PRAGATI ENGINEERING COLLEGE

(AUTONOMOUS)

ADB Road, Surampalem,533 437

Approved by AICTE & Permanently Affiliated to JNTUK Kakinada & Accredited by NBA & NAAC with ' A+' Grade

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

Academic Year: 2025-26 Date: 18.12.2025

CIRCULAR

It is to inform all the students of BTech II Year that the **Electric Vehicles Club (EVC)**, Department of Electrical & Electronics Engineering is organizing a session on **"Architecture and Functional Interconnections of an Electrical Vehicle"**to be held on **20-12-2025**.

This session will introduce the architecture of an Electrical Vehicle (EV), covering key components such as the battery pack, power electronics, electric motor, and control systems. It explains the functional interactions between these components.
The session will be delivered by Shamshad and Ram.

Interested students are invited to participate as per the schedule below:

- Date & Time of Event: 20.12.2025 | 3:00 PM - 4:00 PM
- Venue: MS-10(Core Block)

For further details, please contact the event coordinators.

Faculty Event Coordinator
Ms.V.R.V.S.Sai Valli,

Asst. Professor, EEE Dept.

Student Event Coordinators

M.Murali Krishna (23A31A0241)

Y.Abhishek (23A31A0257)

III EEE DEPARTMENT
Electric Vehicles Club

Faculty Coordinator.

HOD, EEE

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3. Department File
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ELECTRIC VEHICLES CLUB REPORT

I. Club Information

- Club Name: Electric Vehicles Club (Pragati Engineering College)
- Date: 20.12.2025
- Event Name: Architecture and functional interconnetions of an EV
- Student Coordinator: M.Murali & Y.Abhishek , III EEE
- Faculty Coordinator:MS.V.R.V.S.Sai Valli Asst.Professor,EEE Dept

II. Executive Summary

The Electric Vehicles Club of Pragati Engineering College conducted a technical session on " Architecture and Functional Interconnections of an EV " on 20 December 2025. An Electric Vehicle (EV) consists of a battery pack, power electronics, electric motor, transmission system, and control units arranged in a well-defined architecture.

The battery pack stores electrical energy and supplies DC power. This power is processed by power electronics such as the inverter (DC to AC) and DC-DC converter. The inverter controls motor speed and torque by supplying AC power to the electric motor, which converts electrical energy into mechanical energy.

The motor drives the wheels through a simple transmission system.The Vehicle Control Unit (VCU) acts as the brain of the EV, coordinating signals between the battery, motor controller, sensors, and braking system.

The Battery Management System (BMS) ensures battery safety by monitoring voltage, current, and temperature. During braking, regenerative braking converts kinetic energy back into electrical energy and recharges the battery.

III. Concept of Architecture and Functional Interconnections of an EV

The session started with an introduction to the Architecture and functional interconnetions of an EV .The architecture of an Electric Vehicle (EV) represents the organized structure of its energy storage, power electronics, drive motor, and control units. Electrical energy stored in the battery is processed through power electronic converters and delivered to the traction motor to produce mechanical motion.

The functional interconnection ensures smooth coordination between the battery, inverter, motor, and transmission. Intelligent units such as the Vehicle Control Unit and Battery Management System manage performance and safety. Regenerative braking further improves efficiency by recovering energy.

Overall, EV architecture forms a smart and efficient transportation system.

IV. Future Scope

Electric vehicle technology has vast future potential with advancements in battery technology, fast charging systems, and smart energy management. Integration with renewable energy sources, autonomous driving systems, and vehicle-to-grid (V2G) technology will further enhance EV efficiency and sustainability. EVs are expected to play a major role in reducing carbon emissions in the coming years.

V. Advantages

Electric vehicles offer high energy efficiency, low operating cost, and zero tailpipe emissions. Their architecture allows for smooth and quiet operation with fewer moving parts, resulting in reduced maintenance.

EVs also support regenerative braking, which improves overall energy utilization.

VI. Disadvantages

Despite their benefits, electric vehicles have disadvantages such as high upfront cost and dependence on battery performance.

Charging time is longer compared to conventional vehicles, and availability of charging infrastructure is still limited in many areas. Battery replacement cost can also be significant.

VII. Benifits

Energy Efficiency – Direct energy flow from battery to motor reduces losses compared to combustion engines.

Regenerative Braking – Recovers energy during braking, improving overall efficiency.

Simpler Mechanical Design – Fewer moving parts than IC engines, leading to lower maintenance.

Safety and Reliability – Battery Management System (BMS) and Vehicle Control Unit (VCU) monitor systems to prevent failures.

Environmental Friendly – Zero tailpipe emissions reduce air pollution.

Smooth and Quiet Operation – Electric motors provide silent and vibration-free driving.

Smart Control – Intelligent interconnection allows precise torque control, acceleration, and energy management.

VIII. Conclusion

The session on Complete Architecture and functional interconnetions of EV an Electric Vehicle create a smart, efficient, and reliable energy system. By integrating the battery, power electronics, motor, and control units, EVs achieve smooth motion, energy recovery, and intelligent management of power. This design not only improves efficiency and safety but also promotes environmentally friendly and sustainable transportation, making EVs the future of mobility.

.The event was well-received by the attendees, with 35 participants actively taking part, and concluded with an interactive discussion on upcoming opportunities in the electric vehicle sector.

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PHOTOS

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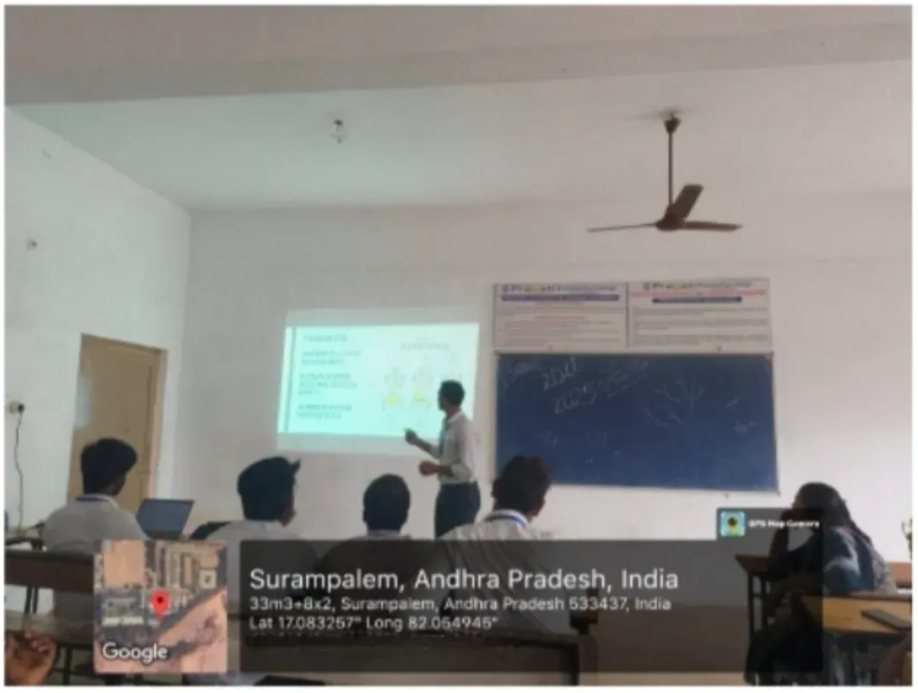
PHOTOS



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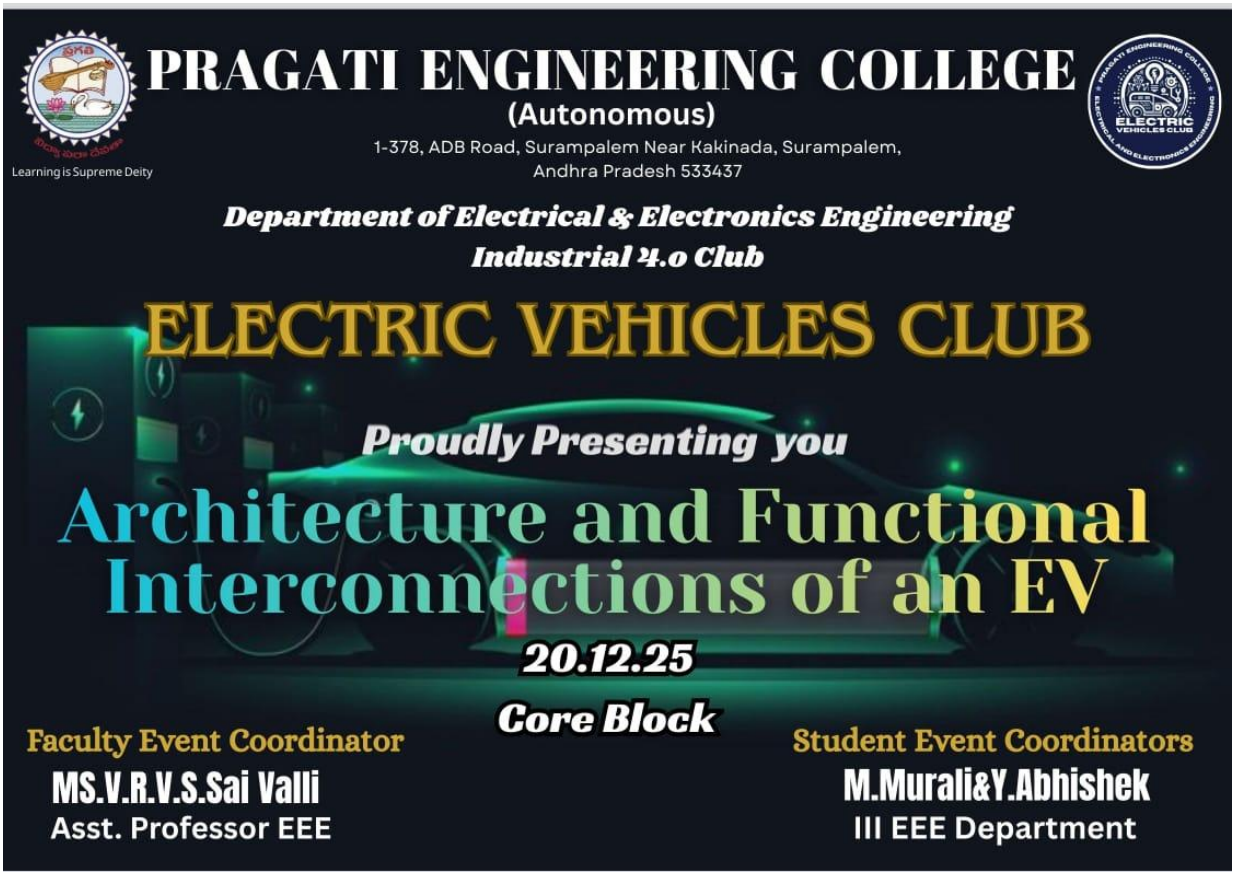

Faculty Coordinator **IQAC Coordinator** **HOD - EEE**

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