



Finolex Academy of Management & Technology, Ratnagiri

Department of Electrical Engineering

Academic Year 2025-26

Hands-on MATLAB Workshop on Motor Design and Simulation for EV Applications

Department: Electrical Engineering

Institution: FAMT, Ratnagiri

Date: 18 September 2025

Participants: Second-Year Electrical Engineering Students

Venue: Electrical Engineering Department, FAMT

Resource Person: Ankit Kumar, Application Engineer, Design Tech Pvt. Ltd., Pune

Coordinator: D Rajeshkumar

Inauguration: Dr. J J Mane, Head of Department

1. Introduction

A hands-on workshop on **Motor Design and Simulation for Electric Vehicle (EV) Applications** was conducted for second-year Electrical Engineering students. The workshop provided practical exposure to **MATLAB/Simulink and Simscape tools** for designing, modeling, and simulating electric motors used in EVs, including **DC motors, BLDC motors, and PMSMs**. It emphasized **practical skills** and enabled students to visualize motor characteristics, perform parameter analysis, and understand motor behavior under various operating conditions relevant to EV applications.

2. Objectives

1. Introduce students to the **MATLAB/Simulink environment** for motor simulation.
2. Design and simulate **DC, BLDC, and PMSM motors** for EV applications.
3. Understand **motor performance parameters** like speed, torque, current, and efficiency.
4. Provide **hands-on experience** analyzing motor behavior under different load conditions.
5. Enhance students' understanding of **EV propulsion systems**.

3. Resource Person and Topics Covered

Resource Person: Ankit Kumar, Application Engineer, Design Tech Pvt. Ltd., Pune

Topics Covered: 1. Introduction to MATLAB and Simulink 2. DC Motor Design and Simulation in Simscape 3. BLDC Motor Design and Simulation from Scratch 4. Introduction to PMSM Motors 5. PMSM vs. BLDC – Key Differences for EV Applications

4. Workshop Schedule

Session	Time	Topics Covered
1	9:15 AM – 12:30 PM	Introduction to MATLAB/Simulink, DC Motor Design and Simulation in Simscape
2	1:15 PM – 5:15 PM	BLDC Motor Design and Simulation, Introduction to PMSM Motors, PMSM vs BLDC Comparison

5. Workshop Content and Hands-on Activities

Session 1: DC Motor Simulation

- Created a **DC motor model** in MATLAB/Simulink using Simscape.
- Studied effects of **armature voltage and field current** on speed and torque.
- Simulated **start-up, load change, and braking conditions**.
- Observed **speed, torque, and current waveforms** and analyzed motor response.

Session 2: BLDC and PMSM Motor Simulation

- Developed **BLDC motor models** from scratch for EV applications.
- Introduced **PMSM motors** and compared their operation with BLDC motors.
- Simulated **torque-speed response and current waveforms** under variable load.
- Discussed **motor control and selection for EV propulsion systems**.

6. Observations and Learning Outcomes

- Students gained **practical exposure** to motor modeling and simulation.
- Learned to **analyze motor parameters and performance characteristics**.
- Understood differences between **BLDC and PMSM motors** for EV applications.
- Developed skills in **interpreting simulation results and motor behavior**.
- Recognized the importance of **motor design and control strategies** in EV efficiency and performance.

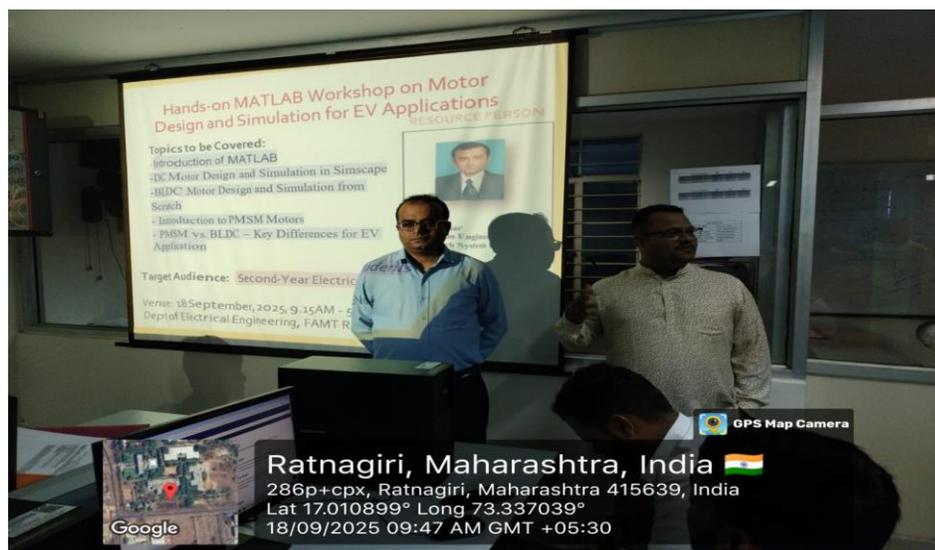
7. Conclusion

The hands-on workshop successfully provided students with **practical knowledge and simulation experience** in electric motor design for EV applications. Students could **design, simulate, and analyze DC, BLDC, and PMSM motors** and gained insights into their **performance characteristics and differences**. The workshop bridged the gap between theory and practice, preparing students for advanced studies and projects in **electric vehicle technology**.

8. Acknowledgements

We sincerely thank **Dr. J J Mane, HOD**, for inaugurating the workshop, **Ankit Kumar** for delivering the sessions, and the **Electrical Engineering Department, FAMT, Ratnagiri**, for providing infrastructure and support.

Event photo for Hands-on MATLAB Workshop on Motor Design and Simulation for EV Applications



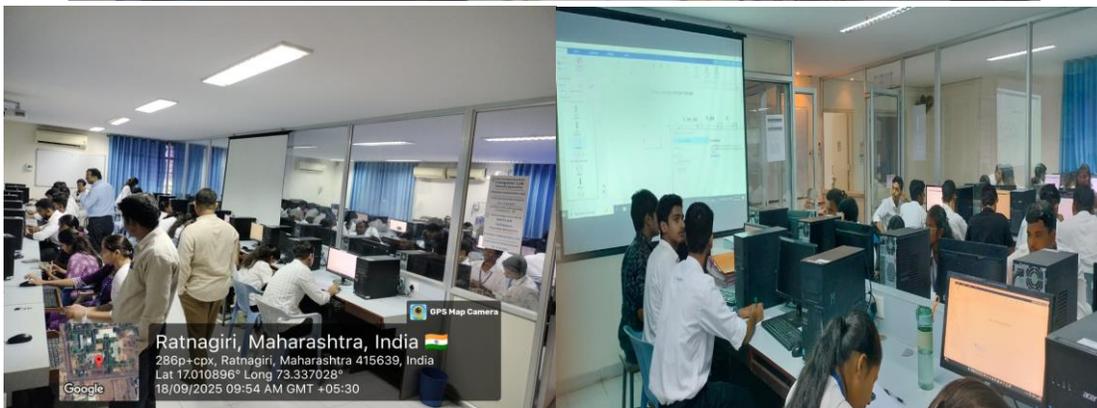


Figure: Students actively participating in MATLAB/Simulink motor simulation sessions, guided by Resource Person Ankit Kumar, while exploring DC, BLDC, and PMSM motor modeling and performance analysis for EV applications.

Executive summary

Sr. No.	Title	Content
1	Title of Program	Hands-on MATLAB Workshop on Motor Design and Simulation for EV Applications
2	Nature of the program	Technical
3	Name of organizing committee	Electrical Department, FAMT.
4	Date of activity	18/09/2025
5	No of resource persons from external	1
6	No of faculty participants from another institute	NIL
7	No of student participants from FAMT	78
8	No of student participants from another institute	0
9	No of participants from society	NIL
10	Total no of participants	78
11	No of judges (if any)	NA
12	Budget sanctioned	NIL
13	Budget utilized	NA
14	Average feedback on scale of 10(if applicable)	9
15	No of students placed/won	NA
16	Other information if any	Resource Person: Ankit Kumar Application Engineer DesignTech, Pune Coordinated by Mr. D Rajeshkumar

Signature and name of convener of authority: HoD/Convener of the committee	
Name of department/committee	EED