

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	M. Tech. in Electrical Engineering (Electric Vehicular Technology)
Semester:	II
Course Code:	3EE32D31
Course Title:	Automotive Safety, Testing and Certification
Course Type:	(<input type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input checked="" type="checkbox"/> Department Elective / <input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/ <input type="checkbox"/> Open Elective / <input type="checkbox"/> Any other)
Year of Introduction:	2022 – 23

L	T	Practical component				C
		LPW	PW	W	S	
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Course Learning Outcomes (CLOs):

At the end of the course, the students will be able to -

1. analyse and evaluate performance of the battery (BL5)
2. make use of various standards for testing of electric motors (BL6)
3. comprehend standards for vehicles (BL4)
4. perform the tests for certification of various chargers (BL4)

Syllabus:

Teaching Hours: 45

Unit-1: Battery Safety tests 12

Battery performance safety test- Evaluation testing of Battery as per AIS 048, ECE R100, USABC, etc., performance testing, life-cycle testing and safety/abusive testing, Material Characterization of battery electrodes and electrolytes.

Unit-2: Electric motor tests 10

Electric Motor Characterization – Net Power, Power & Efficiency as per AIS 041, ECE R85. Reliability, durability and overload capacity. Evaluation of torque, speed, motor characteristics, Regenerative braking test, thermal Characteristics.

Unit-3: Vehicle tests 14

Durability Tests of Electric Vehicle – Lab simulation of tracks. Simulations for environmental conditions like temperature and humidity. Vehicle Performance on Chassis Dynamometer and Test Tracks – Electric energy consumption as per AIS 039 and ECE R101. Electric range as per AIS 040 and ECE R101. Power at wheels as per AIS 041. Brakes, gradeability, noise, Special tests on vehicles – shock, impact, vibration etc.

Unit-4: Charger Testing 09

Charger Testing and Certification – Testing as per AIS 138, Testing as per Bharat EV Charger specification AC001 and DC001

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Suggested Readings:

1. Standards as per ARAI, Pune. <https://www.araiindia.com/>
2. Standards as per the production of the e-motor company, <https://pureev.in/>

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. academic year 2022 - 23 and onwards