



Dhanekula Institute of Engineering and Technology
(Approved by AICTE, New Delhi, Affiliated to JNTUK, Kakinada)
Ganguru, Vijayawada – 521139

Department of Electrical and Electronics Engineering
Report on “DESIGNING & DEVELOPMENT OF ELECTRIC VEHICLES”
18-22 Dec 2023

This Five day Faculty Development Program spans a diverse array of topics, empowering educators in the dynamic field of electric vehicles (EVs). In the first segment, participants explore electric vehicle modelling, power electronics and control systems and the applications of cyber security in EV design. The Battery Management Systems (BMS) module covers fundamental battery aspects, BMS architecture, algorithmic controls and diagnostic procedures. The charging infrastructure and Standards module elucidates the latest technologies and industry standards, preparing faculty to guide students in navigating the dynamic landscape of EV charging.

The second segment centers on the burgeoning field of microgrids. Faculty tackle microgrid control challenges, exploring strategies for seamless integration of renewable energy sources. Lastly, the program addresses the holistic lifecycle of automotive electrification – from design and development to testing and validation.

The design and development of electric vehicles have led to a transformative shift in the automotive industry, with improved technology, expanded infrastructure, and changing consumer perceptions contributing to the growing prominence of electric vehicles on roads worldwide. The ongoing commitment to innovation and sustainability is expected to further accelerate the adoption of electric vehicles in the years to come.

OUTCOMES OF THE FDP:

- Develop and promote research interest in applying different techniques in solving various problems in EVs.
- Proficiency in battery management systems.
- Knowledge of diverse charging infrastructure.
- Understanding of the role of EVs as distributed energy sources, including Vehicle-to-Grid (V2G) technology.
- Gain insights into emerging trends emphasizing the paramount importance of cyber security in the automotive electrification landscape

DAY1: By Dr. M Sreedhar, Associate Professor, Mahendra University, Hyderabad

- ❖ Battery Management System for Electric Vehicle
- ❖ Charging Infra structure and Standards
- ❖ Different types of charging Guns

DAY2: By Dr. M Prem Kumar, Associate Professor and HOD, Dayananda Sagar College of Engineering, Bengaluru

- ❖ Coordinated charging
- ❖ Lift Structures – Transformer and Couple Inductor Based
- ❖ LUO Converter Topologies
- ❖ Multi Level Multiplier Converter
- ❖ Light Duty and Heavy Duty Vehicles
- ❖ Multi stage families
- ❖ Future directions of DC-DC Converter
- ❖ Constraints of Fast & Slow charging
- ❖ Experimental results of Coordinated and Uncoordinated charging

DAY3: By Dr. Jathin Kumar Pradhan, Assistant Professor, NITR Rourkela

- ❖ MIMO PID Controller
- ❖ PID – State Feedback Controller

- ❖ Primary Control
- ❖ Secondary Control
- ❖ EV Integration to Micro Grid
- ❖ H-Infinity, LQR Controllers
- ❖ Multi variable Micro Grid control

DAY4: Industrial Visit to **M/S Avera AI Mobility Pvt.Ltd.** Vikas College Rd, Nunna, Andhra Pradesh 521212

- ❖ Introduction to the Avera AI Mobility
- ❖ Different departments existing
- ❖ Battery Assembly Section
- ❖ Battery Testing Section
- ❖ Assembly Section
- ❖ R&D Section

DAY5: Dr. B Chandrasekhar, Technical Project Manager, Automotive Business Division, L&T Technology Services, Bangalore

- ❖ Automotive Electrification and e-Drive Test bed
- ❖ Types of Electric Vehicles
- ❖ Power vs Vehicle speed with different Motors
- ❖ Testing standards
- ❖ Test setup for BISG ECU level testing
- ❖ Choosing a charging station and Location
- ❖ Novel challenges and Research Gaps



Honouring of Dr. M Sreedhar, Associate Professor, Mahendra University, Hyderabad



Honouring of Dr. Jathin Kumar Pradhan, Assistant Professor, NITR Rourkela



Industrial Visit to M/S Avera AI Mobility Pvt.Ltd. College Rd, Nunna, Andhra Pradesh



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Signature of Member

Signature of HoD