GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: BE-Minor/Hons.

Level: UG

Branch: Electric Vehicles

Course / Subject Code : BE05IAA011

Course / Subject Name : Introduction to Electric & Hybrid Vehicles

w. e. f. Academic Year:	**A.Y. 2024-25**
Semester:	**5th**
Category of the Course:	**Core Course**

Prerequisite:	Fundamentals of Electric Vehicles
Rationale:	This course is designed to provide students with a thorough understanding of automotive electrical systems and the skills needed to diagnose and repair common issues. Through a combination of lectures, hands-on exercises, and real-world case studies, students will understand the working of Electric & Hybrid Vehicles along with various types of Motors being used in the Vehicles.

Course Outcome:

Sr. No.	CO Statement	Topics Mapped	% weightage
CO-1	Understand the design and function of electric motors used in EVs, including their characteristics, performance parameters, and applications in the automotive industry.	2	15%
CO-2	Understand the layout and architecture of Electric Vehicles, including the powertrain design.	1	15%
CO-3	Evaluate the impact of electric vehicle design on performance, efficiency, and safety	1	15%
CO-4	Understand the layout and architecture of Hybrid Vehicles, including the powertrain design.	3	15%
CO-5	Evaluate the impact of hybrid vehicle design on performance, efficiency, and safety	3	15%
CO-6	Understand the construction of Inverter, Rectifier and Converter.	4	10%
CO-7	Demonstrate the working of Inverter, Rectifier and Converter.	4	5%

**Revised Bloom's Taxonomy (RBT)*

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Teaching and Examination Scheme:

Teaching Scheme (Total Course Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	4	5	100	0	0	0	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	**Introduction to Electric Vehicles** Basic electrical circuits and components, Technology comparison with ICE. Different layouts of drivetrains in EV.	27	26
2	**Motors used in Electric Vehicles** Types of Motors, Working Principles, Performance Characteristics and Applications of Motors in Electric & Hybrid Vehicles	26	24
3	**Power Electronics** Working, Construction and Demonstration of rectifiers and inverter and Power Converters used in Electric Vehicles.	25	24
4	**Hybrid Vehicle Technology** Hybrid Vehicle – Safety, Design, Architecture & Efficiency, Different layouts of the drivetrain in Hybrid Vehicles	27	26
	Total	105	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
5	30	20	20	15	10

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze E: Evaluate and C: Create and above Levels (Revised Bloom's Taxonomy)

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