

**AUTONOMOUS**

#### (Approved by A.I.C.T.E & Permanently Affiliated to JNTU, Kakinada)

Accredited by NAAC with “A”Grade

on NH 16, Telaprolu, Krishna Dist – 521109

**B.TECH**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**COURSE STRUCTURE**

**UR20**

# (Applicable for the batches admitted from the Academic Year 2020-21)

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

### COURSE STRUCTURE

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**(Applicable for batches admitted from 2020-2021)**

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| **I SEMESTER ( I Year - I Semester)** |
| **S.No.** | **Course****Category** | **Course****Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | ESC | UR20ES101 | Problem Solving and Programming using C | 3 | 0 | 0 | 3 | 3 |
| 2 | BSC | UR20BS102 | Applied Physics | 3 | 0 | 0 | 3 | 3 |
| 3 | ESC | UR20ES103 | Basic Electrical Engineering | 3 | 0 | 0 | 3 | 3 |
| 4 | BSC | UR20BS104 | Linear Algebra & Calculus | 3 | 0 | 0 | 3 | 3 |
| 5 | ESC | UR20ES114 | Electronic Workshop  | 1 | 0 | 4 | 5 | 3 |
| 6 | ESC | UR20ES111 | Problem Solving and Programming using C Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | BSC | UR20BS112 | Applied Physics Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | ESC | UR20ES113 | Basic Electrical Engineering Lab | 0 | 0 | 3 | 3 | 1.5 |
| **Total**  | **13** | **0** | **13** | **26** | **19.5** |
| **\*Breakup of credits for Engineering Graphics/Engineering Workshop shall be 1-0-4 (as per AICTE model curriculum)** |

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| **II SEMESTER( I Year - II Semester)** |
| **S.No.** | **Course Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact Hrs./Wk** | **C** |
| 1 | ESC | UR20ES201 | Python Programming | 3 | 0 | 0 | 3 | 3 |
| 2 | BSC | UR20BS202 | Engineering Chemistry | 3 | 0 | 0 | 3 | 3 |
| 3 | HSC | UR20HS203 | Communicative English | 3 | 0 | 0 | 3 | 3 |
| 4 | BSC | UR20BS204 | Differential Equations & Vector Calculus | 3 | 0 | 0 | 3 | 3 |
| 5 | ESC | UR20ES205 | Engineering Graphics & Drafting | 1 | 0 | 4 | 5 | 3 |
| 6 | ESC | UR20ES211 | Python Programming Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | BSC | UR20BS212 | Engineering Chemistry Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | HSC | UR20HS213 | Communicative English Lab | 0 | 0 | 3 | 3 | 1.5 |
| **Mandatory Courses** |
| 9 | MC | UR20MC200 | Science, Technology & Society | 0 | 0 | 0 | 2 | 0 |
| 10 | MC | UR20MC201 | Social Service Activity -INCC/NSS/Social Service Club | 0 | 0 | 0 | 0 | 0 |
| **Total**  | **15** | **0** | **13** | **28** | **19.5** |

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| **III SEMESTER( II Year - I Semester)** |
| **S.No.** | **Course Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact Hrs./Wk** | **C** |
| 1 | BSC | UR20BS301 | Numerical Methods and Transforms | 3 | 0 | 0 | 3 | 3 |
| 2 | ESC | UR20ES302 | Network Analysis | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR20PCEC303 | Electronic Devices and Circuits  | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR20PCEC304 | Switching Theory and Logic Design | 3 | 0 | 0 | 3 | 3 |
| 5 | PCC | UR20PCEC305 | Signals and Systems | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR20PCEC306 | Random Variables and Stochastic Processes | 3 | 0 | 0 | 3 | 3 |
| 7 | PCC | UR20PCEC311 | Electronic Devices and Circuits Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | SOC | UR20SOEC312 |  Java Programming  | 1 | 0 | 2 | 3 | 2 |
| **Total**  | **19** | **0** | **5** | **24** | **21.5** |
| **Mandatory Course** |
| 9 | MC | UR20MC300C | Environmental Science | 0 | 0 | 0 | 3 | 0 |
| 10 | MC | UR20MC300B | Social Service Activity -IINCC/NSS/Social Service Club | 0 | 0 | 0 | 0 | 0 |

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| **IV SEMESTER ( II Year - II Semester)** |
| **S.No.** | **Course****Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | ESC | UR20ES401B | Linear control Systems | 3 | 0 | 0 | 3 | 3 |
| 2 | HSC | UR20HS402C | Management Science | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR20PCEC403 | Electronic Circuit Analysis | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR20PCEC404 | Digital IC Design | 3 | 0 | 0 | 3 | 3 |
| 5 | PCC | UR20PCEC405 | Analog Communications | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR20PCEC411 | Electronic Circuit Analysis Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | PCC | UR20PCEC412 | Digital IC Design Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PCC | UR20PCEC413 | Analog Communications Lab | 0 | 0 | 3 | 3 | 1.5 |
| 9 | SOC | UR20SOEC414 | Soft Skills | 0 | 0 | 4 | 4 | 2 |
| 10 | PROJ | UR20PREC415 | Community service Project | 0 | 0 | 0 | 0 | 4 |
|  **Total**  | **15** | **0** | **13** | **28** | **25.5** |
| **Minor Course (The hours distribution can be 3-0-2 or 3-1-0 also)** | **3** | **1** | **0** | **4** | **4** |
| **Internship 2 Months (Mandatory) during summer vacation** |

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| **V SEMESTER( III Year - I Semester)** |
| **S.No.** | **Course****Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | PCC | UR20PCEC501 | Linear Integrated Circuits and Applications | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR20PCEC502 | Electromagnetic Waves and Transmission Lines | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR20PCEC503 | Digital Communications | 3 | 0 | 0 | 3 | 3 |
| 4 | PEC | **Professional Elective (PE1)** | 3 | 3 |
| UR20PEEC504A | Antenna and Wave Propagation | 3 | 0 | 0 |
| UR20PEEC504B | Electronic Measurements and Instrumentation | 3 | 0 | 0 |
| UR20PEEC504C | Computer Architecture & Organization | 3 | 0 | 0 |
| 5 | OEC | --- | **Open Elective Course/****Job oriented elective-1** | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR20PCEC511 | Linear ICs and Applications Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | PCC | UR20PCEC512 | Digital Communications Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PROJ  | UR20PREC513 | Summer Internship | 0 | 0 | 0 | 0 | 1.5 |
| 9 | SOC | UR20SOEC514 | Data Structures using Java Lab | 0 | 0 | 4 | 4 | 2 |
|  **Total**  | **15** | **0** | **10** | **25** | **21.5** |
| **Mandatory Course** |
| 10 | MC | UR20MC500A | Essence of Indian Traditional Knowledge | 0 | 0 | 0 | 2 | 0 |
| **Minor Course (The hours distribution can be 3-0-2 or 3-1-0 also)** | **3** | **1** | **0** | **4** | **4** |

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| **VI SEMESTER ( III Year - II Semester)** |
| **S.No.** | **Course****Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | PCC | UR20PCEC601 | Microprocessor and Microcontrollers | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR20PCEC602 | VLSI Design | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR20PCEC603 | Digital Signal Processing | 3 | 0 | 0 | 3 | 3 |
| 4 | PEC | **Professional Elective (PE2)** | 3 | 0 | 0 | 3 | 3 |
| UR20PEEC604A | Microwave Engineering |
| UR20PEEC604B | Internet of Things |
| UR20PEEC604C | Soft Computing Techniques |
| 5 | OEC | --- | **Open Elective Course/****Job oriented elective -2** | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR20PCEC611 | Microprocessor and Microcontrollers - Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | PCC | UR20PCEC612 | VLSI Design Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PCC | UR20PCEC613 | Digital Signal Processing Lab | 0 | 0 | 3 | 3 | 1.5 |
| 9 | SOC | UR20SOEC614 | ARM based/Aurdino based Programming/IoT | 1 | 0 | 2 | 3 | 2 |
|  **Total**  | **16** | **0** | **11** | **27** | **21.5** |
| **Mandatory Course** |
| 10 | MC | UR20MC600C | Constitution of India | 0 | 0 | 0 | 2 | 0 |
| **Minor Course (The hours distribution can be 3-0-2 or 3-1-0 also)** | **3** | **1** | **0** | **4** | **4** |
| **Industrial/Research Internship (Mandatory) 2 Months during summer vacation** |

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| **VII SEMESTER ( IV Year - I Semester)** |
| **S.No.** | **Course****Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | PEC | **Professional Elective (PE3)** | 3 | 0 | 0 | 3 | 3 |
| UR20PEEC701A | Optical Communication |
| UR20PEEC701B | Digital Image Processing |
| UR20PEEC701C | Low Power VLSI Design |
| 2 | PEC | **Professional Elective (PE4)** | 3 | 0 | 0 | 3 | 3 |
| UR20PEEC702A | Satellite Communications |
| UR20PEEC702B | Embedded Systems |
| UR20PEEC702C | Digital IC Design using CMOS |
| 3 | PEC | **Professional Elective (PE5)** | 3 | 0 | 0 | 3 | 3 |
| UR20PEEC703A | Radar Engineering |
| UR20PEEC703B | Pattern Recognition & Machine Learning |
| UR20PEEC703C | Mobile & Cellular Communication |
| 4 | OEC | --- | **Open Elective Course/****Job oriented elective -3** | 3 | 0 | 0 | 3 | 3 |
| 5 | OEC | --- | **Open Elective Course/****Job oriented elective -4** | 3 | 0 | 0 | 3 | 3 |
| 6 | HSC | UR20HS706 | Universal Human Values-II: Understanding Harmony | 3 | 0 | 0 | 3 | 3 |
| 7 | SOC | UR20SOEC711 | Designer Tools | 1 | 0 | 2 | 3 | 2 |
| 8 | PROJ | UR20PREC712 | Industrial / Research Internship | 0 | 0 | 0 | 0 | 3 |
|  **Total**  | **19** | **0** | **2** | **21** | **23** |
| **Mandatory Course** |
| **9** | MC | UR20MC700B | Research Methodology & IPR | 0 | 0 | 0 | 2 | 0 |
| **Minor Course (The hours distribution can be 3-0-2 or 3-1-0 also** | **3** | **1** | **0** | **4** | **4** |

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| **VIII SEMESTER ( IV Year - II Semester)** |
| **S.No.** | **Course****Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | PROJ | UR20PREC801 | Project work, Seminar and internship in industry | **-** |  | **-** | **-** | 8 |
| **INTERNSHIP (6 MONTHS)** |
| **Total**  | **8** |

**Note:**

**i) For MOOC Courses:** Based on the student’s interest, student can register and complete a 12 week course one year advance, by prior information to the concern.

**ii) For courses with L-T-P-C:3-0-2-4/2-0-2-3**, the distribution shall be 30 marks for internal evaluation (15 marks for day–to–day work & lab internal exam and 15 marks for mid exam from theory part) and 70 marks for semester end examination. There shall be two mid exams in a semester for 15 marks each and final marks can be calculated with 80% weightage for better of the two mids and 20% weightage for other mid and these are to be added to the marks obtained in day-to-day work & lab internal exam.

**List of Open Electives Offered by the Institute**

**I. Open electives offered by CE Department for other branches**

**(Except for CE branch)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No** | **Course Category** | **Course Code** | **Course Name** | **L** | **T** | **P** | **Contact Hrs./wk** | **C** |
| **Open Elective-I** |
| 1 | OEC | UR20OECE50A | Remote Sensing and GIS | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECE50B | Environmental Pollution Control | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECE50C | Conservation of Water Resources | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-II** |
| 1 | OEC | UR20OECE60A | Environmental Engineering | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECE60B | Disaster Management | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECE60C | Green Technologies | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-III** |
| 1 | OEC | UR20OECE70A | Safety Engineering | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECE70B | Water Resources Engineering | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECE70C | Elements of Civil Engineering | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-IV** |
| 1 | OEC | UR20OECE70A | Air Pollution Control Engineering | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECE70B | Urban Planning | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECE70C | Environmental Impact Assessment | 3 | 0 | 0 | 3 | 3 |

**II. Open electives offered by CSE Department for other branches**

**(Except for CSE branch)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No** | **Course Category** | **Course Code** | **Course Name** | **L** | **T** | **P** | **Contact Hrs./wk** | **C** |
| **Open Elective-I** |
| 1 | OEC | UR20OECS505A | Data Structures | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECS505B | Object Oriented Programming through JAVA | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECS505C | Data Base Management Systems | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OECS505D | Computer Graphics | 3 | 0 | 0 | 3 | 3 |
| 5 | OEC | UR20OECS505E | Advanced UNIX Programming | 3 | 0 | 0 | 3 | 3 |
| 6 | OEC | UR20OECS505F | Computer Organization and Architecture | 3 | 0 | 0 | 3 | 3 |
| 7 | OEC | UR20OECS505G | Operating Systems | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-II** |
| 1 | OEC | UR20OECS605A | Python Programming | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECS605B | Web Technologies | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECS605C | Soft Computing | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OECS605D | Distributed Computing | 3 | 0 | 0 | 3 | 3 |
| 5 | OEC | UR20OECS605E | AI and ML for Robotics | 3 | 0 | 0 | 3 | 3 |
| 6 | OEC | UR20OECS605F | Computer Networks | 3 | 0 | 0 | 3 | 3 |
| 7 | OEC | UR20OECS605G | Big Data Analytics | 3 | 0 | 0 | 3 | 3 |
| 8 | OEC | UR20OECS605H | Computational Tools | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-III** |
| 1 | OEC | UR20OECS704A | AI Tools & Techniques | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECS704B | Image Processing | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECS704C | Information Security | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OECS704D | Mobile Application Development | 3 | 0 | 0 | 3 | 3 |
| 5 | OEC | UR20OECS704E | Data Science | 3 | 0 | 0 | 3 | 3 |
| 6 | OEC | UR20OECS704F | Cyber Security | 3 | 0 | 0 | 3 | 3 |
| 7 | OEC | UR20OECS704G | Introduction to Internet of Things | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-IV** |
| 1 | OEC | UR20OECS705A | MEAN Stack Technologies | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OECS705B | Deep Learning Techniques | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OECS705C | Cloud computing with AWS | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OECS705D | Block Chain Technologies | 3 | 0 | 0 | 3 | 3 |
| 5 | OEC | UR20OECS705E | Cryptography & Network Security | 3 | 0 | 0 | 3 | 3 |
| 6 | OEC | UR20OECS705F | Introduction to Machine Learning | 3 | 0 | 0 | 3 | 3 |
| 7 | OEC | UR20OECS705G | Machine Learning with Python | 3 | 0 | 0 | 3 | 3 |

**III. Open electives offered by ECE Department for other branches**

**(Except for ECE branch)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No** | **Course Category** | **Course Code** | **Course Name** | **L** | **T** | **P** | **Contact Hrs./wk** | **C** |
| **Open Elective-I** |
| 1 | OEC | UR20OEEC505A | Basic Electronics | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEC505B | Basics of Signals and systems | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEC505C | Digital logic design | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OEEC505D | Consumer Electronics | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-II** |
| 1 | OEC | UR20OEEC605A | Electronic measurements and instrumentation | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEC605B | Principles of communications | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEC605C | Industrial Electronics | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OEEC605D | Fundamentals of Microprocessors and Microcontrollers | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-III** |
| 1 | OEC | UR20OEEC704A | IC Applications | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEC704B | Transducers and Sensors | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEC704C | Data Communications | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OEEC704D | Bio Medical Instrumentation | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-IV** |
| 1 | OEC | UR20OEEC705A | IOT and applications | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEC705B | Remote Sensing and GIS | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEC705C | Soft computing Techniques | 3 | 0 | 0 | 3 | 3 |
| 4 | OEC | UR20OEEC705D | Principles of Signal Processing | 3 | 0 | 0 | 3 | 3 |

**IV. Open electives offered by EEE Department for other branches (Except for EEE branch)**

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| **S. No** | **Course Category** | **Course Code** | **Course Name** | **L** | **T** | **P** | **Contact Hrs./wk** | **C** |
| **Open Elective-I** |
| 1 | OEC | UR20OEEE505A | Renewable Energy Sources | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEE505B | Concepts of Optimization Techniques | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEE505C | Concepts of Control Systems | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-II** |
| 1 | OEC | UR20OEEE605A | Battery Management Systems and Charging Stations | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEE605B | Fundamentals of utilization of Electrical Energy | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEE605C | Indian Electricity Act | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-III** |
| 1 | OEC | UR20OEEE704A | Concepts of Microprocessors and Microcontrollers | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEE704B | Fundamentals of Electric Vehicles | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEEE704C | Concepts of Internet of Things | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-IV** |
| 1 | OEC | UR20OEEE705A | Concepts of Power System Engineering | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEEE705B | Concepts of Smart Grid Technologies | 3 | 0 | 0 | 3 | 3 |

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| **S. No** | **Course Category** | **Course Code** | **Course Name** | **L** | **T** | **P** | **Contact Hrs./wk** | **C** |
| **Open Elective-I** |
| 1 | OEC | UR20OEIT505A | Full Stack Technologies | 2 | 0 | 2 | 4 | 3 |
| 2 | OEC | UR20OEIT505B | R-Programming | 2 | 0 | 2 | 4 | 3 |
| 3 | OEC | UR20OEIT505C | Scripting Languages | 2 | 0 | 2 | 4 | 3 |
| **Open Elective-II** |
| 1 | OEC | UR20OEIT605A | Basics of AWS Framework | 2 | 0 | 2 | 4 | 3 |
| 2 | OEC | UR20OEIT605B | Mobile Application Development | 2 | 0 | 2 | 4 | 3 |
| 3 | OEC | UR20OEIT605C | NoSQL Databases | 2 | 0 | 2 | 4 | 3 |
| **Open Elective-III** |
| 1 | OEC | UR20OEIT704A | Advanced python Programming | 2 | 0 | 2 | 4 | 3 |
| 2 | OEC | UR20OEIT704B | Deep Learning | 2 | 0 | 2 | 4 | 3 |
| 3 | OEC | UR20OEIT704C | Web Technologies | 2 | 0 | 2 | 4 | 3 |
| **Open Elective-IV** |
| 1 | OEC | UR20OEIT705A | Network Programming | 2 | 0 | 2 | 4 | 3 |
| 2 | OEC | UR20OEIT705B | Big Data Technologies | 2 | 0 | 2 | 4 | 3 |
| 3 | OEC | UR20OEIT705C | Data Science | 2 | 0 | 2 | 4 | 3 |

**V. Open electives offered by IT Department for other branches**

**(Except for IT branch)**

**VI. Open electives offered by ME Department for other branches**

**(Except for ME branch)**

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| **S. No** | **Course Category** | **Course Code** | **Course Name** | **L** | **T** | **P** | **Contact Hrs./wk** | **C** |
| **Open Elective-I** |
| 1 | OEC | UR20OEME505A |  Robotics | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEME505B | Fundamentals of Hybrid Vehicles | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEME505C | Industrial Safety And Environment | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-II** |
| 1 | OEC | UR20OEME605A | Fundamentals of Operations Research | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEME605B | Finite Element Analysis  | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEME605C | Principles of Nano Technology | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-III** |
| 1 | OEC | UR20OEME704A | Sustainable energy Technologies | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEME704B | Optimization Techniques | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEME704C | Advanced materials | 3 | 0 | 0 | 3 | 3 |
| **Open Elective-IV** |
| 1 | OEC | UR20OEME705A | Fundamentals of Mechatronics | 3 | 0 | 0 | 3 | 3 |
| 2 | OEC | UR20OEME705B | Industrial Engineering & Quality Control | 3 | 0 | 0 | 3 | 3 |
| 3 | OEC | UR20OEME705C | Rapid prototyping | 3 | 0 | 0 | 3 | 3 |

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| **List of subjects offered by ECE for Minor Degree** |
| **S.No.** | **Course****Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact****Hrs./Wk** | **C** |
| 1 | MD | UR20MDEC01 | Principles of Electronic Devices and Circuits | 3 | 1 | 0 | 4 | 4 |
| 2 | MD | UR20MDEC02 | Principles of Digital Electronics | 3 | 1 | 0 | 4 | 4 |
| 3 | MD | UR20MDEC03 | Principles of Communication | 3 | 1 | 0 | 4 | 4 |
| 4 | MD | UR20MDEC04 | Fundamentals of Signal and systems. | 3 | 1 | 0 | 4 | 4 |
| 5 | MD | --- | MOOC/NPTEL Course-1 | - | - | - | - | 2 |
| 6 | MD | --- | MOOC/NPTEL Course-2 | - | - | - | - | 2 |
|  **Total**  | **12** | **4** | **0** | **16** | **20** |
| **MOOC/NPTEL Courses for 04 credits (02 courses@ 2 credits each) are compulsory in the domain of Electronics and Communication Engineering** |

**CATEGORY AND CREDITS**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Course Category** | **Definitions** | **Suggested Breakup of Credits** |
| **1** | **BSC** | **Basic Science Courses** | **18** |
| **2** | **ESC** | **Engineering Science Courses** | **25.5** |
| **3** | **HMC** | **Humanities and social sciences including Management Courses** | **10.5** |
| **4** | **PCC** | **Professional Core Courses** | **52.5** |
| **5** | **PEC** | **Professional Elective Courses** | **15** |
| **6** | **OEC** | **Open Elective Courses** | **12** |
| **7** | **MC** | **Mandatory Courses** | **0** |
| **8** | **PROJ** | **Internship, Seminar,****Project Work** | **16.5** |
| **9** | **SOC** | **Skill Oriented Courses** | **10** |
| **Total Credits** | **160** |