**Electronics and Communication Engineering**

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| **Program Name: Master of Technology in Electronics and Communication Engineering (M Tech)** | **Program Code**: **ECEM2PUP** |
| **Program Outcomes of M. Tech (ECE) program is to improve the following attributes in students:**   1. An understanding of the theoretical foundations based on mathematics, science and engineering with a focus on applications in ECE. 2. An ability to adapt existing models, tools and techniques etc. for efficiently solving problems related to ECE. 3. Understanding and ability to use advanced hardware and software tools for development of new electronic systems. 4. An ability to experimentally evaluate and carry out intelligent tradeoffs in design of electronic systems as per the needs of the industry and society. 5. An ability to undertake original research at the cutting edge of ECE & related areas. 6. An ability to function effectively individually or as a part of a team to accomplish a stated goal. 7. An understanding of professional and ethical responsibility. 8. An ability to communicate effectively with a wide range of audience. 9. An ability to learn independently and engage in lifelong learning in the broadest context of technological change.   10. An understanding of the impact of ECE based technologies in an economic, societal and environmental context.  **Program Specific Outcomes (PSOs)**  **After successful completion of the degree, the students will be able to:**   1. Adapt to emerging trends in information and communication technology by innovating new ideas to solve existing/novel problems. 2. Excel in latest technologies of embedded systems. 3. Design, analyze and develop electronic products in the area of antenna. VLSI design and communication systems. 4. Contribute as entrepreneurs in building electronic products. | |

**M.TECH 1st Year (1st Sem)**

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Optical Communication System | **Course Code**: ECEM1101T |
| **Course Outcomes:**   * Have thorough mathematical understanding of modern optical communication systems. * Design, analyze, capable to suggest methods and their trade off for improving the performance of modern high capacity wavelength division multiplexed optical communication systems. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Microcontrollers and Embedded Systems | **Course Code**: ECEM1102T |
| **Course Outcomes:**   * Understand the basic concepts of microcontroller and its internal architecture by learning the logic for assembly language programming. * Familiarize about interfacing of input/output devices with microcontroller to make Embedded Systems. * Learn about microcontrollers and their applications for serial/parallel communication, input/output devices control and microcontroller-based projects. | |
| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Advanced Digital Signal Processing | **Course Code**: ECEM1103T |
| **Course Outcomes:**   * Apply DSP for analyzing, synthesizing, modify, separate, enhance, and modify various audio, image, video, and communication signals. * Apply DSP to electrical, and mechanical designs, and to control of power generation, power distribution, power optimization, navigation, guidance, air traffic control, commerce, scheduling, manufacturing, space exploration, medical imaging, medical care, medical monitoring, collision avoidance, various military offensive and defensive systems, and many more applications. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Information Theory and Coding | **Course Code**: ECEM1105T |
| **Course Outcomes:**   * Understand fundamentals of information theory and coding. * Analyze error performance of a digital communication system in presence of noise and other interferences and it will help to improve the performance of the system. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Nanoelectronics Devices Engineering | **Course Code**: ECEM1106T |
| **Course Outcomes:**   * Familiarize with nanoelectronics, nanodevices, tools used for synthesis/characterization of nanostructures, fundamental quantum mechanics behind nanoelectronics and molecular electronics. * Learn the working of silicon nanoelectronics device and CMOS microelectronic transistor in this course. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Computer System Architecture | **Course Code**: ECEM1107T |
| **Course Outcomes:**   * Conceptualize the basics of organizational and architectural issues of a digital computer. * Analyze performance issues in processor and memory design of a digital computer. * Understand various data transfer techniques in digital computer. * Analyze processor performance improvement using instruction level parallelism. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Microelectronics Technology | **Course Code**: ECEM1108T |
| **Course Outcomes:**   * Acquire a thorough understanding on the Microcircuit devices. * Apply the knowledge to the development of new and novel devices for different applications. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Advanced Digital System Design | **Course Code**: ECEM1109T |
| **Course Outcomes:**   * Familiarize the student with the analysis, design and evaluation of digital systems of medium complexity that are based on SSI, MSI and Programmable logic devices. * Familiarize the students with the issues in the design of iterative networks, timing analysis of synchronous and asynchronous systems. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Multimedia Compression Techniques | **Course Code**: ECEM1110T |
| **Course Outcomes:**   * Understand scalar and vector quantization theory. * Represent multimedia data in different formats for various applications as need for Multimedia compression technique and the different types of data can be explored. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Optimization Techniques | **Course Code**: ECEM1111T |
| **Course Outcomes:**   * Develop the concept of optimization problems by analyzing unconstrained optimization problem using various gradient, direct search techniques. * Solve constrained and multi-objective optimization problems using random search methods. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Semiconductor Devices and Modeling | **Course Code**: ECEM1112T |
| **Course Outcomes:**   * Understand the concept of equations, approximations, and techniques available for deriving a model with specified properties, for a general device characteristic with known qualitative theory. * Apply suitable approximations and techniques to derive the model referred to above starting from drift-diffusion transport equations (assuming these equations hold). * Understand physics of a new device and conversion of this understanding into equations by explaining how the equations get lengthy and parameters increase in number while developing a compact model. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Soft Computing | **Course Code**: ECEM1113T |
| **Course Outcomes:**   * Apply a soft computing methodology for a particular problem and exercise fuzzy logic and reasoning to handle uncertainty and solve engineering problems. * Implement genetic algorithms to combinational optimization problems and utilize neural networks to pattern classification and regression problems for neuro-fuzzy applications. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Electronics Engg. Lab | **Course Code**: ECEM1104P |
| **Course Outcomes:**   * Utilize advanced features of latest software’s such as MATLAB, OPTISIM, HFSS during their research work. * Gain software knowledge required for research work. | |

**M.TECH 1st Year (2nd Sem)**

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Wireless and Mobile Data Communication | **Course Code**: ECEM1201T |
| **Course Outcomes:**   * Explain the fundamental concepts of wireless communication systems and learn cellular system design basics and frequency management techniques. * Describe capacity increase mechanisms, interference reduction strategies and long-distance propagation concepts. * Understand effects of fading, voice coding techniques and signal processing in GSM network and update themselves with recent technology and happenings in the field of mobile technology. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** VLSI Design | **Course Code**: ECEM1202T |
| **Course Outcomes:**   * Understand different design steps required to carry out a complete digital VLSI (Very-Large-Scale Integration) design in silicon. * Explore the CMOS devices and circuits, standard CMOS fabrication processes, CMOS design rules, static and dynamic logic structures, interconnect analysis, CMOS chip layout, simulation and testing, low power techniques, design tools and methodologies, VLSI architecture. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Research Methodology | **Course Code**: ECEM1203T |
| **Course Outcomes:**   * Have a good understanding of inferential Statistics and Research Methodology as applicable in real life Business Management. * Develop a set of skills among the students to use the statistical tools at the workplace to solve research related and general decision problems. * Develop the skills to identify the appropriate statistical techniques for the analysis of data and analyze the data using appropriate statistical tool by learning how to collect, analyze, present and interpret research data. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Digital Image Processing and Analysis | **Course Code**: ECEM1205T |
| **Course Outcomes:**   * Understand the fundamentals of digital image processing and learn to analytical tools which are currently used in digital image processing as applied to image information for human viewing. * Apply the digital image processing tools in the laboratory in image restoration, enhancement and compression by understand differences between computer vision and image processing. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Telecommunication Switching Systems and Networks | **Course Code**: ECEM1206T |
| **Course Outcomes:**   * Familiarize with the concept to learn Switching, Signaling and traffic in the context of telecommunication network. * Expose the evolution of switching systems from manual and electro mechanical systems to stored-program-controlled digital systems using signaling, packet switching and networks. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Microwave Integrated Circuits | **Course Code**: ECEM1207T |
| **Course Outcomes:**   * Acquire knowledge about Microwave Integrated Circuits and to gain knowledge of planar transmission line for MIC and lumped elements for MIC * Utilize the fundamentals required to design & implement Integrated Circuits operating at microwave frequencies for Microwave Semiconductor Devices. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Artificial Neural Networks and Fuzzy Logic Systems | **Course Code**: ECEM1208T |
| **Course Outcomes:**   * Understand different neural networks, their architectures, training algorithms, concept of fuzzy logic, fuzzy Sets, fuzzy rules and fuzzy reasoning. * Understand the applicability of neural networks and fuzzy logic. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** MEMS and Microsystems Technology | **Course Code**: ECEM1209T |
| **Course Outcomes:**   * Understand basics of micro fabrication, develop models and simulate electrostatic and electromagnetic sensors and actuators, understand material properties important for MEMS system performance. * Analyze dynamics of resonant micromechanical structures, understand the design process and validation for MEMS devices and systems, and learn the state of the art in optical Microsystems. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** RF System Design | **Course Code**: ECEM1210T |
| **Course Outcomes:**   * Design and analyze basic resonators and RF Filters. * Study the operation and device characteristics of RF Active components. * Design and analyze RF transistor amplifier. * Understand the operation of Oscillators and mixers used in RF design. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Data and Computer Communication Networks | **Course Code**: ECEM1211T |
| **Course Outcomes:**   * Build an understanding of the fundamental concepts of computer networking. * Familiarize with the basic taxonomy and terminology of the computer networking area. * Understand advanced networking concepts, preparing the student for entry Advanced courses in computer networking. * Gain expertise in some specific areas of networking such as the design and maintenance of individual networks. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Self Study and Seminar | **Course Code**: ECEM1204P |
| **Course Outcomes:**   * To compile data from various research papers in the form of Literature Survey. * To find research gaps from the compiled data in order to do their research work. * To propose modifications in previous research work to accommodate research gaps. | |

**M.TECH 2nd Year (3rd Sem)**

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Antenna System Engineering | **Course Code**: ECEM2102T |
| **Course Outcomes:**   * Gain knowledge of various types of antenna which are used for different applications of wireless communications systems. * Design and have analysis skills for performance improvement of various types of smart antenna systems which they can apply later during their research and industrial experiences. | |
| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** EMI And EMC Techniques | **Course Code**: ECEM2103T |
| **Course Outcomes:**   * Familiarize with the fundamentals that are essential for electronics industry in the field of EMI/EMC. To understand EMI sources and its measurements. * Understand the various techniques for electromagnetic compatibility. * Learn the concepts of Real-world EMC design constraints and make appropriate trade-offs to achieve the most cost-effective design that meets all requirements. * Design electronic systems that function without errors or problems related to electromagnetic compatibility. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Programmable Logic Controller | **Course Code**: ECEM2104T |
| **Course Outcomes:**   * Understand the concept of how to use logical elements and to carry out programming using PLC using various PLCs to Automation problems in industries. * Familiarize with the use of Human Machine Interfacing devices to enhance control & communication aspects of Automation. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Communication Network Security | **Course Code**: ECEM2105T |
| **Course Outcomes:**   * Learn about various aspects of Cryptography in terms of securing the data transfer process. * Familiarize with web security procedures. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Parallel Computing Fundamentals | **Course Code**: ECEM2106T |
| **Course Outcomes:**   * Familiarize with the mathematical models, methods and technologies of parallel programming for multiprocessor systems. * Learn the course for a successful start to practice in the area of parallel programming. * Gain a spectrum of knowledge and skills for developing parallel software system. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Speech Processing | **Course Code**: ECEM2107T |
| **Course Outcomes:**   * Understand fundamental tools and experience the applied technology in the array of speech processing. * Widen the understanding of this topic through the study of speech characteristics and its applications in various fields like coding. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Advanced Microprocessors and Interfacing | **Course Code**: ECEM2108T |
| **Course Outcomes:**   * Familiarize with an in-depth understanding of 16-& 32-bit microprocessors and to provide solid foundation on interfacing the external devices to the microprocessor according to the user requirements to develop microprocessor-based projects. * Learn the internal hardware architecture organization of popular microprocessors and programming language. This subject also assists the students with an academic environment aware for a successful professional carrier. | |
| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Global Tracking and Positioning System | **Course Code**: ECEM2109T |
| **Course Outcomes:**   * Familiarize with the fundamental and advanced concepts, and applications of Global tracking and Positioning System. * Explore fundamentals of Geodesy, GPS- Transit, NAVSTAR GPS, GLONASS, GALILEO; GPS segments- space, control and user, GPS codes- C/A, P, GPS receivers, GPS Orbits, GPS errors and accuracy, GPS Observables, GPS Survey Methods- static vs kinematic, single point vs relative positioning, GPS Modernization plans, GPS Applications. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** English For Research Paper Writing | **Course Code**: ECEM2110T |
| **Course Outcomes:**   * Understand the skills of writing a good research paper. * Understand how to improve your writing skills and level of readability. * Learn about what to write in each section. * Understand the skills needed when writing a Title. * Ensure the good quality of paper at very first-time submission. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Disaster Management | **Course Code**: ECEM2111T |
| **Course Outcomes:**   * Understand the strengths and weaknesses of disaster management approaches. * Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response. * Evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives * Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Value Education | **Course Code**: ECEM2112T |
| **Course Outcomes:**   * Acquire good knowledge of value education. * Explore the knowledge of self-development, highlight the importance of Human values and developing the overall personality of students. * Understand value of education and self- development. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Stress Management by Yoga | **Course Code**: ECEM2113T |
| **Course Outcomes:**   * Achieve overall health of body and mind and to overcome stress. * Develop healthy mind in a healthy body thus improving social health also. | |

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| **Program Name:** M.Tech (2 Year) | **Program Code**:ECEM2PUP |
| **Course Name:** Project | **Course Code**: ECEM2101P |
| **Course Outcomes:**   * Formulate problem related to their thesis work. * Provide research methodology for the proposed work. | |

**M.TECH 2nd Year (4th Sem)**

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| **Program Name:** M.Tech (2Year) | **Program Code**: ECEM2PUP |
| **Course Name**: DISSERTATION | **Course Code** : ECEM2201P |
| **Course Outcomes:**   * To perform a thorough survey of a particular domain. * To find a research problem and present a methodology to resolve the problem. * To obtain adequate experimental results to strengthen the contribution to research. * To learn about communicating the impact of their research work by different tools which includes video, poster and presentation in conferences/journals. | |