# Basaveshwar Engineering College (Autonomous), Bagalkot

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### Scheme of Teaching and Evaluation for B.E Electrical and Electronics Engineering

**Academic Year 2021-22**

**(Students taking admission to B.E in E&EE in 2021-2022)**

**Total Credits for B.E., 160**

## Breakdown of Credits as per NEP 2020

| Sl. | Course Category | Proposed by | | |
|---|---|---|---|---|
| | | AICTE | VTU | BEC(A) |
| 1. | **HSMC:** HSS, Management courses | 12 | 10 | 12 |
| 2. | **BSC:** Basic Science Courses (Physics, Chemistry and Mathematics) | 25 | 23 | 23 |
| 3. | **ESC:** Engineering Science Courses (Basic elect/ electronics/ computer/ mechanics/ workshop/ drawing etc.) | 24 | 20 | 20 |
| 4. | **PCC:** Professional Core Courses (Fundamental subjects of individual disciplines) | 48 | 43 | 48 |
| 5. | **PEC:** Professional Elective Courses relevant to chosen branch/specialization | 18 | 14 | 12 |
| 6. | **OEC:** Open Electives Courses/ Subjects from other technical/ arts/ commerce/ NCC/ NSS & AEC: Ability Enhancement Courses | 18 | 14 | 6+12 =18 |
| 7. | Mini and Major projects/ seminar/ summer internships and Research/ Industrial Internships | 15 | 32 | 25 |
| 8. | Mandatory Non-credit Courses (EV, Kan, UHV, Constitution, induction) | No Credits | 04 | 02 |
| **Total** | | **160** | **160** | **160** |

| Sem | BSC | BEC | HSSM | AEC | PCC | PEC | OEC | Proj. | INT | Sem inar | UHV-2 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | 7 | 10 | 2 | 1 | | | | | | | | 20 |
| II | 7 | 10 | 2 | 1 | | | | | | | | 20 |
| III | 3 | | 2 | 1 (ss-I) | 12 | | | | 2 | | 2 | 22 |
| IV | 3 | | 2 | 1 (ss-II)+1 | 15 | | | | | | | 22 |
| V | 3 | | 1 | 1 (ss-III) | 12 | | 3 | | 2 | | | 22 |
| VI | | | 3 | 2 (RM&IPR) | 9 | 3 | 3 | 2 | | | | 22 |
| VII | | | | 1 | | 9 | | 8 | | | | 18 |
| VIII | | | | 3 (MOOCS) | | | | | 10 | 01 | | 14 |
| Tot. | 23 | 20 | 12 | 12 | 48 | 12 | 06 | 10 | 14 | 01 | 02 | 160* |

**First Year B.E in E&EE:**

**Semester-1 (Physics Group) CAY 2021-22 (160 Credits 2021-22 admitted batch)**

| Sl. | Cat. | Subject Code | Subject Title | Cr. | Hours/Week | | | Examination Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1 | BSC | 21UMA101C | Engineering Mathematics - I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2 | BSC | 21UPH102C | Engineering Physics | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3 | ESC | 21UCS103C | Principles of Programming with C | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4 | ESC | 21UEC104C | Basic Electronics Engineering | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 5 | ESC | 21UEE105C | Basic Electrical Engineering | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 6 | HSSM | 21UHS106C | Communicative English | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| 7 | AEC | 21UNS107C | Scientific Foundation of Health | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 8 | BSC | 21UPH108L | Engineering Physics Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 9 | ESC | 21UCS109L | Programming practice using C | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| | | | Total | 20 | 17 | 2 | 4 | 450 | 450 | 900 |

**Semester-1 (Chemistry Group) CAY 2021-22 (160 Credits 2021-22 admitted batch)**

| Sl. | Cat. | Subject Code | Subject Title | Cr. | Hours/Week | | | Examination Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1 | BSC | 21UMA101C | Engineering Mathematics – I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2 | BSC | 21UCH110C | Engineering Physics | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3 | ESC | 21UCV111C | Principles of Programming with C | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4 | ESC | 21UME112C | Basic Electronics Engineering | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 5 | ESC | 21UME113L | Basic Electrical Engineering | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 6 | HSSM | 21UHS106C | Communicative English | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| 7 | AEC | 21UHS115C | Scientific Foundation of Health | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 8 | BSC | 21UCH114L | Engineering Physics Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| | | | Total | 20 | 16 | 2 | 6 | 400 | 400 | 800 |

**Semester-2 (Physics Group) CAY 2021-22 (160 Credits 2021-22 admitted batch)**

| Sl. | Cat. | Subject Code | Subject Title | Cr. | Hours/Week | | | Examination Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1 | BSC | 21UMA201C | Engineering Mathematics - I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2 | BSC | 21UPH202C | Engineering Physics | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3 | ESC | 21UCS203C | Principles of Programming with C | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4 | ESC | 21UEC204C | Basic Electronics Engineering | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 5 | ESC | 21UEE205C | Basic Electrical Engineering | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 6 | HSSM | 21UHS206C | Communicative English | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| 7 | AEC | 21UNS207C | Scientific Foundation of Health | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 8 | BSC | 21UPH208L | Engineering Physics Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 9 | ESC | 21UCS209L | Programming practice using C | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| | | | Total | 20 | 17 | 2 | 4 | 450 | 450 | 900 |

**Semester-2 (Chemistry Group) CAY 2021-22 (160 Credits 2021-22 admitted batch)**

| Sl. | Cat. | Subject Code | Subject Title | Cr. | Hours/Week | | | Examination Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1 | BSC | 21UMA201C | Engineering Mathematics - I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2 | BSC | 21UCH210C | Engineering Physics | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3 | ESC | 21UCV211C | Principles of Programming with C | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4 | ESC | 21UME212C | Basic Electronics Engineering | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 5 | ESC | 21UME213L | Basic Electrical Engineering | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 6 | HSSM | 21UHS206C | Communicative English | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| 7 | AEC | 21UHS215C | Scientific Foundation of Health | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 8 | BSC | 21UCH214L | Engineering Physics Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| | | | Total | 20 | 16 | 2 | 6 | 400 | 400 | 800 |

**Second Year B.E in E&EE:**

**Semester-3** **CAY 2022-23 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | BSC | | Mathematics –III* | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 2. | PCC | | Network Analysis | 3 | 2 | 0 | 2 | 50 | 50 | 100 |
| 3. | PCC | | Electronic Circuits | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4. | PCC | | Electrical Machines – I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5. | PCC | | Measurement Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 6. | PCC | | Electronic Circuits Lab | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 7. | PCC | | Electrical Machines – I Lab | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 8. | INT | | Summer Internship – I | 2 | | | | 50 | 50 | 100 |
| 9. | AEC | | Soft Skill – I | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 10. | UHV | | UHV – 2 | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| 11. | HSSM | | SK/BK or CI | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| **Total** | | | | **22** | | | | **550** | **550** | **1100** |

**Semester-3** **CAY 2022-23 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | BSC | | Mathematics – IV* | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 2. | PCC | | Power Systems – I [T D & SG] | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3. | PCC | | Power Electronics | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4. | PCC | | Electrical Machines – II | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5. | PCC | | Control Systems | 3 | 2 | 0 | 2 | 50 | 50 | 100 |
| 6. | PCC | | Power System – I Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 7. | PCC | | Power Electronics Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 8. | PCC | | Electrical Machines – II Lab | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 9. | AEC | | Agri-Tech | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 10. | AEC | | Soft Skill - II | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 11. | HSSM | | SK/BK or CI | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| | | | **Total** | **22** | | | | **550** | **550** | **1100** |

**Third Year B.E in E&EE:**

**Semester-5** **CAY 2023-24 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | BSC | | Mathematics – V* | 3 | 2 | 2 | 0 | 50 | 50 | 100 |
| 2. | PCC | | Power System - II | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3. | PCC | | Logic Design | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4. | PCC | | Digital Signal Processing | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5. | OEC | | Open Elective Course – I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 6. | PCC | | Logic Design Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 7. | PCC | | Digital Signal Processing Lab | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 8. | PCC | | Auto CAD Electrical Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 9. | INT | | Summer Internship - II | 2 | | | | 50 | 50 | 100 |
| 10. | HSSM | | Environmental Studies | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| 11. | AEC | | Soft Skills - III | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| | | | **Total** | **22** | | | | **550** | **550** | **1100** |

| List of Open Elective Subjects – I | | |
|---|---|---|
| **Sl.** | **Subject Code** | **Subject Title** |
| 1. | | MATLAB for Engineers |
| 2. | | Renewable Energy Resources |
| 3. | | Electric Vehicle |

**Semester-5** **CAY 2023-24 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | HSSM | | HRM | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2. | PCC | | Power System – III | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3. | PCC | | Embedded Systems | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 4. | PEC | | Professional Elective Course – I | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5. | OEC | | Open Elective Course – II | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 6. | PCC | | Power System – II Lab | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 7. | PCC | | Embedded Systems Laboratory | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 8. | PCC | | Advanced Programming Lab | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 9. | AEC | | Research Methodology & IPR | 2 | 2 | 0 | 0 | 50 | 50 | 100 |
| 10 | Proj | | Mini Project | 2 | 0 | 0 | 4 | 50 | 50 | 100 |
| | | | **Total** | **22** | | | | **500** | **500** | **1000** |

| List of Professional Elective Subjects – I (Sem-VI) | | | List of Open Elective Subjects – II (Sem-VI) | |
|---|---|---|---|---|
| **Sl.** | **Subject Code** | **Subject Title** | **Subject Code** | **Subject Title** |
| 1. | | Electrical Machine Design | | Energy Conservation in Industrial System |
| 2. | | Electrical Engineering Materials | | Electrical Safety for Engineers |
| 3. | | Testing and Commissioning of Electrical Equipment | | Energy Storage Systems |
| 4. | | Micro Electro Mechanical Systems | | |
| 5. | | Advanced Power Electronics | | |
| 6. | | Reactive Power management | | |
| 7. | | SPV based Irrigation Systems | | |

**Fourth Year B.E in E&EE:**

**Semester-7** **CAY 2024-25 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | PEC | | Professional Elective Course-II | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2. | PEC | | Professional Elective Course-III | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3. | OEC | | Professional Elective Course-IV | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5. | Proj | | Project Work | 8 | 0 | 0 | 16 | 50 | 50 | 100 |
| 6. | AEC | | Professional Communication | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| | | | **Total** | **18** | | | | **300** | **300** | **600** |

**Semester-8** **CAY 2024-25 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | AEC | | MOOCs* | 3 | 3 | 0 | 0 | | | |
| 2. | Seminar | | Technical Seminar | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 3. | INT | | Research/Industrial Internship | 10 | | | | 100 | -- | 100 |
| | | | **Total** | **14** | | | | **150** | **50** | **200** |

**OR**

**Semester-7** **CAY 2024-25 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | AEC | | MOOCs* | 3 | 3 | 0 | 0 | | | |
| 2. | Seminar | | Technical Seminar | 1 | 0 | 0 | 2 | 50 | 50 | 100 |
| 3. | INT | | Research/Industrial Internship | 10 | | | | 100 | -- | 100 |
| | | | **Total** | **14** | | | | **150** | **50** | **200** |

**Semester-8** **CAY 2024-25 (160 Credits 2021-22 admitted batch)**

| Sl. | Category | Subject Code | Subject Title | Cr. | Hours/ Week | | | Exam Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | L | T | P | CIE | SEE | Total |
| 1. | PEC | | Professional Elective Course-II | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 2. | PEC | | Professional Elective Course-III | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 3. | OEC | | Professional Elective Course-IV | 3 | 3 | 0 | 0 | 50 | 50 | 100 |
| 5. | Proj | | Project Work | 8 | 0 | 0 | 16 | 50 | 50 | 100 |
| 6. | AEC | | Professional Communication | 1 | 1 | 0 | 0 | 50 | 50 | 100 |
| | | | **Total** | **18** | | | | **300** | **300** | **600** |

| List of Professional Elective Subjects – II (Sem-VII) | | |
|---|---|---|
| **Sl.** | **Subject Code** | **Subject Title** |
| 1. | | Standards and Indian Electricity Act |
| 2. | | Automotive Electronics |
| 3. | | Advances in Instrumentation |
| 4. | | Power System Operation and Control |
| 5. | | Energy Conservation, Audit and DSM |
| 6. | | Flexible AC Transmission Systems |
| 7. | | HVDC Transmission |

| List of Professional Elective Subjects – III (Sem-VII) | | |
|---|---|---|
| **Sl.** | **Subject Code** | **Subject Title** |
| 1. | | Electrical Safety in Industrial Plants |
| 2. | | AI Applications to Power Systems |
| 3. | | Internet of Things |
| 4. | | Electric Vehicles |
| 5. | | Solar Photovoltaic System Design |
| 6. | | Operation Research |
| 7. | | Energy conservation in Industrial Systems |

| List of Professional Elective Subjects – IV (Sem-VII) | | |
|---|---|---|
| **Sl.** | **Subject Code** | **Subject Title** |
| 1. | | Modern Control Theory |
| 2. | | Battery Management Systems |
| 3. | | Data Base management Systems |
| 4. | | Energy Efficient Motors |
| 5. | | Electrical Power Utilization and Drives |
| 6. | | Fundamentals of Wind Energy Conversion Systems |
| 7. | | Smartgrids and Microgrids |

**Awards at the different levels of study**

| Sl. | Minimum Credits to be earned | End of Year | Award |
|---|---|---|---|
| 1 | 36 | First | Certificate |
| 2 | 78 | Second | Diploma |
| 3 | 120 | Third | Bachelor of Science (Engineering) |
| 4 | 160 | Fourth | Bachelor of Engineering (B.E) |
| 5 | 178 [160 + 18 (online)] | Fourth | Bachelor of Engineering (B.E honors) |
| 6 | 178 [160 + 18* (blended)] | Fourth | Bachelor of Engineering (B.E ) with major and minor streams |

- A student has to earn a minimum of 36 credits for award of Certificate at the end of first year.
- A student has to earn a minimum of 78 credits for award of Diploma at the end of second year.
- A student has to earn a minimum of 120 credits for award of Bachelor of Science (Engineering) at the end of third year.
- A student has to earn a minimum of 160 credits for award of Bachelor of Engineering (B.E) at the end of fourth year.
- A student has to earn a minimum of 178 [160 + 18 (online)] credits for award of Bachelor of Engineering (B.E honors) at the end of fourth year.
- A student has to earn a minimum of 178 [160 + 18* (blended)] credits for award of Bachelor of Engineering (B.E) with major and minor streams at the end of fourth year.