**SIDDHARTHA INSTITUTE OF TECHNOLOGY & SCIENCES**
**(UGC – AUTONOMOUS)**
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A+' Grade
Narapally, Korremula Road, Ghatkesar, Medchal-Malkajgiri(Dist)-501 301

## B.Tech – Electrical and Electronics Engineering

### Course Structure (SITS - R22)

Applicable From 2022-23 Admitted Batch

**Structure Breakup**

| S. No | Category | Breakup of credits (Total 160 credits) |
|---|---|---|
| 1 | Humanities and Social Sciences including Management Courses (HSMC) | 9 |
| 2 | Basic Sciences Courses(BS) | 18.5 |
| 3 | Engineering Sciences Courses including Workshop, Drawing basics of Electrical/Mechanical/Computer etc.(ES) | 23.5 |
| 4 | Professional Core Courses(PC) | 64 |
| 5 | Professional Electives(PE) | 18 |
| 6 | Open Electives(OE) | 9 |
| 7 | Project work, Seminar and Internship in Industry or elsewhere (PS) | 18 |
| 8 | Mandatory Courses | - |
| **TOTAL** | | **160** |

# B.Tech - Electrical and Electronics Engineering
## Course Structure (SITS - R22)
Applicable From 2022-23 Admitted Batch

### I YEAR I SEMESTER

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2210001 | Matrices and Calculus | BS | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 2210010 | Engineering Chemistry | BS | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 2210501 | C Programming and Data Structures | ES | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 2210226 | Electrical Circuit Analysis – I | ES | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 2210301 | Computer Aided Engineering Graphics | ES | 1 | 0 | 4 | 3 | 40 | 60 | 100 |
| 6 | 2210273 | Elements of Electrical and Electronics Engineering | ES | 0 | 0 | 2 | 1 | 50 | - | 50 |
| 7 | 2210073 | Engineering Chemistry Laboratory | BS | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 8 | 2210571 | C Programming and Data Structures Laboratory | ES | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| | | Induction Programme | - | - | - | - | - | - | - | - |
| **TOTAL** | | | | **13** | **2** | **10** | **20** | **330** | **420** | **750** |

### I YEAR II SEMESTER

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2220002 | Ordinary Differential Equations and Vector Calculus | BS | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 2220009 | Applied Physics | BS | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 2220302 | Engineering Workshop | ES | 0 | 1 | 3 | 2.5 | 40 | 60 | 100 |
| 4 | 2220011 | English for Skill Enhancement | HS | 2 | 0 | 0 | 2 | 40 | 60 | 100 |
| 5 | 2220227 | Electrical Circuit Analysis - II | PC | 2 | 0 | 0 | 2 | 40 | 60 | 100 |
| 6 | 2220576 | Applied Python Programming Laboratory | ES | 0 | 1 | 2 | 2 | 40 | 60 | 100 |
| 7 | 2220071 | Applied Physics Laboratory | BS | 0 | 0 | 3 | 1.5 | 40 | 60 | 100 |
| 8 | 2220073 | English Language and Communication Skills Laboratory | HS | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 9 | 2220274 | Electrical Circuit Analysis Laboratory | ES | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 10 | 222MC01 | Environmental Science | *MC | 3 | 0 | 0 | 0 | - | - | - |
| **TOTAL** | | | | **13** | **2** | **14** | **20** | **360** | **540** | **900** |

***MC-Satisfactory/Unsatisfactory**

**II YEAR I SEMESTER**

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2230003 | Transform Calculus, Numerical Methods and Complex variables | ES | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 2230228 | Electrical Machines-I | PC | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 2230402 | Analog Electronic Circuits | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 2230229 | Power System-I | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 2230230 | Electro Magnetic Fields | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | 2230275 | Electrical Machines Laboratory-I | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 7 | 2230471 | Analog Electronic Circuits Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 8 | 2230276 | Electrical Simulation tools Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 9 | 223MC03 | Gender Sensitization Laboratory | *MC | 0 | 0 | 2 | 0 | - | - | - |
| **TOTAL** | | | | **15** | **2** | **08** | **20** | **320** | **480** | **800** |

**II YEAR II SEMESTER**

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2240101 | Solid Mechanics & Hydraulic Machines | PC | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 2240231 | Measurements and Instrumentation | ES | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 3 | 2240232 | Electrical Machines–II | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 2240404 | Digital Electronics | PC | 2 | 0 | 0 | 2 | 40 | 60 | 100 |
| 5 | 2240233 | Power System-II | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | 2240473 | Digital Electronics Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 7 | 2240277 | Measurements and Instrumentation Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 8 | 2240278 | Electrical Machines Laboratory-II | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 9 | 224PS01 | Real-time Research Project/ Field Based Project | PS | 0 | 0 | 4 | 2 | 50 | - | 50 |
| 10 | 224MC02 | Constitution of India | *MC | 3 | 0 | 0 | 0 | - | - | - |
| **TOTAL** | | | | **17** | **1** | **10** | **20** | **370** | **480** | **850** |

***MC-Satisfactory/Unsatisfactory**

### III YEAR I SEMESTER

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2250234 | Power Electronics | PC | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | 2250204 | Control Systems | PC | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 3 | 2250406 | Microprocessors & Microcontrollers | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | | Professional Elective-I | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 2250012 | Business Economics and Financial Analysis | HS | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | 2250475 | Microprocessors & Microcontrollers Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 7 | 2250279 | Power Electronics Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 8 | 2250074 | Advanced English Communication Skills Laboratory | HS | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 9 | 225MC04 | Intellectual Property Rights | *MC | 3 | 0 | 0 | 0 | - | - | - |
| **TOTAL** | | | | **18** | **2** | **6** | **20** | **320** | **480** | **800** |

### III YEAR II SEMESTER

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | | Open Elective-I | OE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 2 | | Professional Elective-II | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 3 | 2260407 | Fundamentals of Signals and Systems | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 2260235 | Power System Protection | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 2260236 | Power System Operation and Control | PC | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 6 | 2260280 | Power System Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 7 | 2260281 | Control Systems Laboratory | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 8 | 2260476 | Fundamentals of Digital Signal Processing Lab | PC | 0 | 0 | 2 | 1 | 40 | 60 | 100 |
| 9 | 226PS02 | Industry Oriented Mini Project/ Internship | PS | 0 | 0 | 4 | 2 | - | 100 | 100 |
| 10 | 226MC01 | Environmental Science | *MC | 3 | 0 | 0 | 0 | - | - | - |
| **TOTAL** | | | | **18** | **0** | **10** | **20** | **320** | **580** | **900** |

***MC-Satisfactory/Unsatisfactory**

****MC-Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.**

**IV YEAR I SEMESTER**

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | 2270237 | Power Electronic Applications to Renewable Energy Systems | PC | 3 | 1 | 0 | 4 | 40 | 60 | 100 |
| 2 | | Open Elective-II | OE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 3 | | Professional Elective-III | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | | Professional Elective-IV | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 5 | 2270013 | Fundamentals of Management for Engineers | HS | 2 | 0 | 0 | 2 | 40 | 60 | 100 |
| 6 | 2270282 | Simulation of Renewable Energy Systems Laboratory | PC | 0 | 0 | 4 | 2 | 40 | 60 | 100 |
| 7 | 227PS03 | Project Stage - I | PS | 0 | 0 | 6 | 3 | 100 | - | 100 |
| **TOTAL** | | | | **14** | **1** | **10** | **20** | **340** | **360** | **700** |

**IV YEAR II SEMESTER**

| S. No. | Course Code | Course Name | Course Area | Periods per week | | | Credits | Scheme of Examination Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | Internal (CIE) | External (SEE) | Total |
| 1 | | Professional Elective – V | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 2 | | Professional Elective - VI | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 3 | | Open Elective - III | OE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 4 | 228PS04 | Project Stage – II including seminar | PS | 0 | 0 | 22 | 11 | 40 | 60 | 100 |
| **TOTAL** | | | | **9** | **0** | **22** | **20** | **160** | **240** | **400** |

***MC-Satisfactory/Unsatisfactory**

## Professional Elective (PE) Courses

### PE-I: Professional Elective - I

| S. No. | Course Code | Course Title |
|---|---|---|
| 1 | 22502A1 | IoT Applications in Electrical Engineering |
| 2 | 22502A2 | High Voltage Engineering |
| 3 | 22502A3 | Computer Aided Electrical Machine Design |

### PE-II: Professional Elective - II

| S. No. | Course Code | Course Title |
|---|---|---|
| 1 | 22666C5 | Cyber-Physical Systems |
| 2 | 22602A4 | Power Semiconductor Drives |
| 3 | 22602A5 | Wind and Solar Energy systems |

### PE-III: Professional Elective - III

| S. No. | Course Code | Course Title |
|---|---|---|
| 1 | 22762A4 | Mobile Application Development |
| 2 | 22704A1 | Digital Signal Processing |
| 3 | 22702A6 | Electric and Hybrid Vehicles |

### PE-IV: Professional Elective - IV

| S. No. | Course Code | Course Title |
|---|---|---|
| 1 | 22702A7 | HVDC Transmission |
| 2 | 22702A8 | Power System Reliability |
| 3 | 22704A2 | Embedded Systems Applications |

### PE-V: Professional Elective - V

| S. No. | Course Code | Course Title |
|---|---|---|
| 1 | 22802A9 | Power Quality & FACTS |
| 2 | 22802B1 | Solar Power Batteries |
| 3 | 22802B2 | AI Techniques in Electrical Engineering |

### PE-VI: Professional Elective - VI

| S. No. | Course Code | Course Title |
|---|---|---|
| 1 | 22802B3 | Smart Grid Technologies |
| 2 | 22802B4 | Electrical Distribution Systems |
| 3 | 22802B5 | Machine Learning Applications to Electrical Engineering |

## Open Elective (OE) Courses

| S. No | Open Elective | Course Code | Course Title |
|---|---|---|---|
| 1 | Open Elective- I | 22602G1 | Renewable Energy Sources |
| | | 22602G2 | Fundamental of Electric Vehicles |
| 2 | Open Elective–II | 22702G3 | Utilization of Electric Energy |
| | | 22702G4 | Energy Storage Systems |
| 3 | Open Elective-III | 22802G5 | Charging Infrastructure for Electric Vehicles |
| | | 22802G6 | Reliability Engineering |

***Note:*** *Open Elective subject's syllabus is provided in a separate document. Student should take open electives from the list of offered by other departments/branches only.*