**GONDWANA UNIVERSITY, GADCHIROLI**
**FACULTY OF SCIENCE AND TECHNOLOGY**
Teaching and Evaluation Scheme w.e.f. Academic Year 2024-2025 as per NEP - 2020
**Bachelor of Technology in Electrical Engineering (EE)** (Full Time)
**Semester – I**

| Course Category | Board of Studies | Course Code | Name of the Course | Teaching Scheme | | | | Evaluation Scheme | | | | | | | | | Credit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Theory Marks | | | | | Practical Marks | | | | |
| | | | | L | T | P | Total | MSE (CA) | IE (CA) | ESE (UA) | Total | Min (UA+CA) | CA | UA | Total | Min (UA+CA) | |
| BSC | Science and Humanities | STBSC101 | Engineering Mathematics I | 3 | 1 | – | 4 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 4 |
| BSC | Science and Humanities | STBSC102 | Engineering Chemistry | 3 | – | – | 3 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 3 |
| ESC | Civil Engineering | STESC103 | Engineering Mechanics | 3 | – | – | 3 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 3 |
| PCC | Electrical Engineering | STPCCEE104 | Basic of Electrical Act and Safety | 2 | – | – | 2 | 5 | 5 | 40 | 50 | 20 | – | – | – | – | 2 |
| ESC | Computer Science and Engineering | STESC105 | Programming for Problem Solving | 2 | – | – | 2 | 5 | 5 | 40 | 50 | 20 | – | – | – | – | 2 |
| AEC | Science and Humanities | STAEC106 | Business Communication Skill | 1 | – | 2 | 3 | 5 | 5 | 40 | 50 | 20 | – | – | – | – | 2 |
| BSC | Science and Humanities | STBSC107 | Engineering Chemistry Lab | – | – | 2 | 2 | – | – | – | – | – | 25 | 25 | 50 | 25 | 1 |
| ESC | Civil Engineering | STESC108 | Engineering Mechanics Lab | – | – | 2 | 2 | – | – | – | – | – | 25 | 25 | 50 | 25 | 1 |
| VSEC | Mechanical Engineering | STVSEC109 | Workshop – I | – | – | 4 | 4 | – | – | – | – | – | 50 | 50 | 100 | 50 | 2 |
| CC | Science and Humanities | STCC110 | Self-Learning Course (Yoga and Meditation) | – | – | – | - | – | – | – | – | – | 50 | – | 50 | 25 | 2 |
| | | | **Total** | **14** | **1** | **10** | **25** | | | | **450** | | | | **250** | | **22** |
| | | | **Total Marks** | **700** | | | | | | | | | | | | | |

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**GONDWANA UNIVERSITY, GADCHIROLI**
**FACULTY OF SCIENCE AND TECHNOLOGY**
Teaching and Evaluation Scheme w.e.f. Academic Year 2024-2025 as per NEP - 2020
**Bachelor of Technology in Electrical Engineering (EE)** (Full Time)
**Semester – II**

| Course Category | Board of Studies | Course Code | Name of the Course | Teaching Scheme | | | | Evaluation Scheme | | | | | | | | | Credit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Theory Marks | | | | | Practical Marks | | | | |
| | | | | L | T | P | Total | MSE (CA) | IE (CA) | ESE (UA) | Total | Min (UA+CA) | CA | UA | Total | Min (UA+CA) | |
| BSC | Science and Humanities | STBSC201 | Engineering Mathematics II | 3 | 1 | – | 4 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 4 |
| BSC | Science and Humanities | STBSC202 | Engineering Physics | 3 | 1 | – | 4 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 4 |
| ESC | Electrical Engineering | STESC203 | Basics of Electrical and Electronics Engineering | 3 | – | – | 3 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 3 |
| ESC | Mechanical Engineering | STESC204 | Engineering Graphics and Design | 3 | – | – | 3 | 10 | 10 | 80 | 100 | 40 | – | – | – | – | 3 |
| IKS | Science and Humanities | STIKS205 | Indian Knowledge System | 2 | – | – | 2 | 40 | 10 | – | 50 | 20 | – | – | – | – | 2 |
| BSC | Science and Humanities | STBSC206 | Engineering Physics Lab | – | – | 2 | 2 | – | – | – | – | – | 25 | 25 | 50 | 25 | 1 |
| ESC | Electrical Engineering | STESC207 | Basics of Electrical and Electronics Engineering Lab | – | – | 2 | 2 | – | – | – | – | – | 25 | 25 | 50 | 25 | 1 |
| ESC | Mechanical Engineering | STESC208 | Engineering Graphics and Design Lab | – | – | 2 | 2 | – | – | – | – | – | 25 | 25 | 50 | 25 | 1 |
| VSEC | Mechanical Engineering | STVSECMEC209 | Workshop - II (Mechanical) | – | – | 4 | 4 | – | – | – | – | – | 50 | 50 | 100 | 50 | 2 |
| CC | Mechanical Engineering | STCCMEC210 | Club Activities (Self learning course) | – | – | – | – | – | – | – | – | – | 50 | – | 50 | 25 | 2 |
| | | | **Total** | **14** | **2** | **10** | **26** | | | | **450** | | | | **300** | | **23** |
| | | | **Total Marks** | **750** | | | | | | | | | | | | | |

# GONDWANA UNIVERSITY, GADCHIROLI
## FACULTY OF ENGINEERING AND TECHNOLOGY

Teaching and Evaluation Scheme from Academic Year 2024-2025 as per NEP - 2020

**Programme Electrical Engineering (EE)** (Full Time)

**Scheme of Instructions: UG Certificate Level**

(Exit Course after First Year of Engineering)

| Sr. No. | Category | Course Code | Name of Course | Teaching scheme | | | | Examination Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of Credits | Theory | | | | | Practical | | | |
| | | | | L | T (Tutorial / Assignment/ Field work) | P | | Duration of Paper (Hrs.) | Max. Marks | Max. Marks Sessional | Total Marks | Min. passing marks | Max. Marks | Max. Marks | Total Marks | Min. passing marks |
| | | | | | | | | | ESE | MSE | | | TW | PEE | | |
| 1. | PCC | STEXELE210 | Electrification of building | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| OR | | | | | | | | | | | | | | | | |
| 2. | PCC | STEXELE211 | Electrical Panel Design | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | 8 | | | 4 | 100 | | | | | | | | |

(1) (2) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**

**Four Year Degree Course in Engineering and Technology**

**Course and Examination Scheme with NEP Curriculum**

***Third Semester* Bachelor of Technology in Electrical Engineering**

| Course Category | Course Code | Board of Studies | Course Title | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of credits | THEORY | | | | | | PRACTICAL | | | |
| | | | | L | T | P | | Duration of paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional | | Total | Min. Passing Marks | Max Marks TW | Max Marks POE | Total | Min. Passing Marks |
| | | | | | | | | | | MSE | IE | | | | | | |
| PCC | STPCCELE301 | Electrical | Network Analysis | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCCELE302 | Science & Humanitcs | Electrical Engineering Mathematics | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| MDM | STMDMELE303 | Electronics | Analog Electronic Circuits | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| OE | STOEELE304 | CSE/ME | OE-I | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| HSSM | STHSSMELE305 | Science & Humanitcs | Engineering Economics | 2 | 0 | 0 | 2 | 2 | 40 | -- | 10 | 50 | 20 | -- | -- | -- | -- |
| VEC | STVECELE306 | Science & Humanitcs | Introduction to Constitution of India | 2 | 0 | 0 | 2 | 2 | 40 | -- | 10 | 50 | 20 | | | | |
| **Laboratory** | | | | | | | | | | | | | | | | | |
| PCC | STPCCELE307 | Electrical | Network Analysis | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| MDM | STMDMELE308 | Electronics | Analog Electronics Laboratory | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| OE | STOEELE309 | CSE/ME | OE-I | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| CEP | STCEPELE310 | Electrical | Community Engineering. Project | 0 | 0 | 4 | 2 | | | | | | | 50 | 50 | 100 | 50 |
| **Total** | | | | **16** | **0** | **10** | **21** | | | | | | | | | | |
| **Semester Total** | | | | **26** | | | **21** | | | | | **500** | | | | **250** | |
| | | | | | | | | | | | | | **750** | | | | |

***OE : 1) Data Structures and Algorithms, 2) Thermal and Fluid Engineering***

(1) (3) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**

**Four Year Degree Course in Engineering and Technology**

**Course and Examination Scheme with NEP Curriculum**

***Fourth Semester*** **Bachelor of Technology in Electrical Engineering**

| Course Category | Course Code | BoS | Course Title | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of credits | THEORY | | | | | | PRACTICAL | | | |
| | | | | L | T | P | | Duration of paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional | | Total | Min. Passing Marks | Max Marks TW | Max Marks POE | Total | Min. Passing Marks |
| | | | | | | | | | | MSE | IE | | | | | | |
| PCC | STPCCELE401 | Electrical | Electrical Machines – I | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCCELE402 | Electrical | Measurements & Instrumentation | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| MDM | STMDMELE403 | Electrical | Electromagnetic Field Application in Engineering | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| OE | STOEELE404 | ME/ENTC | OE-II | 2 | 0 | 0 | 2 | 2 | 40 | 05 | 05 | 50 | 20 | -- | -- | -- | -- |
| AEC | STAECELE405 | Electrical | Technical Report Writing | - | 0 | 4 | 2 | - | - | - | - | - | - | 50 | -- | 50 | 25 |
| HSSM | STHSSMELE406 | S & H | Industrial Organization & Management | 2 | 0 | 0 | 2 | 2 | 40 | 05 | 05 | 50 | 20 | | | | |
| VEC | STVECELE407 | S & H | Social Sciences | - | 0 | 4 | 2 | - | - | - | - | - | - | 50 | -- | 50 | 25 |
| **Laboratory** | | | | | | | | | | | | | | | | | |
| PCC | STPCCELE408 | Electrical | Electrical Machines – I Laboratory | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| PCC | STPCCELE409 | Electrical | Measurements &Instrumentation Laboratory | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| VEC | STVECELE410 | Electrical | Electrical Workshop | 0 | 0 | 4 | 2 | -- | -- | -- | -- | -- | -- | 50 | 50 | 100 | 25 |
| **Total** | | | | **13** | **0** | **16** | **21** | | | | | **400** | | -- | -- | **300** | |
| **Semester Total** | | | | **29** | | | **21** | **700** | | | | | | | | | |

**OE : 1) Wind and Solar Energy System, 2) Digital Signal Processing**

(1) (2) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**
**FACULTY OF ENGINEERING AND TECHNOLOGY**
Teaching and Evaluation Scheme from Academic Year 2025-2026 as per NEP - 2020
**Electrical Engineering** (Full Time)
**Scheme of Instructions: UG Diploma Level**
(Exit Course after Second Year of Engineering)

| Sr. No. | Category | Course Code | Name of Course | Teaching scheme | | | | Examination Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of Credits | Theory | | | | | Practical | | | |
| | | | | L | T (Tutorial / Assignment/ Field work) | P | | Duration of Paper (Hrs.) | Max. Marks | Max. Marks | Total Marks | Min. passing marks | Max. Marks | Max. Marks | Total Marks | Min. passing marks |
| | | | | | | | | | | Sessional | | | | | | |
| | | | | | | | | | ESE | MSE | | | TW | POE | | |
| 1. | PCC | STEXELE411 | Repairing and maintenance of Electrical Appliances | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| OR | | | | | | | | | | | | | | | | |
| 3. | PCC | STEXELE412 | Industrial Electrical systems installation and maintenance | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | 8 | | | 4 | 100 | | | | | | | | |

(1) (2) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**

**Four Year Degree Course in Engineering and Technology**

**Course and Examination Scheme with NEP Curriculum**

***Fifth Semester* Bachelor of Technology in Electrical Engineering**

| Course Category | Course Code | BoS | Course Title | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of credits | THEORY | | | | | | PRACTICAL | | | |
| | | | | L | T | P | | Duration of paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional MSE | Max. Marks Sessional IE | Total | Min. Passing Marks | Max Marks TW | Max Marks POE | Total | Min. Passing Marks |
| PCC | STPCCE LE501 | Electrical | Electrical Machine -II | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCCC ELE502 | Electronics | Digital Electronic Circuits | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCCE LE503 | Electrical | Power system-I | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PEC | STPECE LE 504 | Electrical | Program elective-I | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| MDM | STMDM ELE505 | Electrical | Programming Techniques & Simulation | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| OE | STOEEL E506 | ENTC/CSE/ME | Open Elective-III | 2 | 0 | 0 | 2 | 2 | 40 | 05 | 05 | 50 | 20 | | | | |
| **Laboratory** | | | | | | | | | | | | | | | | | |
| PCC | STPCCE LE507 | Electrical | Electrical Machine-II Lab. | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| PCC | STPCCE LE508 | Electronics | Digital Electronic Circuits Lab. | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| PCC | STPCCE LE509 | Electrical | Power system-I Lab. | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| MDM | STMDM ELE510 | Electrical | Programming Techniques & Simulation | 0 | 0 | 2 | 1 | | | | | | | 25 | 25 | 50 | 25 |
| | | | **Total** | **17** | **0** | **8** | **21** | | | | | **550** | | | | **200** | |
| | | | **Semester Total** | **25** | | | **21** | **750** | | | | | | | | | |

**PEC : 1) PLC and SCADA, 2) Electrical Machine Design 3) Electrical Power Utilization**

**OE : 1) Embedded Systems 2) Fuzzy and neural Network 3) I C Engines**

(1) (2) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**
**Four Year Degree Course in Engineering and Technology**
**Course and Examination Scheme with NEP Curriculum**
***Sixth Semester* Bachelor of Technology in Electrical Engineering**

| Course Category | Course Code | BoS | Course Title | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of credits | THEORY | | | | | | PRACTICAL | | | |
| | | | | L | T | P | | Duration of paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional | | Total | Min. Passing Marks | Max Marks TW | Max Marks POE | Total | Min. Passing Marks |
| | | | | | | | | | | MSE | IE | | | | | | |
| PCC | STPCC ELE601 | Electrical | Power Electronics | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCC ELE602 | Electrical | Control system | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCC ELE603 | Electrical | Power System-II | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | | | | |
| PEC | STPEC ELE604 | Electrical | Program Elective-II | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | | | | |
| MDM | STMD MELE605 | Electronics | Microprocessor | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| **Laboratory** | | | | | | | | | | | | | | | | | |
| PCC | STPCC ELE607 | Electrical | Power Electronics Lab. | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| PCC | STPCC ELE608 | Electrical | Control System Lab. | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| PCC | STPCC ELE609 | Electrical | Power System-II Lab | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| PCC | STPCC ELE610 | Electrical | Electrical Equipment Maintenance | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| **Total** | | | | **15** | **0** | **08** | **19** | | | | | **500** | | | | **200** | |
| **Semester Total** | | | | **23** | | | **19** | **700** | | | | | | | | | |

**PEC : 1) Renewable Energy Sources 2) Electric Drives & Control 3) Demand Side Management & Audit**

**Exit option : Award of UG Degree B.Voc / B.Sc. in Major with 120 credits and an additional 8 credits in skill based courses ,internship , mini project etc.**

(1) (2) (3) (4)

# GONDWANA UNIVERSITY, GADCHIROLI
## FACULTY OF ENGINEERING AND TECHNOLOGY

Teaching and Evaluation Scheme from Academic Year 2025-2026 as per NEP - 2020

**Electrical Engineering** (Full Time)

**Scheme of Instructions: B. Voc. Level**

(Exit Course after Third Year of Engineering)

| Sr. No. | Category | Course Code | Name of Course | Teaching scheme | | | | Examination Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of Credits | Theory | | | | | Practical | | | |
| | | | | L | T (Tutorial / Assignment/ Field work) | P | | Duration of Paper (Hrs.) | Max. Marks | Max. Marks | Total Marks | Min. passing marks | Max. Marks | Max. Marks | Total Marks | Min. passing marks |
| | | | | | | | | | | Sessional | | | | | | |
| | | | | | | | | | ESE | MSE | | | TW | POE | | |
| 1. | PCC | STEXELE611 | Installation of Transformer | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| OR | | | | | | | | | | | | | | | | |
| 2.. | PCC | STEXELE612 | Industrial Electrical Systems | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | 8 | | | 4 | 100 | | | | | | | | |

# GONDWANA UNIVERSITY, GADCHIROLI
## FACULTY OF ENGINEERING AND TECHNOLOGY

Teaching and Evaluation Scheme from Academic Year 2025-2026 as per NEP - 2020

**Electrical Engineering** (Full Time)

**Scheme of Instructions: B. Voc. Level**

(Exit Course after Third Year of Engineering)

| Sr. No. | Category | Course Code | Name of Course | Teaching scheme | | | | Examination Scheme | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of Credits | Theory | | | | | Practical | | | |
| | | | | L | T (Tutorial / Assignment/ Field work) | P | | Duration of Paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional MSE | Total Marks | Min. passing marks | Max. Marks TW | Max. Marks POE | Total Marks | Min. passing marks |
| 1. | PCC | STEXELE611 | Installation of Transformer | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| OR | | | | | | | | | | | | | | | | |
| 2.. | PCC | STEXELE612 | Industrial Electrical Systems | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | -- | -- | 8 | 4 | -- | -- | -- | -- | -- | 100 | -- | 100 | 50 |
| | | | Total | 8 | | | 4 | 100 | | | | | | | | |

(1) (2) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**
**Four Year Degree Course in Engineering and Technology**
**Course and Examination Scheme with NEP Curriculum**
***Seventh Semester* Bachelor of Technology in Electrical Engineering**

| Course Category | Course Code | BoS | Course Title | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of credits | THEORY | | | | | | PRACTICAL | | | |
| | | | | L | T | P | | Duration of paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional | | Total | Min. Passing Marks | Max Marks TW | Max Marks POE | Total | Min. Passing Marks |
| | | | | | | | | | | MSE | IE | | | | | | |
| PEC | STPECE LE701 | Electrical | MOOC-I | -- | -- | -- | 3 | -- | -- | -- | -- | 100 | 40 | -- | -- | -- | -- |
| PEC | STPECE LE702 | Electrical | MOOC-I | -- | -- | -- | 3 | -- | -- | -- | -- | 100 | 40 | -- | -- | -- | -- |
| MDM | STMDM ELE703 | Electrical | Multi-disciplinary Minor-V | -- | -- | -- | 2 | -- | -- | -- | -- | 50 | 20 | | | | |
| ELC | STELCE LE704 | Electrical | Internship/OJT | -- | -- | 24 | 12 | -- | -- | -- | -- | -- | -- | 100 | 200 | 300 | 150 |
| Total | | | | **10** | **--** | **24** | **20** | | | | | **250** | | | | **300** | |
| **Semester Total** | | | | **34** | | | **20** | **550** | | | | | | | | | |

**MOOC - I (12 week online certificate courses conducted by NPTEL/SWAYAM/MOOC/OTHERS)**

1. **Advanced Distribution Systems**
2. **Signals and Systems**
3. **Introduction To Embedded System Design**
4. **Power System Analysis**
5. **Design of Photovoltaic Systems**

**MOOC - II (12 week online certificate courses conducted by NPTEL/SWAYAM/MOOC/OTHERS)**

1. **Electric Vehicles And Renewable Energy**
2. **Power System Dynamics, Control And Monitoring**
3. **Power Electronics**
4. **Networks And Systems**
5. **Control Engineering**

**Multi - Disciplinary Minor - V (8 week online certificate courses conducted by NPTEL/SWAYAM/MOOC/OTHERS)**

1. **DC Micro grid and Control System**
2. **Electrical Distribution System Analysis**
3. **Advanced Power Electronics and Control**
4. **Fundamentals Of Electric Drives**
5. **Power Quality Improvement Technique**

**For MOOC I, MOOC-II and MDM – V student may opt for the courses other than mentioned above course with the consent of mentors.**

(1) (2) (3) (4)

**GONDWANA UNIVERSITY, GADCHIROLI**

**Four Year Degree Course in Engineering and Technology**

**Course and Examination Scheme with NEP Curriculum**

***Eighth Semester* Bachelor of Technology in Electrical Engineering**

| Course Category | Course Code | BoS | Course Title | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hours per week | | | No. of credits | THEORY | | | | | | PRACTICAL | | | |
| | | | | L | T | P | | Duration of paper (Hrs.) | Max. Marks ESE | Max. Marks Sessional MSE | Max. Marks Sessional IE | Total | Min. Passing Marks | Max Marks TW | Max Marks POE | Total | Min. Passing Marks |
| PCC | STPCCE LE 801 | Electrical | Power Quality and FACTS | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PCC | STPCCE LE 802 | Electrical | Computer Application in Power Systems | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| ELC | STELCE LE 803 | Electrical | Research Methodology and IPR | 3 | 1 | - | 4 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| PEC | STPECE LE 804 | Electrical | Program Elective-III | 2 | 0 | 0 | 2 | 2 | 40 | 5 | 5 | 50 | 20 | -- | -- | -- | -- |
| MDM | STMDM ELE 805 | ETC | Digital Signal Processing | 2 | 0 | 0 | 2 | 2 | 40 | 05 | 05 | 50 | 20 | -- | -- | -- | -- |
| **Laboratory** | | | | | | | | | | | | | | | | | |
| PCC | STPCCE LE 806 | Electrical | Computer Application in Power Systems Lab | 0 | 0 | 2 | 1 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| Experiential Learning | STEXPL ELE807 | Electrical | Project Stage-II | 0 | 0 | 8 | 4 | -- | -- | -- | -- | -- | -- | 100 | 100 | 200 | 100 |
| | | **Total** | | **13** | **1** | **10** | **19** | | | | | **400** | | | | **250** | |
| | | **Semester Total** | | **23** | | | **19** | **650** | | | | | | | | | |

**PEC-804: 1) Flexible AC Transmission Systems 2) Design of Solar Photovoltaic Systems, 3) Battery Engineering**

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STBSC101**

**Title of the Course : Engineering Mathematics-I**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | 0 | 4 | 4 | 3 | 10 | 10 | 80 | 100 |

**Course Outcome:**

After completion of the course, the student will be able to:

1. To apply knowledge of mathematics in formulating and solving problems analytically.
2. To deal with function of several variables that is essential in most branches of Engineering.
3. To use the knowledge of Gamma and Beta function to evaluate some definite integrals arising in various branches of engineering.
4. To use various statistical techniques to applied engineering problem.

| Unit | Contents | Hours |
|---|---|---|
| 1 | **Differential Calculus**<br>Successive differentiation, Leibnitz's theorem on the $n^{th}$ derivative of a product, Expansion of a function by using Taylor's and Maclaurian's theorem, Indeterminate forms. | 09 |
| 2 | **Partial Differentiation**<br>Partial Derivatives, Euler's theorem on homogeneous functions, Transformation of independent variables (Chain rule). | 09 |
| 3 | **Application of Partial Differentiation**<br>Jacobians, properties of Jacobians, Taylor's and Maclaurin's series for function of two variable, Maxima and Minima of functions of two variables, Lagrange's method of undermined multipliers. | 09 |
| 4 | **Integral Calculus**<br>Gamma and Beta functions, properties of gamma, beta functions, Differentiations of definite integrals under integral sign, (Leibnitz's Rule), Mean and R.M.S. value. | 09 |
| 5 | **Statistics & Finite Differences**<br>Fitting of straight-line, second-degree parabola & exponential curves, Coefficient of Correlation, Regression lines, Rank coefficient of correlation Finite Differences: Operator E & Delta, Fractional polynomial. Lagrange's, interpolation formula for unequal intervals of arguments. | 09 |
| | | 45 |

**Reference Books:**


1. A Text book of Engineering Mathematics, Volume I and II by D. T. Deshmukh.
2. A Text book of Applied Mathematics Volume I and II by J. N. Wartikar and P. N. Wartikar.
3. N. P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi publication, Reprint, 2008.
4. Higher Engineering Mathematics by B. S. Grewal Khanna Publishers.
5. Advanced Engineering Mathematics by H. K. Dass
6. Advanced Engineering Mathematics by ErwinsKreyszig

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STBSC102**

**Title of the Course : Engineering Chemistry**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 0 | 0 | 3 | 3 | 3 | 10 | 10 | 80 | 100 |

**Course Outcome:**

After completion of the course, the student will be able to:

1. Demonstrate the types of hardness of water and softening methods.
2. Classify the types of corrosion and write the uses of battery.
3. Illustrate the working of IC engine.
4. Explore the Eco-friendly sustainable developments.
5. Prepare the organic polymers, Resins.

| Unit | Contents | Hours |
|---|---|---|
| 1 | **Water treatment and Analysis**<br>Definition of hardness of water, Types of hardness and water softening methods like (External treatment methods) 1-Lime-Soda method 2-Zeolite/Permutt method and 3- Ion exchange methods with advantages and limitations. Units of hardness, Numerical problems on Lime-soda and Zeolite process. Boiler troubles: Boiler corrosion, Caustic embrittlement, Priming and Foaming, Scale and Sludge. Internal treatment for Boiler feed water such as Calgon, Colloidal, and Phosphate conditioning. Desalination of Brackish water/Purification of water by Reverse osmosis and Electrodialysis. | 9 |
| 2 | **Corrosion of metals and Battery science**<br>Definition, Cause and Consequences, mechanism of Dry/Direct chemical and Wet/Electrochemical corrosion. Corrosion Prevention methods- Design and Material selection, Anodic & cathodic protection. Types of corrosion- Pitting corrosion, Intergranular corrosion, Stress corrosion and Waterline corrosion<br>Battery science- Primary and Secondary battery, Nickel-Cadmium Battery, Alkaline Fuel cell, Phosphoric acid fuel cell Applications, Advantages and limitations | 9 |
| 3 | **Fuels and Combustion**<br>Classification, Definition of Calorific value, Gross calorific value (HCV) & Net calorific value (NCV) Determination of calorific value by Bomb calorimeter & Boy's calorimeter, Solid Fuel-Proximate & Ultimate Analysis of coal & its significance, Liquid Fuel- Working of IC engine, Knocking, Antiknocking agents, their properties with chemical constitution, Octane number and Cetane number. Gaseous fuel-Composition, Properties and Applications of CNG and LPG, Combustion numerical for Air required | 9 |

| | | |
|---|---|---|
| 4 | **Green Chemistry**<br>Definition, Goals of Green chemistry, Efficiency parameters a need of green chemistry, Major uses traditional and green pathways of synthesis of Adipic acid, indigo dye, Concept of carbon credits. | 9 |
| 5 | **Synthetic Organic Polymer**<br>Introduction, Functionality of monomer, Polymerization, Free radical mechanism and step growth polymerization concept. Thermoplastic and Thermosetting polymers. Preparation, properties and uses of- Polyethylene (LDPE and HDPE), Resins-Urea formaldehyde, Phenol formaldehyde (Bakelite), Synthetic rubber-(SBR), Styrene butadiene rubber, Polymer composites-Fiber Reinforced plastic (FRP} | 9 |

**Text Books:**


1. Engineering chemistry, S.S. Dara Chand publication, New Delhi
2. Engineering chemistry Jain and Jain, Dhanpat Rai and sons, New Delhi


**Reference Books:**


1. Textbook of Engineering Chemistry, Shashi Chawla, Dhanpat Rai & Sons, New Delhi.
2. Applied Chemistry by N. Krishnamurthy, P.Vallinavagam.,K.Jeysubramanian, TMH.
3. Applied Chemistry for Engineers, T. S. Gyngell.
4. Introduction to polymers, by Robert J. Young
5. Chemistry of Advanced Materials:CNRRao, Rsc Publication.
6. Corrosion Engineering by Mars G. Fontanaand Norbert D. Green McGraw Hill Book Co. Tokyo
7. Fuels and Combustion by Amir Circar, Orient Longmans
8. Fundamentals of Corrosion: Michael Henthorne, Chemical Engineering.
9. Water Treatment: F.I. Bilane, Mirpublisher

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STESC103**

**Title of the Course :** EngineeringMechanics

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 0 | 0 | 3 | 3 | 3 | 10 | 10 | 80 | 100 |

**Course Outcomes:**

After completion of the course, the student will be able to:

1. Apply the principles of mechanics for solving the structures like trusses, cables and beams.
2. Equipped with problem solving ability for rigid body mechanics.
3. Exhibit various applications of Newtonian Mechanics in their respective engineering discipline.
4. Understand fundamentals before going for higher level courses such as Strength of Materials, Electrical Machines, Engineering Thermodynamics, Structural Analysis, Design of Structures, Machine Designs etc.

| Units | Contents | Hours |
|---|---|---|
| 1 | Basic principles of mechanics, Types of force system, Moment of a force about a point and about an axis, Couple, Equivalent force systems: Resultant of a co-planner and spatial force system. Analytical and graphical methods. Equilibrium of co-planner force system. Applications to beams and frames | 09 |
| 2 | Analysis of structures. Theory and Laws of friction and its application like Cone friction wedges, belt friction and band brakes. | 09 |
| 3 | Centroid of composite areas, Moment of inertia and products of inertia of plane areas, Transfer theorems for moment of inertia and Product of inertia. Mhor's circle method. | 09 |
| 4 | Kinematics of Particles: rectilinear motion, Motion curve, Relative motion, Fixed axis rotation.<br>Kinetics of particles: D'Alembert'sprinciple,Principal of Impulse Momentum and their applications to particles. Direct central Impact. | 09 |
| 5 | Vibrations: Equations of motion for single degree-of-freedom systems and rigid body assemblies, free vibration (simple harmonic oscillator), concepts of damping and critical damping, damped free vibration: equations of motion for harmonic excitation. | 09 |
| | | 45 |

**Text Books:**


1. Vector Mechanics for Engineers, Vol. 1 – Statics and Vol. 2 – Dynamics, Beer and Johnston, 8th edition, Tata McGraw Hill International Edition, 2010.
2. Engineering Mechanics, Vol. 1 – Statics 4/e, 1998 and Vol. 2 – Dynamics, Merriam, 5/e, Wiley International, 2001.
3. Engineering Mechanics, by Dr. K. L. Kumar, Tata McGraw Hill Publications, 2011

**References Books:**


1. Engineering Mechanics, Irving H. Shames, & Rao, Prentice Hall, New Delhi 2010.
2. Engineering Mechanics, Vol. 1–Statics and Vol. 2–Dynamics, Mokoshi, V.S., Tata MGH Books, 1996.
3. Engineering Mechanics, F.L.Singer, HarperCollins Publishers India, 2001
4. Engineering Mechanics, McLean, 3rd Edition, SCHAUM Series, 1995.
5. Engineering Mechanics, Timoshenko and Young, McGraw Hill Publication.
6. Engineering Mechnaics, R. C. Hibbeler, Pearson Publishers, 2010

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code :STPCCEE104**

**Title of the Course : Basic of Electrical Act & Safety**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 2 | 0 | 0 | 2 | 2 | 2 | 5 | 5 | 40 | 50 |

**Course Outcomes:**

After completing the course students will able to:

CO1 To understand the most important parts of an electrical equipment certificate
CO2 To get a feel for the Electricity Act 2003
CO3 To be able to Understand How Electrical Safety Works
CO4 To learn how lighting affects building and installation.
CO5 To learn about the different kinds of earthing used in electrical work.

**Detailed Syllabus:**

| | | |
|---|---|---|
| **Unit 1** | **Electrical Equipment Concept**: Review of electrical concept, Working principle of major electrical equipment, Typical supply situation, Various Standards and statutory requirements and its functioning. | **5 Hrs** |
| **Unit 2** | **Electricity Act 2003:** Study main silent features of Indian electricity act 2003 related to Generation , Transmission & Distribution | **5 Hrs** |
| **Unit 3** | **Electrical Safety:** International standards of electrical safety, Different Indian standards of electrical safety, First aid cardiopulmonary resuscitation (CPR). Electrical hazards, Effect of electrical shock of human being, | **5 Hrs** |
| **Unit 4** | **Lightening:** Effect of lightening current on installation and buildings, Energy leakage, Clearance and insulation, Excess energy, Current, Surges. | **5 Hrs** |
| **Unit 5** | **Earthing**: Electrical causes of fire and explosion, Introduction to Earthing and Its Types, Advantages of Different Types of Earthings and Earthing for Different Systems Like Transformer, Alternators, DC Machines, etc. Importance of earthing in installation | **5 Hrs** |

**Reference Books:**


1. Krishnan, N.V., Safety Management in Industry, Jaico Publishing House, 1997.
2. Cooper W.F., Electrical Safety Engineering,3rd ed., Newnes, 2002.
3. Cadick, J., et. al., Electrical Safety Handbook, 4thed, McGraw Hill, 2013.

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code: STESC105**

**Title of the Course: Programming for Problem Solving**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 2 | 0 | 0 | 2 | 2 | 2 | 5 | 5 | 40 | 50 |

**Course Outcome:**

After completion of the course, the student will be able to:

1. Write, compile, and execute C programs based on simple constructs like arrays, loops, structures, conditional statements etc.
2. Apply the concepts of arrays and functions to solve problems.
3. Develop simple C program for small applications.

| Unit | Contents | Hours |
|---|---|---|
| 1 | **Fundamentals of C**<br>History & Features of C language, structure of C Program, algorithm, flowchart, keywords, data types, constants and variables, operators, precedence and associativity. | 8 |
| 2 | **Control structure in C**<br>Decision making statements: simple if statement, if else statement, if else if ladder, nested if, switch case, Looping statements: while do while, for, break and continue statement. | 8 |
| 3 | **Arrays and Functions**<br>Concepts of array, declaration, and initialization of arrays, one- and two-dimensional arrays,<br>Concepts of user defined functions, definition of function, call by value, call by reference, recursion. | 8 |
| | | 24 |

**Text Books:**


1. Programming in ANSI C – Balaguruswami 8th Edition (Mc Graw Hill Publications)
2. C Programming: A Modern Approach - K. N. King.
3. Programming in C - Stephen Kochan.
4. Let us C –Yashwant Kanetkar (BPB Publications)


**Reference Books:**


1. C: The Complete Reference - by Kernighan Brian W. and Ritchie Dennis
2. Computer Fundamentals and Programming in C - by Reema Thareja

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STAEC106**
**Title of the Course : Business Communication Skill**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 1 | 0 | 2 | 3 | 2 | 2 | 5 | 5 | 40 | 50 |

**Course Outcome:**

After completion of the course, the student will be able to:

1. Basic proficiency in writingandspeaking English.
2. Essential business communication skills.
3. Presentation and organizing skills.
4. Correspondence skills and etiquettes.
5. Oral communication skills.

| Units | Contents | Hours |
|---|---|---|
| 1 | Identifying Common Errors in Writing<br>1.1 Sentence Structures<br>1.2 Use of phrases and clauses in sentences<br>1.3 Subject-verb agreement.<br>1.4 Noun-pronoun agreement<br>1.5 Articles<br>1.6 Prepositions<br>1.7 Misplaced modifiers<br>1.8 Importance of proper punctuation | 6 |
| 2 | Introduction to the essentials of Business Communication<br>2.1 Meaning and types of communication.<br>2.2 Channels of communication<br>2.3 Levels of communication<br>2.4 Direction of communication<br>2.5 Barriers to communication<br>2.6 Use of visual aids in communication | 6 |
| 3 | Presentation and Organizing Skills<br>Organizing meetings<br>3.1 How to call meeting and design the agenda.<br>3.2 Prepare minutes of the meeting.<br>Presentation skills<br>3.3 Preparation, audience, and their requirements<br>3.4 Effective ways to deliver the presentation.<br>3.5 Multimedia presentation<br>Time Management<br>3.6 Goal setting<br>3.7 Importance of time<br>3.8 Prepare time schedule | 6 |
| 4 | Business and E- Correspondence<br>4.1 Need and importance of business letters<br>4.2 Office memorandum, circulars<br>4.3 Notices and orders<br>4.4 Electronic mail: advantages, safety and smartness<br>4.5 Email etiquettes | 6 |
| 5 | Oral Communication<br>5.1 Listening Comprehension<br>5.2 Pronunciation, Intonation, Stress and Rhythm | 6 |

| | | |
|---|---|---|
| | 5.3 Common Everyday Situations: Conversations and Dialogues<br>5.4 Communication at Workplace<br>5.5 Interviews<br>5.6 Group Discussions<br>5.7 Telephonic Conversation | |

**Reference Books:**


1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007 (iii)On Writing Well. William Zinsser. Harper Resource Book. 2001
3. Study Writing. Liz Hamp-Lyons and Ben Heasly, Cambridge University Press. 2006.
4. Communication Skills. Sanjay Kumar and PushpLata, Oxford University Press. 2011.
5. Exercises in Spoken English. Parts, I-III, CIEFL, Hyderabad, Oxford University Press
6. Grammar for all. N. Ramalingam, Himalaya publishing house

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STBSC107**

**Title of the Course : Engineering Chemistry Laboratory**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 2 | 2 | 1 | --- | 25 | 25 | 50 |

**Course Outcome:**

After completion of the course, the student will be able to:

1. Illustrate the chemical analysis of water and access the quality of water.
2. Estimation of various property by pH meter and conductivity meter.
3. Perform experiments based on syllabus adopting the proper methodology.
4. Derive scientific conclusions on the basis of experimental data.
5. The process of polymer synthesis.

Minimum eight (8) experiments are to be performed from the list given below.

**List of Experiments:**

1. Determination of temporary and permanent hardness of water by complexometric method.
2. Estimation of free chlorine in water sample.
3. Estimation of dissolved oxygen in water sample.
4. Determination of chloride content of water
5. Determination of capacity of anion/cation exchange resin.
6. Determination of the copper by-Iodometry.
7. Synthesis of a polymer
8. To estimate the amount of ferrous and ferric ions present in the given solution.
9. Determination of moisture content in coal sample.
10. Determination of the partition coefficient of a substance between two immiscible
11. Liquids Adsorption of acetic acid by charcoal.
12. Determination of cell constant and conductance of solutions
13. Determination of pH of wastewater.
14. Determination of COD in wastewater.
15. Determination of hardness of water due to calcium and magnesium ions separately.
16. Determination of alkalinity of water sample

# Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STESC108**

**Title of the Course : EngineeringMechanics Laboratory**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 2 | 2 | 1 | --- | 25 | 25 | 50 |

**Course Outcome:** After completion of the course, the student will be able to:

1. To know when theory applies and when theory is limited by simplifying assumptions.
2. Identify reasons why actual measurements will differ from theoretical calculations.
3. Use the laboratory equipment correctly and safely to perform all experiments.
4. Verify the wide field of engineering mechanics in various engineering applications.

Minimum eight (8) experiments are to be performed from the list given below.

**List of Experiments:**

1. Study of simple lifting machines
2. Determination mechanical advantage, velocity ratio and efficiency of Differential axel and wheel and verification of law of machine.
3. Determination mechanical advantage, velocity ratio and efficiency of single purchase crab winch and verification of law of machine.
4. Determination mechanical advantage, velocity ratio and efficiency of double purchase crab winch and verification of law of machine.
5. Determination mechanical advantage, velocity ratio and efficiency of worm and worm wheel and verification of law of machine.
6. Determination mechanical advantage, velocity ratio and efficiency of simple screw jack and verification of law of machine.
7. Determination of tensile and compressive forces in Jib-Crane apparatus and verification of Law of triangle.
8. Determination of reactions at the support of simply supported beam.
9. Determination of limiting friction, angle of friction and coefficient of friction between two bodies in contact by friction plane apparatus.
10. Determination of belt or coil friction between two bodies in contact by coil friction apparatus.
11. Determination of mass moment of inertia of Fly Wheel.
12. Determination of value of “acceleration due to gravity” and verification of Newton’s Second law of Motion by Fleture’strolly equipment.
13. Graphical Methods:
    i. Determination of resultant.
    ii. Determination of support reactions.
    iii. Determination of forces in the members of truss by Maxwell’s Diagram Method.
    iv. Determination of frictional forces

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STVSEC109**
**Title of the Course : Workshop - I**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 4 | 4 | 2 | --- | 50 | 50 | 100 |

**Course Outcomes:**

After successful completion the course, students will be able to:

1. Upon completion of this laboratory course, students will be able to fabricate components with their own hands
2. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes
3. By assembling different components, they will be able to produce small devices of their interest.
4. The students will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

| Units | Contents (Theory and Practical) | Hours |
|---|---|---|
| 1 | **Welding Shop**<br>Concept of accidents, causes of accidents, safety precautions while working in shop, safety equipments and their use. One job on Arc welding-Lap/Butt/Tee Joint etc. | 12 |
| 2 | **Plumbing Shop**<br>Demonstration on plumbing tools, pipes, types of pipe joints, threading dies, pipe fittings filments, valves etc. One job on plumbing including pipe cutting, threading and other related operations. | 12 |
| 3 | **Foundry Shop**<br>Principles of molding methods, core and core boxes,preparation of foundry sand for casting. | 12 |
| 4 | **Machining Shop**<br>Measuring and Gauging, Semi – Precision Tools – Calipers, depth Gauge, Feeler Gauge Precision Tools – Micrometers, VernierCalipers, Vernier Height Gauge, etc, General Safety Considerations, Engine Lathes, Introduction to lathe, Physical Construction, Types of Lathe, and Lathe Operations – Facing, Turning, Threading, Introduction to drilling machine, milling machine, grinding machine and operations performed. | 12 |

**Text Books:**


1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.


**Reference Books:**


1. Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4$^{th}$edition, Pearson Education India Edition, 2002.
2. Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017.
3. Parmar, R. S., Welding Processes and Technology, Khanna Publishers, 2003.

# I Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STCC110**
**Title of the Course : Self Learning Course (Yoga and Meditation)**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | -- | -- | - | --- | 50 | 0 | 50 |

**Contents**

Students are expected to learn and practise

1. Warming up exercises to prepare the body from head to toe for Yoga.
2. Different yogic poses and stretches with varying techniques of breathing that align the mind with the body.
3. All the postures of Surya Namaskar one by one in a very slow pace after warming up.
4. Shavasana for self-relaxation, Sarvangasna, Halasana, Kandharasana, Bhujangasana, Naukasana, Mandukasana, Bhastrika, AnulomVilom, Kapalbhati, PranayamKriyas etc.
5. Sitting in steady posture, control breath flow, body relaxation in Dhyan Mudra and meditate.

In this course students are expected to join local or online training course and submit the certificate of completion of course at the end of a semester. Students are instructed to practice at least twice a week as part of self-learning practices.

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STBSC201**
**Title of the Course : Engineering Mathematics-II**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | 0 | 4 | 4 | 3 | 10 | 10 | 80 | 100 |

**Course Outcome:**

After completion of the course, the student will be able to:

1. To apply knowledge of mathematics in formulating and solving problems analytically.
2. To develop mathematical models for various engineering system and their solution using Differential equation.
3. Use of multiple integrations for calculation of area, mass, volume, centre of gravity.
4. To calculate gradient and directional derivatives of scalar point function.
5. To use Green's theorem to evaluate line integrals along simple close contours on the plane, Stoke's theorem to give physical interpretation of the curl of a vector field and the Divergence theorem to give physical interpretation of the divergence of a vector field.

| Unit | Contents | Hours |
|---|---|---|
| 1 | Ordinary differential equation I :<br>Solution of first order and first-degree differential equations, (Exact, Linear and reducible to Linear Bernoulli's equation) & Higher order linear differential equations with constant coefficients. | 09 |
| 2 | Ordinary differential equation II:<br>Method of variation of parameters, Cauchy's and Legendre's differential equations, Differential equation of the form, Application of differential equation to electrical circuits, Kinematics and Vibrations (Up to second order) | 09 |
| 3 | Multiple Integrals and their Applications:<br>Elementary double integral, change of order of integration (Cartesian), Elementary Tripple Integral, Applications to Area, Volume, Mass and Centre of gravity. | 09 |
| 4 | Vector Calculus:<br>Vector differentiation, Velocity and Acceleration, Tangential and Normal acceleration, Vector operator Del, Gradient, Directional Derivative of scalar point function. | 09 |
| 5 | Vector Calculus - II:<br>Vector point functions, Divergence and Curl, Solenoidal and Irrotational vector fields. Scalar potential, work done and conservative vector field, Line, Surface and volume integrals. Statements without proof of Gauss Divergence theorem, Greens theorem, Stoke's theorem. | 09 |

**Reference Books:**


1. A text book of Engineering Mathematics, Volume I and II by D. T. Deshmukh.
2. A text book of Applied Mathematics Volume I and II by J. N. Wartikar and P. N. Wartikar
3. Higher Engineering Mathematics by Dr. B. S. Grewal
4. Advanced Engineering Mathematics by H. K. Dass.
5. Advance Engineering Mathematics by Erwinskreyszig

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STBSC202**

**Title of the Course : EngineeringPhysics**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | 0 | 4 | 4 | 3 | 10 | 10 | 80 | 100 |

**Course Outcomes:**

After completion of the course, the student will be able to:

1. Apply engineering physics concepts, which form the basis of modern engineering.
2. Elaborate the general nature of concepts learnt and possibility of their cross-disciplinary application.
3. Gain fundamental knowledge in areas like quantum mechanics, semiconductors, crystals, and optics.
4. Solve numerical problems on areas covered.
5. Implement concepts of elementary physics in understanding of engineering applications.

| Units | Contents | Hours |
|---|---|---|
| 1 | **Quantum Physics**<br>Dual nature of matter, De-Broglie's concept of matter waves , Davisson-Germer experiment, wave packet concept, wave function interpretation, Heisenberg's uncertainty principle and its experimental illustrations, Schrodinger's wave equations, application: electron in infinite potential well. | 09 |
| 2 | **Semiconductor Physics**<br>Formation of energy bands in solids, classification of solids based on band theory, energy band diagram of germanium & silicon, probability distribution functions, Fermi energy-its dependence on temp and doping concentration, conductivity of semiconductors, energy band structure of p-n junction diode, junction voltage equation. | 09 |
| 3 | **Structure of solids**<br>Crystal structure, Unit cell and its characteristics, Bravais lattices and crystal systems, Unit cell characteristics of cubic lattices, Crystallographic planes and Miller indices, Inter-planar distance in a cubic crystal, Bragg's law. | 09 |
| 4 | **Wave optics & Electron ballistics**<br>Interference due to thin films of uniform and non uniform thickness, Newton's ring, antireflection coating, applications, Motion of electron in uniform electric and magnetic fields, concept of crossed fields. Electric field focussing-electrostatic lens, magnetic field focussing-magnetic lens | 09 |
| 5 | **Lasers and fibre optics**<br>Interaction of radiation with matter, population inversion and pumping, optical resonator, types of laser; Gas laser (He-Ne), solid state laser (Ruby) and semiconductor laser, characteristics and applications. Introduction to optical fibre structure, principle, acceptance angle, Numerical aperture, fractional refractive index, modes of propagation, types and classifications of optical fibre, V – number, attenuation, dispersion, advantages of optical fibre in communication | 09 |
| | | 45 |

**Text Book:**

1. Avadhanulu&Kshirsagar, Engineering Physics, S. Chand Prakashan.

**Reference Books:**

1. A. Beiser, Concept of modern Physics, TMH Edition
2. S. L. Gupta & S. Gupta, Concept of modern Physics,
3. David Halliday, Robert Resnik And Jerle Walker, Fundamentals of Physics, John Wiley & Sons
4. Ajay Ghatak, Optics, Mc Grow Hill Publication
5. B. B. Laud, Lasers and Non Linear Optics, New Age Publications
6. John Allison, Electronic Engineering Material & Devices, TMH Edition
7. K. C. Nandi, Applied Physics, Tech. Max. Pune

# IISemester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STESC203**

**Title of the Course : Basics of Electrical and Electronics Engineering**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 0 | 0 | 3 | 3 | 3 | 10 | 10 | 80 | 100 |

**Course Outcomes:**

After completion of the course, the student will be able to:

1. To Comprehend the essential elements of an electrical circuit and circuit solving techniques.
2. To Learn the basics of single-phase AC Circuits and Three Phase AC Circuits
3. To Understand the Principles of Different Electrical Machines.
4. To Know the operations Different Rectifiers and Applications of Op-Amp.
5. To Understand the Different Number Systems and Logic Gates

| Units | Contents | Hours |
|---|---|---|
| 1 | **DC Circuits**<br>Electrical circuit elements (R, L and C), voltage and current sources, Source Transformation, Star Delta Transformation, Kirchhoff laws, analysis of simple circuits with dc independent excitation with Mesh and Analysis( Excluding Super mesh) ,Superposition, Thevenin and Norton Theorems. | 09 |
| 2 | **AC Circuits**<br>Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), Three phase balanced circuits, voltage and current relations in star and delta connections. | 09 |
| 3 | **Electrical Machines**<br>Types of Machines (D.C. Machines, A.C. Machines introduction only)<br>**Single Phase Transformers**<br>Construction, working Principle, EMF Equation, Transformation Ratio(K),Rating of Transformer, Losses in Transformer, Ideal and Practical Transformers, Phasor Diagram of a Transformers on No Load, Phasor Diagram of Transformer on Load, Equivalent Circuit, Voltage Regulation, Efficiency, Open Circuit(OC) Test, Short Circuit (S.C.)Test | 09 |
| 4 | **Semiconductor theory**<br>Intrinsic and Extrinsic Semiconductors - N type and P type materials - majority and minority carriers - Semiconductor diode - PN junction - V I characteristics of P N Junction diode<br>**Rectifiers**<br>Working and Waveforms of Half wave - Full wave - Bridge rectifiers (without filters) – Differences<br>**OP Amp**<br>Introduction, Concept of Virtual ground, Different Configurations, Op Amp applications - Adder, Subtractor - Integrator- differentiator | 09 |
| 5 | **Number representation**<br>Decimal, Binary, Octal and Hexa decimal number systems - Conversion of number from one number system to another without decimal points - BCD Codes and limitations – Conversion of BCD to decimal and vice versa.<br>**Logic gates**<br>Symbolic representation - Definition, truth table, symbol, and logical equations of logic gates: AND – OR - NOT- NAND - NOR - EXOR – EXNOR (Only 2-inputs) – Universal gates. | 09 |
| | | 45 |

**Text &Reference Books:**


1. D.C. Kulshrehtha, "Basic Electrical Engineering", Tata McGraw Hill, 2012
2. B.L.Theraja,“Electrical Technology”,S.Chand
3. Millman Halkias , “Electronic Devices and Circuits”,Tata McGraw Hill, 2000
4. R. P. Jain “Modern Digital Electronics” McGraw Hill Education, 2009.

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STESC204**
**Title of the Course : Engineering Graphics and Design**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | -- | 0 | 3 | 3 | 4 | 10 | 10 | 80 | 100 |

**Course Outcomes:**

After completion of the course, the student will be able to:

1. Select and Interpret appropriate Scale, dimensioning methods, types of lines, various Engineering Curves. Create 2d and 3D drawings using computer aided software.
2. Apply knowledge of projections and draw the projections of lines, Planes.
3. Draw the projection of solids and interpret the sections of solids.
4. Prepare simple machine/ engineering parts/buildings plan, elevation, and side elevation.
5. Convert the orthographic views in pictorial views.

| Units | Contents | Hours |
|---|---|---|
| 1 | General drawing principles for all technological drawings, usage of drawing instruments, geometrical constructions, lettering, different types of lines used in drawing practices, dimensioning, Introduction to scale i.e. full size, reducing scale and enlarging scale.<br>Introduction to computer aided drafting (CAD); using FreeCAD, Google Sketch, introduction of the drafting and modeling tools and demonstration of its application in latest machines Engineering Curves; Ellipse, Parabola, Hyperbola, Cycloid, and Involute | 09 |
| 2 | Principles of orthographic projections, concepts of four quadrants, difference between first and third angle projection, conventions used to represent methods of orthographic projection.<br>Projections of points; in all four quadrants.<br>Projection of straight line; parallel to both reference planes, perpendicular to reference plane, parallel to one and inclined to other reference plane, inclined to both reference planes.<br>Projections of planes: Parallel to reference plane, lying in reference plane, inclined to one & perpendicular to other reference plane, inclined to both reference planes. Concept of auxiliary plane method for projection of planes. | 09 |
| 3 | Projections of Solids: projections of cube, tetrahedron, prism, pyramid, cylinder and cone when axis perpendicular to one of the reference planes, axis inclined to one & parallel to other reference plane, axis inclined to both the reference planes.<br>Sections and sectional views of right angular solids; Section planes, true shape of sections sectional views of geometrical solids like Cube, Tetrahedron, Prism, Cylinder, Pyramid, Cone cut by different section planes (axis of solid is perpendicular to reference plane, axis is parallel to one & inclined to other reference plane only) | 09 |
| 4 | Orthographic Projections; Projections from pictorial view of the object on the principle planes for view from front, top and side using first angle of projection method | 09 |
| 5 | Isometric Projections: Principles of Isometric projection – Isometric scale, isometric projection and views, Isometric axes, conversion of orthographic projections of simple solids, machine parts and mechanical components to isometric projections/views. | 09 |
| | | 45 |

**Text Book:**


1. Bhatt N.D. & Panchal V.M., Engineering Drawing, Charotar Publishing House Private Limited.
2. Shah, M. B. & Rana B.C., Engineering Drawing, Pearson Education India
3. D. A. Jolhe, Engineering Drawing, Tata McGraw education private limited.
4. Arunoday Kumar, Engineering Graphics – I, Tech-Max Publications

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STIKS205**
**Title of the Course : Indian Knowledge System**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 2 | 0 | 0 | 2 | 2 | --- | 40 | 10 | 0 | 50 |

**Course Outcomes:**

After successful completion the course, students will be able to:

1. Explain the history of Indian Knowledge System and the broad classification of Indian philosophical systems.
2. Describe the characteristics of the Indian number system and how it has helped improve science and technology.
3. Describe historical development of astronomy in India.
4. Illustrate the basic elements of the Indian calendar.

| Units | Contents (Theory) | Hours |
|---|---|---|
| 1 | **An overview of Indian Knowledge System (IKS)**<br>Importance of Ancient Knowledge -Definition of IKS - Classification framework of IKS - Unique aspects of IKS. The Vediccorpus: Vedas and Vedangas - Distinctive features of Vedic life. Indian philosophical systems:Different schools of philosophy.The knowledge triangle: Prameya, Pramana, Saṃsaya - Framework for establishing validknowledge - Potential fallacies in the reasoning process. | 6 |
| 2 | **Salient features of the Indian numeral system**<br>Importance of decimal representation –Thediscovery of zero and its importance - Unique approaches to represent numbers. Unique aspectsof Indian mathematics - Great mathematicians and their significant contributions inarithmetic, algebra, geometry, trigonometry, combinatorial problems in Chandah-sastraofPingala, binary mathematics and Magic squares in India. | 6 |
| 3 | **Historical development of astronomy in India**<br>The CelestialCoordinate System - Astronomical terminologies - Equinoctial points, precession of equinoxes,movable and fixed zodiac - Elements of the Indian Calendar - Panchanga | 6 |
| 4 | **Yoga a holistic approach to health and fitness**<br>History and development of yoga, traditional schools of yoga, Yoga and holistic health, Yoga and its human values, Importance and objectives of yoga practices, guidelines for yoga practices, common yoga practices, Asanas for health and physical fitness, benefits and limitations of asanas. | 6 |
| 5 | **Scientist of Ancient India and their notable works**<br>Baudhayana (800 BCE- 740 BCE), Sushrutha , Kanada , Charaka, Aryabhatta (476-550 CE), Aryabhata II , Brahmagupta (598-668 CE), Bhaskara I, Varahamihiri (505–587 CE), Bhaskara II/ Bhaskaracharya, Nagarjuna. | 6 |

**Reference Books:**


1. A. K. Bag, History of Technology in India, Vol. I, Indian National Science Academy, New Delhi, 1997.
2. D.N. Bose, S.N. Sen and B. V. Subbarayappa, A Concise History of Science in India, Indian National Science Academy, New Delhi, 2009.

3. B. Datta and A. N. Singh, History of Hindu Mathematics: Parts I and II, Asia Publishing House, Bombay, 1962.
4. M. Hiriyanna, M., Outlines of Indian Philosophy, MotilalBanarsidass, New Delhi, 1994
5. B. Mahadevan, Vinayak Rajat Bhat, and R.N. Nagendra Pavana, Introduction to Indian Knowledge System: Concepts and Applications, PHI Learning Private Limited, New Delhi, 2022.
6. S. N. Sen and K. S. Shukla, History of Astronomy in India, Indian National Science Academy, 2nd edition, New Delhi, 2000.
7. Yoga: A healthy way of living, published by NCERT
8. Knowledge tradition and practices of India vol. 1 and 2, published by NCERT.

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STBSC206**

**Title of the Course : Engineering Physics Laboratory**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 2 | 2 | 1 | --- | 25 | 25 | 50 |

**Course Outcome:** After completion of the course, the student will be able to:

1. Understand and analyse the theoretical concepts in physics through experimentation
2. Learn and use the proper methods while gathering experimental data.
3. Get familiar with the proper use of basic instruments in physics laboratories.

Minimum eight (8) experiments are to be performed from the list given below.

**List of Experiments:**

1. Determination of resistivity of a semiconductor by four probe method.
2. A study of transistor characteristics in common base configuration.
3. Determination of the radius of curvature of a plano-convex lens using Newton's rings.
4. Determination of thickness of a thin foil using air wedge.
5. A study of the static characteristics of diodes.
6. A study of the static characteristics of Zener Diode.
7. A study of transistor characteristics in common emitter configuration.
8. Determination of activation energy of a thermistor.
9. Determination of wavelength of Laser light using plane transmission grating.
10. To measure the divergence of laser beam.
11. Determination of numerical aperture and acceptance angle, attenuation in optical fiber.
12. Determination of refractive index of glass prism.
13. Determination of refractive index of quartz/calcite prism.
14. Determination of wavelength of light using reflection grating.

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STESC207**

**Title of the Course : Basics of Electrical and Electronics EngineeringLaboratory**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 2 | 2 | 1 | --- | 25 | 25 | 50 |

**Course Outcome:** After completion of the course, the student will be able to:
1. Understand basics of Circuit solving Theorems
2. Learn and analyze AC circuits
3.Learn to calculate different losses and efficiency of Electrical Machines
4.Know the electronic devices and their properties
5. Use the various electronic devices for various applications

Minimum eight (8) experiments are to be performed from the list given below.

**List of Experiments:**

1. To study and verification of Kirchhoff's Laws applied to direct current circuit
2. To Study Superposition Theorem
3. To Study Thevenin's Theorem
4. To Study Norton's Theorem
5. To study AC series and Parallel circuits
6. To Study OC and SC test on single phase Transformer
7. To study characteristics of P-N Junction diode
8. To study Half and Full wave rectifier
9. To study Integrator or Differentiator on Op-Amp
10. Verification of Gates

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STESC208**

**Title of the Course : Engineering Graphics and Design Laboratory**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 2 | 2 | 1 | --- | 25 | 25 | 50 |

**Course Outcome:** After completion of the course, the student will be able to:

1. Select and Interpret appropriate Scale, dimensioning methods, types of lines as per B.I.S and Draw various Engineering Curves.
2. Apply knowledge of Projections and Draw the projections of Lines, Planes, and Solids.
3. Interpret Sections of solids and develop the surfaces of solids.
4. Convert the Pictorial views in orthographic views and Isometric views from Orthographic Views
5. Create and modify two-dimensional orthographic drawings and three dimensional Isometric drawing using software

In Practical minimum 8 half imperial (A2-594 mm X 420mm) sheets based onabove Syllabus are to be drawn. In each sheet **minimum** 4 problems are to be drawn. Drawing sheets may include

1. Lettering, different types of lines, dimensioning and conventions used to represent first and third angle projection method.
2. Problems on engineering curves
3. Problems on projection of straight line
4. Problems on projection of planes
5. Problems on projection of solids (Two problem on sheet and two problems using CAD)
6. Problems on Sections of solids (Two problem on sheet and two problems using CAD)
7. Problems on Isometric projections (Two problem on sheet and two problems using CAD)
8. Problems on Orthographic Projections (Two problem on sheet and two problems using CAD)

**Note:**

**During End semester examination (external practical examination) of 25 marks,**

Students are expected tosolveone/two problems on drawing sheetor using the CAD software on the system or15 Objective type Questions for 15 marks performance examination out of 25 and viva voce examinationfor remaining 10 marks.

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STVSECELE209**

**Title of the Course : Workshop-II**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 4 | 4 | 2 | --- | 50 | 50 | 100 |

**Course Outcomes:**

After successful completion the course, students will be able to:

1. Recognise the fundamentals of the electrical wiring symbols and Tools
2. Identify the various electrical wiring components.
3. Understand the various wiring types that are used in real-world situations
4. Know the internal wiring of the fan and light.
5. Understand the primary equipment testing

**List of Practicals**

**1.** Examining Different Electrical Symbols and Tools
**2.** Study of Electrical Elements
**3.** Study of Two-Way and One-Way Control
**4.** Study of Lamp Operated from Three Distinct Locations.
**5.** Study of Living Room Wiring
**6.** Study of Go down Wiring
**7.** Study of Medical Room Wiring
**8.** Study of Fan Wiring
**9.** Study of Tube Light Wiring

# II Semester B.Tech. (Electrical Engineering) NEP 2020

**Course Code : STCCELE210**
**Title of the Course : Club Activities (Self Learning Course)**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | CA | UA | Total |
| 0 | 0 | 0 | 0 | 2 | --- | 50 | 0 | 50 |

The various clubs and student chapters of the institute provide the students the much-cherished opportunity to come together to discuss and exchange ideas with like-minded people.

- Under the EESA club students participates in the annual events organized throughout the nation. The club conducts workshops for students and also organizes the events.
- The environment club inspires students to participate various activities in and outside of the campus.
- The student chapter EESA, organizes various events and activities round the year for overall development of the students.

Under club activities the student is expected to participate in at least five co curricular and extracurricular activities in and outside of the institute, and submit the report to the allotted guide for the evaluation.

Following activities are expected to be coordinated, participated and assisted by the students voluntarily:

- Cultural activities
- Sports activities
- Technical events
- Socio-environmental activities
- Tree Plantation
- Blood donation camps
- Expert Talks by eminent persons from Industry, academic Institutes, Health experts etc.
- Yogic and meditation activities
- Alumni and Parent meets
- Programs in tribute to great leaders and freedom fighters.

Under this head, students are expected to participate in at least five extra-curricular and co-curricular activities in and outside of the Institute and submit the reports/certificates to the allotted guide/supervisor for evaluation.

# Electrical Engineering: UG Certificate LevelNEP 2020

## (Exit Course after First Year of Engineering)

**Course Code : STEXELE210**
**Title of the Course : Electrification of building**

| Course Scheme | | | | | Evaluation Scheme (Practical) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial Hrs./week | Practical Hrs./week | Duration of paper, hrs | Credits | Duration of paper hrs. | CA | UA | Total |
| -- | -- | 8 | -- | 4 | --- | 100 | 0 | 100 |

**Course Description:** After completing this course student will have basic understanding of the specifications and uses of various components for electrification in residential buildings.

**Course Outcomes:**

1. Outline the specifications and uses of various components for electrification in residential buildings
2. Choose a suitable lighting scheme and calculate the number of lighting points in a residential building.
3. Identify the estimate for a suitable earthing as per IS standards.
4. Prepare schedule of materials and estimate for electrification in residential building.

**Detailed Syllabus**

**Electrification of building**

**Introduction** - Electrical safety - phenomenon of electric shock and its effects- precautions against shock - procedure to be taken when an accident due to electric shock occurs- important safety precautions.Electrical wiring systems - purpose - classification of wiring - conduit wiring - accessories - specifications - uses - wiring practices.
**Illumination** - define terms used in illumination - luminous flux-illumination- luminous efficiency - coefficient of utilization - laws of illumination - illumination level for various purposes (as per standards)Lighting systems - classification - basic concept and diagrammatic representation - direct - semi direct - diffused - indirect - comparison of Direct and indirect lighting. Design of lighting schemes for residential buildings - watts per square metre methodcalculation of number of lamps required-problems.
**Earthing-** Purpose – classification (listing only) - standard sizes for earth continuity conductor - electrode and earthing lead-installation procedure. Estimation of earthing - preparation of estimate for a standard pipe and plate earthing as per IS standards.
**Estimation of residential building**– Electrification of residential buildings - preparation of layout, wiring diagram and estimates - problems.

**Text books and Reference books :**


1. Electrical Design Estimating and Costing - Raina, K.B.; Dr. S. K. Bhattacharya, New Age International (p) limited.
2. Electrical Wiring, Estimating and Costing. Dr.S.L.Uppal, New age international (p) limited.
3. A Course in Electrical Installation Estimating and Costing- Gupta, J.B. S.K. Katariaand Sons Edition.

# Electrical Engineering: UG Certificate LevelNEP 2020

## (Exit Course after First Year of Engineering)

**Course Code : STEXELE211**
**Title of the Course : Electrical Panel Design**

| Course Scheme | | | | | Evaluation Scheme (Practical) | | | |
|---|---|---|---|---|---|---|---|---|
| Lecture | Tutorial Hrs./week | Practical Hrs./week | Duration of paper, hrs | Credits | Duration of paper hrs. | CA | UA | Total |
| -- | -- | 8 | -- | 4 | --- | 100 | 0 | 100 |

**Course Description:** After completing this course student will have basic understanding of the designing of Electrical Panel

**Course Outcomes:** After learning the course the students should be able:
1. To usage proper material, tools and testing equipment for panel.
2. To understand basic concept of switchgear equipment, measuring equipment, earthing, bus bar arrangement, contactors and interlocking for standard panel.
3. To prepare different type of panel wiring using software tools with electrical standard.
4. To install, operate, testing and maintenance of an electrical panel.

**Detailed Syllabus**

**Electrical Panel Design**

**Type of panel, panel wiring drawing and standard:**Different types of panels and distribution box LT, HT, domestic, commercial, industrial etc.Type of panel wiring and panel layout Principles of wiring and assembly. Wiring details of panel, daisy chain & point to point networking, channel layout, piping and instrumentation diagram/drawing(P&ID) Internal arrangement of panel, basic components to be installed in a panel. Basic of control circuit and power circuit, its drawing.

**Control panel installation, operation testing and maintenance:**General wiring guideline in panel designing, panel layout. Load distribution and Type of load, Load calculation, connected load, running load and load factor . Design of panel as per requiremen .Designing of control circuits using contactors, relays, timers. Rating and dimension of component use in panel, electrical, electronics and instrumentation.Material used for enclosure of panel, name plate details, location of panel .Installation, commissioning and testing of panel.

**Text books and Reference books :**


1. R. P. Singh, "Electrical Workshop", I.K. International Publishing House Pvt. Ltd.,2013
2. Shalini Gupta, Monte DePouw& John Ventura, “Database Design for Electrical Panels”, May2012