

**COURSE STRUCTURE AND SYLLABUS  
FOR  
B.TECH DEGREE  
IN  
ELECTRICAL ENGINEERING  
(MAJOR IN E-VEHICLE)  
2025 Batch Onwards**



**RAJIV GANDHI INSTITUTE OF PETROLEUM TECHNOLOGY JAIS, AMETHI  
(RGPT JAIS, AMETHI)**

## Credit Distribution for B. Tech-EV 2025 Batch Onwards

| Category                           | Range          | Proposed   |
|------------------------------------|----------------|------------|
| Humanities and Social Science (HU) | 22             | 23         |
| Science (IS)                       | 70-90          | 80         |
| Institute Engineering (IE)         | 40-70          | 48         |
| Engineering Drawing, Workshop (EP) | 18-24          | 15         |
| Language & Management (LM)         | 18-24          | 20         |
| Departmental Core (DC)             | 145-190        | 158        |
| Departmental Elective (DE)         | 30-75          | 36         |
| Open Elective (OE)                 | 15-20          | 18         |
| Project/Industrial Visit (DP)      | 20-50          | 50         |
| <b>Total Credits</b>               | <b>440-490</b> | <b>448</b> |

# Course Structure

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

### 2025 Batch Onwards

#### First Year Odd Semester

| 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        |
| EEV101               | Electrical Engineering Work Practices (EP)       | 1 | 0 | 2   | 5         |
| 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>56</b> |
| LM101                | Basic English* (L)                               | 1 | 2 | 0   | 7         |

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

#### First Year Even Semester

| 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        |
| EEV103               | Electrical Circuits -I (IE)     | 3 | 1 | 0   | 11        |
| ME121                | Engineering Visualization (EP)  | 0 | 1 | 3   | 5         |
| PY121L               | Physics Lab (IS)                | 0 | 0 | 2/2 | 1         |
| <b>Total Credits</b> |                                 |   |   |     | <b>60</b> |
| HU102                | Community Internship            | 1 | 1 | 0   | 5         |

#### **Summer Term**

| Course/Subject                                    | L | T | P  | Cr |
|---------------------------------------------------|---|---|----|----|
| Industrial Training/Summer Project (DP) (2 Weeks) | 0 | 0 | 14 | 2  |

### Second Year Odd Semester

| Course Code   | Course/Subject                             | L | T | P   | Cr |
|---------------|--------------------------------------------|---|---|-----|----|
| MA211         | Linear Algebra and Complex Analysis (IS)   | 2 | 1 | 0   | 8  |
| ECE213        | Electromagnetic Fields Theory (DC)         | 3 | 0 | 0   | 9  |
| EEV221        | Fundamentals of Power Electronics (DC)     | 3 | 0 | 0   | 9  |
| ECE221        | Digital Circuits and Systems (DC)          | 3 | 1 | 0   | 11 |
| EEV203        | Electrical Circuits – II (DC)              | 3 | 1 | 0   | 11 |
| EEV231        | Linear Control Systems (DC)                | 3 | 0 | 0   | 9  |
| EEV231L       | Linear Control Systems Lab (DC)            | 0 | 0 | 2/2 | 1  |
| EEV221L       | Fundamentals of Power Electronics Lab (DC) | 0 | 0 | 2   | 2  |
| Total Credits |                                            |   |   |     | 60 |

### Second Year Even Semester

| Course Code   | Course/Subject                             | L | T | P   | Cr |
|---------------|--------------------------------------------|---|---|-----|----|
| MA231         | Statistical Methods and Data Analysis (IS) | 2 | 1 | 0   | 8  |
| MA141         | Numerical Methods (IS)                     | 2 | 1 | 0   | 8  |
| ECE232        | Analog Circuits and Systems (DC)           | 3 | 1 | 0   | 11 |
| PC101         | Professional Communications (L)            | 2 | 1 | 0   | 8  |
| EEV211        | Electrical Machine – I (DC)                | 3 | 1 | 0   | 11 |
| ECE211        | Signals and Systems (DC)                   | 3 | 1 | 0   | 11 |
| EEV211L       | Electrical Machine – I Lab (DC)            | 0 | 0 | 2/2 | 1  |
| EEV201        | Circuit Design and Simulation Lab (DC)     | 0 | 0 | 2   | 2  |
| Total Credits |                                            |   |   |     | 60 |

### Summer Term

| Course/Subject                                    | L | T | P  | Cr |
|---------------------------------------------------|---|---|----|----|
| Industrial Training/Summer Project (DP) (4 Weeks) | 0 | 0 | 11 | 3  |

### Third Year Odd Semester

| Course Code | Course/Subject                                    | L | T | P | Cr        |
|-------------|---------------------------------------------------|---|---|---|-----------|
| EEV351      | Fundamentals of Electric Vehicles (DC)            | 3 | 0 | 0 | 9         |
| EEV311      | Electrical Machine – II (DC)                      | 3 | 0 | 0 | 9         |
| EEV321      | Static Power Converters and Applications (DC)     | 3 | 0 | 0 | 9         |
| EEV341      | Power Systems - I (DC)                            | 3 | 0 | 0 | 9         |
|             | Department Elective – 1 (DE)                      | 3 | 0 | 0 | 9         |
| EEV311L     | Electrical Machines – II Lab (DC)                 | 0 | 0 | 2 | 2         |
| EEV321L     | Static Power Converters and Applications Lab (DC) | 0 | 0 | 2 | 2         |
|             | <b>Total Credits</b>                              |   |   |   | <b>49</b> |

| <b>Departmental Elective – 1 (DE – 1)</b> |                                                     |
|-------------------------------------------|-----------------------------------------------------|
| EEV352                                    | Architecture of Electric and Hybrid Vehicles        |
| EEV323                                    | Modelling and Control of Power Converters           |
| ECE312                                    | Digital Signal Processing                           |
| ECE328                                    | Linear Integrated Circuits Design                   |
| EEV331                                    | Sensors Actuators and Control for Electric Vehicles |
| ECE311                                    | Communication Engineering - I                       |
| ECE326                                    | Embedded Systems and IOT                            |

### Third Year Even Semester

| Course Code | Course/Subject                        | L | T | P   | Cr        |
|-------------|---------------------------------------|---|---|-----|-----------|
| EEV312      | Electric Drives (DC)                  | 3 | 0 | 0   | 9         |
| EEV443      | Power Systems – II (DC)               | 3 | 0 | 0   | 9         |
| EEV202      | Instrumentation and Measurements (DC) | 3 | 0 | 0   | 9         |
|             | Department Elective – 2 (DE)          | 3 | 0 | 0   | 9         |
|             | Department Elective – 3 (DE)          | 3 | 0 | 0   | 9         |
| EEV312L     | Electric Drives Lab (DC)              | 0 | 0 | 2   | 2         |
| EEV351L     | Electric Vehicle Lab (DC)             | 0 | 0 | 2/2 | 1         |
|             | <b>Total Credits</b>                  |   |   |     | <b>48</b> |

| <b>Departmental Elective – 2 (DE – 2) and (DE – 3)</b> |                                                                  |
|--------------------------------------------------------|------------------------------------------------------------------|
| EEV301                                                 | Vehicular Communication Systems and Networks                     |
| EEV353                                                 | Modelling and Simulation of Electric Vehicles                    |
| EEV354                                                 | Plug-In Electric Vehicle in Smart Grid                           |
| EEV356                                                 | Embedded System (ECU) for E-Vehicles                             |
| EEV357                                                 | Intelligent Transport System                                     |
| EEV333                                                 | Digital Control                                                  |
| EEV332                                                 | Modern Control Systems                                           |
| ECE319                                                 | Video and Image Processing                                       |
| CH451                                                  | Electrochemical Process and Energy Systems                       |
| EE522                                                  | Plug-In Electric Vehicles in Smart Grid                          |
| EE532                                                  | IoT in E-Vehicle Applications                                    |
| EEV451                                                 | EV Batteries and Battery Management System                       |
| ME532                                                  | Automotive Safety                                                |
| EE531                                                  | Modelling and Control of Power Electronics Converters and Drives |
| EEV412                                                 | Electrical Machine Design                                        |
| EEV442                                                 | Power Quality                                                    |
| EEV358                                                 | Flexible AC Transmission System                                  |
| EEV324                                                 | Control Techniques in Power Electronics                          |
| EEV441                                                 | Power System Protection and Switchgear                           |
| EEV431                                                 | Nonlinear Dynamical Systems                                      |
| ECE341                                                 | Biomedical Signal Processing                                     |
| EEV359                                                 | Modelling of Electrical Machines                                 |
| EEV360                                                 | Dynamic Analysis of Electrical Machines                          |
| EEV432                                                 | Optimal and Adaptive Control                                     |
| EEV445                                                 | Smart Grid Technology                                            |

### Summer Term

| <b>Course/Subject</b>                             | <b>L</b> | <b>T</b> | <b>P</b> | <b>Cr</b> |
|---------------------------------------------------|----------|----------|----------|-----------|
| Industrial Training/Summer Project (DP) (6 Weeks) | 0        | 0        | 12       | 5         |

#### Fourth Year Odd Semester

| Course Code | Course/Subject                                   | L | T | P | Cr        |
|-------------|--------------------------------------------------|---|---|---|-----------|
|             | Department Elective – 4 (DE)                     | 3 | 0 | 0 | 9         |
| MT5405      | Foundations of Management (M)                    | 2 | 0 | 0 | 6         |
| HU331       | Organizational Psychology (HU)                   | 2 | 0 | 0 | 6         |
| HU313       | Sociology of Industry & Work Culture (HU)        | 2 | 0 | 0 | 6         |
|             | Leadership and People Management (M)             | 2 | 0 | 0 | 6         |
|             | Ethics and Corporate Governance (HU)             | 2 | 0 | 0 | 6         |
|             | Open Elective - 1 (OE)                           | 3 | 0 | 0 | 9         |
|             | Open Elective – 2 (OE)                           | 3 | 0 | 0 | 9         |
|             | Employability Skills and Industry Readiness (EP) | 0 | 0 | 2 | 2         |
|             | <b>Total Credits</b>                             |   |   |   | <b>59</b> |

| <b>Departmental Elective – 4 (DE – 4)</b> |                                                                    |
|-------------------------------------------|--------------------------------------------------------------------|
| EE541                                     | Electrical Architecture of Electric and Hybrid Vehicles            |
| EEV455                                    | Standards, Testing and Certification of Electric & Hybrid Vehicles |
| EEV456                                    | Vehicle Safety Systems                                             |
| EEV457                                    | EV Charging Technology                                             |
| EV502                                     | Hydrogen and Fuel Cell Technology for Electric and Hybrid Vehicles |
| EEV444                                    | Modelling and Simulation of Power System                           |
| EEV445                                    | Smart Grid Technology                                              |
| EV562                                     | Autonomous and Connected Vehicles                                  |
| EEV451                                    | EV Batteries and Battery Management System                         |
| EE522                                     | Plug-In Electric Vehicles in Smart Grid                            |
| EEV446                                    | Distributed Energy Resources                                       |
| ME532                                     | Automotive Safety                                                  |
| EE531                                     | Modelling and Control of Power Electronics Converters and Drives   |
| EE532                                     | IoT in E-Vehicle Applications                                      |
| EEV432                                    | Optimal and Adaptive Control                                       |

#### Fourth Year Even Semester

| Course Code | Course/Subject                           | L | T | P  | Cr        |
|-------------|------------------------------------------|---|---|----|-----------|
| EEV420      | B.Tech. Project (Internal/External) (DP) | 0 | 0 | 40 | 40        |
|             | <b>Total Credits</b>                     |   |   |    | <b>40</b> |