



Department of Electrical and Electronics Engineering

Research Laboratory

1.	Name of the Research Laboratory	Electric Vehicles
2.	Faculty In-charge	Dr.S.Kirshnan, Dr.M.Muthuvinayagam, Mr.M.Sidheswaran
3.	Objectives	<ul style="list-style-type: none">• Promote innovative research in EV technologies such as batteries, motors, controllers, and charging infrastructure.• Collaborate with industries and academic institutions to develop cost-effective and sustainable EV solutions.• Provide hands-on training and certification programs for students, technicians, and professionals in EV maintenance, repair, and assembly.• Foster entrepreneurship through skill-based courses and incubation support.• Facilitate design, development, and testing of EV components and systems.
4.	Research Focus Areas	<ul style="list-style-type: none">• Battery Technology and Energy Storage• Electric Motors and Power Electronics• Charging Infrastructure and Smart Grid Integration• EV Power train Design and Simulation• Lightweight Materials and Vehicle Design• Autonomous and Connected EV Technologies
5.	List of Major Equipments	<ul style="list-style-type: none">• E Vehicle - Two Wheeler –Study Trainer with Built in Motor, Controller and Battery• Battery (48 V, 30 AH Battery - Lithium Ion)• HUB Motor with Controller for Two Wheeler E Vehicles• Retrofit Kit Setup for TVS-XL• Retrofit Kit Setup for TVS Scooty• Hydraulic Two Wheeler Lift• Electric Impact Wrench IW10508• Lead Acid Battery 12V 7 Ah• Lead Acid Battery 12V 35 Ah• NMC Cells (3.7V 1200 mAh)• LFP (3.2V 6000 mAh)• Weight Machine• I R Tester• Spot Welding Machine• Cell Assembler

		<ul style="list-style-type: none"> • Cell Holder (18650) • Cell Holder (32700) • Battery Pack 48V 20 Ah • Battery Storage Container (48 V) • BMS 48 V (Bluetooth) • Battery Pack Equalizer 24S 5A with Active Balancer with Bluetooth
6.	Research Work	<ul style="list-style-type: none"> • Design and Development of Solar Based Electric Tricycle for Physically Challenged People. • Design and Development of Electric Triwheeler • Design and Development of Retrofit TVS Scooty • Design and Development of Retrofit TVS XL • Design and Fabrication of Hybrid Electric Vehicle • Design and Implementation of dual mode Electric Bicycle
7.	Student Involvement	<ul style="list-style-type: none"> • Students gain exposure to EV components such as batteries, motors, controllers, and charging units. • Engage in dismantling, assembling, and testing of EV prototypes and kits. • Learn to operate diagnostic tools and software for EV system analysis. • Undertake mini and major academic projects related to EV design, efficiency improvement, or system integration • Develop working prototypes such as e-bikes, electric scooters, or solar-powered vehicles • Conduct research on battery technologies, motor control strategies, and vehicle dynamics • Analyze vehicle performance data using sensors and IoT platforms
8.	Faculty Contributions	<ul style="list-style-type: none"> • Academic and Curriculum Development • Publish research papers, patents, and technical articles in reputed journals and conferences • Establish partnerships with EV companies, start-ups, and charging solution providers • Mentor student innovation teams and start-ups through Institution's Innovation Council (IIC), IEDC, and incubation cells. • Develop lab manuals and training modules for hands-on EV experimentation
9.	Industry/Academic Collaboration	<ul style="list-style-type: none"> • TVS, Chennai • Allywin E-Bikes, Dindugul • Silicon Systems, Coimbatore
10.	Outcome expected from the Lab	<ul style="list-style-type: none"> • Technical Skills Development: Students gain practical knowledge and hands-on experience in assembling electric vehicles, including understanding the components, wiring, and systems involved. This can include motor assembly, battery installation, wiring harnesses, and more.

		<ul style="list-style-type: none"> • Understanding of Electric Vehicle Technology: Through the assembly process, students learn about the technology behind electric vehicles, including how electric motors work, battery management systems and other key components. • Career Opportunities: Acquiring skills in electric vehicle assembly can open up various career paths in the growing field of electric mobility, including roles in manufacturing, engineering, maintenance, research and development. • Entrepreneurial Potential: Some students may be inspired to pursue entrepreneurial endeavors related to electric vehicles, such as starting their own assembly or customization businesses, or developing innovative technologies for electric vehicle systems.
11.	Future Research Directions	<ul style="list-style-type: none"> • Design and Fabrication of Electric Boat • E-Trolley for Airport Applications • Retrofit Model of 4 Wheeler- Maruti Suzuki – First Stage • Smart Wheel Chair for Aged People • Battery Testing
12.	Mapping of Program Outcome	PO1, PO2,PO3,PO4, PO5, PO6,PO7,PO8, PO9,PO10,PO11,PO12
13.	Mapping of Program Specific Outcome	PSO2, PSO3
14.	Mapping of Program Educational Objectives	PEO1, PEO2, PEO3



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Assembled E-Scooty -New Vehicle



Specifications/Details

Parameters	Specifications/Rating
Type of the Vehicle	E-Scooty
Type of Motor/Drive	BLDC Motor
Speed (Km/Hr)	45
Input Voltage (V)	48
Input Power (Watts)	750
Battery Capacity (Ah)	24
Charging Time (Hrs)	5
Cost/KMs (Rs.)	0.20

Assembled E-Scooty-Retrofit Model



Specifications/Details

Parameters	Specifications/Rating
Type of the Vehicle	Retrofit E-Scooty
Type of Motor/Drive	BLDC Motor
Speed (Km/Hr)	50
Input Voltage (V)	60
Input Power (Watts)	1000
Battery Capacity (Ah)	24
Charging Time (Hrs)	5.5
Cost/KMs (Rs.)	0.25

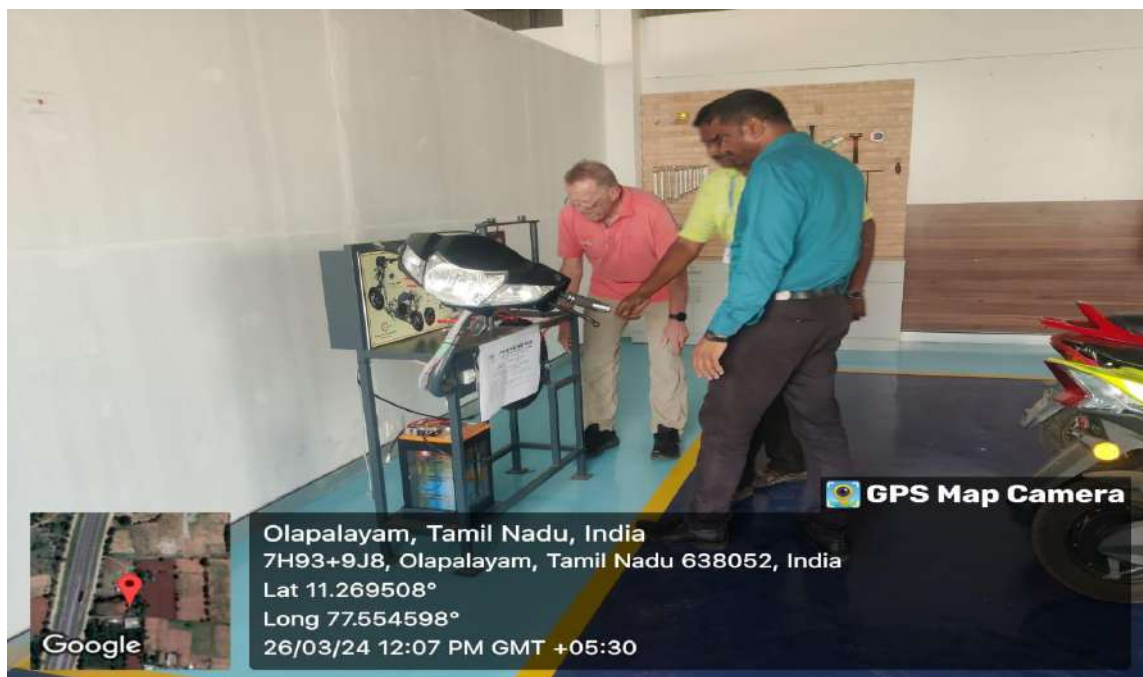
Assembled E-TVS XL-Retrofit Model



Specifications/Details

Parameters	Specifications/Rating
Type of the Vehicle	Retrofit E-TVS XL
Type of Motor/Drive	BLDC Motor
Speed (Km/Hr)	45
Input Voltage (V)	48
Input Power (Watts)	750
Battery Capacity (Ah)	24
Charging Time (Hrs)	5
Cost/KMs (Rs.)	0.20





Interaction with Prof. Dr. Bernhard Gluck, Senior Experten Service, Germany



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Women Hackathon Organized by TANCAM at Mahendra Engineering College on 22/03/2024



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Electric Tricycle for Physically Challenged Persons