



Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex

Report of Seminar on Electric Vehicle Battery Technology and Battery Management Systems (BMS)

Topic: Electric Vehicle Battery Technology and Battery Management Systems (BMS)

Organized by: Department of Automobile Engineering, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex. (In Association with IQAC)

Speaker: Mr. M. Kunal, Founder & CEO, Logiczap Nextgen Technologies Pvt Ltd

Date: 29th September 2026

Time: 12:00 PM onwards

Mode: Offline, Room No.: 121

No. of Participation: 40

Introduction:

The Department of Automobile Engineering of Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex, in association with IQAC, organized a seminar on “Electric Vehicle Battery Technology and Battery Management Systems (BMS)” on 29th September 2026.

The seminar was organized with the objective of providing students with an understanding of the latest developments in electric vehicle (EV) battery technology and the importance of Battery Management Systems in ensuring the safe, efficient, and reliable operation of electric vehicles. The session focused on the fundamental principles of EV batteries, different battery technologies, battery performance, charging characteristics, and the functions of Battery Management Systems.

The programme aimed to enhance students’ technical knowledge of electric vehicle energy storage systems and their practical applications in the automotive industry. It also provided an opportunity for students to understand the technological advancements and challenges associated with battery-powered electric vehicles.

Background:

Electric vehicles are playing an increasingly important role in the transition towards sustainable transportation. The performance, driving range, charging time, safety, and overall efficiency of an electric vehicle depend significantly on its battery technology and energy management system.

EV batteries serve as the primary energy storage units and supply electrical energy to the vehicle's propulsion system. Different battery technologies offer varying characteristics in terms of energy density, power density, charging capability, service life, cost, and safety. Therefore, selecting appropriate battery technology is essential for achieving the desired performance and reliability of an electric vehicle.

A Battery Management System (BMS) is an integral component of an electric vehicle's battery pack. It monitors important battery parameters, including voltage, current, and temperature, and helps maintain the battery within its permissible operating limits. The BMS also performs functions such as

State of Charge (SOC) estimation, State of Health (SOH) monitoring, cell balancing, thermal management coordination, and protection against abnormal operating conditions.

For Automobile Engineering students, knowledge of EV battery technology and BMS is particularly relevant in understanding electric powertrains, vehicle electrification, battery safety, energy efficiency, and the development of modern electric mobility solutions.

Objectives:

The primary objectives of the seminar were:

- To provide students with an overview of electric vehicle battery technology and its significance in modern transportation.
- To familiarize students with different types of batteries used in electric vehicles and their operating characteristics.
- To explain the fundamental principles of battery charging, discharging, and energy storage.
- To introduce the functions and importance of Battery Management Systems in electric vehicles.
- To explain the role of BMS in battery monitoring, protection, cell balancing, and performance optimization.
- To develop an understanding of battery safety, thermal management, and battery life.
- To create awareness about the technological challenges and advancements in EV battery systems.
- To enhance students' understanding of career opportunities and emerging professional roles in the electric vehicle industry.

Overview of the Seminar:

The seminar commenced with an introductory discussion on electric vehicle battery technology and its significance in the development of modern electric mobility. The participants were introduced to the fundamental concepts of battery energy storage, battery performance, and the role of Battery Management Systems in ensuring the safe and efficient functioning of electric vehicles.

Key highlights of the session included:

- ❖ **Introduction to Electric Vehicle Battery Technology:** The session focused on the importance of batteries as the primary energy storage units in electric vehicles. The discussion covered the basic operating principles of rechargeable batteries and their contribution to vehicle performance, driving range, and energy efficiency.
- ❖ **Types of Batteries Used in Electric Vehicles:** The participants were introduced to different battery technologies used in electric vehicles, including lithium-ion batteries and other rechargeable battery systems. The discussion highlighted the importance of battery characteristics such as energy density, power density, charging time, service life, weight, and cost in EV applications.
- ❖ **Battery Performance and Operating Characteristics:** The seminar highlighted the important parameters associated with battery performance, including voltage, current, capacity, energy density, and charging and discharging characteristics. The relationship between battery performance and the driving range, acceleration, and overall efficiency of electric vehicles was

discussed.

- ❖ **Introduction to Battery Management Systems (BMS):** The session explained the fundamental role of a Battery Management System in monitoring and controlling the operation of an EV battery pack. The importance of maintaining battery cells within their permissible operating limits to ensure safe and reliable operation was emphasized.
- ❖ **Battery Monitoring and State Estimation:** The importance of monitoring battery voltage, current, and temperature was discussed. The session also introduced the concepts of State of Charge (SOC) and State of Health (SOH), which help determine the available battery capacity and assess the overall condition of the battery.
- ❖ **Cell Balancing and Battery Protection:** The seminar highlighted the importance of cell balancing in maintaining uniform charge levels among individual battery cells. The protective functions of a BMS against overcharging, excessive discharging, overcurrent, and abnormal temperature conditions were also discussed.
- ❖ **Battery Thermal Management and Safety:** The session emphasized the importance of maintaining an appropriate battery operating temperature to ensure performance, safety, and service life. The role of thermal management in controlling battery temperature and reducing the risk of overheating was highlighted.
- ❖ **Battery Charging and Life Management:** The participants were introduced to the importance of appropriate battery charging practices and the factors affecting battery degradation. The discussion highlighted how effective battery monitoring and management can contribute to improved battery life, reliability, and operational efficiency.
- ❖ **Technological Challenges and Future Developments:** The seminar addressed the importance of improving battery energy density, reducing charging time and cost, enhancing safety, and extending battery life. The discussion also highlighted the significance of continuous technological advancements in battery systems for the wide adoption of electric vehicles.
- ❖ **Career Opportunities in the Electric Vehicle Industry:** The session highlighted the relevance of EV battery technology and BMS knowledge for Automobile Engineering graduates. Opportunities in electric vehicle design, battery testing, battery management, EV maintenance, battery diagnostics, and related automotive engineering fields were discussed.

Learning Outcomes:

The seminar enriched participants with the following takeaways:

- ❖ **Industry Awareness:** Developed an understanding of the importance of battery technology in electric vehicles and the advancement of electric mobility.
- ❖ **Battery Technology:** Gained knowledge of different battery technologies and their operating characteristics in EV applications.
- ❖ **Battery Performance:** Improved understanding of the parameters affecting battery capacity, energy storage, efficiency, and service life.
- ❖ **BMS Functionality:** Developed awareness of the functions of Battery Management Systems in monitoring and controlling battery operation.
- ❖ **Battery Safety:** Understood the importance of battery protection, cell balancing, and thermal

management.

- ❖ **Battery Monitoring:** Gained familiarity with the concepts of State of Charge (SOC) and State of Health (SOH).
- ❖ **Technical Application:** Enhanced understanding of the relationship between battery performance, driving range, charging requirements, and electric vehicle efficiency.
- ❖ **Career Awareness:** Gained awareness of emerging career opportunities in EV battery technology, battery testing, BMS, and electric vehicle systems.

Conclusion:

The seminar on “Electric Vehicle Battery Technology and Battery Management Systems (BMS)” was an informative academic initiative organized by the Department of Automobile Engineering in association with IQAC, Dr. Sudhir Chandra Sur Institute of Technology and Sports Complex. The programme focused on the importance of battery technology and Battery Management Systems in the development and operation of modern electric vehicles.

The discussion highlighted the significance of battery characteristics, performance monitoring, State of Charge (SOC), State of Health (SOH), cell balancing, battery protection, and thermal management. The seminar also emphasized the role of BMS in improving battery safety, reliability, operational efficiency, and service life.

The programme provided students with an opportunity to strengthen their understanding of electric vehicle energy storage systems and their practical relevance in the automotive sector. It also highlighted the importance of developing technical expertise in battery technology and battery management to address the evolving requirements of electric mobility.

Overall, the seminar served as a platform for connecting academic knowledge with emerging automotive technologies. It enhanced awareness of the significance of EV battery systems and encouraged students to explore further learning and career opportunities in the rapidly developing electric vehicle industry.





Seminar on “Electric Vehicle Battery Technology and Battery Management Systems (BMS)” conducted by the department of Automobile Engineering in association with IQAC on 29/09/2026