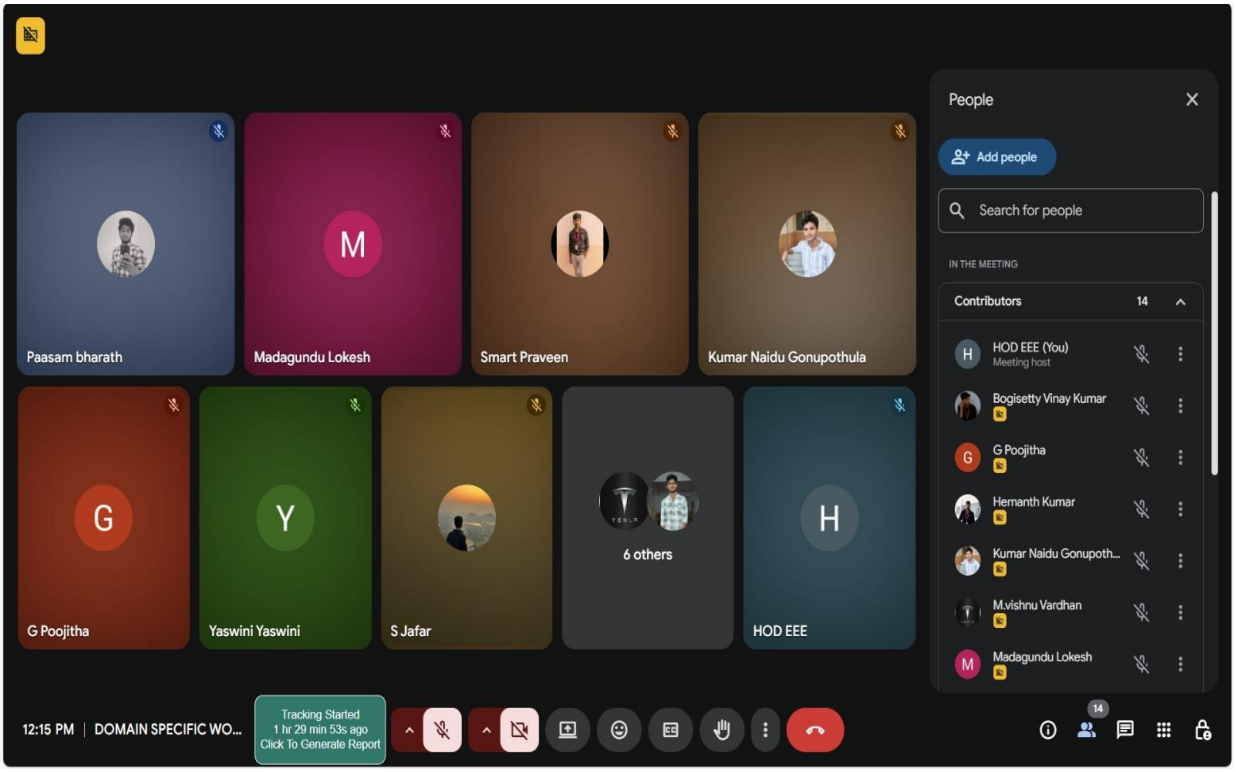
Session 2:

Topic: Battery Technologies for Electric Vehicles: Present Status and Future Developments

Speaker: Dr.K.L.Narayana Retd Profressor & Principal ,S,V.University,Tirupati

Time: 1:45 PM – 4:45 PM

Battery technology is the backbone of electric vehicles, as it directly affects driving range, charging time, safety, cost, and overall performance. At present, most electric vehicles use Lithium-ion (Li-ion) batteries because of their high energy density, long cycle life, low self-discharge rate, and good efficiency. These batteries commonly use chemistries such as Lithium Iron Phosphate (LFP), Nickel Manganese Cobalt (NMC), and Nickel Cobalt Aluminum (NCA). Among these, LFP batteries are widely adopted due to their high safety and long lifespan, while NMC and NCA batteries are preferred for their higher energy density, which helps in achieving longer driving ranges.



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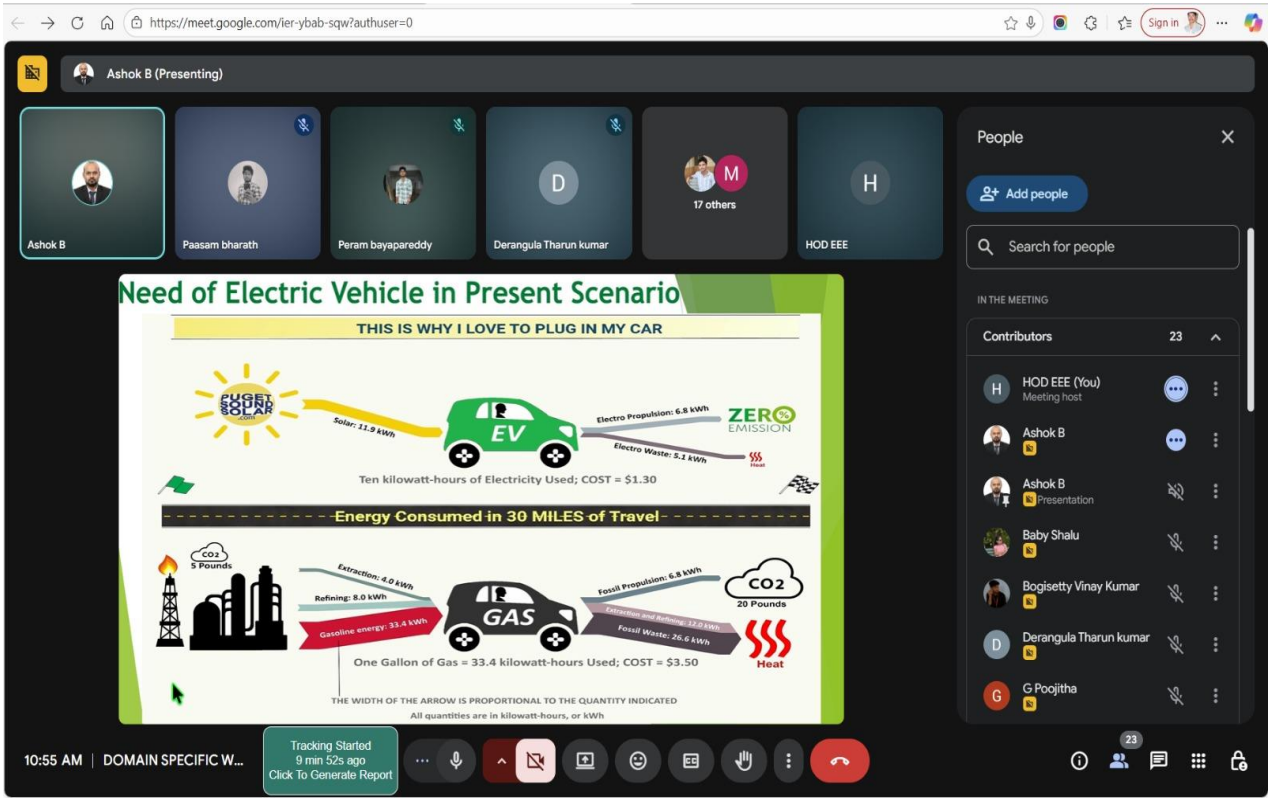
Day 2: 9th Dec 2025

- **Session 1**

  Topic: Transition to Electric Mobility in India: Barriers Exploration and Pathways to Power train Shift and overview of the Electric vehicle power train components

  Speaker: Dr.B.Ashok, Ph.D, PDF, Professor, Department of Automative Engineering, SMEC, VIT Univeristy, Vellore.

  Time: 10:00 AM – 12:00 PM



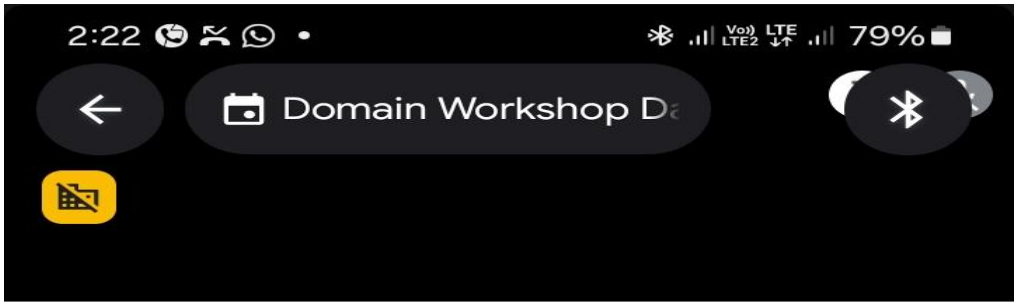
- **Session : 2**

  Topic: Battery Thermal Management System

  Speaker: Dr.D.Madhesh, Professor, AMET University, Chennai.

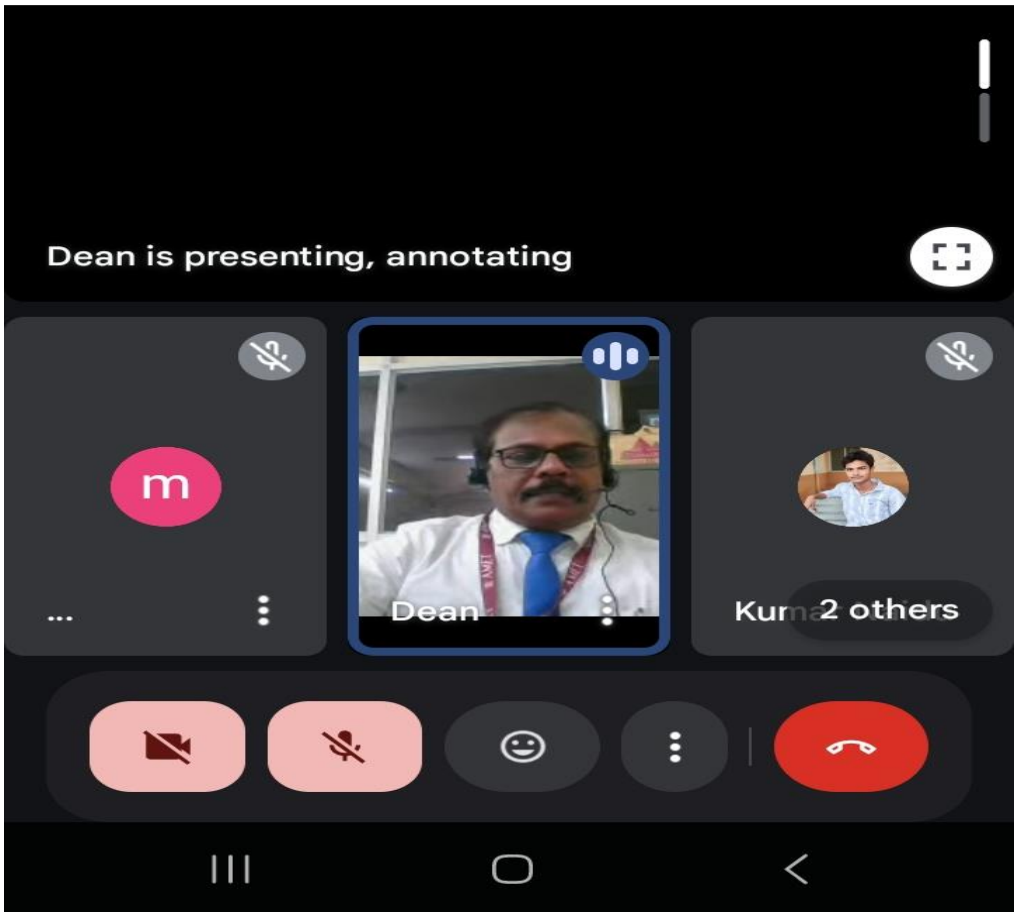
  Time: 2.00 PM – 4:00 PM

Dr.D.Madhesh, session on Battery Thermal Management System. In this session he explain about (BTMS) for EVs regulates battery temperature (ideally 15-35°C) using active (air/liquid cooling, heat pumps) or passive (heat pipes, PCMs) methods to prevent overheating (thermal runaway) and underperformance, ensuring safety, maximizing lifespan, range, and fast charging by removing/adding heat, maintaining uniformity within the pack for optimal performance



Passive Cooling:

- Some buildings do not require devices for cooling systems because they radiate heat in natural ways.
- These systems are usually made of materials that possess certain thermophysical characteristics, such as high thermal conductivity, so that heat can be released through convection.



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- M.vishnu Vardhan — Visitor
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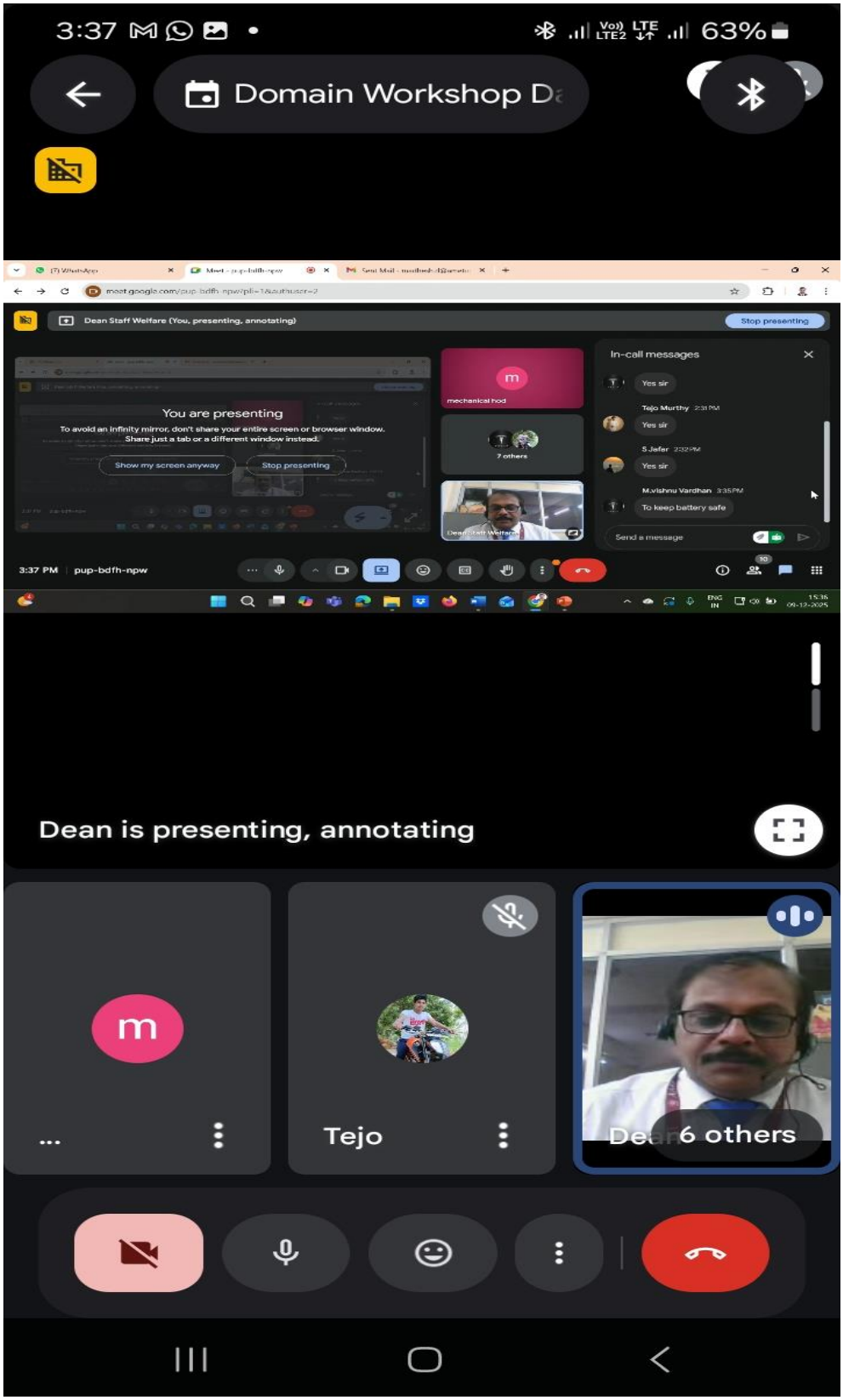
- Yaswini Yaswini — Visitor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Day 3: 10th Dec 2025

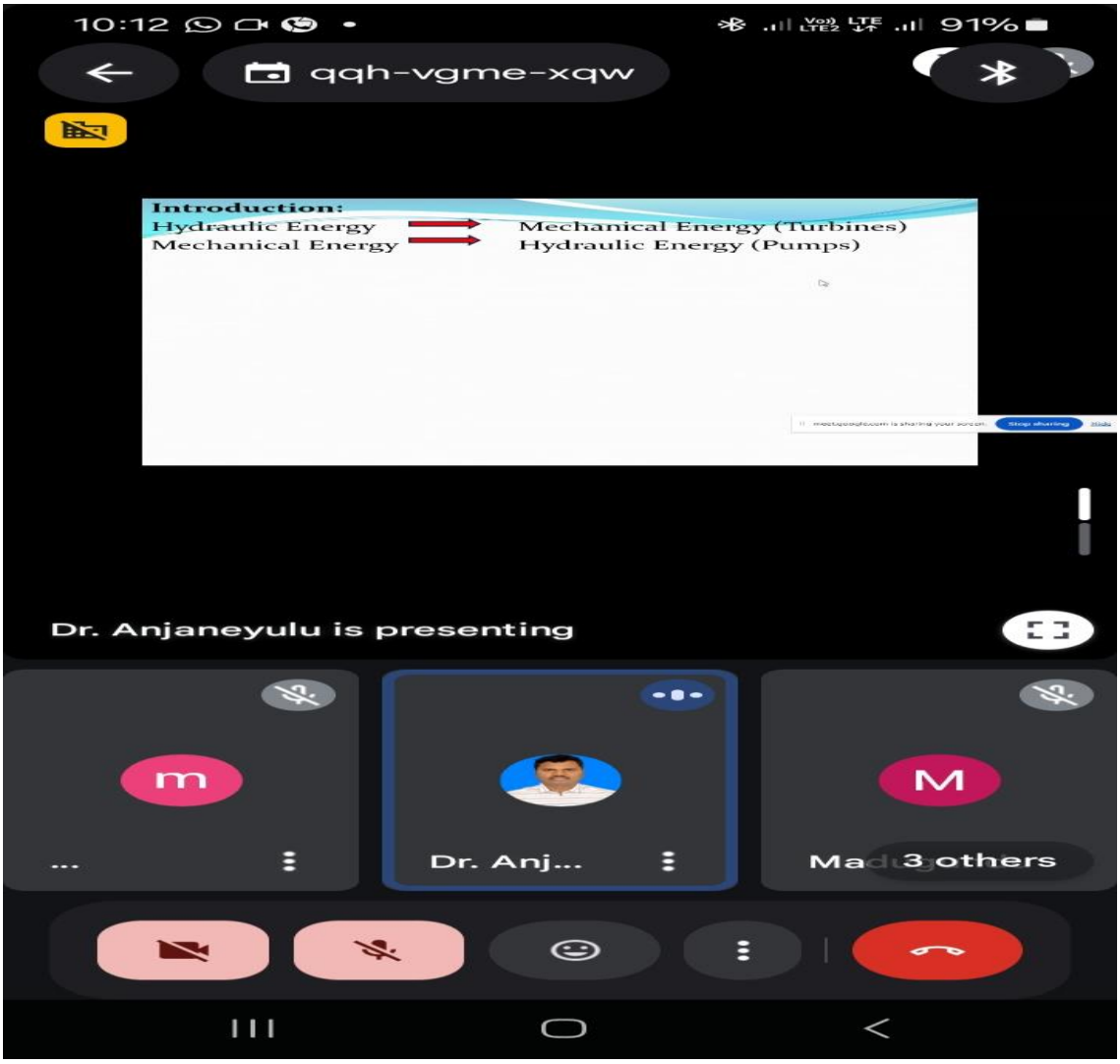
- **Session 1 :**

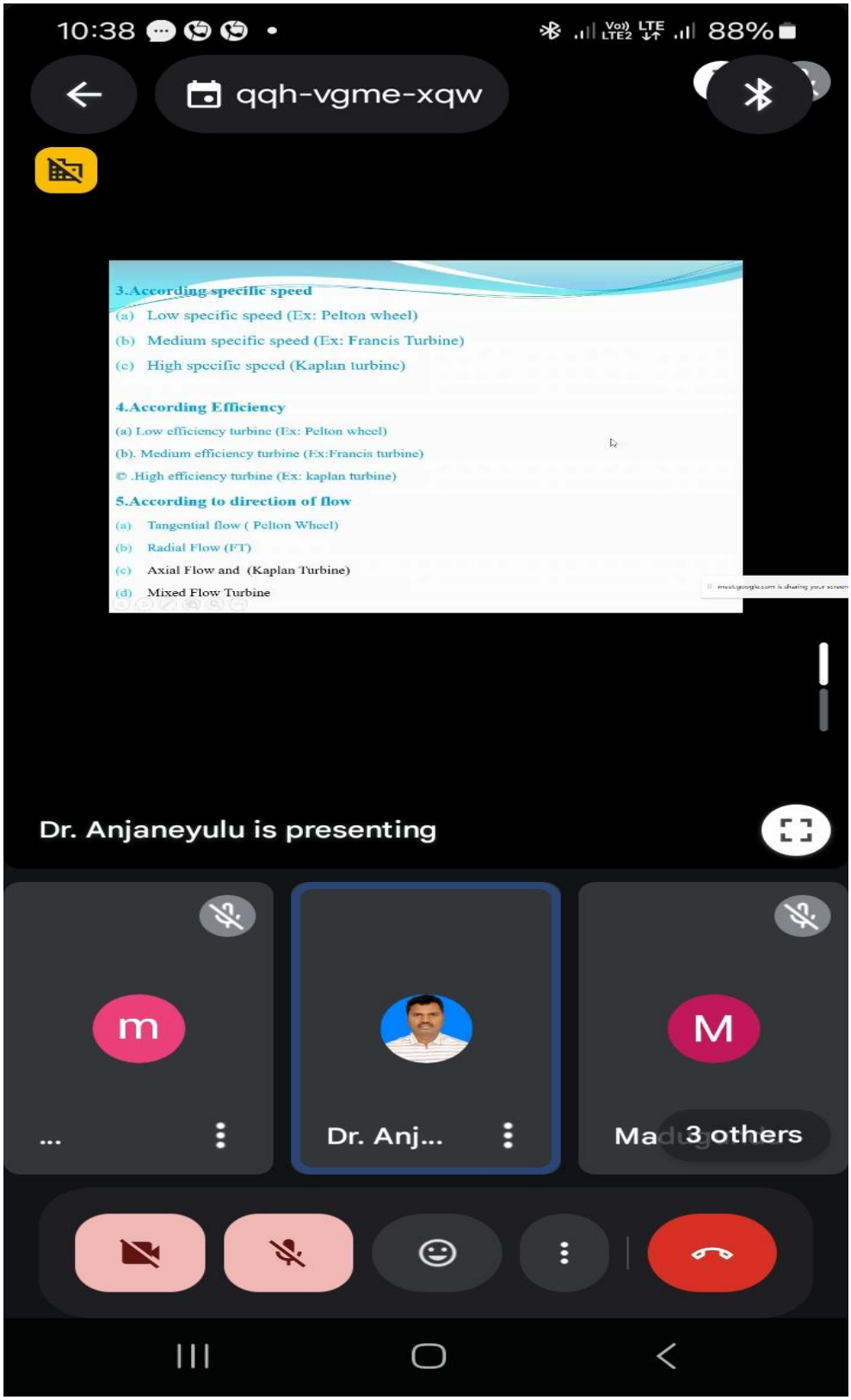
  Topic: Hydraulic Machines

  Speaker: Dr.B.Anjaneyulu, Professor, SRIT, Anatapuram

  Time: 10.00 AM – 12.00 PM

Dr.B.Anjaneyulu talk's about the primary outcome of hydraulic machines is **force multiplication and precise control**, enabling small input forces to move massive loads (like in lifts, cranes, presses) with high efficiency, smooth operation, and reliability, transforming heavy industry through power, accuracy, and versatility, though requiring careful maintenance to avoid leaks and contamination.

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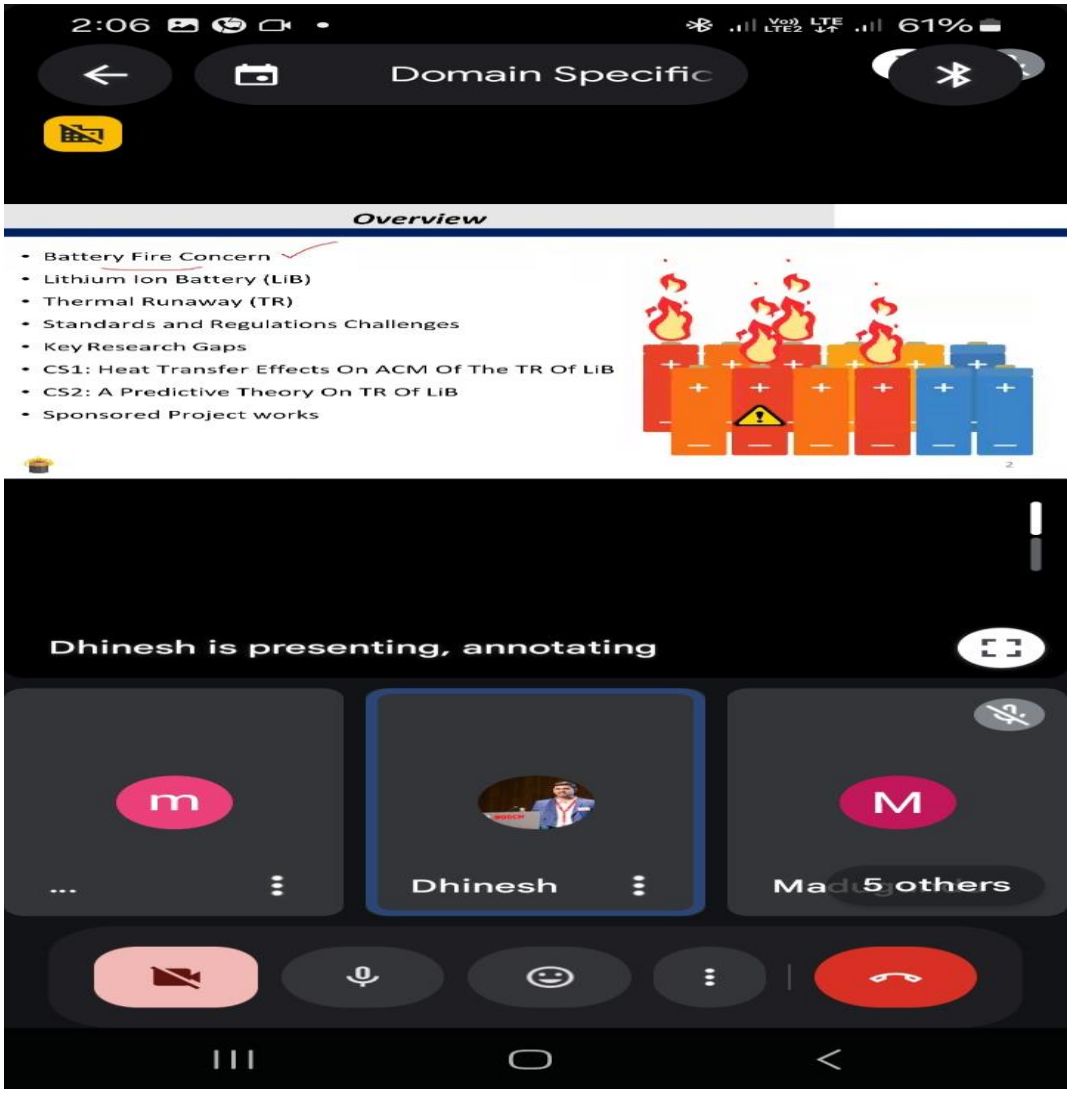
- **Session 2:**

  Topic: AI-Enhanced Prevision Of Thermal Run Way To Lithium-Ion Batteries

  Speaker: Dr.Dhinesh Balasubramaniah, Assistant Professor (Senior), Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, TamilNadu

  Time: 2.00 PM – 4:00 PM

Dr.Dhinesh Balasubramaniah session delivers a significant improvement in **safety, reliability, and performance** of battery systems in electric vehicles and energy storage systems. By enabling early detection and proactive mitigation, AI transforms battery management from a reactive to a predictive process.



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Lithium Ion Battery

Akira Yoshino

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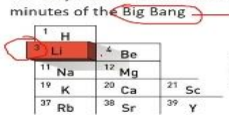
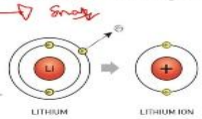
Lithium, an ancient element that was created during the first minutes of the Big Bang





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Day 4: 1st May 2025

- **Session 1 :**

  Topic: Hands-on Session on Electric Vehicle Diagnostics, Testing & Performance Evaluation

  Speaker:. Mr.Mohanavel Technical Advisor, EV Nexus Pvt Ltd, Chennai

  Time: 9:30 AM – 12:30 PM

  A practical session on Electric Vehicles was conducted by Mr. Mohanvel, during which participants were given hands-on exposure to various components and operational aspects of electric vehicle systems. The session covered the practical demonstration of battery packs, battery management systems, motor drive units, controllers, and charging mechanisms. Mr. Mohanvel explained the real-time working of electric vehicle powertrains, including energy flow from the battery to the motor and the functioning of regenerative braking. The participants were also guided on safety procedures, fault identification, and basic troubleshooting techniques in EV systems. This practical session helped bridge the gap between theoretical knowledge and real-world applications, enabling the students to gain better understanding and confidence in working with electric vehicle technologies.

- **Session 2:**

  Topic: Hands-on Session on Electric Vehicle Diagnostics, Testing & Performance Evaluation

  Speaker:. Mr.Mohanavel Technical Advisor, EV Nexus Pvt Ltd, Chennai

  Time: 1:45 PM – 4:45 PM

In the afternoon session, a hands-on practical session was conducted to provide participants with real-time experience in electric vehicle systems. During this session, students actively worked with EV components such as battery modules, motor controllers, inverters, and charging units. They were trained on system connections, parameter monitoring, and basic testing procedures under the guidance of the resource persons. The session also included demonstration of safety practices, fault diagnosis, and performance evaluation of the EV setup. This interactive hands-on session greatly enhanced the practical understanding of the participants and strengthened their technical skills in the field of electric vehicle technology.

Day 5: 12th Dec 2025

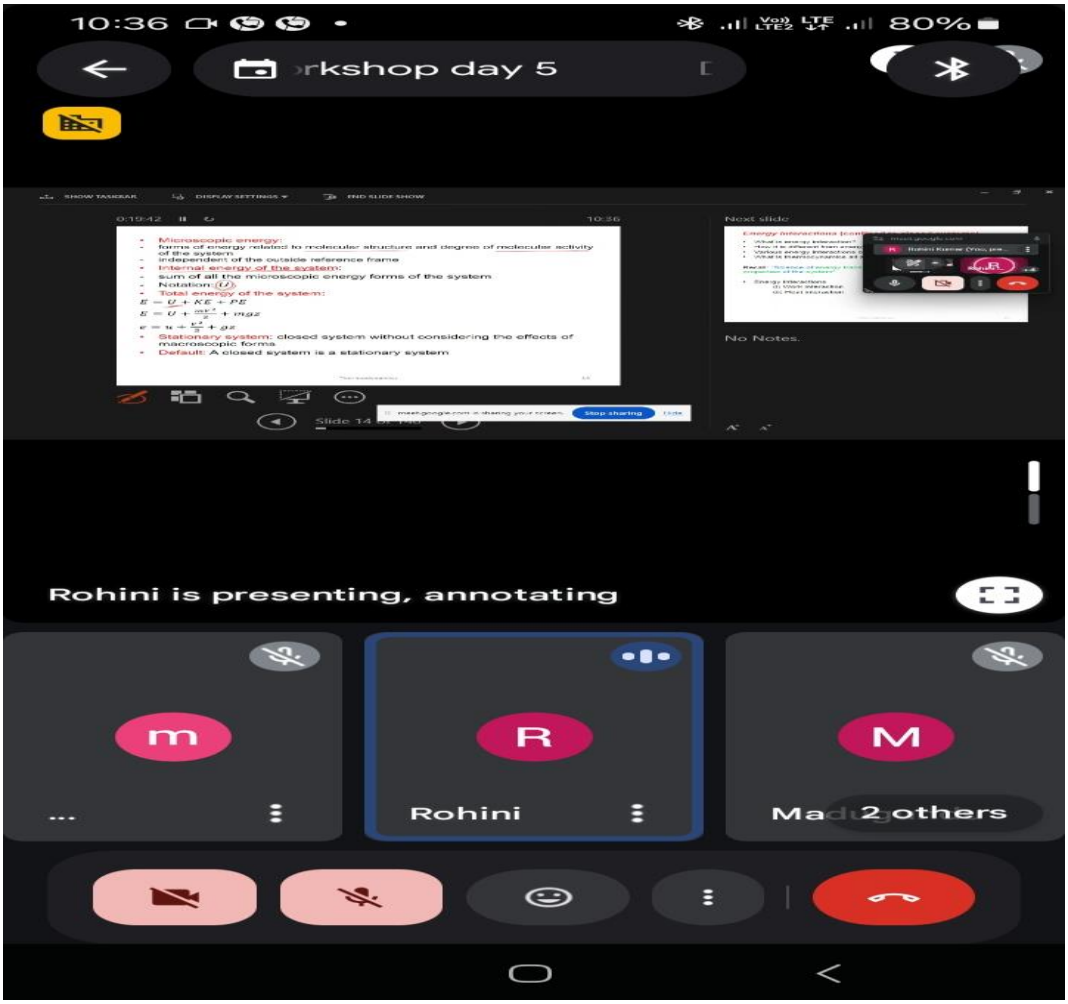
Session 1:

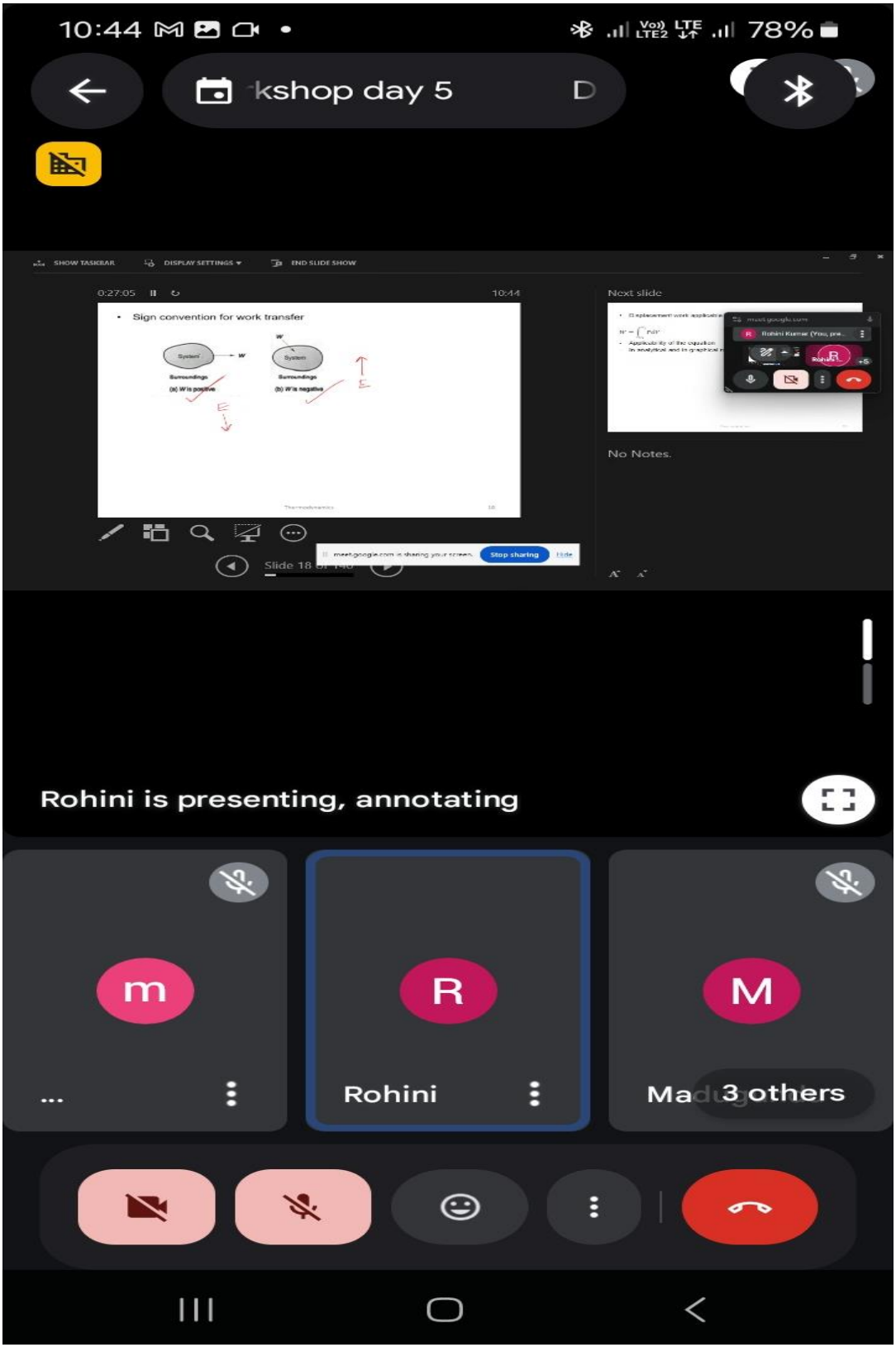
Topic: Fundamental Aspects of Thermal Sciences such as Fluid flow, Heat Transfer and Thermodynamics

Speaker: Dr.Rohini Kumar, Professor, NIT Calicut, Kerala

Time: 10:00 AM – 12:00 PM

Dr.Rohini Kumar session gives the study of fundamental thermal sciences provides the principles to **design, analyze, and optimize systems involving energy, heat, and fluid movement** across numerous industries and everyday applications. The key outcomes include improved energy efficiency, technological innovation, and a better understanding of natural phenomena

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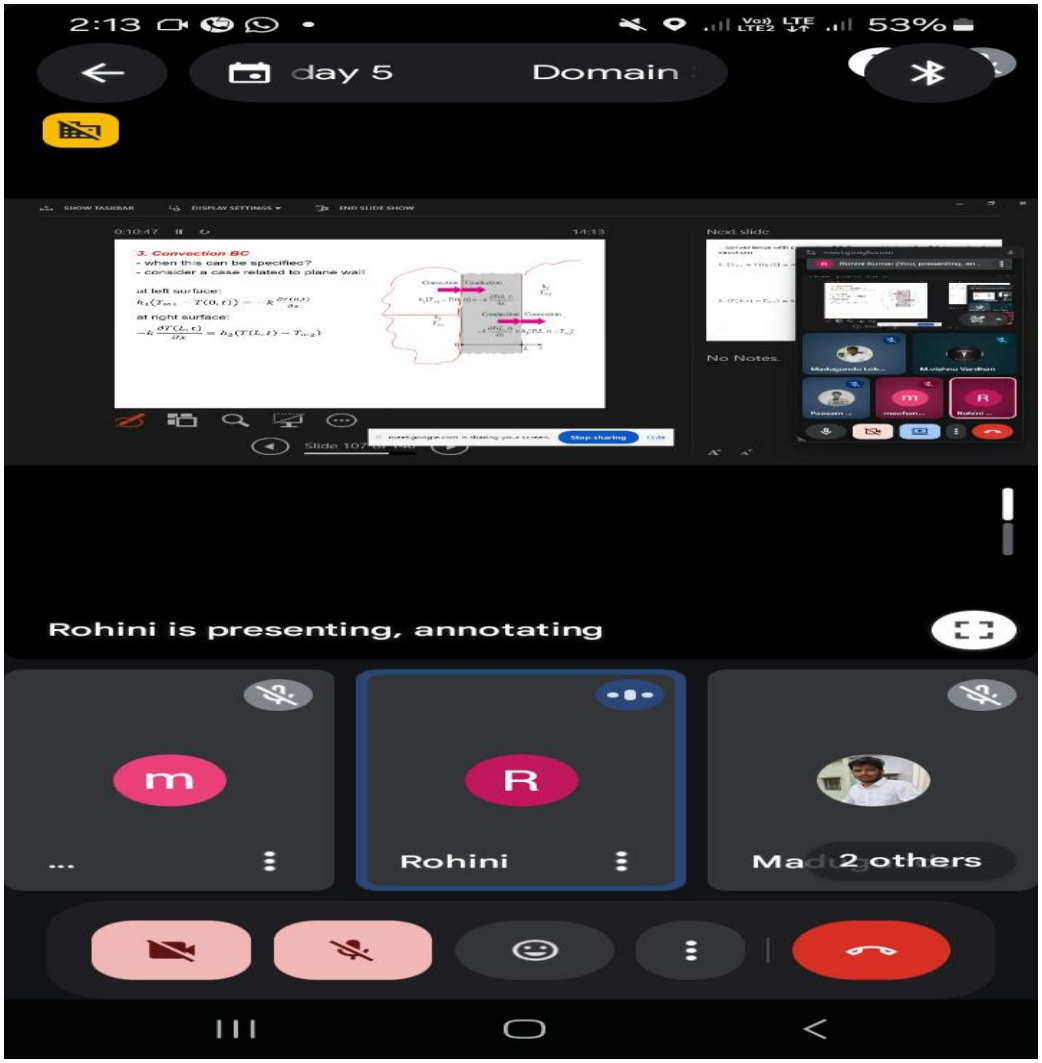
Session 2:

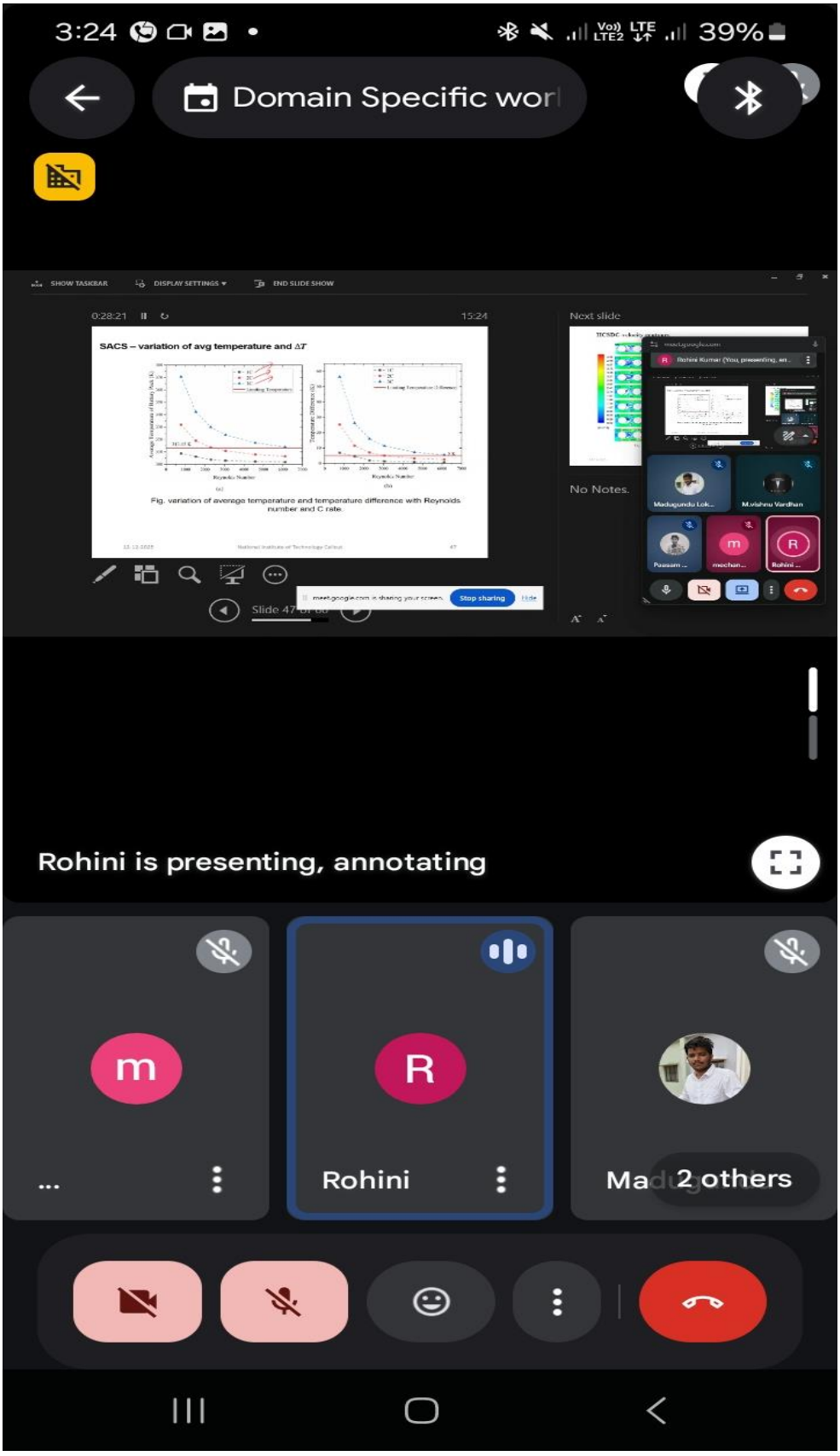
Topic: Thermal Management of Electric Vehicle Battery

Speaker: Dr.Rohini Kumar, Professor, NIT Calicut, Kerala

Time: 2.00 PM – 4.00 PM

Dr.Rohini Kumar session provides detailed information about the Effective EV battery thermal management (BTMS) outcomes include **enhanced safety** (preventing thermal runaway), **improved performance** (better range, faster charging), **longer battery lifespan**, and **greater efficiency**, achieved by keeping the battery within an optimal temperature range (around 15-35°C) and ensuring uniform cell temperature, leading to better power delivery, faster charging.

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SACS – variation of avg temperature and ΔT
Fig. variation of average temperature and temperature difference with Reynolds number and C rate.
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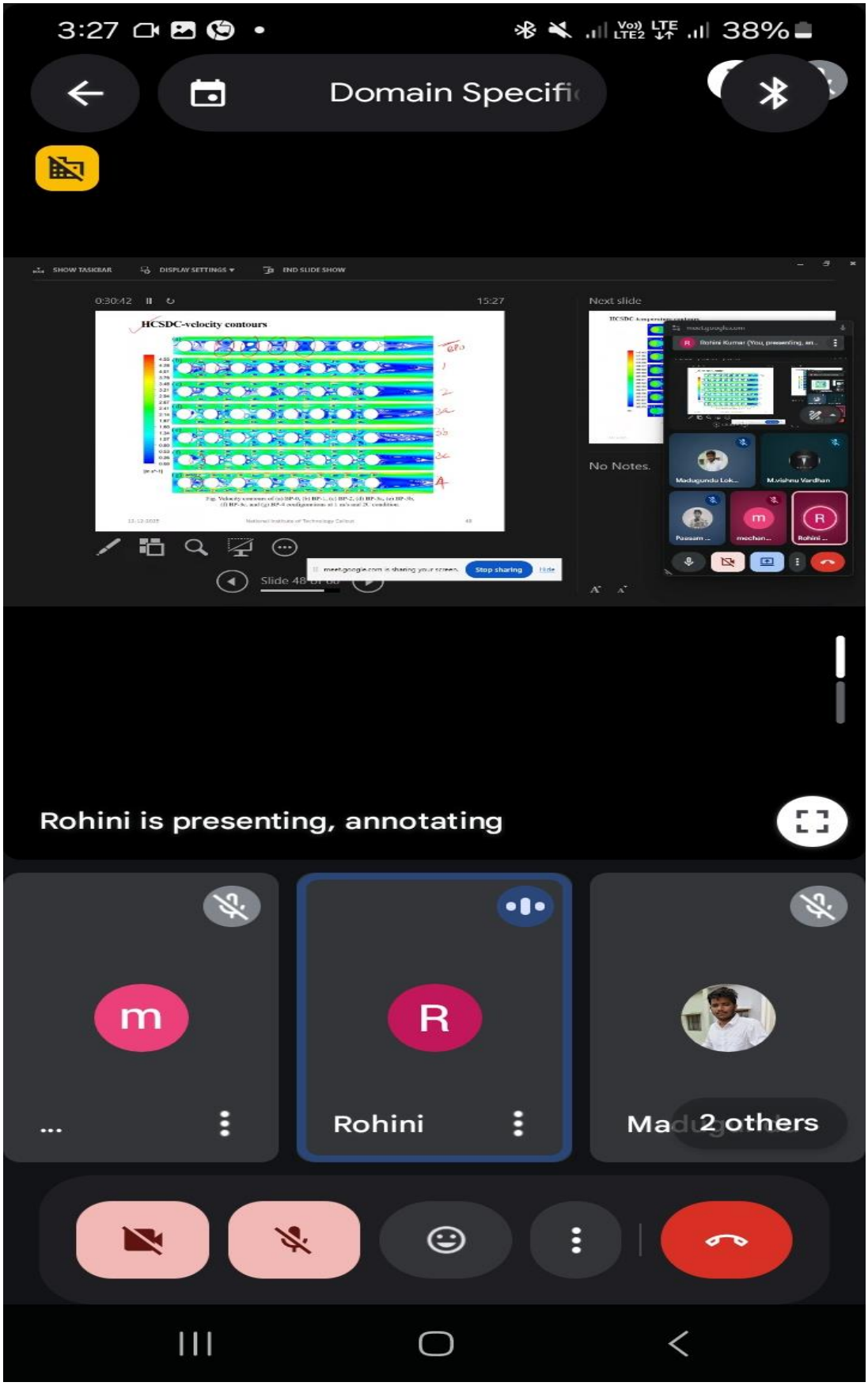
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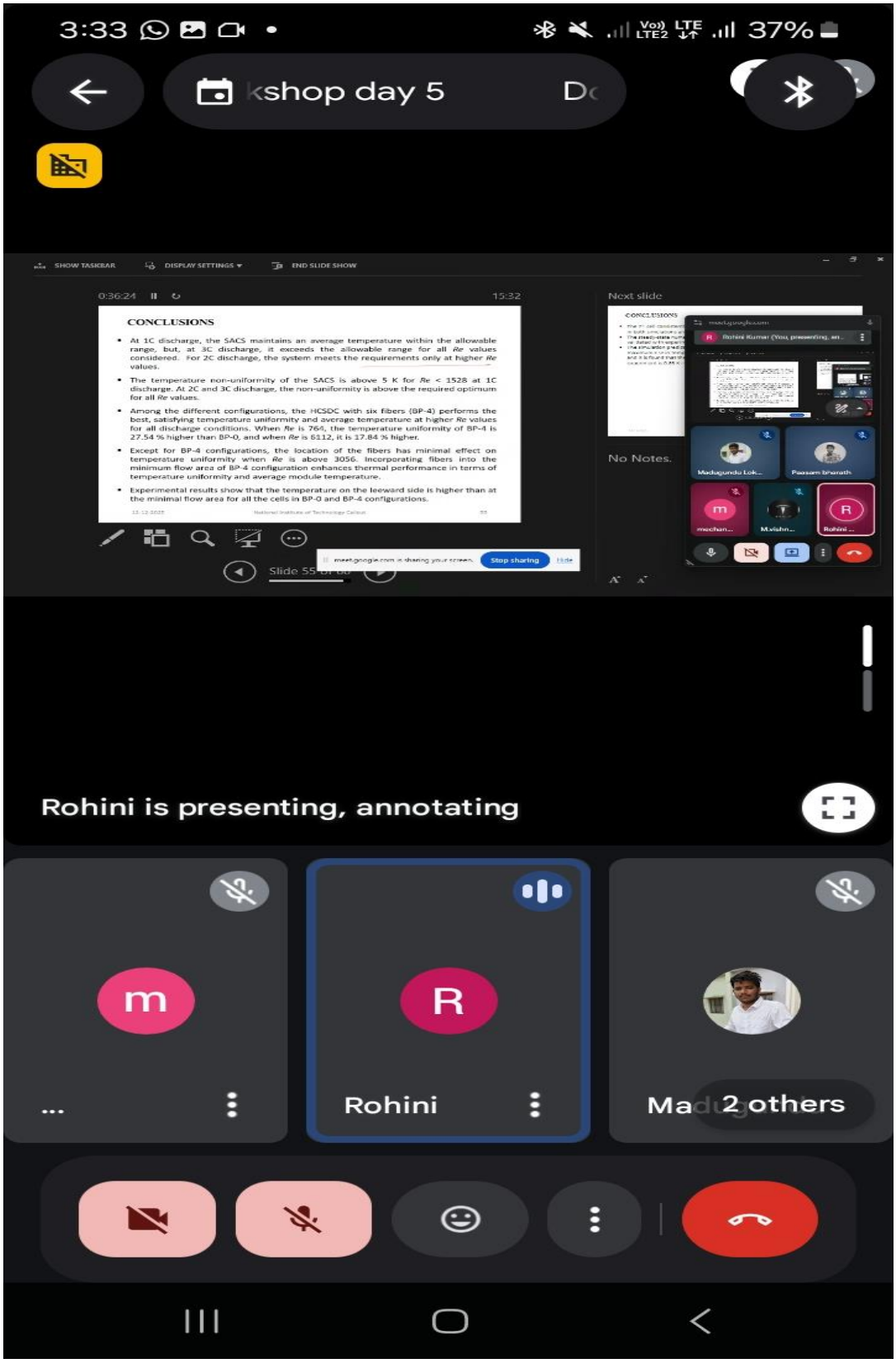
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CONCLUSIONS
At 1C discharge, the SACS maintains an average temperature within the allowable range, but, at 3C discharge, it exceeds the allowable range for all Re values considered. For 2C discharge, the system meets the requirements only at higher Re values.
The temperature non-uniformity of the SACS is above 5 K for Re < 1528 at 1C discharge. At 2C and 3C discharge, the non-uniformity is above the required optimum for all Re values.
Among the different configurations, the HCSDC with six fibers (BP-4) performs the best, satisfying temperature uniformity and average temperature at higher Re values for all discharge conditions. When Re is 765, the temperature uniformity of BP-4 is 27.54 % higher than BP-0, and when Re is 6112, it is 17.84 % higher.
Except for BP-4 configurations, the location of the fibers has minimal effect on temperature uniformity when Re is above 3056. Incorporating fibers into the minimum flow area of BP-4 configuration enhances thermal performance in terms of temperature uniformity and average module temperature.
Experimental results show that the temperature on the leeward side is higher than at the minimal flow area for all the cells in BP-0 and BP-4 configurations.
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Day 6: 13th Dec 2025

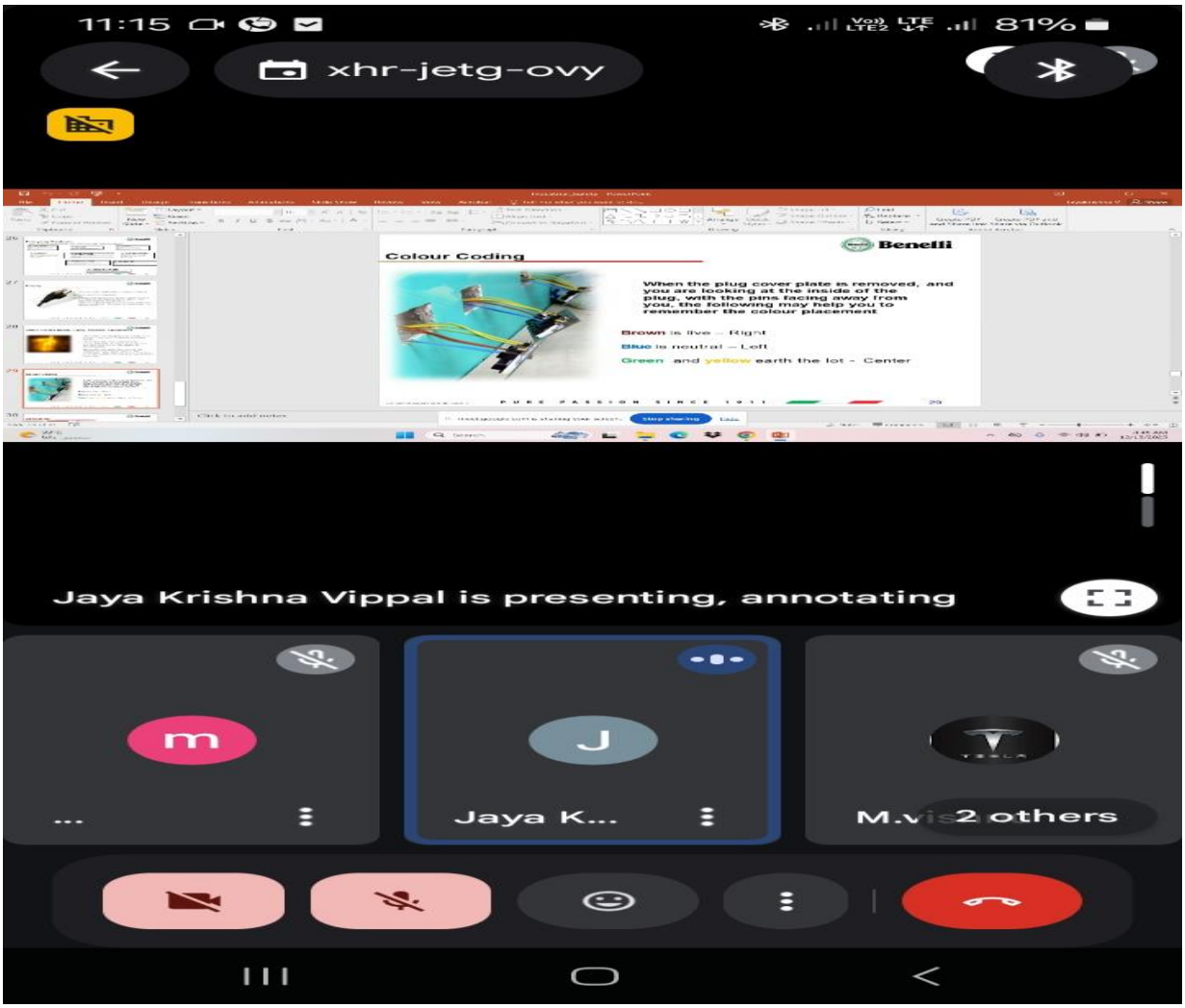
Session 1:

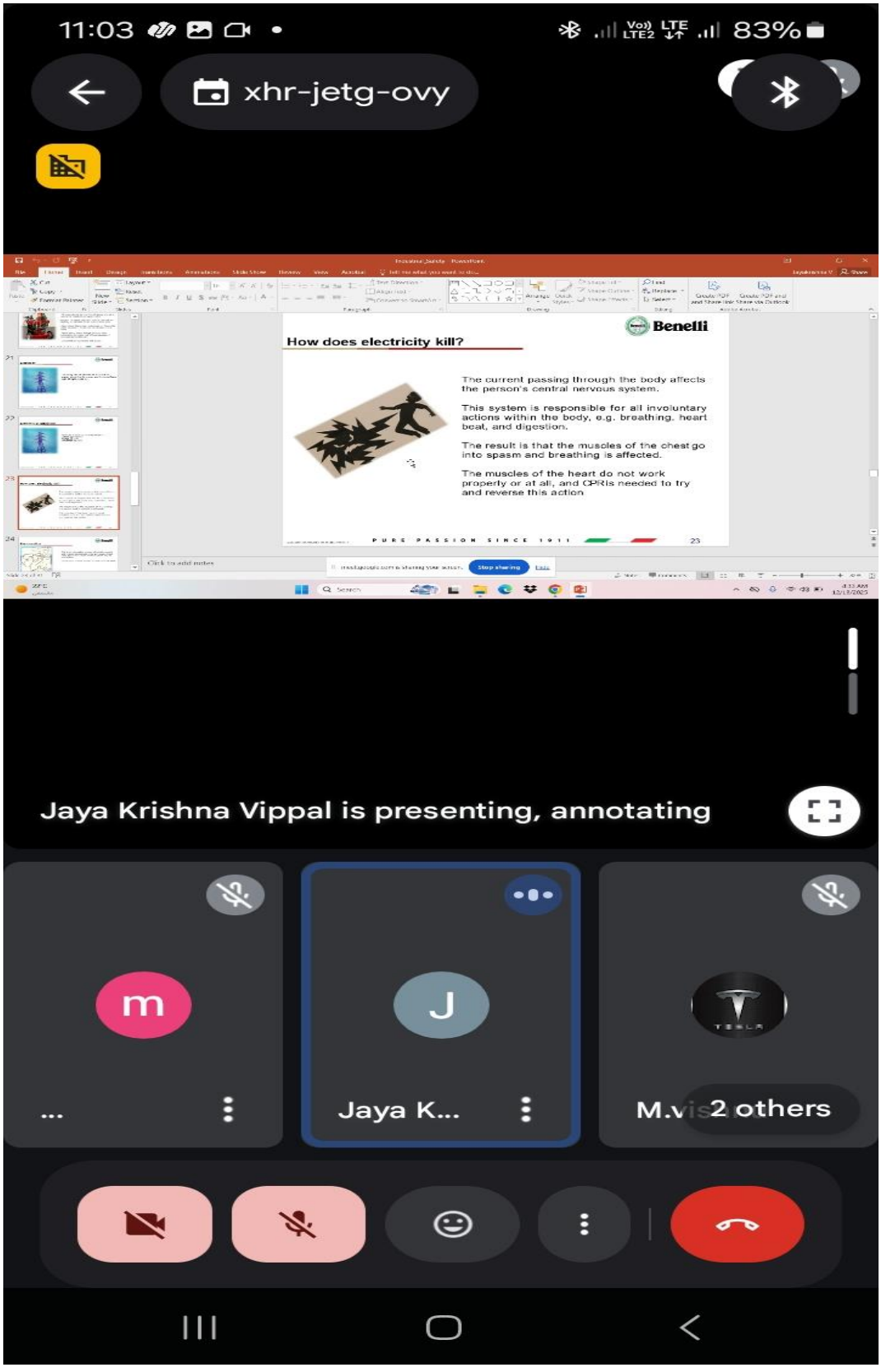
Topic: Industrial Safety

Speaker: Mr.V.Jaya Krishna, Project Manager (MEP), Dammam, Saudi Arabia

Time: 10:00 AM – 12:00 PM

Mr.Jaya Krishna session gives a **fewer accidents, lower costs, and improved productivity for businesses**, alongside **happier, healthier, and more loyal employees** who feel secure, leading to better morale, reduced absenteeism, and strong regulatory compliance, ultimately creating a sustainable, ethical, and efficient work environment with growth opportunities for safety professionals. .

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How does electricity kill?
Benelli
The current passing through the body affects the person's central nervous system.
This system is responsible for all involuntary actions within the body, e.g. breathing, heart beat, and digestion.
The result is that the muscles of the chest go into spasm and breathing is affected.
The muscles of the heart do not work properly or at all, and CPRis needed to try and reverse this action
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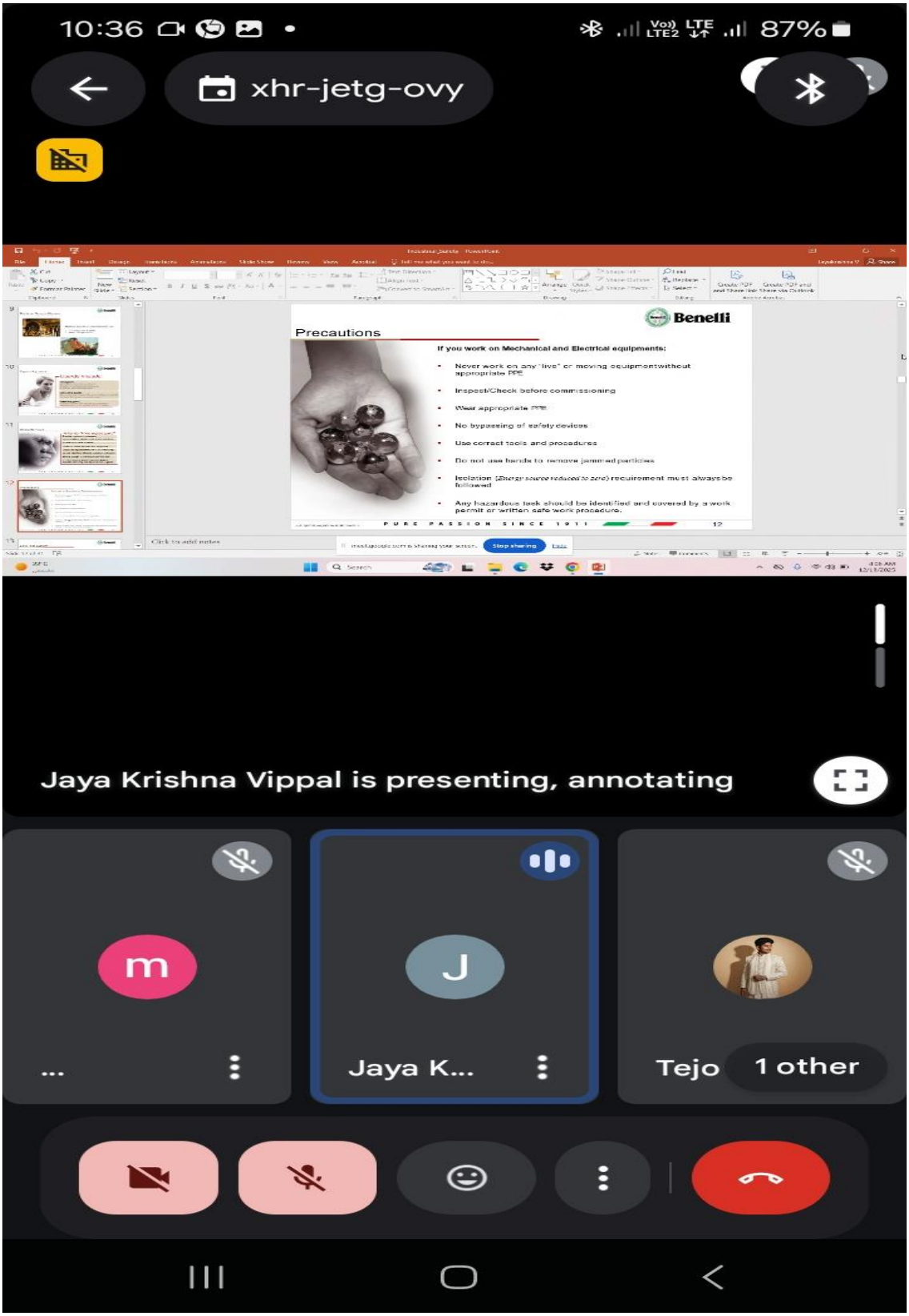
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Precautions
If you work on Mechanical and Electrical equipments:
Never work on any "live" or moving equipmentwithout appropriate PPE
Inspect/Check before commissioning
Wear appropriate PPE
No bypassing of safety devices
Use correct tools and procedures
Do not use hands to remove jammed particles
Isolation (Energy source reduced to zero) requirement must always be followed
Any hazardous task should be identified and covered by a work permit or written safe work procedure.
PURE PASSION SINCE 1911
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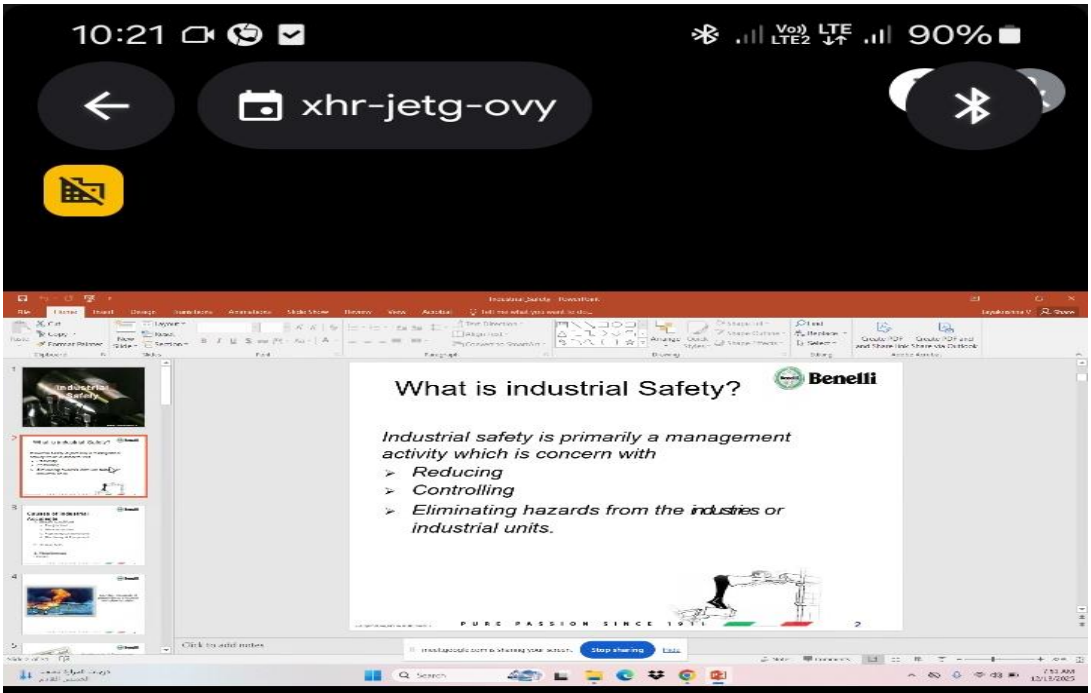
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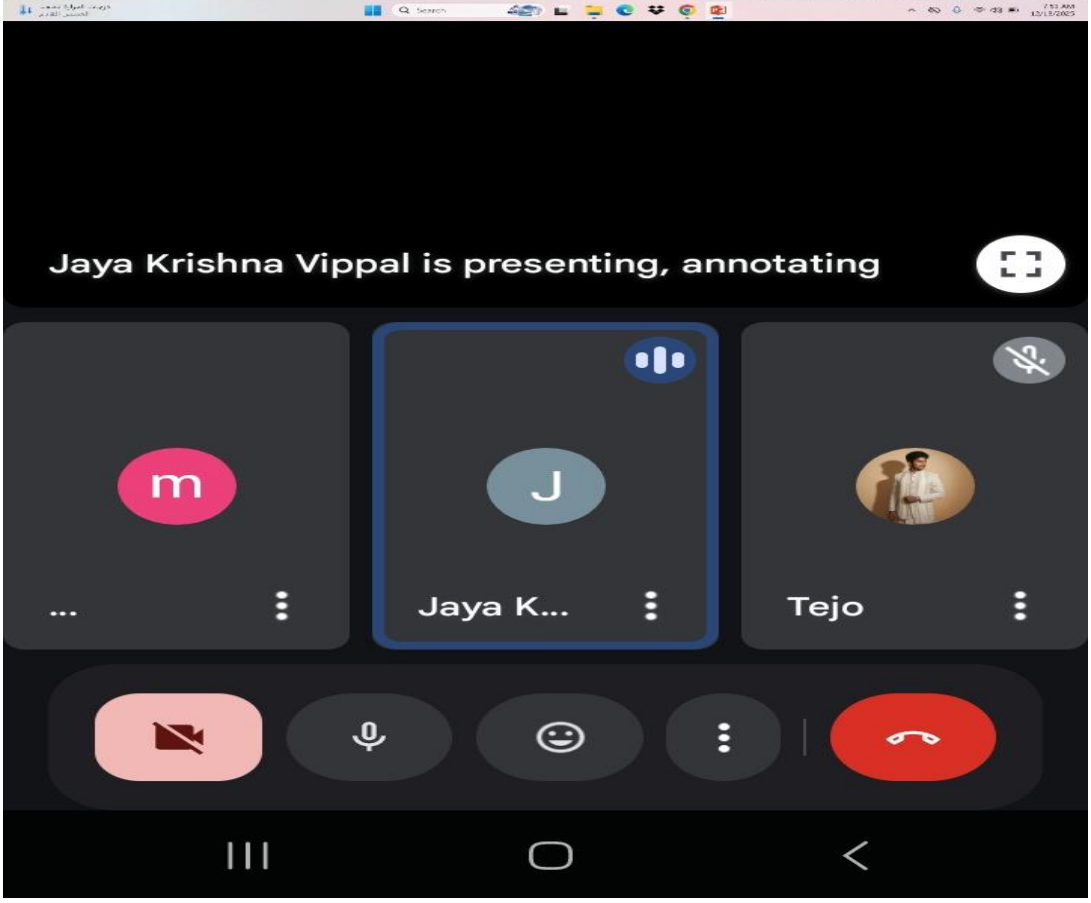
What is industrial Safety?
Benelli
Industrial safety is primarily a management activity which is concern with
Reducing
Controlling
Eliminating hazards from the industries or industrial units.
PURE PASSION SINCE 1911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Valedictory Function Report: Domain Specific Workshop

Date: 13th Dec 2025

The valedictory function of Domain Specific Workshop on **"Smart Hybrid Electric Vehicle Systems"**, held from 8th to 13th Dec 2025, marked the successful conclusion of this Six-day event at **Sreenivasa Institute of Technology and Management Studies (Autonomous), Chittoor**.

Highlights of the Valedictory Session:

1. **Concluding Remarks:**

   - **Dr.** K.L.Narayana appreciated the enthusiastic students and active engagement of attendees throughout the workshop.

2. **Acknowledgements:**

   - **Dr. N.Venkatachalapathi**, Principal and **Dr. N.Satish Kumar** Coordinator of the DSW, expressed gratitude to the Chief Guests, speakers, and students for their contributions to the success of the DSW.

3. **Conclusion:**

   - The valedictory function concluded on a patriotic note with the singing of the **National Anthem**, symbolizing unity and collective dedication to excellence in education.

The workshop was hailed as a significant milestone in fostering innovation and advancing the importance of **Smart Hybrid Electric Vehicle Systems**. Students departed with a renewed commitment to implementing their learnings for the betterment of academia and industry.