

COURSE STRUCTURE AND SYLLABUS  
FOR  
B.TECH DEGREE  
IN  
ELECTRICAL ENGINEERING  
(MAJOR IN E-VEHICLE)  
2023 Batch Onwards



विद्यारत्नम् महद्वनम्

RAJIV GANDHI INSTITUTE OF PETROLEUM TECHNOLOGY JAIS, AMETHI

## Credit Distribution for B.Tech-EV 2023 Batch Onwards

<b>Category</b>	<b>Range</b>	<b>Proposed</b>
Humanities and Social Science (HU)	22	22
Science (IS)	70-90	88
Institute Engineering (IE)	40-70	55
Engineering Drawing, Workshop (EP)	18-24	17
Language & Management (LM)	18-24	26
Departmental Core (DC)	145-190	201
Departmental Elective (DE)	30-75	36
Open Elective (OE)	15-20	18
Project/Industrial Visit (DP)	20-50	20
<b>Total Credits</b>	<b>440-490</b>	<b>483</b>

---

# Course Structure

## (B. Tech. in Electrical Engineering: Major in E-Vehicle) 2023 Batch Onwards

---

### First Year Odd Semester - 1

Course Code	Course/Subject	L	T	P	Cr
PY111	Classical Physics (IS)	3	1	0	11
CY121	Inorganic & Physical Chemistry (IS)	3	1	0	11
MA111	Real Analysis & Calculus (IS)	3	1	0	11
ECE102	Fundamentals of Electronics Engineering (IE)	3	1	0	11
BY101	Biology (IS)	2	1	0	8
ME131	Workshop Practices (EP)	0	0	3	3
ECE102L	Fundamentals of Electronics Engineering Lab (IE)	0	0	2	2
PY111L	Physics Lab (IS)	0	0	2/2	1
CY111L	Chemistry Lab (IS)	0	0	2/2	1
	<b>Total Credits</b>				<b>59</b>
LM101	Basic English* (L)	1	2	0	7
HU101	Universal Human values (HU)	1	1	0	5

\*Basic English course to be taken by a student on a recommendation after Diagnostic Test.

### First Year Even Semester - 2

Course Code	Course/Subject	L	T	P	Cr
PY121	Modern Physics (IS)	2	1	0	8
MA121	Differential Equations (IS)	3	1	0	11
CS101	Computer Programming (IE)	3	1	0	11
CS101L	Computer Programming Lab (IE)	0	0	2	2
CH161	Engineering Thermodynamics (IE)	3	1	0	11
EEV101	Electrical Engineering Work Practices (EP)	1	0	2	5
ME121	Engineering Graphics (EP)	0	0	3	3
PY121L	Physics Lab (IS)	0	0	2/2	1
CY121L	Chemistry Lab (IS)	0	0	2/2	1
	<b>Total Credits</b>				<b>51</b>
HU102	Community Internship (HU)	1	1	0	5

### Second Year Odd Semester – 3

Course Code	Course/Subject	L	T	P	Cr
MA211	Linear Algebra and Complex Analysis (IS)	2	1	0	8
EEV201	Electrical Circuits and Measurements (DC)	3	1	0	11
ECE201	Network Analysis and Synthesis (DC)	3	1	0	11
ECE221	Digital Circuits and Systems (DC)	3	1	0	11
ECE211	Signals and Systems (DC)	3	1	0	11

CH213	Material Engineering and Device Fabrication Practices (IE)	3	0	0	9
EEV202	Circuit Design and Simulation Lab (EP)	0	0	2	2
<b>Total Credits</b>					<b>63</b>

**Second Year Even Semester - 4**

<b>Course Code</b>	<b>Course/Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
MA231	Statistical Methods and Data Analysis (IS)	2	1	0	8
ECE232	Analog Circuits and Systems (DC)	3	1	0	11
EEV231	Control Systems (DC)	3	0	0	9
EEV211	Electrical Machine – I (DC)	3	1	0	11
EEV221	Fundamentals of Power Electronics (DC)	3	0	0	9
PC101	Professional Communications (L)	2	1	0	8
EEV201L	Measurements and Transformer Lab (DC)	0	0	2	2
EEV221L	Fundamentals of Power Electronics Lab (DC)	0	0	2	2
	Group Discussion (EP)	0	0	2	2
<b>Total Credits</b>					<b>62</b>

### Third Year Odd Semester - 5

Course Code	Course/Subject	L	T	P	Cr
EEV351	Fundamentals of Electric Vehicles (DC)	3	0	0	9
ECE312	Electromagnetic Fields and Transmission Lines (DC)	3	1	0	11
EEV311	Electrical Machine – II (DC)	3	1	0	11
	Department Elective – 1 (DE)	3	0	0	9
EEV321	Static Power Converters and Applications (DC)	3	0	0	9
EEV321L	Static Power Converters and Applications Lab (DC)	0	0	2	2
EEV311L	Electrical Machines Lab (DC)	0	0	2	2
	Seminar (EP)	0	0	2	2
EEV418	B.Tech. Project (DP)	0	0	5	5
	<b>Total Credits</b>				<b>60</b>

<b>Departmental Elective – 1 (DE – 1)</b>	
ECE321	Microprocessor and Embedded Systems
EEV352	Architecture of Electric and Hybrid Vehicles
ECE315	Artificial Intelligence
EEV323	Modelling and Control of Power Converters
ECE312	Digital Signal Processing
EEV331	Sensors Actuators and Control for Electric Vehicles
EEV332	Modern Control Systems

### Third Year Even Semester - 6

Course Code	Course/Subject	L	T	P	Cr
EEV301	Vehicular Communication Systems and Networks (DC)	3	0	0	9
EEV341	Power Systems – I (DC)	3	0	0	9
EEV312	Electric Drives (DC)	3	0	0	9
MA141	Numerical Methods (IS)	2	1	0	8
CH232	Heat and Mass Transfer (IE)	3	0	0	9
	Departmental Elective – 2 (DE)	3	0	0	9
EEV312L	Electric Drives Lab (DC)	0	0	2	2
EEV351L	Electric Vehicle Lab (DC)	0	0	2	2
EEV419	B.Tech. Project (DP)	0	0	5	5
	<b>Total Credits</b>				<b>62</b>

<b>Summer Internship</b>	<b>10</b>
--------------------------	-----------

<b>Departmental Elective – 2 (DE – 2)</b>	
EEV353	Modelling and Simulation of Electric Vehicles
EEV354	Plug-In Electric Vehicle in Smart Grid
EEV355	AI and ML for EV Applications
EEV356	Embedded System (ECU) for E-Vehicles
EEV357	Intelligent Transport System
EEV324	Control Techniques in Power Electronics
EEV333	Digital Control

ECE319	Video and Image Processing
CH451	Electrochemical Process and Energy Systems

### Fourth Year Odd Semester - 7

Course Code	Course/Subject	L	T	P	Cr
CS457	Data Analytics (DC)	3	0	2	11
EEV443	Power Systems – II (DC)	3	0	0	9
	Department Elective – 3 (DE)	3	0	0	9
	Open Elective – 1 (OE)	3	0	0	9
	Management Courses M – 1 (M)	3	0	0	9
	HSS – 1 (HU)	2	0	0	6
<b>Total Credits</b>					<b>53</b>

<b>Departmental Elective – 3 (DE – 3)</b>	
EEV452	Impact of E-Vehicle on Power Grids
EEV453	IoT in E-Vehicle Applications
EEV454	Automotive Safety
EEV411	Advanced Electric Drives
EEV412	Electrical Machine Design
EEV442	Power Quality
EEV431	Nonlinear Dynamical Systems



### Fourth Year Even Semester - 8

Course Code	Course/Subject	L	T	P	Cr
EEV441	Power System Protection and Switchgear (DC)	3	0	0	9
EEV451	EV Batteries and Battery Management System (DC)	3	0	0	9
	Department Elective – 4 (DE)	3	0	0	9
	Open Elective – 2 (OE)	3	0	0	9
	Management Courses M – 2 (M)	3	0	0	9
	HSS – 2 (HU)	2	0	0	6
	<b>Total Credits</b>				<b>51</b>

<b>Departmental Elective – 4 (DE – 4)</b>	
EEV455	Standards, Testing and Certification of Electric & Hybrid Vehicles
EEV456	Vehicle Safety Systems
EEV457	EV Charging Technology
EEV458	Hydrogen and Fuel Cell Technology for Electric and Hybrid Vehicles
EEV444	Modelling and Simulation of Power System
EEV445	Smart Grid Technology
EEV459	Autonomous and Connected Vehicles
EEV446	Distributed Energy Resources
EEV432	Optimal and Adaptive Control