

**(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**

# (Applicable for the batches admitted from the Academic Year 2019-20)

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

### COURSE STRUCTURE

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**(Applicable for batches admitted from 2019-2020)**

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| **I SEMESTER** | | | | | | | | |
| **S.No** | **Course**  **Category** | **Course**  **Code** | **Course Title** | **L** | **T** | **P** | **Contact**  **Hrs./Wk** | **C** |
| 1 | HMC | UR19HM101 | Communicative English | 2 | 0 | 0 | 2 | 2 |
| 2 | BSC | UR19BSC101 | Linear Algebra &  Calculus | 3 | 1 | 0 | 4 | 4 |
| 3 | BSC | UR19BSC108 | Applied Physics | 3 | 0 | 0 | 3 | 3 |
| 4 | ESC | UR19ESC104 | Basic Electrical  Engineering | 3 | 0 | 0 | 3 | 3 |
| 5 | ESC | UR19ESC108 | Engineering Graphics and Drafting | 1 | 0 | 3 | 4 | 2.5 |
| 6 | HMC | UR19HML101 | Communicative English  Lab | 0 | 0 | 2 | 2 | 1 |
| 7 | BSC | UR19BSCL102 | Applied Physics Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | ESC | UR19ESCL101 | Engineering Workshop &  IT Workshop | 0 | 0 | 3 | 3 | 1.5 |
| **Mandatory Course** | | | | | | | | |
| 9 | MC | UR19MC102 | Applied Physics-Virtual  Lab\* | 0 | 0 | 0 | 2 | 0 |
| **Total** | | | | **12** | **1** | **11** | **26** | **18.5** |
| **\*Internal Evaluation** | | | | | | | | |

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| **II SEMESTER** | | | | | | | | |
| **S.No** | **Course Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact Hrs./Wk** | **C** |
| 1 | HMC | UR19HM202 | Professional English | 2 | 0 | 0 | 2 | 2 |
| 2 | BSC | UR19BSC203 | Numerical Methods & Transforms | 3 | 0 | 0 | 3 | 3 |
| 3 | BSC | UR19BSC205 | Differential Equations &  Vector Calculus | 3 | 0 | 0 | 3 | 3 |
| 4 | BSC | UR19BSC210 | Applied Chemistry | 3 | 0 | 0 | 3 | 3 |
| 5 | ESC | UR19ESC203 | Network Analysis | 3 | 0 | 0 | 3 | 3 |
| 6 | ESC | UR19ESC210 | Problem Solving and  Programming using C | 3 | 0 | 0 | 3 | 3 |
| 7 | HMC | UR19HML202 | Professional English Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | BSC | UR19BSCL203 | Engineering and Applied  Chemistry Lab | 0 | 0 | 3 | 3 | 1.5 |
| 9 | ESC | UR19ESCL202 | Problem Solving and  Programming using C Lab | 0 | 0 | 3 | 3 | 1.5 |
| **Mandatory Courses** | | | | | | | | |
| 10 | MC | UR19MC200 | Engineering Exploration Project\* | 0 | 0 | 0 | 1 | 0 |
| 11 | MC | UR19MC203 | Constitution of India\* | 0 | 0 | 0 | 2 | 0 |
| **Total** | | | | **17** | **0** | **9** | **29** | **21.5** |
| **\*Internal Evaluation** | | | | | | | | |

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| **III SEMESTER** | | | | | | | | |
| **S.No** | **Course Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact Hrs./Wk** | **C** |
| 1 | PCC | UR19PCEC301 | Electronics Devices and  Circuits | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCEC302 | Switching Theory and Logic Design | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR19PCEC303 | Signals and Systems | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR19PCEC304 | Random Variables and Stochastic Process | 3 | 0 | 0 | 3 | 3 |
| 5 | ESC | UR19ESEC301 | Object Oriented Design  and Programming using Java | 3 | 0 | 0 | 3 | 3 |
| 6 | HMC | UR19HM301 | Managerial Economics &  Financial Analysis | 3 | 0 | 0 | 3 | 3 |
| 7 | PCC | UR19PCECL301 | Electronics Devices and  Circuits - Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PCC | UR19PCECL302 | Switching Theory and Logic Design -Lab | 0 | 0 | 2 | 2 | 1 |
| **Mandatory Course** | | | | | | | | |
| 9 | MC | UR19MC301 | Environmental studies\* | 0 | 0 | 0 | 3 | 0 |
| **Total** | | | | **18** | **0** | **5** | **26** | **20.5** |
| **\*Internal Evaluation** | | | | | | | | |

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| **IV SEMESTER** | | | | | | | | |
| **S.No** | **Course**  **Category** | **Course**  **Code** | **Course Title** | **L** | **T** | **P** | **Contact**  **Hrs./Wk** | **C** |
| 1 | PCC | UR19PCEC401 | Analog Circuits | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCEC402 | Analog Communications | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR19PCEC403 | Control Systems | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR19PCEC404 | Electromagnetic Waves and Transmission Lines | 3 | 0 | 0 | 3 | 3 |
| 5 | ESC | UR19ESEC401 | Computer Architecture  and Organization | 3 | 0 | 0 | 3 | 3 |
| 6 | HMC | UR19HM402 | Management and  Organizational Behavior | 3 | 0 | 0 | 3 | 3 |
| 7 | PCC | UR19PCECL401 | Analog Circuits – Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PCC | UR19PCECL402 | Analog Communications  - Lab | 0 | 0 | 3 | 3 | 1.5 |
| **Mandatory Courses** | | | | | | | | |
| 9 | PROJ | UR19MPROJEC401 | Socially relevant Mini Project-I\* | 0 | 0 | 0 | 2 | 0 |
| **Total** | | | | **18** | **0** | **6** | **26** | **21** |
| **Self-learning Course**\*:MOOCS | | | | | | | | |
| **\*Internal Evaluation** | | | | | | | | |

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| **V SEMESTER** | | | | | | | | |
| **S.No** | **Course**  **Category** | **Course**  **Code** | **Course Title** | **L** | **T** | **P** | **Contact**  **Hrs./Wk** | **C** |
| 1 | PCC | UR19PCEC501 | Integrated Circuits and  applications | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCEC502 | Microprocessor and  Microcontrollers | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR19PCEC503 | Digital Communications | 3 | 0 | 0 | 3 | 3 |
| 4 | PCC | UR19PCEC504 | Antennas and Wave  Propagation | 3 | 0 | 0 | 3 | 3 |
| **Professional Elective (PE1)** | | | | | | | | |
| 5 | PEC | UR19PEEC501 | Information Theory &  Coding | 3 | 0 | 0 | 3 | 3 |
| UR19PEEC502 | Data structures and Algorithms |
| UR19PEEC503 | Embedded Systems |
| UR19PEEC504 | Neural Networks and Fuzzy Logic Control |
| UR19PEEC505 | Electronic Measurements and  Instrumentation |
| 6 | PCC | UR19PCECL501 | Integrated Circuits and  applications - Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | PCC | UR19PCECL502 | Microprocessor and  Microcontrollers Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PCC | UR19PCECL503 | Digital Communications Lab | 0 | 0 | 3 | 3 | 1.5 |
| **Mandatory Course** | | | | | | | | |
| 9 | MC | UR19MCEC501 | Professional Ethics and Human Values**\*** | 0 | 0 | 0 | 0 | 0 |
| **Total** | | | | **15** | **0** | **9** | **24** | **19.5** |
| Employability Skills- I\* | | | | | | | 2 | 0 |
| **Self-learning Course**\* | | | | | | |  |  |
| **\*Internal Evaluation** | | | | | | | | |

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| **VI SEMESTER** | | | | | | | | |
| **S.No** | **Course Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact Hrs./Wk** | **C** |
| 1 | PCC | UR19PCEC601 | Internet of Things | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCEC602 | VLSI Design | 3 | 0 | 0 | 3 | 3 |
| 3 | PCC | UR19PCEC603 | Digital Signal Processing | 3 | 0 | 0 | 3 | 3 |
| **Professional Elective (PE2)** | | | | | | | | |
| 4 | PEC | UR19PEEC601 | Cellular & Mobile  Communications | 3 | 0 | 0 | 3 | 3 |
| UR19PEEC602 | Global Position System (GPS) |
| UR19PEEC603 | Electromagnetic Interference  & Compatibility (EMI/EMC) |
| UR19PEEC604 | Biomedical Signal processing |
| UR19PEEC605 | MIMO Systems |
| 5 | OEC | --- | **Open Elective –I (OE1)** | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR19PCECL601 | Internet of Things Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | PCC | UR19PCECL602 | VLSI Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PCC | UR19PCECL603 | Digital Signal Processing Lab | 0 | 0 | 3 | 3 | 1.5 |
| **Mandatory Courses** | | | | | | | | |
| 9 | MC | UR19MCEC601 | IPR and Patents\* | 0 | 0 | 0 | 3 | 0 |
| 10 | PROJ | UR19MPROJEC601 | Socially relevant Mini Project-II\* | 0 | 0 | 0 | 2 | 0 |
| **Total** | | | | **15** | **0** | **9** | **29** | **19.5** |
| Employability Skills- II\* | | | | | | | 2 | 0 |
| **\*Internal Evaluation** | | | | | | | | |

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| **VII SEMESTER** | | | | | | | | |
| **S.No** | **Course**  **Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact**  **Hrs./Wk** | **C** |
| 1 | PCC | UR19PCEC701 | Microwave and Optical  communications | 3 | 0 | 0 | 3 | 3 |
| 2 | PCC | UR19PCEC702 | Data Communications & Computer networks | 3 | 0 | 0 | 3 | 3 |
| **Professional Elective (PE3)** | | | | | | | | |
| 3 | PEC | UR19PEEC701 | Telecommunication  Switching Systems | 3 | 0 | 0 | 3 | 3 |
| UR19PEEC702 | Digital IC Design |
| UR19PEEC703 | ASIC and FPGA Design |
| UR19PEEC704 | Digital Imaging and Video Processing |
| UR19PEEC705 | Embedded Real Time Operating Systems |
| **Professional Elective (PE4)** | | | | | | | | |
| 4 | PEC | UR19PEEC706 | Radar Engineering | 3 | 0 | 0 | 3 | 3 |
| UR19PEEC707 | Low power VLSI Design |
| UR19PEEC708 | DSP processors and Architectures |
| UR19PEEC709 | Simulation & Mathematical Modeling |
| UR19PEEC710 | Software Defined Radio |
| 5 | OEC | --- | **Open Elective-II (OE2)** | 3 | 0 | 0 | 3 | 3 |
| 6 | PCC | UR19PCECL701 | Microwave and Optical  communications Lab | 0 | 0 | 3 | 3 | 1.5 |
| 7 | PCC | UR19PCECL702 | Data Communications &  Computer networks Lab | 0 | 0 | 3 | 3 | 1.5 |
| 8 | PROJ | UR19PROJEC701 | Project Phase-I | 0 | 0 | 3 | 3 | 1.5 |
| 9 | PROJ | UR19PROJEC702 | Summer internship | 0 | 0 | 0 | 0 | 2 |
| **Total** | | | | **15** | **0** | **9** | **24** | **21.5** |

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| **VIII SEMESTER** | | | | | | | | |
| **S.No** | **Course Category** | **Course Code** | **Course Title** | **L** | **T** | **P** | **Contact Hrs./Wk** | **C** |
| 1 | PCC | UR19PCEC801 | Wireless Networks | 3 | 0 | 0 | 3 | 3 |
| **Professional Elective (PE5)** | | | | | | | | |
| 2 | PEC | UR19PEEC801 | Satellite Communications | 3 | 0 | 0 | 3 | 3 |
| UR19PEEC802 | VLSI Testing & Testability |
| UR19PEEC803 | Machine Learning &  Artificial Intelligence |
| UR19PEEC804 | Computer Vision |
| UR19PEEC805 | Network Security & Cryptography |
| 3 | OEC | --- | **Open Elective-III (OE3)** | 3 | 0 | 0 | 3 | 3 |
| 4 | PROJ | UR19PROJEC801 | Project Phase-II | 0 | 0 | 18 | 18 | 9 |
| **Total** | | | | **9** | **0** | **18** | **27** | **18** |

**Total Credits = 18.5+21.5+21+21+20+19+21+18 = 160**

# COURSE CATEGORY AND CREDITS

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| --- | --- | --- | --- |
| **S.No** | **Course Category** | **Definitions** | **Suggested Breakup of credits** |
| **1** | **BSC** | **Basic Science Courses** | **19** |
| **2** | **ESC** | **Engineering Science Courses** | **20.5** |
| **3** | **HMC** | **Humanities and social sciences including Management Courses** | **12.5** |
| **4** | **PCC** | **Professional Core Courses** | **71.5** |
| **5** | **PEC** | **Professional Elective Courses** | **15** |
| **6** | **OEC** | **Open Elective Courses** | **9** |
| **7** | **MC** | **Mandatory Courses** | **0** |
| **8** | **PROJ** | **Project** | **12.5** |
| **Total Credits** | | | **160** |

**List of Open Electives**

**Open Electives offered by the Dept. of CE**

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| **S.No.** | **Course Code** | **Open Elective-I** |
| 1. | UR19OECE 601 | Introduction To GIS |
| 2. | UR19OECE 602 | Environmental Pollution Control |
| 3. | UR19OECE603 | Conservation of Water Resources |
|  | **Course Code** | **Open Elective-II** |
| 4. | UR19 OECE 701 | Metro Systems and Engineering |
| 5. | UR19 OECE 702 | Natural Disaster Mitigation and Management |
| 6. | UR19OECE 703 | Total Quality Management |
|  | **Course Code** | **Open Elective-III** |
| 7. | UR19 OECE 801 | Sanitary and Public Health Engineering |
| 8. | UR19 OECE 802 | Environmental and Industrial Hygiene |
| 9. | UR19OECE803 | Green Buildings |

**Open Electives offered by the Dept. of EEE**

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| **S.No.** | **Course Code** | **Open Elective-I** |
| 1. | UR19-OEEE601 | Neural Networks and Fuzzy Logic |
| 2. | UR19-OEEE602 | Linear Control Systems |
| 3. | UR19-OEEE603 | Electrical Safety Management |
|  | **Course Code** | **Open Elective – II** |
| 4. | UR19-OEEE701 | Programmable Logic Controllers |
| 5. | UR19-OEEE702 | Energy Audit and Conservation Management |
| 6. | UR19-OEEE703 | Electrical Technology |
|  | **Course Code** | **Open Elective – III** |
| 7. | UR19-OEEE801 | Non Conventional Energy Sources |
| 8. | UR19-OEEE802 | Industrial Electrical Operation |
| 9. | UR19-OEEE803 | Hybrid Electric Vehicles |

**Open Electives offered by the Dept. of ME**

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| **S.No.** | **Course Code** | **Open Elective-I** |
| 1. | UR19-OEME601 | Principles of Nano Technology |
| 2. | UR19-OEME602 | Robotics |
| 3. | UR19-OEME603 | Power Plant Technology |
|  | **Course Code** | **Open Elective-II** |
| 4. | UR19-OEME701 | Operations Research |
| 5. | UR19-OEME702 | Industrial Engineering & Quality control |
| 6. | UR19-OEME703 | Advanced materials |
|  | **Course Code** | **Open Elective-III** |
| 7. | UR19-OEME801 | Optimization Techniques |
| 8. | UR19-OEME802 | Green Engineering systems |
| 9. | UR19-OEME803 | Mechatronics |

**Open Electives offered by the Dept. of ECE**

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| **S.No.** | **Course Code** | **Open Elective-I** |
| 1 | UR19OEEC 601 | Consumer Electronics |
| 2 | UR19OEEC 602 | Digital Electronics |
| 3 | UR19OEEC 603 | Analog and Digital I.C. Applications |
|  | **Course Code** | **Open Elective-II** |
| 4 | UR19OEEC 701 | Embedded Systems |
| 5 | UR19OEEC 702 | Internet of Things (IoT) |
| 6 | UR19OEEC 703 | Principles of Computer Communications and Networks |
|  | **Course Code** | **Open Elective-III** |
| 7 | UR19OEEC 801 | Microcontrollers |
| 8 | UR19OEEC 802 | Principles of Electronic Communications |
| 9 | UR19OEEC 803 | Electronic Measurements and Instrumentation |

**Open Electives offered by the Dept. of CSE**

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| **S.No.** | **Course Code** | **Open Elective-I** |
| 1. | UR19OECS601 | Python Programming |
| 2. | UR19OECS602 | Data Base Management Systems |
| 3. | UR19OECS603 | C++ Programming |
|  | **Course Code** | **Open Elective-II** |
| 4. | UR19OECS701 | Distributed Computing |
| 5. | UR19OECS702 | Java Programming |
| 6. | UR19OECS703 | Big Data |
|  | **Course Code** | **Open Elective-III** |
| 7. | UR19OECS801 | Digital Forenics |
| 8. | UR19OECS802 | Deep Learning |
| 9. | UR19OECS803 | AI and ML for Robotics |

**Open Electives offered by the Dept. of IT**

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| **S.No.** | **Course Code** | **Open Elective-I** |
| 1. | UR19OEIT101 | Data Structures |
| 2. | UR19OEIT102 | Computer Graphics |
| 3. | UR19OEIT103 | Data Science |
|  | **Course Code** | **Open Elective – II** |
| 4. | UR19OEIT201 | Operating Systems |
| 5. | UR19OEIT202 | Python Programming |
| 6. | UR19OEIT203 | Web Technologies |
|  | **Course Code** | **Open Elective – III** |
| 7. | UR19OEIT301 | Information Security |
| 8. | UR19OEIT302 | Mobile Application Development |
| 9. | UR19OEIT303 | Block Chain Technologies |