

# MUJ Faculty of Engineering: BTech in Electric Vehicle Technology (160 Credits)

## New Curriculum Semester-wise Schema

First Semester		
Code	Course Name	Cr
CY10XX	Engineering Chemistry + Lab	3
MA10XX	Mathematics 1	3
EC10XX	Basic Electrical Engineering	3
CV10XX	Basic Structural Engineering	3
CE10XX	Biology for Engineers	2
CS10XX	Computer Programming+ Lab	4
XX10XX	Arduino, IoT Fab Lab	1
XXXXXX	Constitution of India	1
<b>First Semester Credits</b>		<b>20</b>

Second Semester		
Code	Course Name	Cr
PY1001	Engineering Physics + Lab	4
MA20XX	Mathematics 2	3
	Environmental Studies	2
	Basic Mechanical Engineering	3
	Basic Electronics	3
	Creativity & Innovation Lab	2
	Engineering Graphics	1
	Technical Writing Clinic 1	1
DA10XX	Universal Human Values	1
<b>Second Semester Credits</b>		<b>20</b>

Third Semester		
Code	Course Name	Cr
CY10XX	Statistics & Probability	3
XX21XX	Material Science and Mechanics	4
XX21XX	Energy storage systems for Electric Vehicle	4
XX21XX	Kinematics and Dynamics of Automobile	4
XX21XX	Economics	3
XX31XX	University Elective 1	3
	Materials Testing Lab	1
	Data Analytics Lab	1
	Self-Study or Project	1
<b>Third Semester Credits</b>		<b>24</b>

Fourth Semester		
Code	Course Name	Cr
XX22XX	Management	3
XX22XX	Vehicle Architecture system	4
XX22XX	Power Electronics	4
XX22XX	Vehicle networking and Telematics Flexi Core 1	4
XX41XX	Program Elective 1	3
XX41XX	University Elective 2	3
	Computer Aided Drawing Lab	1
	Power Electronics Lab	1
	Project-Based Learning 1	1
<b>Fourth Semester Credits</b>		<b>24</b>

Fifth Semester		
Code	Course Name	Cr
	Sensor Actuators & Control	4
	Electric drives and Motors	4
	Connected vehicles (FC 2)	4
	Program Elective 2	3
	Program Elective 3	3
	University Elective 3	3
	Vehicle Integration Lab	1
	Electric drives and Motors lab	1
	Project-Based Learning 2	1
<b>Fifth Semester Credits</b>		<b>24</b>

Sixth Semester		
Code	Course Name	Cr
	Electrical Systems	4
	EV Charging Technology (FC-3)	4
	Program Elective 4	3
	Program Elective 5	3
	University Elective 4	3
	Technical Writing Clinic 2	1
	Modelling and Simulation Lab	1
	Electrical Systems Lab	1
	Res, Innov & Entrepreneurship	3
<b>Sixth Semester Credits</b>		<b>23</b>

Seventh Semester		
Code	Course Name	Cr
	University Elective 5	3
	Program Elective 6	3
	Program Elective 7	3
	Program Elec 8 / Univ Elect 6	3
	Internship (Industry/ Research)	1
<b>Seventh Semester Credits</b>		<b>13</b>

Eighth Semester		
Code	Course Name	Cr
	Major Project	12
<b>Eighth Semester Credits</b>		<b>12</b>

**Proposed Department Core Courses**

1. Material Science and Mechanics
2. Energy storage systems for Electric Vehicle
3. Kinematics and Dynamics of Automobile
4. Vehicle Architecture system
5. Battery Control Systems
6. Sensor Actuators & Control
7. Electric drives and Motors
8. Electric System

**Proposed Flexi- Courses**

9. FC1: Energy Storage Systems for Electric Vehicles
10. FC1: EV Telematics & Tracking Systems
11. FC1: RDBMS
12. FC2: Electric and Hybrid Vehicle Technology
13. FC2: Vehicle Electronics Systems
14. FC2: OOPS
15. FC3: Automotive Electrical and Electronic systems
16. FC3: Autonomous Vehicle
17. FC3: Power Electronics
18. FC4: Automotive Service Operations
19. FC4: Machine Learning for Automobile applications

**Proposed Department Program Electives- (1&8)**

1. Vehicle Body Engineering
2. Automotive Pneumatic & Hydraulic systems
3. Kinetics and dynamics of Automobile

4. Vehicle Transport Management
5. Artificial Intelligence for automobiles
6. Two and three wheeled vehicle Systems
7. Automotive Air Conditioning Systems
8. Automotive Circular economy
9. Earth Moving Equipment
10. Computational Fluid Dynamics
11. Machine Learning for Automotives
12. Automotive pollution & control
13. Production & Operations Management
14. Data Analytics

**Focus Areas offered by Department of Auto. Engg.**

**Focus Area 1: EV Product Development**

1. 1-D Dynamic Modelling
2. Vehicle & Sub-system Validation
3. Thermal Modelling & Analysis
4. Battery Modelling & Simulation
5. EV Battery & Energy Management Systems Calibration
6. EV Product Development Processes

**Focus Area 2: EV Operation**

1. Vehicle Troubleshooting & Maintenance
2. EV Telematics & Tracking Systems

3. EV Data Analytics & Use Case Generation
4. EV Fleet Planning & Optimization
5. EV Charging Services & Management Systems
6. Urban Transportation Infrastructure Planning

**Focus Area 3: Technology & Safety**

1. Energy Consumption & Emission Estimation Techniques
2. Fuel Cell Electric Vehicles & Hydrogen Technology
3. EV Regulations & Policy Framework
4. EV & Smart Grid
5. Energy Sources - Renewable & Non-Renewable
6. EV Economics & Financial Sustainability

**Proposed Department University Electives.** These courses are only open to students outside of FOE

1. Total Quality Management
2. Statistical Quality Control
3. Lean Six Sigma Problem Solving
4. Product development
5. Automotive Safety Systems
6. Vehicle Maintenance and Garage Practice
7. Automotive Materials and Manufacturing Processes
8. Trends in Vehicle Styling and Ergonomics
9. Fundamentals of Automobile Engineering
10. Fundamentals of Electric and Hybrid Vehicle

<b>PE 1</b>	Vehicle & Sub-system Validation (EVT)	<b>PE 4</b>	EV Charging Services & Management Systems (EVT)
	Two and three-wheeled vehicle Systems (AE)		Vehicle Ergonomics & Safety Systems (AE)
<b>PE-2</b>	EV Product Development Processes (EVT)	<b>PE 5</b>	Fuel Cell Electric Vehicles & Hydrogen Technology (EVT)
	Kinetics and dynamics of Automobile (AE)		Manufacturing Technology (AE)
<b>PE-3</b>	EV Telematics & Tracking Systems (EVT)	<b>PE 6</b>	EV Regulations & Policy Framework (EVT)
	Automotive Air Conditioning Systems (AE)		Computer Integrated Manufacturing (AE)
<b>PE-4</b>	EV Charging Services & Management Systems (EVT)	<b>PE 7</b>	EV Economics & Financial Sustainability (EVT)
	Vehicle Ergonomics & Safety Systems (AE)		Automotive Materials and Manufacturing (AE)