SYLLABUS

Executive M.Tech - Electrical Vehicle Systems

Executive M.Tech. (EV)

About the Program

The M.Tech. Executive in Electrical Vehicle Systems at IIT Bhilai is designed for professionals aiming to gain expertise in electric vehicle (EV) technology, sustainable energy solutions, and advanced power systems. This interdisciplinary program focuses on key areas such as EV battery technology, power electronics, renewable energy integration, and the sustainability of electric transportation systems.

The curriculum blends online coursework, electives, and hands-on project-based learning to equip participants with the skills needed to design, develop, and optimize EV systems. Graduates of this program will be prepared for leadership roles in the EV industry, renewable energy sector, and associated domains.

Program Learning Objectives (PLOs)

	Learning Objective
PLO1	Build a strong foundation in the principles of electric vehicle systems, including energy storage and power systems.
PLO2	Gain expertise in battery technologies, charging systems, and renewable energy integration for EVs.
PLO3	Develop skills to design and optimize power electronics and control systems for electric vehicles.
PLO4	Understand the sustainability and environmental impact of EV systems and integrate sustainable solutions.
PLO5	Foster innovation in EV design, testing, and business models to support the global transition to electric mobility.
PLO6	Cultivate leadership and teamwork skills for managing multidisciplinary EV projects in a professional setting.

Program Outcomes (POs)

	Program Outcome
PO1	Demonstrate expertise in designing, analyzing, and implementing EV systems, including battery management and power systems.
PO2	Apply advanced control strategies and renewable energy technologies to enhance the performance of EVs.
PO3	Develop innovative solutions for EV charging infrastructure, smart grids, and sustainable energy integration.
PO4	Ensure compliance with ethical standards, environmental policies, and safety regulations in EV development.
PO5	Effectively communicate technical concepts, project outcomes, and business strategies in the EV domain.
PO6	Exhibit lifelong learning capabilities to adapt to the rapidly evolving technologies in electric vehicles and sustainable mobility.

COURSE STRUCTURE FOR M.Tech. (EV)

Semester - I

Course Code	Course Name	L	T	P	C	Category
EV01	Fundamentals of Electric Vehicles	3	0	0	3	Core Course
EV02	Energy Storage and Conversion	3	0	0	3	Core Course
EV03	Electric Drives and Control	3	0	0	3	Core Course

Semester - I - Total Credits - 9

Semester - II

Course Code	Course Name	L	T	P	C	Category
EV04	Battery Technology and Manufacturing	3	0	0	3	Core Course
EVEXX	Electives in Power Systems & Electronics	3	1	0	4	Elective -1
EVEXX	Electives in Energy & Sustainability	3	0	0	3	Elective -2

Semester - II - Total Credits - 10

Semester - III

Course Code	Course Name	L	T	P	C	Category
EVEXX	Electives in Energy & Sustainability	3	0	0	3	Elective-2
EVEXX	Electives-3 (Any)	3	0	0	3	Elective-3
EVP01	Electives-3 (Any)	3	0	0	3	Elective-3

Semester - III - Total Credits - 9

Semester - IV

Course Code	Course Name	L	T	P	C	Category
EVE01	Capstone Project	0	0	24	12	M Tech Project
OR						
EVTT02	Thesis*	0	0	0	12	M.Tech Thesis

Semester - IV - Total Credits – 12

Semester – V*

Course Code	Course Name	L	T	P	C	Category
EVE01	Thesis*	0	0	0	14	M.Tech Thesis

***Only for those who have opted for the equivalent degree for the regular MTech Program**

Total Credits : Semester - I + Semester - II + Semester - III + Semester - IV
Total Credits : 9 + 10 + 9 + 12
Total Credits: 40

Students opted for the equivalent degree to the regular M.Tech. Program
Total Credits : Semester - I + Semester - II + Semester - III + Semester – IV+ Semester V
Total Credits : 9 + 10 + 9 + 12+14
Total Credits: 54

Additional Notes:
Program Equivalency: Executive MTech (Online) Program is not equivalent to the regular offline MTech program at IIT Bhilai.
Thesis Requirements: To achieve equivalency with the regular off-line MTech program, the candidate must complete a total of 26 thesis credit on campus from the fourth semester onwards.

Bucket for Electives

Elective-1

Category	Sem	Course Code	Course Name	L	T	P	C
Electives in Power Systems & Electronics	2/3	EVE01	Power Quality Control for EVs	3	1	0	4
	2/3	EVE02	Smart Grids and EV Integration	3	1	0	4
	2/3	EVE03	Power Electronics for EVs	3	1	0	4

Elective-2

Category	Sem	Course Code	Course Name	L	T	P	C
Electives in Energy & Sustainability	2/3	EVE04	EV Charging Technology and Infrastructure	3	0	0	3
	2/3	EVE05	Renewable Energy Systems for EVs	3	0	0	3
	2/3	EVE06	Thermal Management Systems in EV	3	0	0	3
	2/3	EVE07	Vehicle Dynamics and Modeling	3	0	0	3
	2/3	EVE08	Environmental Impact of EVs	3	0	0	3

Elective-3

Category	Sem	Course Code	Course Name	L	T	P	C
Innovation, Business & Testing	3/4	EVE08	Project Management in EV Industry	3	0	0	3
	3/4	EVE09	EV Business Models and Market Analysis	3	0	0	3
	3/4	EVE11	Autonomous and Connected Vehicles	3	0	0	3
	3/4	EVE12	Testing and Certification of EV Batteries	3	0	0	3

Electives will be floated based on the availability of faculty members. This list may be updated from time to time and change batch-wise.