**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**(JNTUH University Constituent Engineering Colleges)**
**B.Tech. in Electrical and Electronics Engineering**
**COURSE STRUCTURE & SYLLABUS (R25 Regulations)**
**Applicable from AY 2025-26 Batch**

**I Year I Semester**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | BSC | Matrices and Calculus | 3 | 1 | 0 | 4 |
| 2 | BSC | Engineering Chemistry | 3 | 0 | 0 | 3 |
| 3 | CSC | C and Data Structures | 3 | 0 | 0 | 3 |
| 4 | ESC | Analog Electronics | 2 | 0 | 0 | 2 |
| 5 | ESC | Electrical Circuits - I | 3 | 0 | 0 | 3 |
| 6 | HSC | English for Skill Enhancement | 3 | 0 | 0 | 3 |
| 7 | BSC | Engineering Chemistry Laboratory | 0 | 0 | 2 | 1 |
| 8 | CSC | C and Data Structures Laboratory | 0 | 0 | 2 | 1 |
| 9 | HSC | English Language and Communication Skills Laboratory | 0 | 0 | 2 | 1 |
| 10 | | Induction Program | | | | |
| | | **Total Credits** | **16** | **01** | **08** | **21** |

**I Year II Semester**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | BSC | Ordinary Differential Equations and Vector Calculus | 3 | 0 | 0 | 3 |
| 2 | BSC | Applied Physics | 3 | 0 | 0 | 3 |
| 3 | ESC | Electromagnetic fields | 2 | 0 | 0 | 2 |
| 4 | MEC | Computer Aided Engineering Graphics | 2 | 0 | 2 | 3 |
| 5 | Dept. Core | Electrical Circuits - II | 3 | 0 | 0 | 3 |
| 6 | MEC | Engineering Workshop | 0 | 0 | 2 | 1 |
| 7 | CSC | IoT and Python Programming Laboratory | 1* | 0 | 2 | 2 |
| 8 | BSC | Applied Physics Laboratory | 0 | 0 | 2 | 1 |
| 9 | ESC | Analog Electronics Laboratory | 0 | 0 | 2 | 1 |
| 10 | ESC | Electrical Circuits Laboratory | 0 | 0 | 2 | 1 |
| | | **Total Credits** | **15** | **0** | **10** | **20** |

*****IoT and Python Programming: Only Internal and External Practical examination should be conducted.

**II YEAR I SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | Dept. Core | Control Systems | 3 | 0 | 0 | 3 |
| 2 | Dept. Core | Electrical Machines - I | 3 | 0 | 0 | 3 |
| 3 | Dept. Core | Digital Electronics | 3 | 0 | 0 | 3 |
| 4 | Dept. Core | Power Systems - I | 3 | 0 | 0 | 3 |
| 5 | Dept. Core | Electrical Measurements and Sensors | 3 | 0 | 0 | 3 |
| 6 | | Innovation and Entrepreneurship | 2 | 0 | 0 | 2 |
| 7 | Dept. Core Laboratory | Electrical Machines - I Laboratory | 0 | 0 | 2 | 1 |
| 8 | Dept. Core Laboratory | Electrical Measurements and Sensors Laboratory | 0 | 0 | 2 | 1 |
| 9 | Dept. Core Laboratory | Digital Electronics Laboratory | 0 | 0 | 2 | 1 |
| 10 | SDC (Skill Development Course – 1) | Design of Electrical Systems using AutoCAD | 0 | 0 | 2 | 1 |
| 11 | MC | Environmental Science | 1 | 0 | 0 | 0 |
| | | **Total Credits** | **17** | **0** | **08** | **21** |

**II YEAR II SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | BSC | Numerical Methods and Complex Variables | 3 | 1 | 0 | 4 |
| 2 | Dept. Core | Electrical Machines - II | 3 | 0 | 0 | 3 |
| 3 | Dept. Core | Power Systems - II | 3 | 0 | 0 | 3 |
| 4 | Dept. Core | Power Electronics | 3 | 0 | 0 | 3 |
| 5 | Dept. Core | Microprocessors and Microcontrollers | 3 | 0 | 0 | 3 |
| 6 | Dept. Core Laboratory | Electrical Machines - II Laboratory | 0 | 0 | 2 | 1 |
| 7 | Dept. Core Laboratory | Control Systems Laboratory | 0 | 0 | 2 | 1 |
| 8 | Dept. Core Laboratory | Microprocessors and Microcontrollers Laboratory | 0 | 0 | 2 | 1 |
| 9 | SDC (Skill Development Course – 2) | PCB Design / FPGA Fundamentals | 0 | 0 | 2 | 1 |
| | | **Total Credits** | **15** | **0** | **10** | **20** |

**III YEAR I SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | Dept. Core | Power Semiconductor Drives | 3 | 0 | 0 | 3 |
| 2 | Dept. Core | Power System Protection | 3 | 1 | 0 | 4 |
| 3 | Dept. Core | Power Electronics for Renewable Energy Systems | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective-I | 3 | 0 | 0 | 3 |
| 5 | | Open Elective-I | 2 | 0 | 0 | 2 |
| 6 | Dept. Core Laboratory | Power System Laboratory | 0 | 0 | 2 | 1 |
| 7 | Dept. Core Laboratory | Power Electronics Laboratory | 0 | 0 | 2 | 1 |
| 8 | Dept. Core Laboratory | Machine Learning & Deep Learning Applications Laboratory | 0 | 0 | 2 | 1 |
| 9 | | Field-Based Project/Internship | 0 | 0 | 4 | 2 |
| 10 | SDC (Skill Development Course – 3) | Robotics and Automation/<br>Web and Mobile Development Applications | 0 | 0 | 2 | 1 |
| 11 | MC | Indian Knowledge System | 1 | 0 | 0 | 0 |
| | | **Total Credits** | **15** | **0** | **12** | **21** |

**III YEAR II SEMESTER**

| S.No | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | Dept. Core | Power System Operation and Control | 3 | 1 | 0 | 4 |
| 2 | Dept. Core | Hybrid Electric Vehicles | 3 | 0 | 0 | 3 |
| 3 | | Fundamentals of Management/<br>Business Economics and Financial Analysis/<br>Organisational Behaviour | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective-II | 3 | 0 | 0 | 3 |
| 5 | | Open Elective – II | 2 | 0 | 0 | 2 |
| 6 | Dept. Core Laboratory | Power System Simulation Laboratory | 0 | 0 | 2 | 1 |
| 7 | Dept. Core Laboratory | Electrical Drives Laboratory | 0 | 0 | 2 | 1 |
| 8 | Dept. Core Laboratory | Power Electronics for Renewable Energy Systems Laboratory | 0 | 0 | 2 | 1 |
| 9 | HSC | English for Employability Skills Laboratory | 0 | 0 | 2 | 1 |
| 10 | SDC (Skill Development Course – 4) | Design of Solar Power System/<br>Battery Technologies | 0 | 0 | 2 | 1 |
| 11 | MC | Gender Sensitization Lab*/<br>Human Values and Professional Ethics* | 1 | 0 | 0 | 0 |
| | | **Total Credits** | **15** | **0** | **10** | **20** |

***Note: For the courses Gender Sensitization Lab and Human Values and Professional Ethics-** one hour of instruction will be conducted on alternate weeks. For example, if a one-hour class for Gender Sensitization Lab is conducted this week, then a one-hour class for Constitution of India will be conducted in the following week.

**IV YEAR I SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | Dept. Core | Smart Metering and Communication Protocols | 3 | 0 | 0 | 3 |
| 2 | Dept. Core | EV Charging Infrastructure | 3 | 0 | 0 | 3 |
| 3 | | Fundamentals of Management/ Business Economics and Financial Analysis/ Organisational Behaviour | 3 | 0 | 0 | 3 |
| 4 | | Professional Elective - III | 3 | 0 | 0 | 3 |
| 5 | | Professional Elective – IV | 3 | 0 | 0 | 3 |
| 6 | | Open Elective – III | 2 | 0 | 0 | 2 |
| 7 | Dept. Core Laboratory | Electric Vehicles Laboratory | 0 | 0 | 2 | 1 |
| 8 | Dept. Core Laboratory | Smart Metering and Communication Protocols Lab | 0 | 0 | 2 | 1 |
| 9 | | Industry Oriented Mini Project/ Summer Internship | 0 | 0 | 4 | 2 |
| | | **Total Credits** | **17** | **0** | **08** | **21** |

**IV YEAR II SEMESTER**

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1 | | Professional Elective – V | 3 | 0 | 0 | 3 |
| 2 | | Professional Elective – VI | 3 | 0 | 0 | 3 |
| 3 | | Project Work | 0 | 0 | 28 | 14 |
| | | **Total Credits** | **06** | **0** | **28** | **20** |

***Note:** Students who wish to exit after II Year II Semester has to register for this optional course and acquire the credits allotted by doing 6 weeks Work-based Vocational Course/ Internship or Apprenticeship. Please refer R25 Academic Regulations for more information.

**Professional Elective - I**

| | |
|---|---|
| 1 | Machine Learning & Deep Learning and Its Applications |
| 2 | Renewable Energy Systems |
| 3 | VLSI Design |
| 4 | Digital Signal Processing |

**Professional Elective - II**

| | |
|---|---|
| 1 | Signals and Systems |
| 2 | High Voltage Engineering |
| 3 | Utilization of Electrical Energy |
| 4 | Optimization Techniques |

**Professional Elective-III**

| | |
|---|---|
| 1 | Energy Storage Systems |
| 2 | Smart Grid Technologies |
| 3 | Programmable Logic Controllers |
| 4 | Robotics and Automation |

**Professional Elective-IV**

| | |
|---|---|
| 1 | Battery Management Systems |
| 2 | HVDC Transmission |
| 3 | Embedded Systems |
| 4 | Digital Control Systems |

**Professional Elective-V**

| | |
|---|---|
| 1 | Computer Vision and Image Processing |
| 2 | Electrical Distribution and Automation |
| 3 | Switched Mode Power Conversion |
| 4 | Autonomous and Connected Vehicles |

**Professional Elective-VI**

| | |
|---|---|
| 1 | Drone Technology |
| 2 | Power Quality Techniques |
| 3 | Energy Conservation and Audit |
| 4 | Cyber-Physical Systems |

**Open Elective-I:**

| | |
|---|---|
| 1 | Fundamentals of Electric Vehicles |
| 2 | Industrial Automation and Control |
| 3 | Electrical Design, Estimation and Costing |

**Open Elective-II:**

| | |
|---|---|
| 1 | Digital Energy Systems |
| 2 | Energy Audit and Policies |
| 3 | Applications of Electrical Energy |

**Open Elective-III:**

| | |
|---|---|
| 1 | Sustainable Energy Technologies |
| 2 | Electrical Safety |
| 3 | Instrumentation |