Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

*(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)*

**(Accredited 'A++' Grade by NAAC with a score of 3.6)**

Hingna Road, Wanadongri, Nagpur - 441 110


# Bachelor of Technology

# SoE & Syllabus 2023

## 1st to 6th Semester

**(Department of Electrical Engineering)**

## B. Tech in Electrical Engineering

Nagar Yuwak Shikshan Sanstha's

**Yeshwantrao Chavan College of Engineering**

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **FIRST SEMESTER (GROUP-B)** | | | | | | | | | | | | | | | |
| 1 | 1 | BS | GE | 23GE1102 | Differential Equations, Matrices and Statistics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 1 | BS | GE | 23GE1108 | Engineering Physics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 1 | BS | GE | 23GE1109 | **Lab:** Engineering Physics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 1 | BES | ME | 23ME1101 | Engineering Graphics | T | 1 | 0 | 0 | 1 | 1 | 30 | 20 | 50 | 3 |
| 5 | 1 | BES | ME | 23ME1102 | **Lab :** Engineering Graphics | P | 0 | 0 | 4 | 4 | 2 | | 60 | 40 | |
| 6 | 1 | BES | EL | 23EL1101 | Basic Electrical and Electronics Engineering | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 1 | BES | EL | 23EL1105 | **Lab :** Electrical and Electronics Workshop | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 1 | PC | EL | 23EL1103 | Fundamentals of Electrical Engineering | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 1 | PC | EL | 23EL1104 | **Lab :** Fundamentals of Electrical Engineering | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 1 | VSEC | GE | 23GE1117 | Get Set Go | … | … | … | … | … | 2 | | 60 | 40 | |
| 11 | 1 | CC2 | GE | | **Liberal Learning Course (LLC2)** | … | … | … | … | … | 2 | | 60 | 40 | |
| | | | | | **TOTAL FIRST SEM** | | **13** | **0** | **10** | **23** | **22** | | | | |
| **MANDATORY LEARNING COURSES** | | | | | | | | | | | | | | | |
| 1 | 1 | HS | | GE2131 | Universal Human Values (UHV) | **A** | 2 | 0 | 0 | 2 | 0 | | | | |
| **SECOND SEMESTER (GROUP-B)** | | | | | | | | | | | | | | | |
| 1 | 2 | BS | GE | 23GE1201 | Calculus and Vector | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 2 | BS | GE | 23GE1204 | Applied Chemistry | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 2 | BS | GE | 23GE1205 | **Lab:** Applied Chemistry | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 2 | HS/AEC1 | GE | 23GE1212 | Professional Communication | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 5 | 2 | HS/IKS | GE | 23GE1215 | Indian Knowledge System | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 6 | 2 | BES | CV | 23CV1201 | Engineering Mechanics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 2 | BES | CV | 23CV1202 | **Lab:** Engineering Mechanics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 2 | BES | IT | 23IT1203 | Programming for Problem Solving | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 9 | 2 | BES | IT | 23IT1204 | **Lab:** Programming for Problem Solving | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 2 | VSEC | GE | 23GE1218 | Functional English | … | … | … | … | … | 2 | | 60 | 40 | |
| 11 | 2 | CC1 | GE | | **Liberal Learning Course (LLC1)** | … | … | … | … | … | 2 | | 60 | 40 | |
| | | | | | **TOTAL SECOND SEM** | | **15** | **0** | **6** | **21** | **22** | | | | |

**Liberal Learning Course**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 2 | CC2 | GE | 23LLC1201 | Music (Vocal) |
| 2 | 2 | CC2 | GE | 23LLC1202 | Music (Instrumental) |
| 3 | 2 | CC2 | GE | 23LLC1203 | Indian Classical Dance |
| 4 | 2 | CC2 | GE | 23LLC1204 | Other forms of Dances |
| 5 | 2 | CC2 | GE | 23LLC1205 | Painting |
| 6 | 2 | CC2 | GE | 23LLC1206 | Theatre and acting |
| 7 | 2 | CC2 | GE | 23LLC1207 | Photography |
| 8 | 2 | CC2 | GE | 23LLC1208 | Yoga |
| 9 | 2 | CC2 | GE | 23LLC1209 | Chess |
| 10 | 2 | CC2 | GE | 23LLC1210 | Athletics |
| 11 | 2 | CC2 | GE | 23LLC1211 | Basket Ball |
| 12 | 2 | CC2 | GE | 23LLC1212 | Judo |
| 13 | 2 | CC2 | GE | 23LLC1213 | Elements of Japanese Language |
| 14 | 2 | CC2 | GE | 23LLC1214 | Elements of German Language |
| 15 | 2 | CC2 | GE | 23LLC1215 | Elements of French Language |
| 16 | 2 | CC2 | GE | 23LLC1216 | Elements of Spanish Language |
| 17 | 2 | CC2 | GE | 23LLC1217 | Basics of Vedic Maths |
| 18 | 2 | CC2 | GE | 23LLC1218 | Skilling in Microsoft Visio and Inkscape |

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## B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |

### Liberal Learning Course

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 1 | CC1 | GE | 23LLC1101 | Music (Vocal) |
| 2 | 1 | CC1 | GE | 23LLC1102 | Music (Instrumental) |
| 3 | 1 | CC1 | GE | 23LLC1103 | Indian Classical Dance |
| 4 | 1 | CC1 | GE | 23LLC1104 | Other forms of Dances |
| 5 | 1 | CC1 | GE | 23LLC1105 | Painting |
| 6 | 1 | CC1 | GE | 23LLC1106 | Theatre and acting |
| 7 | 1 | CC1 | GE | 23LLC1107 | Photography |
| 8 | 1 | CC1 | GE | 23LLC1108 | Yoga |
| 9 | 1 | CC1 | GE | 23LLC1109 | Chess |
| 10 | 1 | CC1 | GE | 23LLC1110 | Athletics |
| 11 | 1 | CC1 | GE | 23LLC1111 | Basket Ball |
| 12 | 1 | CC1 | GE | 23LLC1112 | Judo |
| 13 | 1 | CC1 | GE | 23LLC1113 | Elements of Japanese Language |
| 14 | 1 | CC1 | GE | 23LLC1114 | Elements of German Language |
| 15 | 1 | CC1 | GE | 23LLC1115 | Elements of French Language |
| 16 | 1 | CC1 | GE | 23LLC1116 | Elements of Spanish Language |
| 17 | 1 | CC1 | GE | 23LLC1117 | Basics of Vedic Maths |
| 18 | 1 | CC1 | GE | 23LLC1118 | Skilling in Microsoft Visio and Inkscape |

**MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment**

**TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance**

**TA** = for Practical : MSPA will be 15 marks each**

| | | | |
|---|---|---|---|
| Chairperson | Dean (Acad. Matters) | July, 2023 | 1.00 |
| | | Date of Release | Version |

**Applicable for AY 2023-24 Onwards**

Nagar Yuwak Shikshan Sanstha's

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**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **THIRD SEMESTER** | | | | | | | | | | | | | | | |
| 1 | 3 | BS | GE | 23GE1302 | Integral Transform | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 3 | HSSM-1 | GE | 23GE1301 | Fundamentals of Management & Economics | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 3 | 3 | VEC-1 | CV | 23CV1311 | Environmental Sustainability, Pollution and Management | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 4 | 3 | PC | EL | 23EL1301 | Electrical Energy Generation System | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 5 | 3 | PC | EL | 23EL1302 | **Lab:** Renewable Energy Sources | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 6 | 3 | PC | EL | 23EL1303 | Network Analysis | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 3 | PC | EL | 23EL1304 | **Lab** : Electrical Engineering Workshop | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 3 | PC | EL | 23EL1305 | Electrical Machines | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 3 | PC | EL | 23EL1306 | **Lab :** Electrical Machines | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 3 | CEP | EL | 23EL1307 | **Community Engagement Project** | P | 0 | 0 | 2 | 4 | 2 | | 60 | 40 | |
| 11 | 3 | OE I | OE | | **Open Elective -I** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 12 | 3 | MDM | MDM | | **MD Minor Course-I** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| | | | | | **TOTAL** | | **20** | **0** | **8** | **30** | **25** | | | | |

| List of Mandatory Learning Course (MLC) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | HS | T&P | MLC2123 | **YCAP3 :** YCCE Communication Aptitude Preparation | **A** | 3 | 0 | 0 | 3 | **0** | | | | |

**Open Elective - I**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 3 | OE1 | GE | 23OE1301 | OE-I : Combinatorics |
| 2 | 3 | OE1 | GE | 23OE1302 | OE-I : Fuzzy Set Theory, Arithmetic And Logic |
| 3 | 3 | OE1 | GE | 23OE1303 | OE-I : Green Chemistry & Sustainability |
| 4 | 3 | OE1 | GE | 23OE1304 | OE-I : Hydrogen Fuel |
| 5 | 3 | OE1 | GE | 23OE1305 | OE-I : Electronic Materials And Applications |
| 6 | 3 | OE1 | GE | 23OE1306 | OE-I : Laser Technology And Applications |
| 7 | 3 | OE1 | MGT | 23OE1307 | OE-I : Finance And Cost Management |
| 8 | 3 | OE1 | MGT | 23OE1308 | OE-I : Operation Research Techniques |
| 9 | 3 | OE1 | MGT | 23OE1309 | OE-I : Project Evaluation & Management |
| 10 | 3 | OE1 | MGT | 23OE1310 | OE-I : Total Quality Management |
| 11 | 3 | OE1 | MGT | 23OE1311 | OE-I : Value Engineering |
| 12 | 3 | OE1 | MGT | 23OE1312 | OE-I : Maintenance Management |
| 13 | 3 | OE1 | MGT | 23OE1313 | OE-I : Industrial Safety |
| 14 | 3 | OE1 | MGT | 23OE1314 | OE-I : Industry 4.0 |
| 15 | 3 | OE1 | MGT | 23OE1315 | OE-I : Operation Management |
| 16 | 3 | OE1 | MGT | 23OE1316 | OE-I : Material Management |
| 17 | 3 | OE1 | MGT | 23OE1317 | OE-I : Hospitality Management |
| 18 | 3 | OE1 | MGT | 23OE1318 | OE-I : Human Resource Management & Organizational Behaviour |
| 19 | 3 | OE1 | MGT | 23OE1319 | OE-I : Agri-Business Management |
| 20 | 3 | OE1 | MGT | 23OE1320 | OE-I : Rural Marketing |
| 21 | 3 | OE1 | MGT | 23OE1321 | OE-I : Marketing Management |
| 22 | 3 | OE1 | MGT | 23OE1322 | OE-I : Health Care Management |
| 23 | 3 | OE1 | MGT | 23OE1323 | OE-I : Designated approved online NPTEL/KKSU Course |
| 24 | 3 | OE1 | MGT | 23OE1324 | OE-I : Indian Archeology |
| 25 | 3 | OE1 | MGT | 23OE1325 | OE-I : Social & Positive Psychology |
| 26 | 3 | OE1 | MGT | 23OE1326 | OE-I : Seismology & Earthquake |

| | | July, 2023 | 1.00 | Applicable for AY 2023-24 Onwards |
|---|---|---|---|---|
| Chairperson | Dean (Acad. Matters) | Date of Release | Version | |

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**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **FOURTH SEMESTER** | | | | | | | | | | | | | | | |
| 1 | 4 | HSSM-2 | GE | 23GE1401 | Entrepreneurship Development | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 2 | 4 | **AEC-2** | GE | 23GE1405<br>23GE1406 | Marathi Language<br>Hindi Language | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 3 | 4 | PC | EL | 23EL1401 | Electrical Measurement and Instrumentation | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 4 | 4 | PC | EL | 23EL1402 | **Lab :** Electrical Measurement and Instrumentation | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 5 | 4 | PC | EL | 23EL1403 | Electrical Machines in Power System | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 6 | 4 | PC | EL | 23EL1404 | **Lab** : Electrical Machines in Power System | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 7 | 4 | VSEC-3 | EL | 23EL1405 | **Lab :** Computer Programming | P | 0 | 0 | 2 | 4 | 2 | | 60 | 40 | |
| 8 | 4 | VEC-2 | EL | 23EL1406 | Digital Signal Processing | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 9 | 4 | MDM | EL | | **MD Minor Course-II** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 10 | 4 | OE-2 | OE | | **Open Elective-II** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| | | | | | **TOTAL** | | **16** | **0** | **6** | **24** | **20** | | | | |
| **List of Mandatory Learning Course (MLC)** | | | | | | | | | | | | | | | |
| 1 | 4 | HS | T&P | MLC2124 | **YCAP4 :** YCCE Communication Aptitude Preparation | **A** | 3 | 0 | 0 | 3 | **0** | | | | |

**Open Elective - II**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 4 | OE2 | GE | 23OE2401 | OE-II : Combinatorics |
| 2 | 4 | OE2 | GE | 23OE2402 | OE-II : Fuzzy Set Theory, Arithmetic And Logic |
| 3 | 4 | OE2 | GE | 23OE2403 | OE-II : Green Chem. & Sustainability |
| 4 | 4 | OE2 | GE | 23OE2404 | OE-II : Hydrogen Fuel |
| 5 | 4 | OE2 | GE | 23OE2405 | OE-II : Electronic Materials And Applications |
| 6 | 4 | OE2 | GE | 23OE2406 | OE-II : Laser Technology And Applications |
| 7 | 4 | OE2 | MGT | 23OE2407 | OE-II : Finance And Cost Management |
| 8 | 4 | OE2 | MGT | 23OE2408 | OE-II : Operation Research Techniques |
| 9 | 4 | OE2 | MGT | 23OE2409 | OE-II : Project Evaluation & Management |
| 10 | 4 | OE2 | MGT | 23OE2410 | OE-II : Total Quality Management |
| 11 | 4 | OE2 | MGT | 23OE2411 | OE-II : Value Engineering |
| 12 | 4 | OE2 | MGT | 23OE2412 | OE-II : Maintenance Management |
| 13 | 4 | OE2 | MGT | 23OE2413 | OE-II : Industrial Safety |
| 14 | 4 | OE2 | MGT | 23OE2414 | OE-II : Industry 4.0 |
| 15 | 4 | OE2 | MGT | 23OE2415 | OE-II : Operation Management |
| 16 | 4 | OE2 | MGT | 23OE2416 | OE-II : Material Management |
| 17 | 4 | OE2 | MGT | 23OE2417 | OE-II : Hospitality Management |
| 18 | 4 | OE2 | MGT | 23OE2418 | OE-II : Human Resource Management & Organizational Behaviour |
| 19 | 4 | OE2 | MGT | 23OE2419 | OE-II : Agri-Business Management |
| 20 | 4 | OE2 | MGT | 23OE2420 | OE-II : Rural Marketing |
| 21 | 4 | OE2 | MGT | 23OE2421 | OE-II : Marketing Management |
| 22 | 4 | OE2 | MGT | 23OE2422 | OE-II : Health Care Management |
| 23 | 4 | OE2 | MGT | 23OE2423 | OE-II : Designated approved online NPTEL/KKSU Course |
| 24 | 4 | OE2 | MGT | 23OE2424 | OE-II : Indian Archeology |
| 25 | 4 | OE2 | MGT | 23OE2425 | OE-II : Social & Positive Psychology |
| 26 | 4 | OE2 | MGT | 23OE2426 | OE-II : Seismology & Earthquake |

| | | | | |
|---|---|---|---|---|
| | | July, 2023 | 1.00 | Applicable for AY 2023-24 Onwards |
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**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **FIFTH SEMESTER** | | | | | | | | | | | | | | | |
| 1 | 5 | PC | EL | 23EL1501 | Control System | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 5 | PC | EL | 23EL1502 | **Lab** : Control System | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 3 | 5 | PC | EL | 23EL1503 | Power Electronics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 4 | 5 | PC | EL | 23EL1504 | **Lab** : Power Electronics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 5 | 5 | PC | EL | 23EL1505 | Fundamentals of Power System | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 6 | 5 | PC | EL | 23EL1506 | **Lab :** Power System | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 7 | 5 | PE | EL | | **Professional Elective-I** | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 8 | 5 | PE | EL | | **Professional Elective-II** | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 5 | **OE-3** | OE | | **Open Elective-III** | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 10 | 5 | MDM | EL | | **MD Minor Course-III** | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 11 | 5 | STR | EL | 23EL1507 | Internship and Indsutrial Visit | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| | | | | | | **TOTAL** | **21** | **0** | **8** | **29** | **25** | | | | |
| **List of Mandatory Learning Course (MLC)** | | | | | | | | | | | | | | | |
| 1 | 5 | HS | T&P | MLC2125 | **YCAP5 :** YCCE Communication Aptitude Preparation | **A** | 3 | 0 | 0 | 3 | 0 | | | | |

| **Professional Elective - I** | | | | | |
|---|---|---|---|---|---|
| 1 | 5 | PE-I | EL | 23EL1521 | **PE-I :** Electric and Magnetic Field |
| 2 | 5 | PE-I | EL | 23EL1522 | **PE-I :** Electrical Machine Design |
| 3 | 5 | PE-I | EL | 23EL1523 | **PE-I :** Design of Photovoltaic System |
| 4 | 5 | PE-I | EL | 23EL1524 | **PE-I :** Electric Power Utilization |
| 5 | 5 | PE-I | EL | 23EL1525 | **PE-I :** Applications of Renewable Energy Sources |
| 6 | 5 | PE-I | EL | 23EL1526 | **PE-I :** Optimization Techniques |
| 7 | 5 | PE-I | EL | 23EL1527 | **PE-I :** Thermal Power Plant Familiarization |

| **Professional Elective - II** | | | | | |
|---|---|---|---|---|---|
| 1 | 5 | PE-II | EL | 23EL1541 | **PE-II :** Illumination Engineering(MOOC) |
| 2 | 5 | PE-II | EL | 23EL1542 | **PE-II :** Electrical Wiring: Estimation and Costing |
| 3 | 5 | PE-II | EL | 23EL1543 | **PE-II :** Sensors and Actuators |
| 4 | 5 | PE-II | EL | 23EL1544 | **PE-II :** Distributed Generations in Power System |
| 5 | 5 | PE-II | EL | 23EL1545 | **PE-II :** 8085 Programming |
| 6 | 5 | PE-II | EL | 23EL1546 | **PE-II :** Analog and Digital Electronics |

| **Coursera Elective** | | | | | |
|---|---|---|---|---|---|
| 1 | 5 | PE-II | EL | 23EL1547 | **PE-II :** Power Electronics |

**Open Elective - III**

| SN | Sem | Type | BoS/Deptt | Sub. Code | Subject | FACULTY |
|---|---|---|---|---|---|---|
| 1 | 5 | OE3 | CSE | 23OE3501 | OE-III : Social Reformers in Modern Maharashtra | ARTS |
| 2 | 5 | OE3 | CSE | 23OE3502 | OE-III : Independent India 1948-2010 | ARTS |
| 3 | 5 | OE3 | CT | 23OE3503 | OE-III : Introduction To Cognitive Psychology | ARTS |
| 4 | 5 | OE3 | CT | 23OE3504 | OE-III : Introduction To Engineering Psychology | ARTS |
| 5 | 5 | OE3 | CT | 23OE3505 | OE-III : Introduction To Behavioural Psychology | ARTS |
| 6 | 5 | OE3 | CT | 23OE3506 | OE-III : Introduction To Emotional Psychology | ARTS |
| 7 | 5 | OE3 | EL | 23OE3507 | OE-III : Elements of Public Administration | ARTS |
| 8 | 5 | OE3 | ETC | 23OE3508 | OE-III : Ancient Indian History | ARTS |
| 9 | 5 | OE3 | IT | 23OE3509 | OE-III : Consciousness Studies | ARTS |
| 10 | 5 | OE3 | IT | 23OE3510 | OE-III : Psychology for Professionals | ARTS |
| 11 | 5 | OE3 | IT | 23OE3511 | OE-III : Introduction to Sociology and Human Behavior | ARTS |
| 12 | 5 | OE3 | GE | 23OE3512 | OE-III : Economics of Money and Banking | ARTS |
| 13 | 5 | OE3 | GE | 23OE3513 | OE-III : Economics of Capital Market | ARTS |
| 14 | 5 | OE3 | GE | 23OE3514 | OE-III : Digital Humanities | ARTS |
| 15 | 5 | OE3 | GE | 23OE3515 | OE-III : Introduction to Political Science | ARTS |
| 16 | 5 | OE3 | CT | 23OE3516 | OE-III : Bhagwat Geeta - An Engineer's Interpretation | ARTS - IKS |
| 17 | 5 | OE3 | CT | 23OE3517 | OE-III : Artha shastra by Kautiliya | ARTS - IKS |
| 18 | 5 | OE3 | CSD | 23OE3518 | OE-III : Glimpses of Ancient science and Technology | ARTS - IKS |
| 19 | 5 | OE3 | CV | 23OE3519 | OE-III : Indian taxation system | COMMERCE |
| 20 | 5 | OE3 | CV | 23OE3520 | OE-III : Elements of share trading | COMMERCE |
| 21 | 5 | OE3 | EE | 23OE3521 | OE-III : Introduction to Fintech | COMMERCE |
| 22 | 5 | OE3 | EE | 23OE3522 | OE-III : Financial Analytics | COMMERCE |
| 23 | 5 | OE3 | ETC | 23OE3523 | OE-III : Fundamentals of Investments | COMMERCE |
| 24 | 5 | OE3 | EE | 23OE3524 | OE-III : Lifestyle Diseases | HEALTHCARE & MEDICINE |
| 25 | 5 | OE3 | EE | 23OE3525 | OE-III : Holistic Nutrition | HOME SCIENCE |
| 26 | 5 | OE3 | EL | 23OE3526 | OE-III : Community Organization & Development | HOME SCIENCE |
| 27 | 5 | OE3 | CSE | 23OE3527 | OE-III : Human Rights & International Laws | LAW |
| 28 | 5 | OE3 | CSE | 23OE3528 | OE-III : Cyber Crime Administration | LAW |
| 29 | 5 | OE3 | MATHS | 23OE3529 | OE-III : Finite Differences & Numerical Methods | SCIENCE |
| 30 | 5 | OE3 | MATHS | 23OE3530 | OE-III : Business Statistics | SCIENCE |
| 31 | 5 | OE3 | PHY | 23OE3531 | OE-III : Crystalline Solids: Properties and Applications. | SCIENCE |
| 32 | 5 | OE3 | PHY | 23OE3532 | OE-III : Nanotechnology: Fundamental to Applications | SCIENCE |
| 33 | 5 | OE3 | CHE | 23OE3533 | OE-III : Chemistry in daily life | SCIENCE |
| 34 | 5 | OE3 | CHE | 23OE3534 | OE-III : Battery Systems and Management | SCIENCE |
| 35 | 5 | OE3 | NPTEL | 23OE3535 | OE-III : Designated approved online NPTEL Course | NPTEL |

| Chairperson | Dean (Acad. Matters) | July, 2023 | 1.00 | Applicable for AY 2023-24 Onwards |
|---|---|---|---|---|
| | | Date of Release | Version | |

Nagar Yuwak Shikshan Sanstha's

**Yeshwantrao Chavan College of Engineering**

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **SIXTH SEMESTER** | | | | | | | | | | | | | | | |
| 1 | 6 | PC | EL | 23EL1601 | Power System Analysis | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 6 | PC | EL | 23EL1602 | Fundamentals of Electrical Drives | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 6 | PC | EL | 23EL1603 | **Lab :** Fundamentals of Electrical Drives | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 6 | PC | EL | 23EL1604 | **Lab :** Electronics Engineering workshop | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 5 | 6 | PC | EL | 23EL1605 | **Lab :** Simulation in Power Electronics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 12 | 6 | PC | EL | 23EL1606 | Design Thinking and Research Methodology | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 6 | 6 | PE | EL | | **Professional Elective -III** | T | 2 | 0 | 0 | 2 | 3 | 30 | 20 | 50 | 3 |
| 7 | 6 | PE | EL | | **Lab : Professional Elective -III** | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 6 | PE | EL | | **Professional Elective -IV** | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 6 | MDM | EL | | **MD Minor Course-IV** | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 10 | 6 | **VSEC-4** | EL | 23EL1607 | **Lab**.:Substation Design | P | 0 | 0 | 2 | 4 | 2 | | 60 | 40 | |
| 11 | 6 | STR | EL | 23EL1608 | Project Phase -I | P | 0 | 0 | 4 | 4 | 2 | | 60 | 40 | |
| | | | | | **TOTAL** | | **16** | **0** | **14** | **32** | **25** | | | | |

| **Professional Electives-III** | | | | | |
|---|---|---|---|---|---|
| 1 | 6 | PE-III | EL | 23EL1621 | **PE-III :** Electrical Installation Design |
| 2 | 6 | PE-III | EL | 23EL1622 | **PE-III : Lab :** Electrical Installation Design |
| 3 | 6 | PE-III | EL | 23EL1623 | **PE-III :** Electrical Energy Audit and Safety Analysis |
| 4 | 6 | PE-III | EL | 23EL1624 | **PE-III : Lab :** Electrical Energy Audit and Safety Analysis |
| 5 | 6 | PE-III | EL | 23EL1625 | **PE-III :** Project Planning and Management |
| 6 | 6 | PE-III | EL | 23EL1626 | **PE-III : Lab :** Project Planning and Management |
| 7 | 6 | PE-III | EL | 23EL1627 | **PE-III :** Power Electronics Converters for Renewable Energy |
| 8 | 6 | PE-III | EL | 23EL1628 | **PE-III : Lab :** Power Electronics Converters for Renewable Energy |
| 9 | 6 | PE-III | EL | 23EL1629 | **PE-III :** Embedded System |
| 10 | 6 | PE-III | EL | 23EL1630 | **PE-III : Lab :** Embedded System |
| 11 | 6 | PE-III | EL | 23EL1631 | **PE-III :** PLC and Industrial Automation |
| 12 | 6 | PE-III | EL | 23EL1632 | **PE-III : Lab :** PLC and Industrial Automation |

| **Professional Electives -IV** | | | | | |
|---|---|---|---|---|---|
| 1 | 6 | PE-IV | EL | 23EL1641 | **PE-IV :** Advanced Power Electronics |
| 2 | 6 | PE-IV | EL | 23EL1642 | **PE-IV :** Advanced Electrical Drives |
| 3 | 6 | PE-IV | EL | 23EL1643 | **PE-IV :** Grid integration in Renewable Energy Systems |
| 4 | 6 | PE-IV | EL | 23EL1644 | **PE-IV :** Power System Operation and Management |
| 5 | 6 | PE-IV | EL | 23EL1645 | **PE-IV :** Microgrid |
| 6 | 6 | PE-IV | EL | 23EL1646 | **PE-IV :** Advanced Control System |
| 7 | 6 | PE-IV | EL | 23EL1647 | **PE-IV :** Environmental, Social, and Governance (ESG) frameworks in Industry 4.0 |
| **Coursera Elective** | | | | | |
| 1 | 6 | PE-IV | EL | 23EL1648 | **PE-IV :** Energy Production, Distribution and Safety |

| | | | |
|---|---|---|---|
| | | July, 2023 | 1.00 |
| **Chairperson** | **Dean (Acad. Matters)** | **Date of Release** | **Version** |

**Applicable for AY 2023-24 Onwards**

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

*(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)*

**(Accredited 'A++' Grade by NAAC with a score of 3.6)**

Hingna Road, Wanadongri, Nagpur - 441 110

# Bachelor of Technology

# SoE & Syllabus 2023

## 1st Semester

**(Department of Electrical Engineering)**

## B. Tech in Electrical Engineering

Nagar Yuwak Shikshan Sanstha's

**Yeshwantrao Chavan College of Engineering**

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **FIRST SEMESTER (GROUP-B)** | | | | | | | | | | | | | | | |
| 1 | 1 | BS | GE | 23GE1102 | Differential Equations, Matrices and Statistics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 1 | BS | GE | 23GE1108 | Engineering Physics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 1 | BS | GE | 23GE1109 | **Lab:** Engineering Physics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 1 | BES | ME | 23ME1101 | Engineering Graphics | T | 1 | 0 | 0 | 1 | 1 | 30 | 20 | 50 | 3 |
| 5 | 1 | BES | ME | 23ME1102 | **Lab :** Engineering Graphics | P | 0 | 0 | 4 | 4 | 2 | | 60 | 40 | |
| 6 | 1 | BES | EL | 23EL1101 | Basic Electrical and Electronics Engineering | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 1 | BES | EL | 23EL1105 | **Lab :** Electrical and Electronics Workshop | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 1 | PC | EL | 23EL1103 | Fundamentals of Electrical Engineering | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 1 | PC | EL | 23EL1104 | **Lab :** Fundamentals of Electrical Engineering | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 1 | VSEC | GE | 23GE1117 | Get Set Go | … | … | … | … | … | 2 | | 60 | 40 | |
| 11 | 1 | CC2 | GE | | **Liberal Learning Course (LLC2)** | … | … | … | … | … | 2 | | 60 | 40 | |
| | | | | | **TOTAL FIRST SEM** | | **13** | **0** | **10** | **23** | **22** | | | | |
| **MANDATORY LEARNING COURSES** | | | | | | | | | | | | | | | |
| 1 | 1 | HS | | GE2131 | Universal Human Values (UHV) | **A** | 2 | 0 | 0 | 2 | 0 | | | | |
| **SECOND SEMESTER (GROUP-B)** | | | | | | | | | | | | | | | |
| 1 | 2 | BS | GE | 23GE1201 | Calculus and Vector | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 2 | BS | GE | 23GE1204 | Applied Chemistry | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 2 | BS | GE | 23GE1205 | **Lab:** Applied Chemistry | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 2 | HS/AEC1 | GE | 23GE1212 | Professional Communication | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 5 | 2 | HS/IKS | GE | 23GE1215 | Indian Knowledge System | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 6 | 2 | BES | CV | 23CV1201 | Engineering Mechanics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 2 | BES | CV | 23CV1202 | **Lab:** Engineering Mechanics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 2 | BES | IT | 23IT1203 | Programming for Problem Solving | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 9 | 2 | BES | IT | 23IT1204 | **Lab:** Programming for Problem Solving | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 2 | VSEC | GE | 23GE1218 | Functional English | … | … | … | … | … | 2 | | 60 | 40 | |
| 11 | 2 | CC1 | GE | | **Liberal Learning Course (LLC1)** | … | … | … | … | … | 2 | | 60 | 40 | |
| | | | | | **TOTAL SECOND SEM** | | **15** | **0** | **6** | **21** | **22** | | | | |

**Liberal Learning Course**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 2 | CC2 | GE | 23LLC1201 | Music (Vocal) |
| 2 | 2 | CC2 | GE | 23LLC1202 | Music (Instrumental) |
| 3 | 2 | CC2 | GE | 23LLC1203 | Indian Classical Dance |
| 4 | 2 | CC2 | GE | 23LLC1204 | Other forms of Dances |
| 5 | 2 | CC2 | GE | 23LLC1205 | Painting |
| 6 | 2 | CC2 | GE | 23LLC1206 | Theatre and acting |
| 7 | 2 | CC2 | GE | 23LLC1207 | Photography |
| 8 | 2 | CC2 | GE | 23LLC1208 | Yoga |
| 9 | 2 | CC2 | GE | 23LLC1209 | Chess |
| 10 | 2 | CC2 | GE | 23LLC1210 | Athletics |
| 11 | 2 | CC2 | GE | 23LLC1211 | Basket Ball |
| 12 | 2 | CC2 | GE | 23LLC1212 | Judo |
| 13 | 2 | CC2 | GE | 23LLC1213 | Elements of Japanese Language |
| 14 | 2 | CC2 | GE | 23LLC1214 | Elements of German Language |
| 15 | 2 | CC2 | GE | 23LLC1215 | Elements of French Language |
| 16 | 2 | CC2 | GE | 23LLC1216 | Elements of Spanish Language |
| 17 | 2 | CC2 | GE | 23LLC1217 | Basics of Vedic Maths |
| 18 | 2 | CC2 | GE | 23LLC1218 | Skilling in Microsoft Visio and Inkscape |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

## B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |

### Liberal Learning Course

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 1 | CC1 | GE | 23LLC1101 | Music (Vocal) |
| 2 | 1 | CC1 | GE | 23LLC1102 | Music (Instrumental) |
| 3 | 1 | CC1 | GE | 23LLC1103 | Indian Classical Dance |
| 4 | 1 | CC1 | GE | 23LLC1104 | Other forms of Dances |
| 5 | 1 | CC1 | GE | 23LLC1105 | Painting |
| 6 | 1 | CC1 | GE | 23LLC1106 | Theatre and acting |
| 7 | 1 | CC1 | GE | 23LLC1107 | Photography |
| 8 | 1 | CC1 | GE | 23LLC1108 | Yoga |
| 9 | 1 | CC1 | GE | 23LLC1109 | Chess |
| 10 | 1 | CC1 | GE | 23LLC1110 | Athletics |
| 11 | 1 | CC1 | GE | 23LLC1111 | Basket Ball |
| 12 | 1 | CC1 | GE | 23LLC1112 | Judo |
| 13 | 1 | CC1 | GE | 23LLC1113 | Elements of Japanese Language |
| 14 | 1 | CC1 | GE | 23LLC1114 | Elements of German Language |
| 15 | 1 | CC1 | GE | 23LLC1115 | Elements of French Language |
| 16 | 1 | CC1 | GE | 23LLC1116 | Elements of Spanish Language |
| 17 | 1 | CC1 | GE | 23LLC1117 | Basics of Vedic Maths |
| 18 | 1 | CC1 | GE | 23LLC1118 | Skilling in Microsoft Visio and Inkscape |

**MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment**

**TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance**

**TA** = for Practical : MSPA will be 15 marks each**

| | | | |
|---|---|---|---|
| Chairperson | Dean (Acad. Matters) | July, 2023 | 1.00 |
| | | Date of Release | Version |

**Applicable for AY 2023-24 Onwards**

# I SEMESTER

## 23GE1102 : Differential Equations, Matrices and Statistics

| Course Outcomes |
|---|
| **The students will be able to** |
| 1. Use appropriate Methods to solve first order and higher order differential equations and apply it to find solution of engineering problems. |
| 2. Use Matrix method to solve linear system of equations, evaluate eigen values - eigen vectors and its applications. |
| 3. Make use of probability distributions to solve real life problems. |
| 4. Inspect scientific data, use proper curve fitting and find correlation, regression of variables. |

| **Unit I: Differential Equations I** | **(7 Hrs.)** |
|---|---|
| Linear differential equations of first order and first degree, Differential equation reducible to linear form, Exact differential equations (excluding the case of integrating factor) and their applications to various fields. **(Contemporary Issues related to Topic)** | |
| **Unit II: Differential Equations II** | **(7 Hrs.)** |
| Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields. **(Contemporary Issues related to Topic)** | |
| **Unit III: Differential Equations III** | **(6 Hrs.)** |
| Cauchy's homogeneous linear differential equations, Legendre's linear differential equation, Applications of differential equations to various fields (only up to second order). **(Contemporary Issues related to Topic)** | |
| **Unit IV: Partial Differential Equations** | **(6 Hrs.)** |
| Partial Differential Equations of first order, first degree i.e. Lagrange's form, linear homogeneous equations of higher order with constant coefficient. Application of variable separable method to solve first and second order partial differential equations. **(Contemporary Issues related to Topic)** | |
| **Unit IV: Matrices** | **(7 Hrs.)** |
| Rank of a matrix, Consistency of system of equations using rank, Characteristics equations, Eigen values and Eigen vectors, Cayley Hamilton Theorem (without proof) statement and verification, Sylvester's theorem-statement and its application. **(Contemporary Issues related to Topic)** | |
| **Unit VI: Statistics** | **(6 Hrs.)** |
| Fitting of straight line, $y = a + bx$, a parabola $y = a + bx + cx^2$, exponential curves and power curves by method of least squares; Lines of regression and correlation; Rank correlation. **(Contemporary Issues related to Topic)** | |
| **Total Lecture** | **39 Hours** |

| **Textbooks:** | |
|---|---|
| 1. | Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC. |
| 2. | H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi. |
| 3. | H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi. |
| 4. | Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers. |
| 5. | P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan. |

| **Reference Books:** | |
|---|---|
| 1. | G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999. |
| 2. | N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/ |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| 1. | https://nptel.ac.in/courses/111103070 |
| 2. | https://onlinecourses.nptel.ac.in/noc19_ma28/preview |
| 3. | https://nptel.ac.in/courses/111/106/111106100/ |

## I SEMESTER

## 23GE1108 : Engineering Physics

**Course Outcomes :**

**Upon successful completion of the course the students will be able to**

1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.
2. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands.
3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
4. Analyze the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering applications.

| **Unit I: Quantum Physics** | **(7 Hrs.)** |
|---|---|
| Wave-particle duality, de-Broglie's hypothesis, Wave packet, Heisenberg's uncertainty principle: significance and applications, Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite potential well. **(Contemporary Issues related to Topic)** | |
| **Unit II: Semiconductor Physics** | **(7 Hrs.)** |
| Formation of energy bands in solids; Classification of solids, Energy band diagram of Si and Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Fermi function, Fermi level in intrinsic and extrinsic semiconductors, Dependence of Fermi level on impurity concentration and temperature, Hall effect. **(Contemporary Issues related to Topic)** | |
| **Unit III: Geometrical Optics** | **(7 Hrs.)** |
| Interference: Interference in thin films, Wedge shaped film, Newton's rings, Applications of interference Diffraction: Fraunhofer diffraction from a single slit. **(Contemporary Issues related to Topic)** | |
| **Unit IV: Laser** | **(6 Hrs.)** |
| Coherence and its types, Interaction of radiation with matter, Population Inversion, Pumping: methods and schemes, Optical resonant cavity, Ruby laser, Semiconductor diode laser, Properties and engineering applications of laser. **(Contemporary Issues related to Topic)** | |
| **Unit V: Electron Ballistics** | **(7 Hrs.)** |
| Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope and its application. **(Contemporary Issues related to Topic)** | |
| **Unit VI: Magnetic Materials & Superconductors** | **(6 Hrs.)** |
| Introduction to magnetic materials, Interpretation of Hysteresis curves, Superconductors: Type-I and Type-II, Meissner effect, Applications. **(Contemporary Issues related to Topic)** | |
| **Total Lecture** | **40 Hours** |

| **Textbooks** | |
|---|---|
| **1** | M. N. Avadhanulu, P.G.Kshirsagar, A Textbook of Engg. Physics, S.Chand and Company. |
| **2** | Hitendra K Malik , A K Singh , Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited, |

| **Reference Books** | |
|---|---|
| **1** | David Halliday, Robert Resnick and Jerle Walker, John-Wiley India, Fundamentals of Physics, 10th John Wiley & Sons Inc. |
| **2** | Brijlal and Subramanyam, Text Book of Optics, Revised edition, S. Chand and Company. |
| **3** | M.N. Avadhanulu, 2nd Edition, Laser, S.Chand and Company. |
| **4** | A.Beiser, Concept of Modern Physics, 6th Edition, Laser, Tata McGraw-Hill. |
| **5** | Thyagarajan K. and Ghatak A.K, LASERS: Theory and Applications, 2nd Edition, Macmillan Publication |
| **6** | S.O.Pillai, Solid State Physics, 9th Edition, New Edge International Publishers. |
| **7** | Palanisamy, Solid State Physics, 8th Edition, New Edge International Publishers. |
| **8** | C. Kittel, Solid State Physics, 8th Edition, Willey Publication. |
| **9** | B. K. Pandey, S. Chaturvedi, Engineering Physics, 1st Edition, Cengage Learning. |
| **10** | John Allision, Electronic Engineering Materials and Devices, TMH edition, 10th reprint, Tata McGraw Hill. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf |
| **2** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf |
| **3** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Dekker%20-%20Solid%20State%20Physics.pdf |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | https://nptel.ac.in/courses/115106066 - Quantum Physics |
| **2** | https://archive.nptel.ac.in/courses/115/105/115105121/ -CRO |
| **3** | www.digimat.in/nptel/courses/video/115102124/L36.html- Laser |

# I SEMESTER

# 23GE1109 : Lab. Engineering Physics

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to**<br>1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.<br>2. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands.<br>3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.<br>4. Analyze the motion in electric field and magnetic field and its applications to electron optic devices.<br>5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering Applications. |

**List of Experiments :**

| Sr. No. | Experiments based on |
|---|---|
| 1 | Determination of Planck's constant. |
| 2 | Study of Tunnel Diode. |
| 3 | Determination of Hall coefficient and density of charge carriers using Hall effect. |
| 4 | Dependence of Hall coefficient on temperature. |
| 5 | Determination of Band gap in a semiconductor by four probe method. |
| 6 | Determination of Band gap in a semiconductor using reverse biased p-n junction diode. |
| 7 | Determination of radius of curvature of Plano convex lens using Newton's rings. |
| 8 | Determination of thickness of thin paper using air wedge. |
| 9 | Determination of wavelength of sodium light using diffraction grating. |
| 10 | Determination of wavelength of laser using diffraction grating. |
| 11 | Determination of divergence of laser beam. |
| 12 | Determination of amplitude and frequency of sinusoidal signal using CRO. |
| 13 | To measure the phase shift introduced by a phase shift network using Dual beam CRO. |
| 14 | Determination of the velocity of Ultrasonic waves in a non -electrolytic liquid by ultrasonic interferometer. |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Mechanical Engineering)

**B.Tech in Mechanical Engineering**

**SoE No. 23ME-101**

## I SEMESTER

## 23ME1101 : Engineering Graphics

| **Course Outcomes :** |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1. Construct orthographic drawing and isometric drawing of a given object |
| 2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects |
| 3. Develop the lateral surfaces of various solids, their section and intersection**.** |
| 4. Practice the use of software tools used for Two dimensional drawings. |

| **Unit I: Theory of Orthographic Projections:** | **(3 Hrs.)** |
|---|---|
| Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes, First and Third angle projections, | |
| **Unit II: Theory of Isometric Projections:** | **(2 Hrs.)** |
| Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections. | |
| **Unit III: Lines:** | **(2 Hrs.)** |
| Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane. | |
| **Unit IV: Planes and Solids:** | **(4 Hrs.)** |
| Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids :(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution | |
| **Unit V: Section of Solids and Development of Surfaces:** | **(2 Hrs.)** |
| Types of Section planes, Sectional top view, True shape.<br>Development of different solids using Radial line and parallel line methods. | |
| **Unit VI: Intersection of Surfaces of solids:** | **(2 Hrs.)** |
| Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection. | |
| **Total Lecture** | **15 Hours** |

| **Textbooks:** | |
|---|---|
| 1. | D.M. Kulkarni, A. P. Rastogi and A. K. Sarkar , Engineering Graphics with AutoCAD PHI learning Pvt. Ltd., Revised Edition(2014), |
| 2. | N. D. Bhatt ,Engineering Drawing Charotar Publishing House Pvt. Ltd, 53 rd Edition 2017 |

| **Reference Books:** | |
|---|---|
| 1. | D. A. Jolhe Engineering Drawing , Tata McGraw Hill Publications , 2008, |
| 2. | K. L. Narayana & P. Kannaiah , Engineering Drawing SciTech Publication , 2010 |
| 3. | R. K. Dhawan Engineering Drawing S. Chand Publication Multicolor revised edition 2015 |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| 1 | Intranet on address 172.16.1.10. data/CCC/software / AutoCAD Software Setup. |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| 1. | https://youtube.com/playlist?list=PLLy_2iUCG87Bw9XPfEF3r3EW5UlAOv8iz |
| 2. | Eng https://nptel.ac.in/courses/112105294 |

## I SEMESTER

## 23ME1102 : Lab. Engineering Graphics

| **Course Outcomes :** |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1. Construct orthographic drawing and isometric drawing of a given object |
| 2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects |
| 3. Develop the lateral surfaces of various solids, their section and intersection**.** |
| 4. Practice the use of software tools used for Two dimensional drawings. |

**Practical's to be performed from the list as below**

| SN | **Experiments based on** | **No.of Practical's** |
|---|---|---|
| 1 | Introduction of AutoCAD Basic Commands | 02 |
| 2 | Orthographic Projection | 03 |
| 3 | Isometric Projection | 03 |
| 4 | Projection of Straight Line | 03 |
| 5 | Projection of Planar Surface | 03 |
| 6 | Projection of Solid | 03 |
| 7 | Section and Development of Solid | 04 |
| 8 | Intersection of Surfaces | 03 |
| 9 | Drawing Sheet 1: Convention for various lines, Dimensioning and Orthographic Projection | 02 |
| 10 | Drawing Sheet 2: Projection of line, planar surface or solid. (Any one) | 02 |
| | **Total Practical's** | **28 Hours** |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Electrical Engineering)

**B.Tech in Electrical Engineering**

**SoE No. 23EL-101**

## I SEMESTER

## 23EL1101 : Basic Electrical and Electronics Engineering

**Course Outcomes:**

1. Understand the fundamental concepts of Analog Electronic and Electrical Circuits
2. Apply the concepts of Electrical and Electronic Circuits to obtain the desired parameter
3. Analyze analog Electrical Circuits for given application.
4. Analyze analog Electronic Circuits for given application

| **Unit I: Circuit Elements and Energy Sources** | **(7 Hrs.)** |
|---|---|
| Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection. **(Contemporary Issues related to Topic)** | |
| **Unit II: Analysis of Network** | **(7 Hrs.)** |
| Kirchhof's Laws, Current Division, Voltage Division, Nodal and Mesh Analysis of Electric Circuits, Thevenin's Theorem **(Contemporary Issues related to Topic)** | |
| **Unit III: Generator and Motors** | **(7 Hrs.)** |
| Introduction to Generator, Construction, working principle, Types of Generators, Introduction to DC Motor,Working Principle of DC Motor, Types of Motors. **(Contemporary Issues related to Topic)** | |
| **Unit IV: Diode and Transistor** | **(6 Hrs.)** |
| Introduction to Semiconductor, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier. Introduction to BJT- NPN and PNP, Modes of operation,. **(Contemporary Issues related to Topic)** | |
| **Unit V: Operational Amplifier and Its Application** | **(7 Hrs.)** |
| Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP like adder, Subtractor, integrator, differentiator and non-linear application using Comparator. **(Contemporary Issues related to Topic)** | |
| **Unit VI: Electronics Measurement** | **(6 Hrs.)** |
| Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic characteristics of measurement system, Types of errors & their sources, Statistical analysis. **(ContemporaryIssues related to Topic)** | |
| **Total Lecture** | **40 Hours** |

| | | | | | |
|---|---|---|---|---|---|
| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |

| **Textbooks:** | |
|---|---|
| 1. | Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, First Edition2005 |
| 2. | Electronics Devices and circuits, Millman Jacob, McGraw Hill Education, Fourth Edition (2015) |
| 3. | Circuit Theory (Analysis and Synthesis) , by A. Chakrabarti, Dhanpat Rai & Co., Reprint Edition 2014 |

| **Reference Books:** | |
|---|---|
| 1. | OP-AMP and Linear Integrated Circuit, by Ramakant A. Gayakwad, Prentice Hall India Learnin Private Limited, Published in 2002 |
| 2. | Electrical & Electronic measurement & Instrument, A. K. Sawhney, Dhanpat Rai & Co.,18th edition 2008 |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| 1 | http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0 |
| 2 | https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042 |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| 1. | https://onlinecourses.nptel.ac.in/noc22_ee113/preview |

## I SEMESTER

## 23EL1105 : Lab : Electrical and Electronics Workshop

**Course Outcomes:**

**Upon successful completion of the course the students will be able**

1. To choose the electrical and electronics components/equipment for various application
2. To select various sensors and measuring instruments for different applications.
3. To build the various electrical wiring for different application

| Sr. No. | Experiments based on |
|---|---|
| 1 | Introduction of Tools, Electrical Materials and Electrical Drawing Symbols |
| 2 | Introduction to basic Electrical Components (R, L, C) with its number and color coding. |
| 3 | Introduction to Different types of Measuring Instruments and its demonstration. |
| 4 | To implement 12 V DC power supply using 7812 IC |
| 5 | Fabrication of four switch socket Electrical Distribution Board |
| 6 | To fabricate Staircase Wiring and Godown Wiring |
| 7 | Fabrication of solar powered electric fan |
| 8 | To monitor the output voltage of solar panel using voltage Sensor |
| 9 | Introduction to Different sensor devices and its demonstration. |
| 10 | To Study different protection devices and Importance of Earthing. |

## I SEMESTER

## 23EL1103 : Fundamentals of Electrical Engineering

**Course Outcomes:**

**Upon successful completion of the course the students will be able to**

1. Reproduce fundamentals of dc circuits, magnetic circuits, single phase, and three phase ac circuits.
2. Compute basic electrical and magnetic quantities for electrical and magnetic circuits respectively.
3. Explain construction, working, testing, and applications of single-phase transformers.

| **Unit I: D. C. Circuits** | **(7 Hrs.)** |
|---|---|

Basics of electrical circuits, Equivalent resistance, Kirchhoff's Laws. Current and Voltage division rule. Mesh and Nodal analysis of dc circuits. Superposition theorem. **(Contemporary Issues related to Topic)**

| **Unit II: Electromagnetism & Magnetic Circuits** | **(6 Hrs.)** |
|---|---|

Magnetic Field, Magnetic Flux, Magnetic Flux Density, Permeability, Relation between magnetic flux density and field intensity, Magnetic field due to current carrying conductor and a coil. Right hand grip rule, Force on a current carrying conductor placed in a magnetic field, Magnetomotive Force, Magnetic Field Strength. Reluctance, Magnetization curves of magnetic materials, Magnetic hysteresis and hysteresis loss. Eddy current and eddy current loss, Leakage flux and fringing, Faraday's laws of electromagnetic induction, Lenz's Law, Types of induced EMF, Magnetic Circuits **(Contemporary Issues related to Topic)**

| **Unit III: A.C. Fundamentals & Single-Phase Series A. C. Circuits** | **(7 Hrs.)** |
|---|---|

Generation of alternating voltage. Values of alternating quantity. Average and rms value by mid – ordinate method and method of integration. Form factor and peak factor. Concept of phasor and its mathematical representation. Concept of phasor diagram. Phasor algebra. Power in a.c. circuit. Concept of power factor, reactive power and apparent power with power triangle.

Analysis of purely resistive (R), inductive (L), and capacitive (C) circuits. Concept of inductive and capacitive reactance.

Analysis of series R – L, R – C, and R – L – C circuits for voltages and current, their waveforms, phasor diagram, impedance triangle, power factor. Series resonance. **(Contemporary Issues related to Topic)**

| **Unit IV: Single Phase Parallel & Series – Parallel A. C. Circuits** | **(6 Hrs.)** |
|---|---|

Concept of conductance, susceptance and admittance. Admittances in series and parallel. Analysis of single phase parallel and series – parallel a.c. circuits with their phasor diagram. Parallel resonance. **(Contemporary Issues related to Topic)**

| **Unit V: Three Phase A.C. Circuits** | **(7 Hrs.)** |
|---|---|
| Advantages of three – phase systems over single – phase systems. Generation of three phase a.c. supply. Phase sequence. Interconnection of three phases.<br>Star or Wye connection. Phase and line voltages/currents in star connection and their relationships.<br>Delta or Mesh connection. Phase and line voltages/currents in delta connection and their relationships.<br>Concept of balanced load. Active, reactive, and apparent power in balanced three phase circuits. **(Contemporary Issues related to Topic)** | |
| **Unit VI: Single Phase Transformer** | **(6 Hrs.)** |
| Working principle. EMF equation. Voltage ratio and turns ratio. Step up and step-down transformers. Construction of a single-phase transformer. Types of transformers and their applications.<br>Ideal transformer. Transformer on no load with phasor diagram and equivalent circuit. Practical transformer and its equivalent circuit. Referred values.<br>Transformer on load with phasor diagram and equivalent circuit. Voltage Regulation.<br>Losses in transformer. Load Test. Open circuit and Short circuit tests on transformers. Efficiency and condition for maximum efficiency. Autotransformer operation, kVA rating of autotransformer<br>**(Contemporary Issues related to Topic)** | |
| **Total Lecture** | **39 Hours** |

| **Textbooks:** | |
|---|---|
| 1. | D. C. Kulshreshtha , "Basic Electrical Engineering" ,Tata McGraw - Hill Education Private Limited. |
| 2. | T. K. Nagsarkar , M. S. Sukhija , "Basic Electrical Engineering" , Oxford University Press , Third Edition. |

| **Reference Books:** | |
|---|---|
| 1. | V. N. Mittle , Arvind Mittal , "Basic Electrical Engineering" , Tata McGraw - Hill Publishing Company Limited , Second Edition. |
| 2. | B. L. Theraja , A. K. Theraja , "A Text Book Of Electrical Technology Volume I & II" , S. Chand & Company Pvt. Ltd. , Twenty Third Edition. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| 1 | http://link.springer.com/openurl?genre=book&isbn=978-3-540-43965-3 |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| 1. | Course on Basic Electrical Technology By Prof. Dr. L. Umanand<br>https://archive.nptel.ac.in/courses/108/108/108108076 |
| 2. | Course on Fundamentals Of Electrical Engineering By Prof. Debapriya Das<br>https://nptel.ac.in/courses/108105112 |
| 3. | Course on Basic Electrical Technology By Prof. N.K. De, Prof. G.D. Roy, Prof. T.K. Bhattacharyahttps://nptel.ac.in/courses/108105053 |

## I SEMESTER

## 23EL1104 : Lab. Fundamentals of Electrical Engineering

**Course Outcomes:**

**Upon successful completion of the course the students will be able to**

1. Reproduce fundamentals of dc circuits, magnetic circuits, single phase, and three phase ac circuits.
2. Compute basic electrical and magnetic quantities for electrical and magnetic circuits respectively.
3. Explain construction, working, testing, and applications of single-phase transformers.
4. Determine performance of single-phase transformers.
5. Perform laboratory experiments and demonstrate competency in collecting, interpreting, analysing data,communicating and presenting effectively through laboratory journals.

| SN | **Experiments based on** |
|---|---|
| 1 | To verify Kirchhoff 's voltage law and Kirchhoff 's current law. |
| 2 | To study R – L – C series circuit. |
| 3 | To verify Superposition theorem. |
| 4 | To study R – L – C parallel circuit. |
| 5 | To study balanced three phase star (Y) connected load. |
| 6 | To find transformation ratio, regulation, and efficiency of a single-phase transformer by direct loading. |
| 7 | To study balanced three phase delta (Δ) connected load. |
| 8 | To perform open circuit test and short circuit test on a single-phase transformer. |
| 9 | To draw B - H curve of a magnetic material. |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Civil Engineering)

**B.Tech in FYC**

**SoE No. 23FY-101**

## I SEMESTER

## 23GE1117-Get Set Go

**Course Outcomes:**

**Upon successful completion of the course the students will be able to**

1. Students will understand the importance of building trust in communication and learn how to use the 3Vs of communication (Visual, Vocal, Verbal) to energize their interactions.
2. The course will focus on leadership principles and styles, emphasizing how effective communication can motivate others and gain willing cooperation. Students will participate in activities like skits and team presentations to demonstrate their leadership skills.
3. The course will equip students with team management and organization skills, enabling them to lead and participate in team-building activities effectively.

| Unit:1 | Build a foundation for success | 6 Hours |
|---|---|---|
| Explain the Importance of Process of improvement, stating<br>your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o<br>PACE – Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision"<br>Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications – Explain 3Vs of communication – Visual-Vocal-Verbal<br>Activity – Practice Conversations, Pause-Part-Punch, Group Activity | | |
| **Unit:2** | **Increase Self Confidence** | **6 Hours** |
| Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behaviour ,Motivate Others and Enhance Relationships- • Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility<br>Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island . | | |
| **Unit:3** | **Fundamentals of Communication** | **6 Hours** |
| Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize<br>Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment | | |
| **Unit:4** | **Team Management and Organization skills** | **5 Hours** |
| Team Management and Organization skills, Leadership Styles, Effective Communication<br>Activity- Team Presentation, Team building activities. | | |
| **EVALUATION** | **1 Hour** | **EVALUATION** |
| **WRITTEN TEST** | | |
| | | |
| **Total Lecture Hours** | | **24 Hours** |

| | | | | | |
|---|---|---|---|---|---|
| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |

| Reference Books | |
|---|---|
| **1** | Soft Skills - Enhancing Employability: Connecting Campus with Corporate. - M S Rao |
| **2** | Soft Skills Training: A Workbook to Develop Skills for Employment - Frederick H Wentz |
| **3** | Soft Skills: Know Yourself and Know the World - Alex |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

*(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)*

**(Accredited 'A++' Grade by NAAC with a score of 3.6)**

Hingna Road, Wanadongri, Nagpur - 441 110


# Bachelor of Technology

# SoE & Syllabus 2023

## 2nd Semester

**(Department of Electrical Engineering)**

## B. Tech in Electrical Engineering

Nagar Yuwak Shikshan Sanstha's

**Yeshwantrao Chavan College of Engineering**

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **FIRST SEMESTER (GROUP-B)** | | | | | | | | | | | | | | | |
| 1 | 1 | BS | GE | 23GE1102 | Differential Equations, Matrices and Statistics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 1 | BS | GE | 23GE1108 | Engineering Physics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 1 | BS | GE | 23GE1109 | **Lab:** Engineering Physics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 1 | BES | ME | 23ME1101 | Engineering Graphics | T | 1 | 0 | 0 | 1 | 1 | 30 | 20 | 50 | 3 |
| 5 | 1 | BES | ME | 23ME1102 | **Lab :** Engineering Graphics | P | 0 | 0 | 4 | 4 | 2 | | 60 | 40 | |
| 6 | 1 | BES | EL | 23EL1101 | Basic Electrical and Electronics Engineering | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 1 | BES | EL | 23EL1105 | **Lab :** Electrical and Electronics Workshop | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 1 | PC | EL | 23EL1103 | Fundamentals of Electrical Engineering | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 1 | PC | EL | 23EL1104 | **Lab :** Fundamentals of Electrical Engineering | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 1 | VSEC | GE | 23GE1117 | Get Set Go | … | … | … | … | … | 2 | | 60 | 40 | |
| 11 | 1 | CC2 | GE | | **Liberal Learning Course (LLC2)** | … | … | … | … | … | 2 | | 60 | 40 | |
| | | | | | **TOTAL FIRST SEM** | | **13** | **0** | **10** | **23** | **22** | | | | |
| **MANDATORY LEARNING COURSES** | | | | | | | | | | | | | | | |
| 1 | 1 | HS | | GE2131 | Universal Human Values (UHV) | **A** | 2 | 0 | 0 | 2 | 0 | | | | |
| **SECOND SEMESTER (GROUP-B)** | | | | | | | | | | | | | | | |
| 1 | 2 | BS | GE | 23GE1201 | Calculus and Vector | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 2 | BS | GE | 23GE1204 | Applied Chemistry | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 3 | 2 | BS | GE | 23GE1205 | **Lab:** Applied Chemistry | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 4 | 2 | HS/AEC1 | GE | 23GE1212 | Professional Communication | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 5 | 2 | HS/IKS | GE | 23GE1215 | Indian Knowledge System | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 6 | 2 | BES | CV | 23CV1201 | Engineering Mechanics | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 2 | BES | CV | 23CV1202 | **Lab:** Engineering Mechanics | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 2 | BES | IT | 23IT1203 | Programming for Problem Solving | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 2 |
| 9 | 2 | BES | IT | 23IT1204 | **Lab:** Programming for Problem Solving | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 2 | VSEC | GE | 23GE1218 | Functional English | … | … | … | … | … | 2 | | 60 | 40 | |
| 11 | 2 | CC1 | GE | | **Liberal Learning Course (LLC1)** | … | … | … | … | … | 2 | | 60 | 40 | |
| | | | | | **TOTAL SECOND SEM** | | **15** | **0** | **6** | **21** | **22** | | | | |

**Liberal Learning Course**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 2 | CC2 | GE | 23LLC1201 | Music (Vocal) |
| 2 | 2 | CC2 | GE | 23LLC1202 | Music (Instrumental) |
| 3 | 2 | CC2 | GE | 23LLC1203 | Indian Classical Dance |
| 4 | 2 | CC2 | GE | 23LLC1204 | Other forms of Dances |
| 5 | 2 | CC2 | GE | 23LLC1205 | Painting |
| 6 | 2 | CC2 | GE | 23LLC1206 | Theatre and acting |
| 7 | 2 | CC2 | GE | 23LLC1207 | Photography |
| 8 | 2 | CC2 | GE | 23LLC1208 | Yoga |
| 9 | 2 | CC2 | GE | 23LLC1209 | Chess |
| 10 | 2 | CC2 | GE | 23LLC1210 | Athletics |
| 11 | 2 | CC2 | GE | 23LLC1211 | Basket Ball |
| 12 | 2 | CC2 | GE | 23LLC1212 | Judo |
| 13 | 2 | CC2 | GE | 23LLC1213 | Elements of Japanese Language |
| 14 | 2 | CC2 | GE | 23LLC1214 | Elements of German Language |
| 15 | 2 | CC2 | GE | 23LLC1215 | Elements of French Language |
| 16 | 2 | CC2 | GE | 23LLC1216 | Elements of Spanish Language |
| 17 | 2 | CC2 | GE | 23LLC1217 | Basics of Vedic Maths |
| 18 | 2 | CC2 | GE | 23LLC1218 | Skilling in Microsoft Visio and Inkscape |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

## B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |

### Liberal Learning Course

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 1 | CC1 | GE | 23LLC1101 | Music (Vocal) |
| 2 | 1 | CC1 | GE | 23LLC1102 | Music (Instrumental) |
| 3 | 1 | CC1 | GE | 23LLC1103 | Indian Classical Dance |
| 4 | 1 | CC1 | GE | 23LLC1104 | Other forms of Dances |
| 5 | 1 | CC1 | GE | 23LLC1105 | Painting |
| 6 | 1 | CC1 | GE | 23LLC1106 | Theatre and acting |
| 7 | 1 | CC1 | GE | 23LLC1107 | Photography |
| 8 | 1 | CC1 | GE | 23LLC1108 | Yoga |
| 9 | 1 | CC1 | GE | 23LLC1109 | Chess |
| 10 | 1 | CC1 | GE | 23LLC1110 | Athletics |
| 11 | 1 | CC1 | GE | 23LLC1111 | Basket Ball |
| 12 | 1 | CC1 | GE | 23LLC1112 | Judo |
| 13 | 1 | CC1 | GE | 23LLC1113 | Elements of Japanese Language |
| 14 | 1 | CC1 | GE | 23LLC1114 | Elements of German Language |
| 15 | 1 | CC1 | GE | 23LLC1115 | Elements of French Language |
| 16 | 1 | CC1 | GE | 23LLC1116 | Elements of Spanish Language |
| 17 | 1 | CC1 | GE | 23LLC1117 | Basics of Vedic Maths |
| 18 | 1 | CC1 | GE | 23LLC1118 | Skilling in Microsoft Visio and Inkscape |

**MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment**

**TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance**

**TA** = for Practical : MSPA will be 15 marks each**

| | | | |
|---|---|---|---|
| Chairperson | Dean (Acad. Matters) | July, 2023 | 1.00 |
| | | Date of Release | Version |

**Applicable for AY 2023-24 Onwards**

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Mathematics & Humanities)

**B.Tech First Year**

**SoE No. 23FY-101**

## II SEMESTER

## 23GE1201: Calculus and Vector

| **Course Outcomes :** |
|---|
| **The students will be able to**<br>1. Apply the knowledge of differentiation to solve the Engineering problems.<br>2. Determine the derivatives of functions of several variables and develop the relations among the derivatives of variables.<br>3. Apply the knowledge of Beta and Gamma functions to find area, volume and mass.<br>4. Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single and multiple variables. |

| **Unit I: Differential Calculus** | **(6 Hrs.)** |
|---|---|
| Successive differentiation, $n^{th}$ derivative of rational function, Trigonometrical transformations, $n^{th}$ derivative of the product of two functions (Leibnitz's theorem), Taylor's theorem, Use of Maclaurin's theorem for one variable, standard expansions, Examples on Taylor's Theorem. **(Contemporary Issues related to Topic)** | |
| **Unit II: Partial Differentiation** | **(7 Hrs.)** |
| Functions of several variables, First and higher order derivatives, Homogeneous functions, Euler's theorem on homogeneous function, Chain rule and total differential coefficient of composite functions. Jacobians. **(Contemporary Issues related to Topic)** | |
| **Unit III: Integral Calculus** | **(6 Hrs.)** |
| Improper integrals: Gamma and Beta functions, applications of integral calculus in computing area, length, volumes, and surface of solids of revolutions. **(Contemporary Issues related to Topic)** | |
| **Unit IV: Multiple integrals** | **(6 Hrs.)** |
| Double integral, change of order of integral, change of variables, triple integrals and its applications. **(Contemporary Issues related to Topic)** | |
| **Unit V: Vector Calculus** | **(7 Hrs.)** |
| Vector fields, Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrotational motions. **(Contemporary Issues related to Topic)** | |
| **Unit VI: Vector Integration & Applications** | **(7 Hrs.)** |
| Vector integration: Line, surface and volume integrals, Statement of Stoke's theorem, Gauss divergence theorem and Green's theorem (without proof), Simple applications of these theorems. **(Contemporary Issues related to Topic)** | |
| **Total Lecture** | **39 Hours** |

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|---|---|---|---|---|---|
| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |

| **Textbooks:** | |
|---|---|
| 1. | Erwin Kreyzig, Advance Engineering Mathematics, 10th Edition, John Wiley and Sons, INC. |
| 2. | H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi. |
| 3. | H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi. |
| 4. | Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers. |
| 5. | P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan. |

| **Reference Books:** | |
|---|---|
| 1. | G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999. |
| 2. | Michael Spivak and Tom Apostol, Calculus, VolI & Vol II 2nd edition, Wiley. |
| 3. | N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/ |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| 1. | https://nptel.ac.in/courses/111/106/111106146/ |
| 2. | https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf |

## I/II SEMESTER
## 23GE1104/23GE1204: Applied Chemistry

**Course Outcomes:**

**Upon successful completion of the course the students will be able to:**

1. **Build** the knowledge of qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
2. **Apply** fundamental principles of electrochemistry to understand corrosion, energy storage devices and their industrial applications. (L3)
3. **Develop** insight into engineering materials for industrial applications. (L3)
4. **Utilize** knowledge of advanced engineering materials for technological applications. (L3).

| **Unit I: Water Chemistry** | **(8 Hrs.)** |
|---|---|
| Introduction, Potable water quality parameters. Hardness, Types of hardness. Sterilization. Desalination of water by R.O. Softening of water by Zeolite process and Ion Exchange Process (principle, advantages, and limitations). Numerical based on Hardness and Zeolite process. Boiler trouble (Scale and sludge).<br>Contemporary issues related to the topic | |
| **Unit II: Electrochemistry** | **(8 Hrs.)** |
| Introduction, Redox reactions, EMF of a cell, standard electrode potential, Nernst equation, numerical and applications to chemical cells. Conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Electrolysis, laws of electrolysis and numerical.<br>Industrial applications: Electroplating, Electrolytic refining.<br>**Corrosion:** Definition, Causes, theories of corrosion- dry, wet and differential aeration.<br>Contemporary issues related to the topic | |
| **Unit III: Energy storage devices** | **(7 Hrs.)** |
| **Battery:** Introduction, Characteristics, and General applications<br>Lithium-ion battery, Glass battery, $H_2$-$O_2$ Fuel cell. Differences between Battery and Fuel cell. Recycling and safe disposal of batteries.<br>**Supercapacitors:** Definition, Types, Characteristics,and Application.<br>**$H_2$ as a green fuel:** Introduction, Production, Storage, and Utilization.Contemporary issues related to the topic | |
| **Unit IV: Fuels** | **(8 Hrs.)** |
| Introduction, Calorific value, HCV & LCV. Determination of calorific value of fuels by Bomb & Boy's calorimeter. Dulong's formula Numerical.<br>Significance of Proximate and Ultimate analysis.<br>Knocking in Internal combustion petrol and diesel engines, Octane and Cetane number, Knocking and its relationship with structure of fuels. Catalytic cracking & advantages. Contemporary issues related to the topic | |
| **Unit V: Engineering Materials** | **(7 Hrs.)** |
| **Cement:** Introduction, Manufacturing of Portland cement. Role of microscopic constituents. Properties-setting and hardening, heat of hydration and soundness. Types of cement-Rapid hardening cement, Low heat cement, High alumina cement. Ready-mix concrete. | |

**Lubricants:** Introduction, Classification, Mechanism of Lubrication.
Properties & Significance of liquid lubricants–Viscosity and viscosity index, Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number. Numerical on V.I. Contemporary issues related to the topic.

| **Unit VI: Advanced Materials** | **(7 Hrs.)** |
|---|---|

**Nanomaterials:** Definition, Carbon Nanotubes and types. Applications of Nanomaterials in Electronics, Environment and Medicine.
**Liquid Crystal Polymers:** Introduction**,** General properties and applications.
**Polymers in electronic industries**: Introduction**,** Piezo, pyroelectric, Ferroelectric polymers.
**Smart materials:** Introduction**,** Properties and applications of Chromoactive, Photoactive and Magneto rheological materials.
**Spectroscopic techniques:** Introduction and applications. Contemporary issues related to the topic

| **Total Lecture** | **45 Hours** |
|---|---|

**Textbooks:**

| | |
|---|---|
| 1. | S S. Dara , A Text book of Engineering Chemistry , S.Chand & Co New Delhi. Eleventh Edition. |
| 2. | P.C. Jain and Monica Jain , Engineering Chemistry , Dhanpat Rai & sons New Delhi , Sixteenth Edition. |
| 3. | P. W. Atkins, Physical Chemistry ,Oxford Publications, Eighth edition . |

**Reference Books:**

| | |
|---|---|
| 1. | Eskel Nordell , Water treatment for industrial and other use ,Rein hold Publishing Corporation, New York. |
| 2. | Lloyd A.Munro, Chemistry in Engineering, Prentice-hall, Inc Nj, 2nd Edition. |
| 3. | Robert B Leighou Mc Graw, Chemistry of Engineering Materials, Hill Book Company, Inc New York. |
| 4. | B.K.Sharma Krishna, Engineering Chemistry, Prakashan media private LTD. 1st Edition, 2014. |
| 5. | R.V.Gadag, A.Nityananda Shetty, Engineering Chemistry ,I K International Publishing House New Delhi , First Edition. |
| 6 | Fred. Billmeyer Jr., A textbook of polymer science, Wiley India ,Third Edition. |

**YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]**

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|---|---|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/ |

**MOOCs Links and additional reading, learning, video material**

| | |
|---|---|
| 1. | https://www.youtube.com/watch?v=XTt3gXB0a84 |
| 2. | https://www.youtube.com/watch?v=iihYXx79QiE |
| 3. | https://www.youtube.com/watch?v=JfJ7MlP9Dco |
| 4. | https://www.youtube.com/watch?v=L2VSOccUrSk |
| 5. | https://www.youtube.com/watch?v=p5pk4Um6lsk |
| 6. | https://youtu.be/-R7s17hD104 |
| 7. | https://youtu.be/Bmj85Ihfv7w |

## I/II SEMESTER

## 23GE1105/23GE1205: Applied Chemistry Lab

**Course Objectives (PR)**

1) Develop analytical ability.
2) Integrate chemistry fundamentals with practical applications.

**Course Outcomes**

**Upon successful completion of the course the students will be able to**

1. **Apply** the knowledge of quantitative and qualitative chemical analysis to perform record and analyze the results. (L3)
2. **Experiment** with instrumental and analytical techniques in Chemistry to solve engineering problems related to sustainability. (L3)
3. **Write** effective reports and communicate through oral presentations. (L3)
4. **Review a**nd apply laboratory safety protocols and procedures to acquire the ability for independent and lifelong learning. (L3)

**Total 9 experiments are to be performed**
**(4 each from Lab I and Lab II and one demonstration experiment )**

| SN | **Experiments based on** |
|---|---|
| | **List of Experiments-Lab- I** |
| 1 | Estimation of Nickel. |
| 2 | Estimation of $Fe^{2+}$ ions by redox titration |
| 3 | Determination of copper by iodometric titration |
| 4 | Determination of Cation exchange capacity of an ion exchange resin |
| 5 | To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution |
| 6 | Determination of COD of water sample. |
| | **List of Experiments-Lab- II** |
| 1 | Determination of viscosity of lubricating oil by Redwood Viscometer I or II |
| 2 | Determination of molecular weight of a polymer. |
| 3 | Proximate analysis of coal |

| | |
|---|---|
| 4 | Determination of electrochemical equivalence of copper using Faradays Law |
| 5 | Determination of strength of the given acid conductometrically. |
| 6 | To verify Beer-Lambert law for $KMnO_4$ calorimetrically and determine the concentration of the given solution of $KMnO_4$. |
| | **List of Demonstration Experiments** |
| 1 | Synthesis of urea formaldehyde. |
| | **Advanced Topics (CBS)** |
| 1. | To Determine optimum alum dosage for water or wastewater treatment by turbidity measurement using nephelometer and residual chlorine testing using chloroscope. |
| 2. | Comparative study of effects of different drying techniques on the quality of fruits and vegetables. |

Nagar Yuwak Shikshan Sanstha's

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**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Mathematics & Humanities)

**B.Tech First Year**

**SoE No. 23FY-101**

## II SEMESTER

## 23GE1212 : Professional Communication

| **Course Outcomes :** |
|---|
| **Upon successful completion of the course the students will be able to:**<br>1.Apply different modes for effective communication<br>2.Produce competently the Phonology of English language<br>3.Apply nuances of LSRW skills<br>4.Practice Communication through different channels |

| **Unit I: Basics of Communication** | **(6 Hrs.)** |
|---|---|
| Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational). | |
| **Unit II: English Phonetics** | **(7 Hrs.)** |
| Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules | |
| **Unit III: Presentation & Interview Skills** | **(6 Hrs.)** |
| Presentation-Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation,<br>Interview-Purpose , expectations of employer and preparation for Interview, Types, Types of Questions &Answering Techniques, Telephonic Interviews – preparation and guidelines | |
| **Unit IV: Technical Reports, Memo & E-Mail Etiquettes** | **(7 Hrs.)** |
| Report -Types, Characteristics, prewriting aspects of report and preparing writing of reports<br>Memo- Objectives, Types, Structure and Layout<br>Email-Etiquettes, acronyms. | |
| **Total Lecture** | **26 Hours** |

| **Textbooks:** | |
|---|---|
| 1. | Meenakshi Raman & Sangeeta Sharma, Technical Communication, Raman & Sharma, Oxford University Press Orford University Press |
| 2. | T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd |
| 3. | |

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| Reference Books: | |
|---|---|
| 1. | Dale Carnegie ,How to Develop Self – Confidence & Influence People by Public Speaking |
| 2. | Asha Kaul, Communication Skills |
| 3. | Allen Peas ,Body Language |
| 4. | Gerson's Gerson, Technical Communication |

| MOOCs Links and additional reading, learning, video material | |
|---|---|
| 1. | https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf |
| 2. | https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superiorvocabulary-e157841139.html |
| 3. | https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-stylelearn-skills-of-persuasion-e156963640.html |
| 4. | https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improveyour-communication-skills-and-social-intelligence-e158273760.html |

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(Department of Mathematics & Humanities)

**B.Tech First Year**

**SoE No. 23FY-101**

## II SEMESTER

## 23GE1215 : Indian Knowledge System

| Course Outcomes: |
|---|
| **Upon successful completion of the course the students will be able to** |
| **1.** Apply primary requirements pertaining towards awareness of Indian Knowledge System. |
| 2. Analyze various Indian society, culture and literature to enhance their traditions. |
| **3.** Evaluate structure of Indian art. |
| **4.** Understand Indian heritage and architectural skills. |

| | | |
|---|---|---|
| **Unit:1** | **Introduction to Indian Civilization** | **6 Hours** |
| Development of Human Civilization with specific reference:<br>Stone age: Tool Technology and Cultural Development, Indus Valley civilization, Vedic Civilization.<br>**(Contemporary Issues related to Topic)** | | |
| **Unit:2** | **Indian Society, Culture and Literature** | **6 Hours** |
| Society and its types, Culture and its Characteristics, Foundational Literature.<br>**(Contemporary Issues related to Topic)** | | |
| **Unit:3** | **Tradition of Indian Art and Painting** | **7 Hours** |
| Indian Traditional Painting, Art style folk, mural with Gandhara and Mathura school of art.<br>**(Contemporary Issues related to Topic)** | | |
| **Unit:4** | **Indic Traditions of Architecture, Design and Planning** | **7 Hours** |
| Monumental studies of architectural skill: Rock Cut Caves, Stupa and Temple Architecture, The Ancient cities of Indus Saraswati region. Town Planning and drainage system.<br>**(Contemporary Issues related to Topic)** | | |
| | **Total Lecture Hours** | **26 Hours** |

| **Textbooks** | |
|---|---|
| 1 | Reader's Digest: Vanished Civilizations, THE READER'S DIGEST ASSOCIATION LIMITED, LONDON,NEWYORK. |
| 2 | Qaiser Zoha Alam ; Language and Literature Divers Indian Experience |
| 3 | Bal Ram Singh (Author), Nath Girish (Author) ; Science and Technology in Ancient Indian Texts |
| 4 | NCERT Books |

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| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |

| **Reference Books** | |
|---|---|
| 1 | B S Harishankar; Art and Archaeology of India: Stone Age to the Present, 2003. |
| 2 | Gupte R S and Mahajan B D; Ajanta, Ellora and Aurangabad, 1962. |
| 3 | Dharampal, Some Aspects of Earlier Indian Society and Polity and Their Relevance Today, New Quest Publications, Pune, 1987. |
| 4 | Michel Lorblanchet, "Rock Art In The Old World" IGNCA series, in India |
| 5 | Percy Brown, "Indian Architecture" D. B. Taraporevala sons & co. Pvt. Ltd. Bombay(1959). |

| **PPT's/Research papers** | |
|---|---|
| **1** | https://www.researchgate.net/publication/360889208_STONE_AGE_TOOL_TECHNOLOGY_and_CULTURAL_DEVELOPMENT |
| **2** | https://scholar.google.com/citations?view_op=view_citation&hl=en&user=iT1KSV8AAAAJ&sortby=pubdate&citation_for_view=iT1KSV8AAAAJ:UeHWp8X0CEIC |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | https://prepp.in/news/e-492-indian-architecture-art-and-culture-notes |
| **2** | https://www.artzolo.com/blog/most-famous-indian-painting-styles |
| **3** | https://www.researchgate.net/publication/360889332_Stone_Age_Tool_Technology_Cultural_Development |
| **4** | https://testbook.com/ias-preparation/ancient-history-16-mahajanapadas |

## II SEMESTER

## 23CV1201 : Engineering Mechanics

| **Course Outcomes :** |
|---|
| **Upon successful completion of the course the students will be able to**<br>1. Describe the fundamental concepts of statics and dynamics.<br>2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.<br>3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.<br>4. Analyze pin jointed truss frame structure and beam structure analytically and graphically.<br>5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine |

| **Unit I: Resultant of planar force System** | **(7 Hrs.)** |
|---|---|
| Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of force, Moment of force, Principle of moment, Couple, Resultant of a planar force system, Equivalent force couple system. **(Contemporary Issues related to Topic)** | |
| **Unit II: Equilibrium of planar force System** | **(6 Hrs.)** |
| Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads on beam, Equilibrium of a planar force system **(Contemporary Issues related to Topic)** | |
| **Unit III: Friction and Trusses** | **(7 Hrs.)** |
| Friction: Coulomb's laws of dry friction, plane friction, belt friction.<br>Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint. **(Contemporary Issues related to Topic)** | |
| **Unit IV: Properties of Surfaces** | **(6 Hrs.)** |
| Centroid: Introduction, First Moment of Area, Centroid of composite areas.<br>Moment of Inertia: Introduction, Second Moment of Area, Polar moment of Inertia, Radius of Gyration, Transfer formula for moment of Inertia, Product of Inertia, Moment of Inertia, and product of inertia for composite areas, Principal Moments of Inertia. **(Contemporary Issues related to Topic)** | |
| **Unit V: Virtual Work Method and Kinetics of Particle** | **(7 Hrs.)** |
| Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame.<br>Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system. **(Contemporary Issues related to Topic)** | |
| **Unit VI: Work Energy and Impulse Momentum Method** | **(6 Hrs.)** |
| Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system.<br>Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. **(Contemporary Issues related to Topic)** | |
| **Total Lecture** | **39 Hours** |

| | |
|---|---|
| **Textbooks:** | |
| 1. | Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009. |
| 2. | Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2013. |
| 3. | Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994. |
| **Reference Books:** | |
| 1. | Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007. |
| 2. | Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008. |
| 3. | Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000. |
| 4. | Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson Publication, New Delhi, 2003. |
| 5. | Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication, New Delhi. 2007. |
| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
| 1 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf |
| 2 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf |
| 3 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf |
| **MOOCs Links and additional reading, learning, video material** | |
| 1. | https://www.youtube.com/watch?v=nGfVTNfNwnk |
| 2. | https://www.youtube.com/watch?v=6nguX-cEsvw |
| 3. | https://nptel.ac.in/courses/112103108 |

# II SEMESTER

# 23CV1202 : Lab. Engineering Mechanics

| Course Outcomes |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1. Describe the fundamental concepts of statics and dynamics. |
| 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system. |
| 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body. |
| 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically. |
| 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine |

**Minimum Eight Practical's to be performed from the list as below**

| SN | Experiments based on |
|---|---|
| 1 | To find determine the support reactions of a Simply Supported Beam experimentally and analytically. |
| 2 | To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically. |
| 3 | To determine the coefficient of friction between two surfaces of different material on Plane Friction Apparatus. |
| 4 | To determine the coefficient of friction of Coil Friction Apparatus. |
| 5 | To determine the forces in members of a Shear Leg Apparatus experimentally and manually. |
| 6 | To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus |
| 7 | To determine efficiency and law of machine of Differential Axel & Wheel machine. |
| 8 | To determine efficiency and Law of machine of Single Purchase Crab machine. |
| 9 | To determine efficiency and Law of machine of Double Purchase Crab machine. |
| 10 | To verify law of polygonal of forces using Law of Polygon Apparatus. |
| 11 | To find support reactions of a simply supported beam using graphical method and hand calculation. |
| 12. | To find the forces in the member of truss using graphical method and hand calculation. |
| 13. | To find (1) Principle moment of inertia and (2) Moment of inertia and product of inertia about any inclined axis for a composite figure using Mohr's circle and hand calculation, |

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**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Information Technology)

**B.Tech in Information Technology**

**SoE No. 23IT-101**

## II SEMESTER

## 23IT1203 : Programming for Problem Solving

| **Course Outcomes :** |
|---|
| 1) Understand the basics of computer system operations and algorithms, flowcharts. |
| 2) Apply the basics of C programming for problem solving. |
| 3) Apply and analyze the different dimensional arrays for problem solving. |
| 4) Understand the basics of string, structure, and union and apply them to problem solving. |

| **Unit I: Computer System Basics:** | **(3 Hrs.)** |
|---|---|
| Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts ), Introduction to library functions, | |
| **Unit II: Basic of C Programming** | **(6 Hrs.)** |
| **Basic building blocks of C:** Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement. | |
| **Unit III: Loop Structures:** | **(5 Hrs.)** |
| While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples. | |
| **Unit IV: Modular Programming:** | **(6 Hrs.)** |
| Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples | |
| **Unit V: Arrays:** | **(6 Hrs.)** |
| One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting technique – Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples | |
| **Unit VI: String, Structure and Union:** | **(4 Hrs.)** |
| Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples | |
| **Total Lecture** | **30 Hours** |

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| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
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| Text books | |
|---|---|
| 1 | The C Programming Language, J.B.W.Kernighan & D.M.Ritchie, Prentice Hall |
| 2 | Mastering C, K.R.Venugopal & S.R. Prasad, TMH, 2007. |
| 3 | Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education |

| Reference Books | |
|---|---|
| 1 | Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education. |
| 2 | Programming with C, Byron Gottfried, Schaum;s Outline Series |
| 3 | How to solve it by computers, R. G. Dromey, Prentice Hall India |

| YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] | |
|---|---|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books |

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|---|---|
| 1 | https://nptel.ac.in/courses/106104128 |
| 2 | https://nptel.ac.in/courses/106104128 |
| 3 | https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Information Technology)

**B.Tech in Information Technology**

**SoE No. 23IT-101**

## II SEMESTER

## 23IT1204 : Lab. Programming for Problem Solving

| **Course Outcomes: Students will be able to** |
|---|
| 1) Understand the basics of computer system operations and algorithms, flowcharts.<br>2) Apply the basics of C programming for problem solving.<br>3) Apply and analyze the different dimensional arrays for problem solving.<br>4) Understand the basics of string, structure, and union and apply them to problem solving. |

| | |
|---|---|
| **Unit I: Computer System Basics:** | **(3 Hrs.)** |
| Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts ), Introduction to library functions, | |
| **Unit II: Basic of C Programming** | **(6 Hrs.)** |
| **Basic building blocks of C:** Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement. | |
| **Unit III: Loop Structures:** | **(5 Hrs.)** |
| While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples. | |
| **Unit IV: Modular Programming:** | **(6 Hrs.)** |
| Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples | |
| **Unit V: Arrays:** | **(6 Hrs.)** |
| One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting technique – Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples | |
| **Unit VI: String, Structure and Union:** | **(4 Hrs.)** |
| Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples | |
| **Total Lecture** | 30 Hours |

| | | | | | |
|---|---|---|---|---|---|
| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |

| Text books | |
|---|---|
| 1 | The C Programming Language, J.B.W.Kernighan & D.M.Ritchie, Prentice Hall |
| 2 | Mastering C, K.R.Venugopal & S.R. Prasad, TMH, 2007. |
| 3 | Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education |

| Reference Books | |
|---|---|
| 1 | Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education. |
| 2 | Programming with C, Byron Gottfried, Schaum;s Outline Series |
| 3 | How to solve it by computers, R. G. Dromey, Prentice Hall India |

| YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] | |
|---|---|
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books |

| MOOCs Links and additional reading, learning, video material | |
|---|---|
| 1 | https://nptel.ac.in/courses/106104128 |
| 2 | https://nptel.ac.in/courses/106104128 |
| 3 | https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt |

## List of Practical

| SN | Unit | Name Of The Practical | Remark | CO'S Mapped | PO'S Mapped |
|---|---|---|---|---|---|
| 1(A) | | Introduction to Linux Operating system & it's different commands. | **Manual** | **CO 1** | **PO1** |
| 1(B) | | Introduction to Vi editor, Compilation and Execution of a program in Linux. | **Manual** | **CO 1** | **PO1** |
| 2 | **II** | Practical based on Arithmetic and Conditional operators. | **Operators** | **CO 1** | **PO1** |
| 3 | **II** | Practical based on Conditional and Unconditional Statements. | **Conditional Statements** | **CO 1** | **PO1** |
| 4 | **III** | Practical based on Entry Controlled Looping Statements. | **For / While Loop** | **CO 2** | **PO 1, PO 2** |
| 5 | **III** | Practical based on Exit Controlled Looping Statement | **Do while Loop** | **CO 2** | **PO 1, PO 2** |
| 6 | **IV** | Practical based on Functions and Recursion. | **Functions / Recursion** | **CO 3** | **PO2, PO3** |
| 7 | **V** | Practical based on 1-D Array. | **1D Array** | **CO 3** | **PO2, PO3** |
| 8 | **V** | Practical based on 2-D Array. | **2D Array** | **CO 3** | **PO2, PO3** |
| 9 | **VI** | Practical based on Strings. | **Strings & Pointers** | **CO 3** | **PO2, PO3** |
| 10 | **VI** | Practical based on Structures. | **Structures** | **CO 4** | **PO1, PO2, PO3** |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B. Tech SoE and Syllabus 2023**

**(Scheme of Examination w.e.f. 2023-24 onward)**

(Department of Mathematics & Humanities)

**SoE No. 23FY-101**

**B.Tech First Year**

## II SEMESTER

## 23GE1218 : Functional English

| Course Outcomes: |
|---|
| **Upon successful completion of the course the students will be able to**<br>1. Understand the concept of FE (Functional English) and its application in various real-life scenarios.<br>2. Develop basic interactive communication skills, including greetings, asking for information, stating opinions, and providing feedback.<br>3. Acquire knowledge of social networking, texting, instant messaging, blogs, and discussion boards, along with the ethical considerations associated with online communication.<br>4. Successfully complete quizzes and assignments assessing knowledge in the covered topics of FE, social media, tenses, and effective communication. |

| Unit:1 | Introduction to Functional English | 6 Hours |
|---|---|---|
| What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye. Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology. Modal Verbs - Words used often: Can- could, Will – would, Shall – should, Ought to-Must, May-might.<br>Practice exercises, Practice Conversations, Script Activity | | |
| **Unit:2** | **Internet & Social Media Communication** | **6 Hours** |
| Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of social media & communication<br>Topic: Introduction to Creative Ads Why Ads, What's in it for me? Characteristics of ads.<br>Assignment Quiz on the above Topics, Exercises for Evaluation | | |
| **Unit:3** | **TENSES** | **6 Hours** |
| Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples.<br>Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples<br>Introduction to Movie Magic, Learn English with films, Film Vocabulary, Describing a film, Types of Films<br>Assessment – Letter and Email Writing, Tenses – Quiz | | |
| **Unit:4** | **Written Communication** | **5 Hours** |
| Introduction & Basics of Writing, five methods of communication, Mind your grammar, Commonly confusing words<br>Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice<br>Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects. | | |

| | | | | | |
|---|---|---|---|---|---|
| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |

Assignment Presentation on Mad Ads, Quiz on Tenses and social media-Internet Communication
Topic: Activity Extempore

| | | | |
|---|---|---|---|
| **EVALUATION** | | | **1 Hour** |
| **WRITTEN TEST** | **TA=60** | **ESE=40** | **TOTAL=100** |
| | | | |
| **Total Lecture Hours** | | | **24 Hours** |

| **Reference Books** | |
|---|---|
| **1** | How to win friends & influence people – Dale Carnegie |
| **2.** | Functional English for Communication - Ujjwala Kakarla |
| **3** | Functional English for Technical Students – Dr Prathibha Mahato & Dr Dora Thompson |

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

*(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)*

**(Accredited 'A++' Grade by NAAC with a score of 3.6)**

Hingna Road, Wanadongri, Nagpur - 441 110


# Bachelor of Technology

# SoE & Syllabus 2023

## 3rd Semester

**(Department of Electrical Engineering)**

## B. Tech in Electrical Engineering

Nagar Yuwak Shikshan Sanstha's

**Yeshwantrao Chavan College of Engineering**

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **THIRD SEMESTER** | | | | | | | | | | | | | | | |
| 1 | 3 | BS | GE | 23GE1302 | Integral Transform | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 2 | 3 | HSSM-1 | GE | 23GE1301 | Fundamentals of Management & Economics | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 3 | 3 | VEC-1 | CV | 23CV1311 | Environmental Sustainability, Pollution and Management | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 4 | 3 | PC | EL | 23EL1301 | Electrical Energy Generation System | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 5 | 3 | PC | EL | 23EL1302 | **Lab:** Renewable Energy Sources | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 6 | 3 | PC | EL | 23EL1303 | Network Analysis | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 7 | 3 | PC | EL | 23EL1304 | **Lab** : Electrical Engineering Workshop | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 8 | 3 | PC | EL | 23EL1305 | Electrical Machines | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 9 | 3 | PC | EL | 23EL1306 | **Lab :** Electrical Machines | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 10 | 3 | CEP | EL | 23EL1307 | **Community Engagement Project** | P | 0 | 0 | 2 | 4 | 2 | | 60 | 40 | |
| 11 | 3 | OE I | OE | | **Open Elective -I** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 12 | 3 | MDM | MDM | | **MD Minor Course-I** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| | | | | | **TOTAL** | | **20** | **0** | **8** | **30** | **25** | | | | |

| List of Mandatory Learning Course (MLC) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3 | HS | T&P | MLC2123 | **YCAP3 :** YCCE Communication Aptitude Preparation | **A** | 3 | 0 | 0 | 3 | **0** | | | | |

**Open Elective - I**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 3 | OE1 | GE | 23OE1301 | OE-I : Combinatorics |
| 2 | 3 | OE1 | GE | 23OE1302 | OE-I : Fuzzy Set Theory, Arithmetic And Logic |
| 3 | 3 | OE1 | GE | 23OE1303 | OE-I : Green Chemistry & Sustainability |
| 4 | 3 | OE1 | GE | 23OE1304 | OE-I : Hydrogen Fuel |
| 5 | 3 | OE1 | GE | 23OE1305 | OE-I : Electronic Materials And Applications |
| 6 | 3 | OE1 | GE | 23OE1306 | OE-I : Laser Technology And Applications |
| 7 | 3 | OE1 | MGT | 23OE1307 | OE-I : Finance And Cost Management |
| 8 | 3 | OE1 | MGT | 23OE1308 | OE-I : Operation Research Techniques |
| 9 | 3 | OE1 | MGT | 23OE1309 | OE-I : Project Evaluation & Management |
| 10 | 3 | OE1 | MGT | 23OE1310 | OE-I : Total Quality Management |
| 11 | 3 | OE1 | MGT | 23OE1311 | OE-I : Value Engineering |
| 12 | 3 | OE1 | MGT | 23OE1312 | OE-I : Maintenance Management |
| 13 | 3 | OE1 | MGT | 23OE1313 | OE-I : Industrial Safety |
| 14 | 3 | OE1 | MGT | 23OE1314 | OE-I : Industry 4.0 |
| 15 | 3 | OE1 | MGT | 23OE1315 | OE-I : Operation Management |
| 16 | 3 | OE1 | MGT | 23OE1316 | OE-I : Material Management |
| 17 | 3 | OE1 | MGT | 23OE1317 | OE-I : Hospitality Management |
| 18 | 3 | OE1 | MGT | 23OE1318 | OE-I : Human Resource Management & Organizational Behaviour |
| 19 | 3 | OE1 | MGT | 23OE1319 | OE-I : Agri-Business Management |
| 20 | 3 | OE1 | MGT | 23OE1320 | OE-I : Rural Marketing |
| 21 | 3 | OE1 | MGT | 23OE1321 | OE-I : Marketing Management |
| 22 | 3 | OE1 | MGT | 23OE1322 | OE-I : Health Care Management |
| 23 | 3 | OE1 | MGT | 23OE1323 | OE-I : Designated approved online NPTEL/KKSU Course |
| 24 | 3 | OE1 | MGT | 23OE1324 | OE-I : Indian Archeology |
| 25 | 3 | OE1 | MGT | 23OE1325 | OE-I : Social & Positive Psychology |
| 26 | 3 | OE1 | MGT | 23OE1326 | OE-I : Seismology & Earthquake |

| | | July, 2023 | 1.00 | Applicable for AY 2023-24 Onwards |
|---|---|---|---|---|
| Chairperson | Dean (Acad. Matters) | Date of Release | Version | |

## III /IV SEMESTER
## 23GE1302/23GE1402 : Integral Transforms

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1 Apply the knowledge of Laplace and Fourier transforms to solve the continuous problems. |
| 2. Apply the knowledge of Z transforms to solve the discrete mathematical equations. |
| 3. Determine Fourier series expansion of periodic functions, Fourier Transform. |
| 4. Use appropriate methods to solve partial differential equations. |

| **Unit I:** | **7 Hrs.** |
|---|---|
| **Laplace Transforms** : Definition and examples of Laplace transforms, properties of Laplace transforms, Examples by using properties of Laplace transforms, Unit step function, periodic function. | |
| **Unit II:** | **8 Hrs.** |
| **Inverse of Laplace Transform:** Definition and examples of Inverse Laplace transforms, Inverse Laplace transform by using properties, Partial fraction method to find Inverse Laplace transforms, convolution theorem, Applications of Laplace transform to solve ordinary differential equations. | |
| **Unit III:** | **7 Hrs.** |
| **Z-Transform:** Some elementary concepts, Definition of Z-Transform, Examples of Z-Transform, Properties (without proof), Inversion by partial fraction decomposition and residue theorem, Applications of Z-transform to solve difference equations with constant co-efficient. | |
| **Unit IV:** | **8 Hrs.** |
| **Fourier Series:** Periodic Functions, standard results, Fourier series expansion, Convergence of Fourier Series, Fourier Series for even and odd function, Change of interval, half range Fourier Series, Examples on half range sine and cosine series. | |
| **Unit V:** | **8 Hrs.** |
| **Fourier Integral:** Fourier Integral of a function formula and examples, Fourier Cosine integral, Fourier Sine integral, Complex Fourier integral, Evaluation of integration using Fourier integral. | |

| **Unit VI:** | **7 Hrs.** |
|---|---|
| **Fourier Transforms:** Fourier Transform, Fourier sine and cosine transformation and its examples, Properties of Fourier sine and cosine transform and its examples, Application of Fourier sine and cosine transform on Partial differential equation, Parseval's Identity. | |
| **Total Lecture** | **45 Hours** |

| **Textbooks:** | |
|---|---|
| **1** | Erwin Kreyzig, Advance Engineering Mathematics, 9th Edition, John Wiley and Sons, INC. |
| **2** | Dr. B. S. Grewal, Higher Engineering Mathematics, 40th edition, Khanna Publisher. |
| **3** | H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi. |

| **Reference Books:** | |
|---|---|
| **1** | Chandrika Prasad, Mathematics for Engineers, 19th Edition, John Wiley and Sons, INC. |
| **2** | L. A. Pipes and Harville, Applied Mathematics for Engineers, 3rd Edition, McGraw Hill. |
| **3** | P.N. and J. N. Wartikar, A text book of Applied MAthematics, 3rd edition, Pune Vidyarthi Griha Prakashan |
| **4** | N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/ |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | https://nptel.ac.in/courses/111106111 |
| **2** | https://onlinecourses.nptel.ac.in/noc22_ma41/preview |
| **3** | https://archive.nptel.ac.in/courses/111/101/111101153/ |

## III SEMESTER
## 23GE1301: Fundamentals of Management & Economics

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1. Develop the Managerial Perspective and perform the various functions of management for optimum utilization of Engineering Resources<br>2. Identify and Analyze the role of Financial Accountancy and Marketing Management in the Organization<br>3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.<br>4. Interprets comparative advantage of resources. |

| **Unit I:** | **7 Hrs.** |
|---|---|
| **Principles of Management**: Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Staffing and Controlling, Motivational Theories, Concept of Leadership. | |
| **Unit II:** | **8 Hrs.** |
| **Marketing and Financial Management:** Marketing and Financial Management –Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions<br>Financial Management and Accountancy- Accountancy Rules and Capital, Preparation of Books of Account- Journal posting of Transaction into ledger and preparation of trial Balance, Introduction of Trading Account, Profit and loss account and balance sheet. | |
| **Unit III:** | **7 Hrs.** |
| **Introduction to Microeconomics:** Nature and Scope of Microeconomics, Demand Analysis: Meaning and determinants of demand, law of demand, Elasticity of Demand - types and degrees, Utility analysis, Law of diminishing marginal utility, supply- law of supply, Law of Variable proportions and Return to Scale, Classification of market structure. | |
| **Unit IV:** | **8 Hrs.** |
| **Introduction to Macroeconomics:** Nature and Scope of Macroeconomics, Concept of GDP, GNP, NDP, NNP, Measurement of GDP; Economic Growth and development, Money – definition, types and function of money, Inflation – meaning, types, causes and measure to control, concept of deflation, functions of central and commercial bank , Sources of public revenue - direct and indirect taxes. | |
| **Total Lecture** | **30 Hours** |

| **Textbooks:** | |
|---|---|
| 1 | Principle of Management, 9th edition , Harold Koontz Ramchandra, Tata McGrow hills |
| 2 | Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian |
| 3 | Fundamentals of Accounting Gupta R.L. & Radhaswamy ; |
| 4 | Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009 |
| 5 | Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher,2007 |
| 6 | Principle of Economics, 7th edition, Mankiw N. Gregory, Thomson, 2013 |

| **Reference Books:** | |
|---|---|
| 1 | Foundations of Financial Markets and Institutions, 3rd Edition, Fabozzi, Pretice Hall |
| 2 | Fundamentals of Financial Instruments , 2nd Edition, Parameshwaran, Wiley India |
| 3 | Marketing Management , 3rd Edition , RajanSaxena, Tata McGraw Hill |
| 4 | Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009 |
| 5 | International Trade, 12th edition, M. L. Zingan, Vindra Publication, 2007 |
| 6 | Macro Economics, 11th edition, M. L. Zingan, Vindra Publication, 2007 |
| 7 | Monitory Economics:,1st Edition, M. L. Sheth, Himayalaya Publisher, 1995 |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0 |
| **2** | https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042 |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | https://onlinecourses.nptel.ac.in/noc22_mg104/preview |
| **2** | https://archive.nptel.ac.in/courses/110/101/110101131/ |
| **3** | https://onlinecourses.nptel.ac.in/noc23_mg122/preview |
| **4** | https://onlinecourses.nptel.ac.in/noc21_hs52/preview |
| **5** | https://onlinecourses.nptel.ac.in/noc22_hs67/preview |

## III/IV SEMESTER
## 23CV1311/23CV1411
## Environmental Sustainability, Pollution and Management

| **Course Outcomes :** |
|---|
| **Upon successful completion of the course, the students will be able to** |
| The student will be able to<br>1. Gain insights into the efforts to safeguard the Earth's environment and resources.<br>2. Develop a critical understanding of the contemporary environmental issues of concern<br>3. Have an overview of pollution, climate change and national and global efforts to address adaptation and mitigation to changing environment through environmental management.<br>4. Learn about the major international treaties and our country's stand on and responses to the major international agreements. |

| **Unit:1** | **Environment and Sustainable Development** | **8 Hours** |
|---|---|---|
| The man-environment interaction; Overview of natural resources: renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs; Environmental issues: Global change, Climate Change and Mitigation. | | |
| **Unit:2** | **Environmental Pollution and Health** | **7 Hours** |
| Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on biotic and abiotic things. | | |
| **Unit:3** | **Environmental Management** | **8 Hours** |
| Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme | | |
| **Unit:4** | **Environmental Treaties and Legislation** | **7 Hours** |
| Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives | | |
| | **Total Lecture** | **30 Hours** |

| **Text books** | |
|---|---|
| 1 | Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson |
| 2 | Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press |
| 3 | Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK |
| 4 | Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson Education |
| 5 | Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge. |
| 6 | Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press |
| 7 | Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press |

| Reference Books | |
|---|---|
| 1 | Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press |
| 2 | Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson) |
| 3 | William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-Graw Hill, USA) |
| 4 | Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through Sustainable Use: Lessons from India. Routledge. |
| 5 | Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/ standards |
| 6 | Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213 |
| 7 | Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press |
| 8 | Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp- content/uploads/2020/02/ convention-V-16-CURVE-web.pdf |
| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
| 1 | |
| **MOOCs Links and additional reading, learning, video material** | |
| 1 | |

## III SEMESTER
## 23EL1301 : Electrical Energy Generation System

**Course Outcomes:**

**Upon successful completion of the course the students will be able to**

1. Classify types of renewable energy sources and different factors associated with a generating station
2. Explain various parameters related to selection and application of Solar ,Wind Energy and Biogas
3. Illustrate design parameters for Hydro and Thermal Power generating Systems.
4. Explain various parameters related to generation of Nuclear Power

| **Unit:1** | **Introduction to generation systems** | **7 Hours** |
|---|---|---|

Importance of Electrical Energy, Generation of Electrical Energy, Relationships among Energy units, Calorificvalue of fuels.
Sources of Electrical energy- Coal, oil and natural gas, hydro, solar, wind and nuclear energy.Different factors associated with a generating station : connected load, maximum demand, demand factor, load factor, diversity factor, plant capacity and utilization factor, load curve and load duration curve load survey, base load and peak load station, advantages of interconnection.
Tariff-: Definition, Objective, Characteristics of tariff, Types of Tariff (Numerical), economical choice of tariff.
**Contemporary Issues related to Topic**

| **Unit:2** | **Solar Energy** | **8 Hours** |
|---|---|---|

Solar radiation & its Measurement: - Solar constant, Solar radiation at earth's surface, Solar radiation geometry, Solar radiation on tilted surfaces, Solar radiation measurement, Solar Energy Collectors: - Physical principles of the conversion of solar radiation into heat, flat plate collectors. Applications of Solar energy: Solar Dryer, Solar Still, Solar cooker
Solar Photovoltaic Cell: Principle of solar photovoltaic energy conversion, Equivalent circuit of solar cell
**Contemporary Issues related to Topic**

| **Unit:3** | **Wind Energy** | **7 Hours** |
|---|---|---|

Principle of wind energy conversion, Power in the wind, Cut In, Cut Off Wind Speed ,Site selection considerations, Basic components of wind energy conversion systems(WECS),Classification of WEC systems, Advantages and Limitations of WECS,,Types of wind Machines(HAWT and VAWT), Application of wind energy.
**Contemporary Issues related to Topic**

| **Unit:4** | **Hydro Power Station** | **8 Hours** |
|---|---|---|

Schematic arrangement of Hydroelectric Power Station, Constituents of Hydroelectric power plant, Advantages and Limitations of Hydro-electric Plants , Hydrology, stream flow, flow duration curve, power duration curve, mass curve, reservoir capacity, Water Power equation (Numerical), type of hydro power plants and their field of use, pumped storage plant and their utility, surge tanks. General study of Hydro Turbine, Introduction to Small hydro plants.
**Contemporary Issues related to Topic**

| **Unit:5** | **Thermal Power Station** | **7 Hours** |
|---|---|---|

Introduction, Site selection, size and number of units, general layout, major equipment, auxiliaries, electric supply to auxiliary, cost of generation ,effect of different factors on costs.
General study of steam Turbine.
Condenser: Different types of condensers. Construction and Working principle of Condenser
**Contemporary Issues related to Topic**

| **Unit :6** | **Nuclear Power Plant and Biomass Energy** | **8 Hours** |
|---|---|---|

Site selection for nuclear power plant, introduction to nuclear physics, chain reaction, Working Principle of nuclear Power Plant, Components of a nuclear reactor, types of nuclear reactor, material for moderator and control rods, control of nuclear reactors, , economics of nuclear power generation. Biogas production from waste biomass, classification of biogas plants, operational parameters, availability of raw material and gas yield.
**Contemporary Issues related to Topic**

Total: **45 Hours**

| **Text books** | |
|---|---|
| **1** | M.L.Soni,P.V.Gupta,U.S.Bhatnagar,A Textbook on Power System Engineering, 2nd edition 2014, Dhanpat Rai and Co. |
| **2** | V.K.Mehta, Rohit Mehta, Principles of Power System, 2nd edition 2008,S.Chand |
| **3** | B.R.Gupta,Generation of Electrical Energy,5th edition 2007 ,S.Chand |
| **4** | G. D. Rai,Non-Conventional Energy Sources, 5th edition 2011, Khanna Publication |

| **Reference Books** | |
|---|---|
| **1** | T.K. Nagsarkar, M.S. Sukhija,Power System Analysis,1st edition 2007, Oxford Publication |
| **2** | Ashfaque Hussain,Electrical Power System,5th edition 2007, CBS Publication |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20System%20Engineering/Principles%20of%20Power%20Systems%20V.K%20Mehta.pdf |
| **2** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/B.H.Khan%20Book%20RES.pdf |
| **3** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/Solar%20Energy%20pdf.pdf |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems [Intro Video] |
| **2** | http://103.152.199.179/YCCE/DTEL%20Material/3.Electrical%20Engineering/DTEL%20PPTs/IV%20SEMESTER/EL-2253%20EEGS/ |

# III SEMESTER
# 23EL1302: Lab. Renewable Energy Sources

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1. Summarize, classify types of renewable energy sources, outline as per Global and Indian context |
| 2. Utilize ,analyze solar energy for various applications. |
| 3. Classify, analyze wind energy conversion systems and estimate its parameters. |

**Minimum Eight Practical's to be performed from the list as below**

| S. N. | Experiments based on |
|---|---|
| 1 | To analyze I-V and P-V characteristics of single PV module |
| 2 | To analyze I-V and P-V characteristics of series connected PV modules |
| 3 | To analyze I-V and P-V characteristics of parallel connected PV modules |
| 4 | To observe effect of shading on power output of single PV module |
| 5 | To observe effect of tilt angle on power output of single PV module |
| 6 | To explain working of Solar Water Heater in natural convection and force convection mode |
| 7 | To explain the Biogas generation plant model set up at YCCE College |
| 8 | To explain working of Solar Cooker A)Box type B)Concentrated type |
| 9 | To design home Solar PV system |
| 10 | To explain Hydroelectric Power plant |

# III SEMESTER
# 23EL1303 : Network Analysis

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course, the students will be able to:**<br>1) Apply node voltage and mesh current analysis methods to electric circuits.<br>2) Apply network theorems to electric circuits.<br>3) Determine initial and final values of current and voltage of electric circuits containing energy storage elements.<br>4) Apply Laplace transform to electric circuits. |

| | | |
|---|---|---|
| **Unit:1** | **Nodal Analysis of Electric Circuits** | **7 Hours** |
| Basics of electric circuits, circuit elements and their voltage – current relationship, classification of circuit elements, sources - their types and characteristics, concept of equivalent sources, source transformation, concept of supernode and V – shift, nodal analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage, power, and energy.<br>**Contemporary Issues related to Topic** | | |
| **Unit:2** | **Mesh Analysis of Electric Circuits** | **8 Hours** |
| Concept of supermesh and I – shift, mutual inductance, coefficient of coupling, dot convention, dot marking in coupled coils, mesh analysis of circuits containing resistors, inductors, capacitors, transformers, and both independent and dependent sources to determine current, voltage, power, and energy.<br>**Contemporary Issues related to Topic** | | |
| **Unit:3** | **Network Theorem** | **7 Hours** |
| Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem.<br>**Contemporary Issues related to Topic** | | |
| **Unit:4** | **Initial and Final Conditions, Impedance Functions And Circuit Analysis With Laplace Transform.** | **8 Hours** |
| Concept of initial and final conditions, behavior of resistor, inductor and capacitor at t = 0- and at t = 0+, procedure for evaluating initial and final conditions, analytical treatment. Review of Laplace Transform, concept of complex frequency, transform impedance and admittance, s – domain impedance and admittance models for resistor, inductor and capacitor, series and parallel combinations of elements. Transformed network on loop and mesh basis, mesh and node equations for transformed networks, time response of electrical network with and without initial conditions by Laplace transform. **Contemporary Issues related to Topic** | | |
| **Unit:5** | **Transforms of other Signal Waveforms, Network Functions, Poles and Zeros Of Network Functions** | **7 Hours** |
| Unit step, ramp and impulse functions with and without time delay, their Laplace transform, waveform synthesis and its application to electrical networks. Terminal pairs or ports, network functions for one port and two port networks, definition and physical interpretation of poles and zeros, pole-zero plot for network functions, restrictions on pole and zero locations for driving point and transfer functions, time domain behavior from the pole<br>– zero plot, network synthesis using pole – zero plot. | | |

| Unit :6 | Two Port Parameters | 8 Hours |
|---|---|---|
| Standard reference directions for the voltages and currents of a two – port network, defining equations for open circuit impedance, short circuit admittance, transmission, inverse transmission, hybrid and inverse hybrid parameters, relationships between parameter sets, conditions for reciprocity and electrical symmetry in terms of two – port parameters, interconnections of two - port networks. | | |
| **Contemporary Issues related to Topic** | | |
| **Total Lecture Hours** | | **45 Hours** |

| **Text books** | |
|---|---|
| **1** | M. E. Van Valkenburg , "Network Analysis" , PHI Learning Private Limited , Third Edition. |
| **2** | William H. Hayt, Jack E. Kemmerly, Steven M. Durbin , "Engineering Circuit Analysis" , McGraw – Hill , Eighth Edition. |
| **3** | Decarlo , Lin , "Linear Circuit Analysis" , Oxford Univ. Press , Second Edition |

| **Reference Books** | |
|---|---|
| **1** | Syed A. Nasar , "Schaum's 3000 Solved Problems In Electric Circuits Book 1 & 2" , McGraw - Hill , First Edition. |
| **2** | Joseph A. Edminister , "Schaum's Outline Series : Theory and Problems of Electric Circuits" , McGraw - Hill , Fifth Edition. |
| **3** | Lawrence P. Huelsman , "Basic Circuit Theory" , PHI Learning Private Limited , Third Edition. |
| **4** | Ravish R. Singh , "Network Analysis And Synthesis" , McGraw - Hill Education (India) Private Limited. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://link.springer.com/openurl?genre=book&isbn=978-90-481-9442-1 |
| **2** | https://web.p.ebscohost.com/ehost/detail/detail?vid=2&sid=4051e547-e3c2-4c21-8a54-384a6b804d38%40redis&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=2196243&db=e230xww |
| **3** | http://link.springer.com/openurl?genre=book&isbn=978-0-412-38310-6 |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | Course on Circuit Theory By Prof. S. C. Dutta Royhttps://nptel.ac.in/courses/108102042 |
| **2** | Course on Network Analysis By Prof. Tapas Kumar Bhattacharya https://archive.nptel.ac.in/courses/108/105/108105159/ |
| **3** | Course on Basic Electric Circuits By Prof. Ankush Sharmahttps://nptel.ac.in/courses/108104139 |

# III SEMESTER
# 23EL1304 : Lab : Electrical Engineering Workshop

**Course Outcomes:**

**Upon successful completion of the course the students will be able to**

1. Describe the basic concept of various electrical components.
2. Demonstrate, formulate and solve the basic maintenance and troubleshooting of household Equipments, energy saving etc.
3. Outline the fundamentals of major electrical devices and actual operation of devices like AC and DC machines.

**Minimum Eight Practical's to be performed from the list as below**

| Sr. No. | Experiments based on |
|---|---|
| 1 | To study the construction and working of ceiling fan and troubleshooting. |
| 2 | To find the fault of electric iron (ordinary and automatic) and study about them and prepare the maintenance chart of the possible faults and their remedies |
| 3 | To study about electric mixer and find out fault in it |
| 4 | To measure Earth Resistance by Earth Tester |
| 5 | To measure the value of insulation resistance of a given electrical equipment using the Megger instrument. |
| 6 | To construct the single phase centre tapped shell type transformer |
| 7 | To identify terminals and testing of DC Compound Motor |
| 8 | To assemble the Direct Online Starter – DOL Starter for Motors |
| 9 | To assemble the Star Delta Starter – (Y-Δ) for Motors |
| 10 | To demonstrate Solar Rooftop Installation |
| 11 | To study Electrical Insulator and Types of Insulator |
| 12 | To explain the basic design of a Transmission tower. |
| 13 | To study the Types of Electrical Power Cables (Sizes & Ratings) |

## III SEMESTER
## 23EL1305 : Electrical Machines

| Course Outcomes: | |
|---|---|
| 1. | Analyze the performance of Transformers. |
| 2. | Illustrate proficiency in understanding the performance of D.C. Machines |
| 3. | Evaluate the performance of Induction Motors. |
| 4. | Explain working of Special Machines. |

| Unit:1 | Three Phase Transformer | 7 Hours |
|---|---|---|

Types of 3 phase transformers, Construction, Labelling of terminals, Vector Groups, Polarity marking & Test, Transformer connections and their comparative features, Open Delta Connection, Parallel operation of three phasetransformers, All day efficiency. Harmonics effect due to saturation.

**Contemporary Issues related to Topic**

| Unit:2 | D.C. Generator | 8 Hours |
|---|---|---|

Construction, Magnetic structure, Field and Armature systems, Field and Armature windings ( Both Lap and Wave Types),EMF Equation, Characteristics and applications of different types of D.C. Generators, Building of Emf in D.C. Shunt generator, Armature reaction, commutation, straight line commutation, inter-poles, compensating winding.

**Contemporary Issues related to Topic**

| Unit:3 | D.C. Motor | 7 Hours |
|---|---|---|

Principle, Torque Equation, Characteristics and applications of various types of D.C. Motors, Starting of D.C. Motors, Speed control of Series and Shunt motors, Power flow in DC machines, Losses and Efficiency in D.C. machines.

**Contemporary Issues related to Topic**

| Unit:4 | Single Phase Induction Motor | 8 Hours |
|---|---|---|

Production of rotating magnetic field, Double-field revolving theory of Induction motor, Types of single phase Induction motors, Comparison of single phase and three phase Induction motor, Application of single phase Induction Motor.

**Contemporary Issues related to Topic**

| Unit:5 | Three Phase Induction Motor | 7 Hours |
|---|---|---|

Construction , Production of rotating magnetic field, Principle of operation, Speed and Slip, frequency of rotor voltage and current, Relationship between rotor copper loss and rotor input, Developed torque, Torque of an Induction Motor, Condition for maximum torque, Torque-slip and torque-speed characteristics.

Equivalent circuit, No load and blocked rotor tests and determination of parameters of equivalent circuit, Losses and efficiency. Starting, Speed control, Crawling and Cogging, Application of three phase Induction Motor.

**Contemporary Issues related to Topic**

| Unit :6 | Special Machines | 8 Hrs |
|---|---|---|
| Double cage induction motor: principle, construction, torque slip characteristics. Induction Generator: principle, isolated operation, double fed induction generator, Applications.<br>Stepper Motors, Permanent Magnet Brushless DC Motor: Constructional features, Principle of Operation,Torque prediction, Types, Applications.<br>**Contemporary Issues related to Topic** | | |
| **Total Lecture Hours** | | **45 Hours** |

| **Text books** | |
|---|---|
| **1** | Dr. P. K. Mukherjee and S. Chakravarti,"Electrical Machines", Dhanpat Rai Publications (P) Ltd,2nd Edition -1993 |
| **2** | I.J.Nagrath and Dr. D.P.Kothari,"Electrical Machines", Tata McGraw Hill , 3rd Edition-2010 |
| **3** | Ashfaq Husain,"Electric Machines", Dhanpat Rai Publications (P) Ltd., 2nd Edition-2014 |
| **4** | K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008. |
| **5** | A.E.Fitzgerald, C.Kingsley, S.D.Umans, "Electrical Machinery", Tata McGraw Hill. Sixth Edition 2002. |

| **Reference Books** | |
|---|---|
| **1** | Alexander S. Langdorf,**"**D.C. Machines",: Mcgraw-hill Book Company, 1915. |
| **2** | Nasser Syed, "Electrical Machines and Transformers", A New York, Macmillon 1984. |
| **3** | R.Srinivasan, 'Special Electrical Machines', Lakshmi Publications, 2013. |
| **4** | P.S.Bhimbra, 'Generalised Theory of Electrical Machine' , Khanna Publishers, Edition 7th -2008. |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3 |
| **2** | http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9 |
| **3** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Electrical%20Machines/ |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | https://archive.nptel.ac.in/courses/108/105/108105155/ |

# III SEMESTER
# 23EL1306 : Lab. Electrical Machines

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to**<br>1. Analyze the performance of Transformers.<br>2. Illustrate proficiency in understanding the performance of D.C. Machines<br>3. Evaluate the performance of Induction Motors.<br>4. Explain working of Special Machines. |

**Minimum Eight Practical's to be performed from the list as below**

| Sr. No. | Experiments based on |
|---|---|
| 1 | To study phasing out and polarity marking of a 3-phase transformer |
| 2 | To study voltage and current relations in a 3-phase, Delta-Star connected transformer |
| 3 | To perform Open Circuit and Short Circuit test on a 3-phase transformer |
| 4 | To plot magnetization characteristic of a DC generator |
| 5 | To study speed control of a DC shunt motor by varying –<br>(a) field excitation and (b) armature voltage |
| 6 | To perform load test on a DC shunt motor |
| 7 | To study measurement of slip of a 3-phase induction motor by different methods |
| 8 | To study control of a 3-phase slip-ring induction motor by –<br>(a) variation of a rotor resistance and (b) varying supply voltage |
| 9 | To perform open circuit test and blocked rotor test on a 3-phase induction motor |
| 10 | To perform load test on a 3-phase induction motor by direct loading. |
| 11 | To perform No-Load and Blocked rotor tests on a 1-phase induction motor |
| 12 | To study Induction generator operation. |
| 13 | To measure inrush current of three phase,60 Hp induction motor |

# III SEMESTER
# 23EL1307 : Community Engagement Project

| **Course Outcomes:** |
|---|
| **Activities related to following topics will be undertaken under this lab:**<br>1. Calculation of electrical load of a particular site<br>2. Safety measures to be undertaken to avoid accidents at domestic level.<br>3. Safety measures to be undertaken to avoid accidents at commercial level.<br>**4.** Measures to undertake for saving of electricity bill. |

**Minimum Eight Practical's to be performed from the list as below**

| Sr. No. | Experiments based on |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |

# III SEMESTER
## Multidisciplinary Minor Courses

### Track 1

| Courses | Sem | MDMT1EL101 : Electric Vehicles |
|---|---|---|
| MDM-I | 3 | (MDM1EL101) Introduction to Electric Vehicles |
| MDM-II | 4 | (MDM2EL102) Energy storage devices |
| MDM-III | 5 | (MDM3EL103) Electric Machines |
| MDM-IV | 6 | (MDM4EL104) Power Electronics and Motor drives |
| MDM-V | 7 | (MDM5EL105) Drives and Autonomous Vehicle |
| MDM-VI | 8 | (MDM6EL106) Hybrid Electric Vehicle |

### Track 2

| Courses | Sem | MDMT2EL201 : Solar Engineering |
|---|---|---|
| MDM-I | 3 | (MDM1EL201) Introduction to Solar -Thermal Energy |
| MDM-II | 4 | (MDM2EL202) Semi-conductor material for Solar Photovoltaic cells |
| MDM-III | 5 | (MDM3EL203) Solar Power Plant Design |
| MDM-IV | 6 | (MDM4EL204) Solar rooftop:Design and Installation |
| MDM-V | 7 | (MDM5EL205) Technical and economic analysis of Solar PV |
| MDM-VI | 8 | (MDM6EL206) Applications of Solar Energy |

# III SEMESTER
# MDM1EL101: Introduction to Electric Vehicles

| Unit:1 | Electric Vehicle | 7 Hours |
|---|---|---|

Introduction:
History of EV, Components of Electric Vehicle, Comparison with Internal combustion Engine: Technology, Comparison with Internal combustion Engine: Benefits and Challenges, EV classification and their electrification levels.

| Unit:2 | Types of EV Chargers | 8 Hours |
|---|---|---|

Electric Vehicle Technology and Charging Equipment's, Basic charging Block Diagram of Charger, Difference between Slow charger and fast charger, Slow charger design rating, Fast charger design rating, AC charging and DC charging, Inboard and off board charger specification, Type of Mode of charger Mode -2 , Mode-3 and Mode-4, EVSE associated charge times calculation.

| Unit:3 | Selection and sizing of Common types of connectors and applications | 7 Hours |
|---|---|---|

Selection of AC charger type-1, type -2 and type -3, Communication between AC charger and EV, Selection of DC charger connector GB/T, CHAdeMO, CCS-1 and CSS-2, Communication methodology of DC fast chargers, IS/ IEC/ARAI/ standard of Charging topology, Communication and connectors (IEC 61851-1, IEC 61851-24,62196-2), Selection sizing of Charger connector cable.

| Unit:4 | Public Charging infrastructure / Electrical system design | 8 Hours |
|---|---|---|

Assessment of site Location for Public charging station, Selection and Sizing of – Distribution transformer, HT Equipment (VCB, CT, PT, Metering), HT Cables and LT cables, Distribution Board / feeders, LT and HT cable, Compact Substation (CSS for EV CS)/ Power Substation), relay and calculation, EV Charger Single Line Diagram

**30 Hours**

# III SEMESTER
# MDM1EL102: Introduction to Solar -Thermal Energy

| | |
|---|---|
| **Unit I: Flat plate collectors** | **(7 Hrs.)** |
| Radiative Properties and Characteristics of Materials, Performance analysis, Transmissivity of the cover system, Transmissivity-Absorptivity product, Overall loss co-efficient and heat transfer calculations | |
| **Unit II: Concentrating Collectors** | **(8 Hrs.)** |
| General characteristics, Thermal analysis of concentrating collectors, Solar Concentration Ratio (C), Cylindrical parabolic collector | |
| **Unit III: Thermal energy storage** | **(7 Hrs.)** |
| Introduction, Sensible heat storage, Latent heat storage, Thermochemical storage | |
| **Unit IV: Solar Pond** | **(8 Hrs.)** |
| Introduction to Solar Pond, Description , Applications | |
| | **30 Hours** |

| **Textbooks:** | |
|---|---|
| 1. | Solar photovoltaic: Fundamentals, Technologies and Applications by Chetan Singh Solanki, Published by PHI |

| **Reference Books:** | |
|---|---|
| 1. | B.H.Khan , " Non Conventional Energy Resources" , 3rd edition 2017, Mc Graw Hill Publication |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| 1. | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20System%20Engineering/Principles%20of%20Power%20Systems%20V.K%20Mehta.pdf |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| 1. | Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems [Intro Video]<br><br>http://103.152.199.179/YCCE/DTEL%20Material/3.Electrical%20Engineering/DTEL%20PPTs/IV%20SEMESTER/EL-2253%20EEGS/ |

## III SEMESTER

### Open Elective -I : Basket

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 3 | OE1 | GE | 23OE1301 | OE-I : Combinatorics |
| 2 | 3 | OE1 | GE | 23OE1302 | OE-I : Fuzzy Set Theory, Arithmetic And Logic |
| 3 | 3 | OE1 | GE | 23OE1303 | OE-I : Green Chem. & Sustainability |
| 4 | 3 | OE1 | GE | 23OE1304 | OE-I : Hydrogen Fuel |
| 5 | 3 | OE1 | GE | 23OE1305 | OE-I : Electronic Materials And Applications |
| 6 | 3 | OE1 | GE | 23OE1306 | OE-I : Laser Technology And Applications |
| 7 | 3 | OE1 | MGT | 23OE1307 | OE-I : Finance And Cost Management |
| 8 | 3 | OE1 | MGT | 23OE1308 | OE-I : Operation Research Techniques |
| 9 | 3 | OE1 | MGT | 23OE1309 | OE-I : Project Evaluation & Management |
| 10 | 3 | OE1 | MGT | 23OE1310 | OE-I : Total Quality Management |
| 11 | 3 | OE1 | MGT | 23OE1311 | OE-I : Value Engineering |
| 12 | 3 | OE1 | MGT | 23OE1312 | OE-I : Maintenance Management |
| 13 | 3 | OE1 | MGT | 23OE1313 | OE-I : Industrial Safety |
| 14 | 3 | OE1 | MGT | 23OE1314 | OE-I : Industry 4.0 |
| 15 | 3 | OE1 | MGT | 23OE1315 | OE-I : Operation Management |
| 16 | 3 | OE1 | MGT | 23OE1316 | OE-I : Material Management |
| 17 | 3 | OE1 | MGT | 23OE1317 | OE-I : Hospitality Management |
| 18 | 3 | OE1 | MGT | 23OE1318 | OE-I : Human Resource Management & Organizational Behaviour |
| 19 | 3 | OE1 | MGT | 23OE1319 | OE-I : Agri-Business Management |
| 20 | 3 | OE1 | MGT | 23OE1320 | OE-I : Rural Marketing |
| 21 | 3 | OE1 | MGT | 23OE1321 | OE-I : Marketing Management |
| 22 | 3 | OE1 | MGT | 23OE1322 | OE-I : Health Care Management |

**Link for Open Electives syllabus: https://ycce.edu/syllabus/**

## III SEMESTER
## Mandatory Learning Course (Audit Course)
## MLC2123 : YCAP3

Nagar Yuwak Shikshan Sanstha's

# Yeshwantrao Chavan College of Engineering

*(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)*

**(Accredited 'A++' Grade by NAAC with a score of 3.6)**

Hingna Road, Wanadongri, Nagpur - 441 110

# Bachelor of Technology

# SoE & Syllabus 2023

# 4th Semester

**(Department of Electrical Engineering)**

## B. Tech in Electrical Engineering

Nagar Yuwak Shikshan Sanstha's

**Yeshwantrao Chavan College of Engineering**

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

**B.TECH SCHEME OF EXAMINATION 2023**

(Scheme of Examination w.e.f. 2023-24 onward)

**(Department of Electrical Engineering)**

**B. Tech in Electrical Engineering**

SoE No. 23EL-101

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject | T/P | Contact Hours | | | | Credits | % Weightage | | | ESE Duration Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | L | T | P | Hrs | | MSEs* | TA** | ESE | |
| **FOURTH SEMESTER** | | | | | | | | | | | | | | | |
| 1 | 4 | HSSM-2 | GE | 23GE1401 | Entrepreneurship Development | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 2 | 4 | **AEC-2** | GE | 23GE1405<br>23GE1406 | Marathi Language<br>Hindi Language | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 3 | 4 | PC | EL | 23EL1401 | Electrical Measurement and Instrumentation | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 4 | 4 | PC | EL | 23EL1402 | **Lab :** Electrical Measurement and Instrumentation | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 5 | 4 | PC | EL | 23EL1403 | Electrical Machines in Power System | T | 3 | 0 | 0 | 3 | 3 | 30 | 20 | 50 | 3 |
| 6 | 4 | PC | EL | 23EL1404 | **Lab** : Electrical Machines in Power System | P | 0 | 0 | 2 | 2 | 1 | | 60 | 40 | |
| 7 | 4 | VSEC-3 | EL | 23EL1405 | **Lab :** Computer Programming | P | 0 | 0 | 2 | 4 | 2 | | 60 | 40 | |
| 8 | 4 | VEC-2 | EL | 23EL1406 | Digital Signal Processing | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 9 | 4 | MDM | EL | | **MD Minor Course-II** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| 10 | 4 | OE-2 | OE | | **Open Elective-II** | T | 2 | 0 | 0 | 2 | 2 | 30 | 20 | 50 | 3 |
| | | | | | **TOTAL** | | **16** | **0** | **6** | **24** | **20** | | | | |
| **List of Mandatory Learning Course (MLC)** | | | | | | | | | | | | | | | |
| 1 | 4 | HS | T&P | MLC2124 | **YCAP4 :** YCCE Communication Aptitude Preparation | **A** | 3 | 0 | 0 | 3 | **0** | | | | |

**Open Elective - II**

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 4 | OE2 | GE | 23OE2401 | OE-II : Combinatorics |
| 2 | 4 | OE2 | GE | 23OE2402 | OE-II : Fuzzy Set Theory, Arithmetic And Logic |
| 3 | 4 | OE2 | GE | 23OE2403 | OE-II : Green Chem. & Sustainability |
| 4 | 4 | OE2 | GE | 23OE2404 | OE-II : Hydrogen Fuel |
| 5 | 4 | OE2 | GE | 23OE2405 | OE-II : Electronic Materials And Applications |
| 6 | 4 | OE2 | GE | 23OE2406 | OE-II : Laser Technology And Applications |
| 7 | 4 | OE2 | MGT | 23OE2407 | OE-II : Finance And Cost Management |
| 8 | 4 | OE2 | MGT | 23OE2408 | OE-II : Operation Research Techniques |
| 9 | 4 | OE2 | MGT | 23OE2409 | OE-II : Project Evaluation & Management |
| 10 | 4 | OE2 | MGT | 23OE2410 | OE-II : Total Quality Management |
| 11 | 4 | OE2 | MGT | 23OE2411 | OE-II : Value Engineering |
| 12 | 4 | OE2 | MGT | 23OE2412 | OE-II : Maintenance Management |
| 13 | 4 | OE2 | MGT | 23OE2413 | OE-II : Industrial Safety |
| 14 | 4 | OE2 | MGT | 23OE2414 | OE-II : Industry 4.0 |
| 15 | 4 | OE2 | MGT | 23OE2415 | OE-II : Operation Management |
| 16 | 4 | OE2 | MGT | 23OE2416 | OE-II : Material Management |
| 17 | 4 | OE2 | MGT | 23OE2417 | OE-II : Hospitality Management |
| 18 | 4 | OE2 | MGT | 23OE2418 | OE-II : Human Resource Management & Organizational Behaviour |
| 19 | 4 | OE2 | MGT | 23OE2419 | OE-II : Agri-Business Management |
| 20 | 4 | OE2 | MGT | 23OE2420 | OE-II : Rural Marketing |
| 21 | 4 | OE2 | MGT | 23OE2421 | OE-II : Marketing Management |
| 22 | 4 | OE2 | MGT | 23OE2422 | OE-II : Health Care Management |
| 23 | 4 | OE2 | MGT | 23OE2423 | OE-II : Designated approved online NPTEL/KKSU Course |
| 24 | 4 | OE2 | MGT | 23OE2424 | OE-II : Indian Archeology |
| 25 | 4 | OE2 | MGT | 23OE2425 | OE-II : Social & Positive Psychology |
| 26 | 4 | OE2 | MGT | 23OE2426 | OE-II : Seismology & Earthquake |

| | | | | |
|---|---|---|---|---|
| | | July, 2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Date of Release | Version | |

## IV SEMESTER

## 23GE1401 : Entrepreneurship Development

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to**<br>1. Appreciate role of entrepreneurs in society and develop entrepreneurial abilities by providing information about skill sets.<br>2. Develop an understanding of how and what form of business organization to choose for start up.<br>3. Stimulate to innovate, develop prototypes or ideas by applying theory into practice.<br>4. Identify the Support rendered by various Government Agencies. |

| **Unit I:** | **7 Hrs.** |
|---|---|
| **Entrepreneur & Entrepreneurship:** Meaning of Entrepreneur, Evolution of the concept – Theories and Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation, Screening, Selection and Managing Resources. | |
| **Unit II:** | **8 Hrs.** |
| **Legal Compliances for Incorporating Start up:** Fundamentals of choosing the Business Organization form for startup, Incorporation of Partnership, LL.P & Co – operative, Incorporation of One Person Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal Compliances. | |
| **Unit III:** | **7 Hrs.** |
| **Entrepreneurship and IP Strategy:** Intellectual Property : Definition and Concept of Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship. | |
| **Unit IV:** | **8 Hrs.** |
| **Support to Entrepreneurs:** Financing new ventures, Business Incubators – Government Policy for Small Scale Enterprises, Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Subcontracting. | |
| **Total Lecture** | **30 Hours** |

## IV SEMESTER

## 23EL1401: Electrical Measurement & Instrumentation

**Course Outcomes:**

**Upon successful completion of the course the students will be able to**

1. Discuss the working principle of measuring instruments and circuit parameters
2. Explain the concepts of measurement of power and Energy.
3. Illustrate the fact and ideas related to instrument transformer.
4. Apply the knowledge of analog and digital instruments with transducers to measure physical quantities

| **Unit:1** | **Measuring Instruments** | **7 Hours** |
|---|---|---|

Electrical Measurement : Classification of Instruments , Deflection and null type instruments ,forces acting in Indicating instruments , Construction and working principle of PMMC and MI type instruments , Measurement of Resistance : Classification of Resistance, Wheatstone bridge , Kelvin's Double Bridge , Loss of charge method. Construction and working principle of Megger , Measurement of Earth Resistance.

**Contemporary Issues related to Topic**

| **Unit:2** | **Potentiometers and AC Bridges** | **8 Hours** |
|---|---|---|

D.C. Potentiometer: Basic Potentiometer circuit, Lab Type Potentiometer voltage ratio box. A.C. Potentiometer:- - Standardization of AC Potentiometer, Drysdale Polar potentiometer, Gall-Tinsley (Co-ordinate type) Potentiometer. AC Bridges: General equation of AC bridge balance, measurement of Inductance by Maxwell Inductance-capacitance Bridge, detectors used in AC Bridges, Measurement of Capacitance By High voltage Schering bridge , Measurement of Relative Permittivity by Schering bridge, Measurement of frequency By Wien'sBridge.

**Contemporary Issues related to Topic**

| **Unit:3** | **Measurement of Power and Energy** | **7 Hours** |
|---|---|---|

Wattmeter : Construction and operation of Electrodynamometer type wattmeter , LPF Wattmeter, Measurement of power using instrument transformer, Blondal's Theorem , Measurement of three phase power By single wattmeter, Two wattmeter , and Three wattmeter method , measurement of Reactive power for Balanced load using single wattmeter method. Energy Measurement : Induction type Energy meter (construction and operating principle)Errors and their compensation , Two element energy meter , maximum demand energy meter , phantom Loading (Merz – price). Power factor Meter : Three phase Electrodynamometer type power factor meter.

**Contemporary Issues related to Topic**

| Unit:4 | Instrument Transformers | 8 Hours |
|---|---|---|

Instrument Transformer : Use of instrument transformer , ratios in instrument transformer , burden , characteristics of CT , Effect of secondary open in CT. Potential transformer : Difference between CT and PT , Errors in PT , Reduction of errors in PT , characteristics of PT.

| Unit:5 | Analog Transducers | 7 Hours |
|---|---|---|

Transducers: Introduction, Types (Piezoelectric Transducer, Active , Passive transducers )
Transducers : Transducers required for the measurement of ( Non electrical quantities) Linea displacement
,(LVDT), Strain , (Strain gauge, Un bounded metal Strain gauge, semi conductor Strain gauge ),Pressure (Bourden Tube,Bellows, Pirani Gauge ),Torque , Linear velocity, Angular Velocity Temperature,(Thermocouples
,First and Second Law of Thermocouple, Thermistors , Bimetallic Thermocouples), Flow ( Electromagnetic Flov meter), Acceleration : LVDT Accelerometer. Digital Encoding transducers – Contacting or Brush type, Shat encoder.

**Contemporary Issues related to Topic**

| Unit :6 | Digital Instruments and Transducers | 8 Hours |
|---|---|---|

Digital Voltmeters, Digital Ammeters: Ramp type digital Voltmeter and Ammeter, Integrating type digital voltmeter and ammeter. Digital Frequency Meter: Basic circuit, Time base, start and stop Gate circuit for measurement of frequency. Electrical resonance type frequency meter, Weston frequency meter

**Contemporary Issues related to Topic**

| | |
|---|---|
| **Total Hours** | **45 Hours** |

| **Student activities:** | |
|---|---|
| 1. | Interview at least four entrepreneurs or businessman and identify Traits of successful entrepreneurs. |
| 2. | Analyse case studies of any two successful entrepreneurs. |
| 3. | Download product development and innovative films from internet. |
| 4. | Identify your hobbies and interests and convert them into business idea |

**Textbooks**


| | |
|---|---|
| **1.** | Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013. |
| **2.** | Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014. |
| **3.** | Corporate Law, 33rd ed. 2016, Taxman New Delhi. |
| **4.** | Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006) |
| **5.** | Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland |
| **6.** | Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013. |
| **7.** | Ramaiya's Guide to the Companies Act, 18th ed. 2014, Lexis Nexis New Delhi. |

| **Reference Books** | |
|---|---|
| **1.** | Mehta, Monica- The Entrepreneurial Instinct : How everyone has the innate ability to start a successful small business – McGraw – Hill Education, New Delhi 2012, ISBN 978-0-07-179742-9 |
| **2** | Prasanna Chandra "Protect Preparation, Appraisal, Implementation" Tata McGraw Hill. New Delhi |
| **3** | S Anil Kumar "Entrepreneurship Development" New Age International Publishers |
| **4** | Nishith Dubey "Entrepreneurship Development" PHI Learning |
| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
| **1** | http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0 |
| **2** | https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042 |
| **MOOCs Links and additional reading, learning, video material** | |
| **1** | https://onlinecourses.swayam2.ac.in/cec23_mg24/course- entrepreneurship development |
| **2** | https://onlinecourses.nptel.ac.in/noc23_mg74/announcements?force=true-entrepreneur |
| **3** | https://onlinecourses.nptel.ac.in/noc23_mg126/announcements?force=true- Business fundamentals for entrepreneurship |

## IV SEMESTER

## 23EL1402: Lab. Electrical Measurement & Instrumentation

| **Course Outcomes:** | |
|---|---|
| **Upon successful completion of the course the students will be able to** | |
| 1. | Discuss the working principle of measuring instruments and circuit parameters |
| 2. | Explain the concepts of measurement of power and Energy. |
| 3. | Illustrate the fact and ideas related to instrument transformer |
| 4. | Apply the knowledge of analog and digital instruments with transducers to measure physical quantities |

**Minimum Eight Practical's to be performed from the list as below**

| Sr. No. | Experiments based on |
|---|---|
| 1 | To find high resistance using loss of charge method |
| 2 | To determine low resistance using Kelvin's double bridge. |
| 3 | To compute medium resistance using Wheatstone bridge |
| 4 | To measure inductance using Anderson's bridge. |
| 5 | To evaluate three phase power using two wattmeter method |
| 6 | To calculate electrical energy using electromechanical energy meter |
| 7 | To measure capacitance using Schering Bridge |
| 8 | Testing of single phase induction type energy meter |
| 9 | To calculate reactive power in balanced three phase ac circuit using single wattmeter. |
| 10 | To explain working of Strain gauge |
| 11 | To estimate Torque using sensors. |
| 12 | To explain working of an instrumentation amplifier |
| 13 | To explain working of Cathode Ray Oscilloscope. |

## IV SEMESTER

## 23EL1403: Electrical Machines in Power System

**Course Outcomes:**

1. Analyze steady state performance of synchronous machines
2. Illustrate Synchronization, load sharing and effect of variable excitation in parallel operation of alternators.
3. Evaluate the performance of Synchronous machine connected to infinite bus.
4. Describe the transient behaviour of Synchronous Machine.

| **Unit:1** | **Armature Winding** | **7 Hours** |
|---|---|---|

Full pitch coil, short pitched coil, Coil span factor, concentrated winding, distributed winding, distribution factor, introduction to armature winding and field winding, MMF of armature winding, induced EMF with and without harmonics.

**Contemporary Issues related to Topic**

| **Unit:2** | **Steady State Operation of Three phase synchronous generators** | **8 Hours** |
|---|---|---|

Introduction, Constructional features of cylindrical and salient pole rotor machines,Effect of loading on terminal voltage, Armature reaction, Effect of load power factor on armature reaction, concept of synchronous reactance, Phasor diagram on load, regulation by Direct loading, Emf method, Load characteristics, External Characteristic, Zero power factor characteristics (ZPFC), construction of Potier triangle..

**Contemporary Issues related to Topic**

| **Unit:3** | **Parallel Operation of Synchronous Generators** | **7 Hours** |
|---|---|---|

Conditions of synchronization of generator with another generator and or Infinite busbars, Parallel operation, Loadsharing between parallel connected generators. Effect of variable excitation and power input (speed) on generator operation

**Contemporary Issues related to Topic**

| **Unit:4** | **Synchronous Motor** | **8 Hours** |
|---|---|---|

Principle of operation, Methods of starting, phasor diagram, expression for torque, Excitation Emf, load/torque angle, Effect of variable excitation and load on motor operation, V and inverted V curves, Concept of synchronous condenser, Introduction to Permanent Magnet Synchronous motor, Reluctance and Hysteresis motor.

**Contemporary Issues related to Topic**

| **Unit:5** | **Synchronous Machine Connected to Infinite Bus** | **7 Hours** |
|---|---|---|

Power Angle Characteristic of Synchronous machines with and without armature resistance. Expression forelectrical and electromechanical power developed, losses and efficiency in synchronous machines.

**Contemporary Issues related to Topic**

| Unit :6 | Transient Behaviour | 8 Hours |
|---|---|---|
| Short circuit ratio, unbalanced Loading, Sequence Component, Sudden 3-phase short circuit, Constant flux linkage theorem, Transient and sub–transient reactances, Time constants and equivalent circuit diagram, role of damper winding in both generator and motor operation. Experimental determination of steady state & transient parameters<br>**Contemporary Issues related to Topic** | | |
| **Total Lecture Hours** | | **45 Hours** |

| **Text books** | |
|---|---|
| **1** | Dr. P. K. Mukherjee and S. Chakravarti,"Electrical Machines", Dhanpat Rai Publications (P) Ltd ,Edition 2nd -1993 |
| **2** | I.J.Nagrath and Dr. D.P.Kothari, "Electrical Machines" , Tata McGraw Hill ,edition 3rd -2010. |

| **Reference Books** | |
|---|---|
| **1** | M.G. Say ,"Alternating Current Machines" ,Publishers ,Edition 1st -1983 |
| **2** | P.S.Bhimbra ,"Electrical Machinery", Khanna Publisers, Edition 7TH -2008. |
| **3** | A.E.Fitzgerald, C.Kingsley, S.D.Umens , "Electrical Machinery", Mc Graw Hill, Edition 1ST-1985 |
| **4** | Ashfaq Husain , "Electric Machines", Dhanpat Rai Publications (P) Ltd., 2nd -2008 |

| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
|---|---|
| **1** | http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3 |
| **2** | http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9 |
| **3** | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Electrical%20Machines/ |

| **MOOCs Links and additional reading, learning, video material** | |
|---|---|
| **1** | https://archive.nptel.ac.in/courses/108/105/108105131/ |

## IV SEMESTER

## 23EL1404 : Lab. Electrical Machines in Power System

| **Course Outcomes:** |
|---|
| 1. Analyze steady state performance of synchronous machines |
| 2. Illustrate Synchronization, load sharing and effect of variable excitation in parallel operation of alternators. |
| 3. Evaluate the performance of Synchronous machine connected to infinite bus. |
| 4. Describe the transient behaviour of Synchronous Machine. |

**Minimum Eight Practical's to be performed from the list as below**

| Sr. No. | Experiments based on |
|---|---|
| 1 | To determine voltage regulation of an alternator by direct loading |
| 2 | To determine voltage regulation of an alternator by synchronous impedance method. |
| 3 | To plot external characteristics of synchronous generator at different power factor loads |
| 4 | To perform slip test on a 3-phase synchronous machine. |
| 5 | To study synchronization of a 3-phase alternator with infinite bus-bars. |
| 6 | To determine sub-transient reactance of synchronous machine. |
| 7 | To determine negative sequence reactance of a 3-phase synchronous machine |
| 8 | To determine zero sequence reactance of a 3-phase synchronous machine. |
| 9 | To observe armature voltage and current waveforms of a 3-phase alternator during slip-test on C.R.O. |
| 10 | To plot V and inverted V curves of a 3-phase synchronous motor |

## IV SEMESTER

## 23EL1405 : Lab : Computer Programming

| **Course Outcomes:** |
|---|
| **Upon successful completion of the course the students will be able to** |
| 1. Explain various programming constructs of SCILAB |
| 2. Develop programs using SCILAB |
| 3. Analyse and plot the results using SCILAB |

**Minimum Eight Practical's to be performed from the list as below**

| Sr. No. | Experiments based on |
|---|---|
| 1 | To discuss functions and keywords of SCILAB |
| 2 | To demonstrate operations on matrices |
| 3 | To Construct a function and demonstrate how functions are called |
| 4 | To Solve linear differential equations |
| 5 | To Calculate the roots of quadratic equation using if else statement |
| 6 | To Construct a function that returns the mean and standard deviation of a vector of numbers |
| 7 | To Construct a function that reverses the order of letters in a string, and returns the new string |
| 8 | To Compute the power factor of the RL series circuit. Plot the voltage and current |
| 9 | To Create the vector 0:pi/20:2*pi and use it to sample the sin() function. Plot the results with labels |
| 10 | To Determine the mesh currents for the given circuit diagram |
| 11 | Determine the node voltages for the given circuit diagram |
| 12 | Observe the for loop construct in Vlabs |
| 13 | Observe the if else, if else if constructs in Vlabs |

## IV SEMESTER

### 23EL1406 : Digital Signal Processing

| **Course Outcomes:** |
|---|
| Upon successful completion of the course the students will be able to<br>1. Classify mathematical representation of signals and systems in various domains.<br>2. Determine and analyze signals in time and frequency domain using Fourier series and Fourier transform.<br>3. Evaluate and analyze signals using Z-transform.<br>4. Analyze and design digital filter |

| **Unit:1** | **Continuous and Discrete time signals** | **7 Hours** |
|---|---|---|
| Continuous and discrete Signal representation, classification of signals, Signal Energy and Power, Periodic, Even & Odd, Real and Exponential Signals<br>Discrete Signal properties: Linearity, causality, stability, static/dynamic. Time invariance/Time variance Convolution | | |
| **Unit:2** | **Fourier Series Representation of Periodic Signals** | **8 Hours** |
| Fourier Series Representation of Continuous-Time Periodic Signals. Convergence of the Fourier Series. Properties of Continuous-Time Fourier Series.<br>Fourier Series Representation of Discrete-Time Periodic Signals. Properties of Discrete-Time Fourier Series. | | |
| **Unit:3** | **Fourier Transform and Z-Transform** | **7 Hours** |
| Fourier Transform - Convergence of Fourier Transform and its Properties, Representation of Aperiodic Signals, The Fourier Transform for Periodic Signals.<br><br>Z-Transform - The Region of Convergence for the z-Transform. The Inverse z-Transform. Geometric Evaluation of the Fourier Transform from the Pole-Zero Plot. Properties of the z-Transform. Block Diagram Representations. The Unilateral z-Transform. | | |
| **Unit:4** | **Introduction to Digital Signal Processing** | **8 Hours** |
| Sampling theorem, Basic Digital Filtering, FIR, and IIR Filter Designs | | |
| | **Total Lectures** | **30 Hours** |

| Text books | |
|---|---|
| 1 | Signals and Systems 2nd Edition, 2013,Alan V. Oppenheim, Alan S. Willsky, with S. Hamid |

| Reference Books | |
|---|---|
| 1 | Signals & Systems,2nd Edition., 2005 Simon Haykin and Van Veen Wiley |
| 2 | Signals, Systems and Transforms 3rd Edition, 2004 C. L. Philips, J.M.Parr and Eve A.Riskin Pearson education |
| 3 | Schaum's Outlines of Signals and Systems 3rd Edition, 2002 Hwei P. Hsu McGraw Hill |
| 4 | Linear Systems and Signals 2nd Edition B.P. Lathi Oxford University Press |

| YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS] | |
|---|---|
| 1 | http://link.springer.com/openurl?genre=book&isbn=978-1-4614-5331-4 |
| 2 | http://link.springer.com/openurl?genre=book&isbn=978-3-540-92953-6 |

| MOOCs Links and additional reading, learning, video material | |
|---|---|
| 1 | nptel video lect/ https://youtu.be/xrVWB9VYZ64 by Prof. Aditya K. Jagannatham |
| 2 | nptel video lect/ https://youtu.be/7Z3LE5uM-6Y by Prof. K.S. Venktesh |

# IV SEMESTER
## Multidisciplinary Minor Courses

### Track 1

| Courses | Sem | MDMT1EL101 : Electric Vehicles |
|---|---|---|
| MDM-I | 3 | (MDM1EL101) Introduction to Electric Vehicles |
| MDM-II | 4 | (MDM2EL102) Energy storage devices |
| MDM-III | 5 | (MDM3EL103) Electric Machines |
| MDM-IV | 6 | (MDM4EL104) Power Electronics and Motor drives |
| MDM-V | 7 | (MDM5EL105) Drives and Autonomous Vehicle |
| MDM-VI | 8 | (MDM6EL106) Hybrid Electric Vehicle |

### Track 2

| Courses | Sem | MDMT2EL201 : Solar Engineering |
|---|---|---|
| MDM-I | 3 | (MDM1EL201) Introduction to Solar -Thermal Energy |
| MDM-II | 4 | (MDM2EL202) Semi-conductor material for Solar Photovoltaic cells |
| MDM-III | 5 | (MDM3EL203) Solar Power Plant Design |
| MDM-IV | 6 | (MDM4EL204) Solar rooftop:Design and Installation |
| MDM-V | 7 | (MDM5EL205) Technical and economic analysis of Solar PV |
| MDM-VI | 8 | (MDM6EL206) Applications of Solar Energy |

## IV SEMESTER
## Track1 : MDMT1EL101 : Electric Vehicles
## MDM2EL102: Energy Storage Devices

**Course Outcomes:**

Upon successful completion of the course the students will be able to

1. To understand the fundamentals of advanced batteries, their sizing, and applications of super-capacitors.
2. To understand the aspects of battery hybridization, and fuel reforms.
3. To understand the various battery recycling, testing procedures, and verification of battery performances.
4. To understand the battery management systems, thermal management systems, and aspects of battery safety.

| | | |
|---|---|---|
| **Unit:1** | **BATTERIES** | **7 Hours** |
| Advanced Lithium-iron (Li-ion) battery, Nickel-metal hybrid battery, Advanced Nickel-metal hydride battery (Ni-MH) batteries for transportation, Advanced lead-acid batteries, applications of batteries for use of High-temperature, load leveling, large-scale grid operation, and space. | | |
| **Unit:2** | **Battery hybridization and its application** | **8 Hours** |
| Hybridization and the applications of Battery and Supercapacitor, Battery and Fuel-Cell, Battery and Solar-Cell, Battery and Wind Turbine | | |
| **Unit:3** | **Battery Recycling Technologies, Battery Chargers, and Battery Testing Procedures** | **7 Hours** |
| Technology and economic aspects of battery recycling, its applications, Constant current and constant voltage methods, Hybrid methods, Inductive chargers, Battery testing. | | |
| **Unit:4** | **Battery Management Systems (BMS)** | **8 Hours** |
| Fundamentals of battery management systems and controls, passive and active cooling, regulations and safety aspects of high voltage batteries using codes and standards, Safe handling of lithium batteries, the safety of high voltage devices. | | |
| | | **30 Hours** |

**Text Books:**

| Sr. No. | Title | Author Details | Publication Details |
|---|---|---|---|
| 1 | Battery Technology Handbook | A. Kiehne | Marcel Dekker, NYC, 2003 |
| 3 | Handbook of Batteries, 3rd Edition | D. Linden and T. S. Reddy | McGraw-Hill, 2002 |
| 4 | Maintenance-Free Batteries | D. Berndt | John Wiley & Sons, NY, 1997 |

**References:**

| Sr. No. | Title | Author Details | Publication Details |
|---|---|---|---|
| 1 | Electric Vehicle Technology Explained | James Larminie and John Lowry | John Wiley, NY, 2003 |

**Online Resources**

| Sr. No. | Link |
|---|---|
| 1 | https://archive.nptel.ac.in/courses/113/105/113105102/ |

# IV SEMESTER

## Track2 : MDMT2EL201 : Solar Engineering

## MDM2EL202: Semi-conductor material for Solar Photovoltaic cells

| **Unit I: Fundamentals of semi-conductor** | **(7 Hrs.)** |
|---|---|
| Semi-conductors as solar cell material, arrangements of atoms in space, Bohr model of Hydrogen atom<br><br>Metal, insulator and semiconductor, direct and indirect band gap, charge carriers in semiconductors, carrier motion in semiconductors | |
| **Unit II: An introduction to solar cell** | **(7 Hrs.)** |
| P-N junction-equilibrium condition, P-N junction in non-equilibrium condition, P-N junction under illumination, generation of photo voltage, light generated current, I-V equation of solar cell, solar cell characteristics. | |
| **Unit III: Design of solar cell** | **(8 Hrs.)** |
| Upper Limits of cell parameter: short circuit current, open circuit voltage, fill factor, efficiency<br>Losses in solar cell | |
| **Unit IV: Solar cell technologies** | **(7 Hrs.)** |
| Production of Si, Si wafers, Si sheets, Si uses in solar PV, Use of Anti-reflective coating , introduction to bifacial solar cell. | |
| **Total Lecture** | **30 Hours** |

| | |
|---|---|
| **Textbooks:** | |
| 1. | C.S.Solanki, Solar Photovoltaics - Fundamentals, Technologies and Applications, 2nd edition 2013, PHI Publication |
| **Reference Books:** | |
| 1. | B.H.Khan , " Non Conventional Energy Resources" , 3rd edition 2017, Mc Graw Hill Publication |
| **YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]** | |
| 1 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Power%20System%20Engineering/Principles%20of%20Power%20Systems%20V.K%20Mehta.pdf |
| 2 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/B.H.Khan%20Book%20RES.pdf |
| 3 | http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Electrical%20Engineering/Renewable%20Energy%20Sources/Solar%20Energy%20pdf.pdf |
| **MOOCs Links and additional reading, learning, video material** | |
| 1 | Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems [Intro Video] |
| 2 | http://103.152.199.179/YCCE/DTEL%20Material/3.Electrical%20Engineering/DTEL%20PPTs/IV%20SEMESTER/EL-2253%20EEGS/ |

# IV SEMESTER

## Open Elective -II : Basket

| SN | Sem | Type | BoS/ Deptt | Sub. Code | Subject |
|---|---|---|---|---|---|
| 1 | 4 | OE2 | GE | 23OE2401 | OE-II : Combinatorics |
| 2 | 4 | OE2 | GE | 23OE2402 | OE-II : Fuzzy Set Theory, Arithmetic And Logic |
| 3 | 4 | OE2 | GE | 23OE2403 | OE-II : Green Chem. & Sustainability |
| 4 | 4 | OE2 | GE | 23OE2404 | OE-II : Hydrogen Fuel |
| 5 | 4 | OE2 | GE | 23OE2405 | OE-II : Electronic Materials And Applications |
| 6 | 4 | OE2 | GE | 23OE2406 | OE-II : Laser Technology And Applications |
| 7 | 4 | OE2 | MGT | 23OE2407 | OE-II : Finance And Cost Management |
| 8 | 4 | OE2 | MGT | 23OE2408 | OE-II : Operation Research Techniques |
| 9 | 4 | OE2 | MGT | 23OE2409 | OE-II : Project Evaluation & Management |
| 10 | 4 | OE2 | MGT | 23OE2410 | OE-II : Total Quality Management |
| 11 | 4 | OE2 | MGT | 23OE2411 | OE-II : Value Engineering |
| 12 | 4 | OE2 | MGT | 23OE2412 | OE-II : Maintenance Management |
| 13 | 4 | OE2 | MGT | 23OE2413 | OE-II : Industrial Safety |
| 14 | 4 | OE2 | MGT | 23OE2414 | OE-II : Industry 4.0 |
| 15 | 4 | OE2 | MGT | 23OE2415 | OE-II : Operation Management |
| 16 | 4 | OE2 | MGT | 23OE2416 | OE-II : Material Management |
| 17 | 4 | OE2 | MGT | 23OE2417 | OE-II : Hospitality Management |
| 18 | 4 | OE2 | MGT | 23OE2418 | OE-II : Human Resource Management & Organizational Behaviour |
| 19 | 4 | OE2 | MGT | 23OE2419 | OE-II : Agri-Business Management |
| 20 | 4 | OE2 | MGT | 23OE2420 | OE-II : Rural Marketing |
| 21 | 4 | OE2 | MGT | 23OE2421 | OE-II : Marketing Management |
| 22 | 4 | OE2 | MGT | 23OE2422 | OE-II : Health Care Management |

**Link for Open Electives syllabus: https://ycce.edu/syllabus/**

# IV SEMESTER
## Mandatory Learning Course (Audit Course)
## MLC2124 : YCAP4

| | | | | | |
|---|---|---|---|---|---|
| | | | July,2023 | 1.00 | Applicable for AY 2023-24 Onwards |
| Chairperson | Dean (Acad. Matters) | Dean OBE | Date of Release | Version | |