

- **Department Name :- Electronics and Telecommunication Engineering**
- **UG Program Name :-B.Tech Electronics and Telecommunication Engineering**
- **Vision and Mission :-**

Vision :-

Promote excellence in the field of Electronics & Telecommunication Engineering and allied areas through quality education and research to provide valuable assets for industry and society.

Mission:-

- To provide quality education through need based curriculum, effective teaching learning process and state-of-art infrastructure.
- To inculcate research aptitude leading to patents and publications in refereed journals.
- To imbibe professional ethics, leadership skills, social, cultural & environmental awareness with a passion for lifelong learning.
- To strengthen relationships with industry, society, government bodies and alumni.

| Sr. No. | Program Outcomes |
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| 1. | Acquire in-depth knowledge of electronics engineering and augment it by comparing, evaluating, analyzing and synthesizing with existing knowledge |
| 2. | Exercise intellectual inquiry by critical analysis and synthesis of information for conducting research in theoretical and practical context. |
| 3. | Conceptualize and formulate the engineering problem, find its optimal solution from wide range of potential solutions by giving due consideration to societal and environmental factors |
| 4. | Apply tools and techniques of research methodology for development of innovative electronics systems |
| 5. | Effectively use computers and computing approach for analysis and simulation of electronics systems |
| 6. | Recognize research opportunities in multidisciplinary areas and provide solutions by working as a leader or productive member of a team |
| 7. | Understand and apply the principles of project management both as a member and a team leader for project development |
| 8. | Communicate effectively through reports, presentations and discussions within both the technical domain and the community at large |
| 9. | Ready for a lifelong learning to face increasing challenges and responsibilities |
| 10. | Understand professional, ethical and moral responsibilities for sustainable development of society |
| 11. | Learn independently by observing and critically examining outcomes of the process and take self corrective actions |
| 12. | Life-. |

| Sr. No. | Program Specific Outcomes |
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| 1. | Analyze, design and develop electronic systems for communication applications by using appropriate modern tools and techniques. |
| 2. | Demonstrate the knowledge of the state of art tools and apply for the development of VLSI circuits/systems. |

| Sr. No. | Semester | Course Code | Course Name | Course Outcome |
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| 1. | III | EC2011 | Electronic devices and circuits | <ol style="list-style-type: none"> 1. Describe fundamentals of various semiconductor devices. 2. State working principle of power amplifier 3. Compute various parameters of analog circuits 4. Illustrate various applications of semiconductor devices 5. Analyze transistor biasing circuits & various frequency models of amplifier |
| 2. | | EC2031 | Analog Communication | <ol style="list-style-type: none"> 1. Describe the basic concept of communication system 2. Apply Fourier analysis to different communication signals 3. Design simple systems for generating and demodulating AM and FM signals. 4. Explain different types of pulse modulation systems 5. Compare the performance of various modulation systems. |
| 3. | | EC2051 | Network Theory | <ol style="list-style-type: none"> 1. Identify and draw network graphs and their parts. 2. Analyze DC & AC circuits using network theorems. 3. Plot the frequency response of RLC circuits. 4. Calculate the two port parameters of the two port networks. 5. Apply the knowledge of Laplace transformation to analyze the circuits. |
| 4. | | SH2111 | Engineering Mathematics -III | <ol style="list-style-type: none"> 1. Apply linear differential equations to solve engineering problems. 2. Solve problems on probability Distributions by using different formula. 3. Find Laplace transform and Inverse Laplace transform of various functions by using properties of Laplace transform |

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| | | | | <p>and apply Laplace transform to solve linear diff equations.</p> <p>4. Find Coefficient of correlation, Lines of regression, fitting of curves.</p> <p>5. Find Expansions of functions by using Fourier series.</p> |
| 5. | | EC2071 | C++ Programming | <p>1. Differentiate between C & C++ and Explain object oriented principles.</p> <p>2. Write, debug, and test basic C++ codes using the object oriented approaches introduced in the course.</p> <p>3. Select appropriate methods for organizing data files and implement file-based data structures.</p> <p>4. Analyze given problems and implement in object-oriented programming tool.</p> <p>5. Compare types of basic data structures.</p> |
| 6. | | EC2511 | Basic Electronics Lab | <p>1. Build circuit as per the requirement.</p> <p>2. Observe the voltage waveforms at various test points.</p> <p>3. Plot the frequency response of amplifier.</p> <p>4. Interpret results of experiment & compare with measured values.</p> <p>5. Improve the ability to communicate effectively through written lab journals.</p> |
| 7. | | EC2531 | Analog Communication Lab | <p>1. Analyze & design simple analog communication system.</p> <p>2. Illustrate amplitude and frequency modulation and demodulation methods.</p> <p>3. Draw AM waveform & its spectrum.</p> <p>4. Visualize AM & FM signals using MATLAB.</p> <p>5. Demonstrate different types of pulse modulation system</p> |
| 8. | | EC2551 | Circuit Simulation and PCB design lab | <p>1. Analyze different analog electronic circuits using different simulation software.</p> <p>2. Analyze different digital electronic</p> |

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| | | | | <p>circuits using different simulation software</p> <ol style="list-style-type: none"> Design the PCB layout using TINA. Develop Electronic circuits on printed circuit board. Test Electronic circuits on printed circuit board. |
| 9. | | SH254 | Personal Effectiveness and Body Language Lab | <ol style="list-style-type: none"> Develop skills to build self-esteem and positive attitude. Discover ways to overcome procrastination. Demonstrate responsiveness towards stress and health issues. Interpret the non-verbal behaviour of a person. |
| 10. | | SH255 | Interpersonal Skills Lab | <ol style="list-style-type: none"> Exhibit interpersonal communication skills. Demonstrate decision-making skills. Apply conflict resolution styles appropriate in different situations. Explore leadership skills. |
| 11. | | SH 256 | Leadership and Public Speaking Lab | <ol style="list-style-type: none"> Exhibit the ability to work effectively in team. Describe the traits of a leadership through real life examples. Plan the speech as per the audience and context requirements. Analyze public speeches. |
| 12. | | SH 257 | CORPORATE COMPETENCY LAB | <ol style="list-style-type: none"> Demonstrate professional etiquette and ethics. Apply various presentation tools. Perform confidently in screenings of campus placement drives. Participate in meetings through video and tele-conferencing. |
| 13. | | SH 258 | INTRODUCTION TO ENGLISH LITERATURE | <ol style="list-style-type: none"> Explain literary concepts and the underlying aesthetics of English literature. Demonstrate reading skills. Interpret different types of text. Make use of newly learnt words in various contexts. |
| 14. | IV | EC2021 | Signals & Systems | <ol style="list-style-type: none"> Describe mathematical descriptions and representations of continuous and discrete signals and systems. Develop input output relationships for Linear Time Invariant Systems Deduce impulse response of a |

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| | | | | <p>system and convolution operation.</p> <ol style="list-style-type: none"> 4. Apply Fourier and Laplace Transform analysis for continuous-time LTI signals and systems. 5. Use z-Transform analysis for discrete time signals |
| 15. | | EC2041 | Digital Design & Verilog HDL | <ol style="list-style-type: none"> 1. Use Boolean algebra, the Karnaugh maps to simplify and design logic circuits. 2. Design modular combinational circuits using decoders, encoders, Mux & Demux. 3. Describe digital system design by Hardware Description Language platform via Verilog HDL. 4. Write program in Verilog HDL using procedures, functions and different programming strategies 5. Develop and simulate combinational and sequential modules of digital system in Verilog HDL. |
| 16. | | EC2061 | Linear integrated circuits | <ol style="list-style-type: none"> 1. Analyze and design differential amplifiers used in linear integrated circuits. 2. Distinguish and evaluate different parameters of various configurations of OP-AMP. 3. Evaluate and design different applications Using OP-AMP. 4. Design amplifiers and active filters. 5. Illustrate waveform generators and Timer using special ICs. Discuss different PLL and VCO ICs and its applications |
| 17. | | EC2081 | Control System | <ol style="list-style-type: none"> 1. Identify the basic elements and structures of feedback control systems 2. Apply Routh-Hurwitz criterion, Bode and Polar plots to determine stability of linear system. 3. Design Lead-Lag compensators based on frequency data for an open-loop linear system. 4. Construct and recognize the properties of root-locus for feedback control systems 5. Modeling of linear systems using state-space representation |
| 18. | | EC2101 | Electronics | <ol style="list-style-type: none"> 1. Identify & classify error sources & |

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| | | | Measurement & Instrumentation | <p>explain how their effects can be minimized in measurement.</p> <ol style="list-style-type: none"> 2. Explain the operating principle of common electronic measuring instruments & their application to testing. 3. Apply the knowledge of transducers & sensors for various applications. 4. Analyze different systems used in monitoring & data acquisition. 5. Choose & use particular analyzer for specific application. |
| 19. | | SH2011 | Environmental Science | <ol style="list-style-type: none"> 1. Understand the importance and sensitivity of environment. 2. Avoid over exploitation of natural resources and follow the environmental ethics. 3. Do the sustainable practices for sustainable development. 4. Protect environment and prevent environmental pollution. 5. Apply their knowledge and skills to solve their environment related problems. |
| 20. | | EC2521 | Digital Design & Verilog HDL Lab | <ol style="list-style-type: none"> 1. Design & implement on hardware, different combinational & sequential circuits using Proteus & Altera kits. 2. Interpret the art of digital system design by Hardware Description Language platform via Verilog HDL and Xilinx 12.1 ISE tools. 3. Write program in Verilog HDL using procedures, functions and different programming strategies. 4. Program, test and simulate for both combinational and sequential modules of digital system in Verilog HDL. 5. Design the real time digital system applications by coding, simulating and synthesis. |
| 21. | | EC2541 | Linear integrated circuits Lab | <ol style="list-style-type: none"> 1. Analyze differential amplifiers used in linear integrated circuits. 2. Evaluate and design different applications Using OP-AMP. 3. Design amplifiers and active filters. 4. Illustrate waveform generators and Timer using special ICs. |

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| | | | | 5. Discuss different PLL and VCO ICs and its applications. |
| 22. | | EC2561 | Programming lab - II | <ol style="list-style-type: none"> 1. Become familiar with fundamental operations in MATLAB. 2. Write programs using MATLAB. 3. Perform statistical data analysis, data interpolation by MATLAB, solve differentiation equation with MATLAB. 4. Apply standard signals in various mathematical operations of continuous and discrete systems operations. 5. Design and simulate time domain and frequency domain control system problem. |
| 23. | | EC2581 | Mini Project (Environmental Science) | <ol style="list-style-type: none"> 1. Experiential Learning. 2. Development of research attitude regarding the environment related problems. 3. Improved teamwork, Environmental awareness, communication, customer awareness, project management. 4. Have insight of interdisciplinary project. 5. Community involvement. |
| 24. | V | EC3011 | Electromagnetic Field Theory | <ol style="list-style-type: none"> 1. Apply the knowledge of vector algebra and Co-ordinate system to formulate electromagnetic concepts 2. Calculate various parameters of electrostatics and magneto-statics 3. Solve electromagnetic numericals 4. Analyze transients on transmission lines. 5. Answer objective questions in competitive examinations by applying basic knowledge. |
| 25. | | EC3031 | Electronics Communication System | <ol style="list-style-type: none"> 1. Define spread spectrum modulation and describe its general purpose and its applications. 2. Explain basic concepts of RADAR system & basic elements of optical fiber transmission link, fiber modes configurations & structures. 3. Differentiate between different modulation techniques such as PAM, PWM, PPM. |

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| | | | | <ol style="list-style-type: none"> 4. Calculate radar range equation, numerical aperture & losses in optical fiber. 5. Compare different types of photodiodes & photo detectors. |
| 26. | | EC3051 | CMOS Digital Integrated Circuit Design | <ol style="list-style-type: none"> 1. Describe fundamentals of MOS devices and circuits 2. Construct various digital circuits using CMOS VLSI 3. Analyze various parameters of CMOS VLSI circuits 4. Compare various MOS circuits 5. Design and optimize various digital building blocks using CMOS VLSI |
| 27. | | EC3071 | Digital Signal Processing | <ol style="list-style-type: none"> 1. Relate effect of computation accuracy on performance of digital signal processing system. 2. Describe techniques available for implementation of digital signal processing system. 3. Explain techniques available for implementation of digital signal processing system. 4. Design and simulate the working of given digital signal processing system. 5. Differentiate between techniques available for implementation of digital signal processing system. |
| 28. | | EC3091 | Microcontroller | <ol style="list-style-type: none"> 1. Explain the fundamentals of microprocessor, microcontroller and programming related terms. 2. Describe the instructions of microprocessor. 3. Write the programming of microcontroller 8051. 4. Interface peripherals to the microcontroller 8051 |
| 29. | | EC3511 | Electronics Communication System Lab | <ol style="list-style-type: none"> 1. Arrange proper set up for given communication system 2. Predict output of given communication system 3. Test & analyze given communication system for various inputs 4. Sketch waveforms of input & output of given communication system 5. Write relevant conclusion on the |

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| | | | | performance of given communication system |
| 30. | | EC3531 | CMOS Digital Integrated Circuit Design Lab | <ol style="list-style-type: none"> 1. Design and simulate schematic of various digital circuits 2. Sketch layout of various digital block in CAD Tools 3. Analyze various parameters of VLSI logic circuits 4. Interpret results and compare with measured values 5. Improve the ability to communicate effectively through written lab journals |
| 31. | | EC3551 | Microcontroller Lab | <ol style="list-style-type: none"> 1. Write programs in assembly language. 2. Write program in C language. 3. Test and Debug the program 4. Interface various peripheral. 5. Write report and analyze the result |
| 32. | | EC3571 | Digital signal processing lab | <ol style="list-style-type: none"> 1. Design and simulate the working of given digital signal processing system 2. Evaluate the performance of designed digital signal processing system 3. Write relevant conclusion on the performance of designed digital signal processing system 4. Present and Write laboratory reports in desired format in grammatically correct language |
| 33. | | SH3191 | Scholastic Aptitude I | <ol style="list-style-type: none"> 1. Solve aptitude problems within stipulated time with appropriate logic |
| 34. | VI | EC3021 | Antenna & wave propagation | <ol style="list-style-type: none"> 1. Explain the basic parameters of the antennas. 2. Develop the expressions of the fields radiated by the wire antennas. 3. Analyze compare and describe the various types of antennas and their characteristics 4. Select antennas for specific wireless communication applications 5. Solve the objective questions in competitive examinations by applying basic knowledge. |
| 35. | | EC3041 | Mixed Mode Controller | <ol style="list-style-type: none"> 1. Identify the basics of TI MSP430 controller architecture with its |

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| | | | | <p>hardware specifications. & Low power comparative study with other microcontrollers.</p> <ol style="list-style-type: none"> Describe complete system solution with minimum system design issues (Data sheet) including a RISC CPU, flash memory, on-chip data converters and on-chip peripherals Use IDE for Assembly language & C language by writing different programs. Demonstrate an ability to use on chip peripherals for interfacing a microcontroller with peripheral devices & develop software for microcontroller systems using a high-level programming language. Design and Simulate embedded system for the given specifications |
| 36. | | EC3061 | Digital Communication | <ol style="list-style-type: none"> Compare analog and digital communication systems, Solve numerical on statistical theory, source coding and channel coding. Apply various theorems of encoding, error control etc on signals. Analyze various digital modulation techniques. Evaluate performance of different modulation techniques. |
| 37. | | EC3081 | Mobile Communication | <ol style="list-style-type: none"> Describe the evolution of wireless communication systems, major modern wireless communication of 21st century, the cellular radio concepts and the most common analog and digital communication techniques used in wireless communication. Identify techniques to improve coverage and capacity in cellular systems, which describes how to model and measure large scale and small scale fading effects and choose the multiple access schemes which allow many mobile users to share a finite amount of spectrum simultaneously. Evaluate speech quality in existing |

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| | | | | <p>and proposed cellular, cordless communication, etc.</p> <ol style="list-style-type: none"> Analyze frequency reuse principles for the 1st generation cellular systems, coding and modulation techniques for the 2nd generation cellular systems and CDMA technology for the 3rd generation cellular systems. Explain the need of coding and describe current and future cellular mobile communication systems (GSM, IS95, CDMA, LTE, etc.) |
| 38. | | EC3101 | Industrial Organization and Management | <ol style="list-style-type: none"> Determine relevance of various different industrial organization structures. Discover practical importance of planning and management. Determine the appropriate staffing and controlling techniques, how to motivate the staff with specific traits. Capable of planning an entrepreneurship with understanding of being rich vs. powerful. Solve case studies related with project management and plan risk reward balance. |
| 39. | | EC3121 | Java Programming | <ol style="list-style-type: none"> Differentiate between Simple Programming Language and Object Oriented Programming Language. Define predefined packages and create user defined packages. Describe the different platforms of programming Languages. Classify the Java Language to database connections types |
| 40. | | EC3521 | Antenna Lab | <ol style="list-style-type: none"> Measure and analyze the parameters of the different antennas Design and Simulate different types of Antennas using Electromagnetic Field solver Analyze the performance of the different types of antennas Demonstrate ability to work effectively in a team |
| 41. | | | Mixed Mode | <ol style="list-style-type: none"> Understand how to use IDE for |

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| | | EC3541 | Controller Lab | <p>Assembly language & C language by writing different programs.</p> <ol style="list-style-type: none"> 2. Study complete system solution with minimum system design issues including a RISC CPU, flash memory, on-chip data converters and on-chip peripherals 3. Demonstrate an ability to use on chip peripherals for interfacing a microcontroller with peripheral devices & develop software for microcontroller systems using a high-level programming language. 4. Design and Simulate embedded system for the given specifications. 5. Document and present design solutions in a team environment. |
| 42. | | EC3561 | Digital Communication Lab | <ol style="list-style-type: none"> 1. Calculate PDF, CDF, Mean and Variance of continuous and discrete random variables 2. Differentiate and Illustrate different types of Modulation techniques. 3. Explain different data formats. 4. Analyze and demonstrate different shift keying techniques. 5. Conduct the experiments in group. |
| 43. | | EC3581 | Mini-project | <ol style="list-style-type: none"> 1. Identify & formulate problems which can be resolved by engineering solutions. 2. Analyze, design, implement & test electronics system by using advanced tools and techniques. 3. Develop professional, ethical and moral responsibilities. 4. Communicate effectively through reports, presentations and discussions. 5. Apply project management skills (scheduling work, procuring parts, and documenting expenditures and working within the confines of a deadline). 6. Work as a member and a team leader for project development. |
| 44. | | SH3222 | Scholastic Aptitude II | <ol style="list-style-type: none"> 1. 1. Solve aptitude problems within stipulated time with appropriate logic |
| 45. | VII | EC4011 | RTOS based Embedded System | <ol style="list-style-type: none"> 1. Distinguish a real-time system from other systems. |

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| | | | Design | <ol style="list-style-type: none"> 2. Implement the real-time operating system principles. 3. Appreciate the use of multitasking techniques in real-time systems 4. Evaluate the need for real-time operating systems. 5. Compare performance of RTOS based systems |
| 46. | | EC4061 | Power Electronics | <ol style="list-style-type: none"> 1. Discuss the characteristics of power devices and their ratings. 2. Explain operation of power electronics systems. 3. Analyze performance parameters of the converters and inverters. 4. Compare control techniques of different converters and inverters with respect to their performance. 5. Design converter circuits for the given specifications. |
| 47. | | EC4031 | Computer Communication & Network | <ol style="list-style-type: none"> 1. Explain & evaluate reference models- OSI & TCP/IP. 2. Summarize network components & protocols with their roles. 3. Discuss different errors detection & correction techniques in data link layer. 4. Analyze the routing, congestion control & prevention polices. 5. Illustrate networking standards & packet formats |

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| 48. | | EC4191 | Image Processing | <ol style="list-style-type: none"> 1. Describe general terminology of digital image processing. 2. Design and implement algorithms for digital image processing operations such as histogram equalization, enhancement, filtering, using MATLAB. 3. Apply & differentiate different masks used in spatial filters & analyze the effect on it using appropriate tool. 4. Explain & formulate different morphological image processing techniques and analyze the effect of it by applying different structuring elements. 5. Compare various techniques used in segmentation by applying different types of the mask on the image using appropriate tool. |
| 49. | | EC4111 | Biomedical Signal Processing | <ol style="list-style-type: none"> 1. Interpret technical aspects of medicine. 2. Solve Engineering Problems related to medical field. 3. Recognize medical diagnosis and therapy. 4. Explain the types Bio Signal and process it with different tools. 5. Compare the different preamplifiers used for amplifying the Bio Signals and do the measurement. |
| 50. | | EC4131 | Satellite Communication | <ol style="list-style-type: none"> 1. Discuss the fundamentals of satellite communication. 2. Explain different satellite subsystems and satellite applications. 3. Design link budget for a satellite. 4. Compare different satellite systems. |

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| | | | | 5. Compile recent explorations by India. |
| 51. | | EC4151 | Wireless Sensor Network and IoT | <ol style="list-style-type: none"> 1. Categorize sensor networks for various applications. 2. Select suitable medium access protocols for WSN hardware. 3. Design and simulate small sensor nodes 4. Illustrate quality of service, fault-tolerance, and security resource constraints of WSN. 5. Evaluate the performance of sensor networks with IoT and identify bottlenecks. |
| 52. | | EC4171 | Neural Networks | <ol style="list-style-type: none"> 1. Describe models, processes and network architectures used in neural network. 2. Illustrate principles of learning processes and algorithms used in pattern recognition. 3. Evaluate learning algorithms and architectures for given application. 4. Assess the utility of neural network for linear and non-linear network. 5. Summarize the neural network applications for image processing, remote sensing and military etc. |
| 53. | | EC4531 | Embedded System Lab | <ol style="list-style-type: none"> 1. Summarize the features and structures of practical implementation of real-time operating system μCOS-II. 2. Explain the need for real-time operating systems. 3. Identify the real-time operating system principles. 4. Classify different Real time operating systems. 5. Review & implement the protocols used by controllers to communicate with external sensors & actuators in real world. |
| 54. | | EC4541 | Power Electronics Lab | <ol style="list-style-type: none"> 1. Sketch the circuit diagram/block diagram as per the requirement. 2. Demonstrate response of the converters/inverters for various conditions. 3. Determine performance parameters of the converters. |

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| | | | | <ol style="list-style-type: none"> 4. Analyze the results and conclude. 5. Produce the report of the experiment. |
| 55. | | EC4511 | Computer Network Lab | <ol style="list-style-type: none"> 1. Develop logic for implementation of different algorithms used in networking. 2. Design proper topology and configure each network device using GNS3. 3. Test code for implementation of different networking algorithms. 4. Analyze IP protocol and capture packets using Wireshark. 5. Combine the knowledge of networking to design code for different protocol. |
| 56. | | EC4551 | Industrial Training | <ol style="list-style-type: none"> 1. To make student proficient in latest technologies used in industries. 2. To increase students employability. |
| 57. | | EC4571 | Employability Enhancement skill-I | <ol style="list-style-type: none"> 1. Write programs for Siemens PLC. 2. Design Electrical drawing. 3. Design hardwiring for Siemens PLC |
| 58. | | EC4591 | Project Phase I | <ol style="list-style-type: none"> 1. Apply knowledge of mathematics, science, physics, engineering and management principles to solve complex engineering problems. 2. Identify, formulate and analyze engineering problem based on experimental, statistical and computational methods to meet desired needs. 3. Design a system, component or process to meet desired needs within realistic constraints. 4. Work as a leader or productive member of multi-disciplinary and multi-cultural team. |
| 59. | | RE0407 | URE Phase I | <ol style="list-style-type: none"> 1. Perform literature review and identify research topic. 2. Write synopsis of the research work that being done in semester VIII. 3. Write technical review paper. |

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| 60. | | LL0407 | Internship Phase I LIBERAL LEARNING | <p>1. Human Cultures, Physical and Natural World. (Engaging with big questions through study in science and mathematics, Social Sciences, Humanities, History, Languages and Arts)</p> <p>2. Intellectual and Practical skills. (Challenging students to succeed in a progressively more challenging environment by extensively practicing critical and creative thinking, written and oral communication mathematical and information literacy and problem solving)</p> <p>3. Personal and social responsibility (Emphasis on civic knowledge and engagement, both local and intercultural knowledge and competence, ethical reasoning and action and foundation and skills for lifelong learning)</p> <p>4. Integrative Learning (Demonstration of synthesis and advanced accomplishment across their studies through application of skills, knowledge and responsibilities to new setting and complex problems. The integration of engineering and liberal arts is essential to compete in a highly competitive and technology based global economy)</p> |
| 61. | | ED4001 | ED Phase I | <p>1. Generate & Identify different business ideas.</p> <p>2. Make analysis of different ideas.</p> <p>3. Select proper business idea to suit his personality & competencies.</p> |
| 62. | | EC4601 | Online Course** | <p>1. Enhance self learning ability</p> <p>2. Explore advanced technology</p> <p>3. Improve analyzing, critical thinking and problem solving skills</p> |
| 63. | VIII | EC4201 | System Verilog | <p>1. Describe various concepts of verification methodologies using system Verilog.</p> <p>2. Choose good coding techniques as per current industrial practices.</p> <p>3. Write a System Verilog code for any digital function/Module.</p> |

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| | | | | <ol style="list-style-type: none"> 4. Analyze the differences between Verilog and System Verilog. 5. Design digital modules and verify using system verilog |
| 64. | | EC4101 | Embedded Linux | <ol style="list-style-type: none"> 1. Describe basic fundamentals of Embedded Linux 2. Write applications in Linux for various peripherals 3. Develop a device driver for Embedded Linux 4. Design an embedded system using Embedded Linux OS. |
| 65. | | EC4021 | Microwave engineering | <ol style="list-style-type: none"> 1. Describe microwave semiconductor devices, microwave tubes, microwave amplifiers. 2. Solve problems based on S parameters, microwave components and measurements. 3. Analyze basic microwave circuits and devices. 4. Evaluate performance of different types of microwave sources and microwave components based on construction, working and characteristics. 5. Choose the appropriate microwave tubes, semiconductor devices and amplifiers for the microwave applications. |
| 66. | | EC4121 | Biomedical image processing | <ol style="list-style-type: none"> 1. Discuss about imaging applications in medicine. 2. Explain algorithms that are widely used in image processing. 3. Solve Engineering Problems related to medical imaging field. 4. Explain current technologies and issues that are specific to medical image processing systems. 5. Develop hands-on experience by using computers to process images with MATLAB. |
| 67. | | EC4161 | Machine Vision | <ol style="list-style-type: none"> 1. Define and select components of a machine vision system. 2. Apply basic techniques used in the development of machine vision system. 3. Analyze various techniques used in segmentation by applying different types of the mask on the image using appropriate tool. 4. Compare a variety of pattern |

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| | | | | <p>classification, structural pattern recognition, and pattern classifier combination techniques.</p> <p>5. Implement the machine vision algorithms for real world applications.</p> |
| 68. | | EC4181 | Fuzzy Logic | <ol style="list-style-type: none"> 1. Identify fuzzy sets and classical sets. 2. Relate fuzzy relations. 3. Interpret membership functions. 4. Plan knowledge base and rule base system. 5. Analyze fuzzy control applications |
| 69. | | OEC442 | Robotics | <ol style="list-style-type: none"> 1. Describe architecture and components of robotics 2. Design controlled robot mechanisms 3. Apply wired and wireless communication techniques for robotic applications |
| 70. | | OEC476 | Mechatronics | <ol style="list-style-type: none"> 1. Study of sensors, actuators, system modeling and design with real-time controller interfacing. 2. Design step-by-step mechatronics system design. 3. Analyze the system for different input and different output. |
| 71. | | EC4501 | System Verilog Lab | <ol style="list-style-type: none"> 1. Write system verilog code for digital circuits and systems 2. Test and verify combinational and sequential circuits and systems 3. Demonstrate operation of combinational and sequential circuits using system verilog 4. Communicate effectively through lab journals |
| 72. | | EC4503 | Embedded Linux Lab | <ol style="list-style-type: none"> 1. To get familiar with Linux Operating system 2. Study Commands, tools and editors & Enable to write Shell scripts 3. To understand different stages involved in code compilation 4. Enable you to create projects and automate the build using Make |
| 73. | | EC4505 | Microwave engineering Lab | <ol style="list-style-type: none"> 1. Illustrate operation of microwave sources, description of components and guide lines to operate microwave instruments. 2. Measure various microwave |

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| | | | | <p>parameters.</p> <ol style="list-style-type: none"> Design microwave circuit using microwave components. Perform in team and communicate effectively through reports. |
| 74. | | EC4581 | Project phase II | <ol style="list-style-type: none"> Analyze result of implemented system to reach proper conclusions. Inculcate professional, ethical and moral responsibilities. Communicate effectively through reports, presentations and discussions within both the technical domain and the community at large. Apply the principles of project management both as a member and a team leader for project development. Learn independently and be ready for a lifelong learning to face increasing challenges and responsibilities. |
| 75. | | IIP4801 | Internship | <ol style="list-style-type: none"> Understand the functioning of the company in terms of inputs, transformation process and the outputs Learn to adjust with the company culture, work norms, code of conduct Understand and follow the safety norms, code of conduct Learn to observe, analyze and document the details as per the industry practices Understand the processes, systems and procedures and to relate the theoretical concepts-studies |
| 76. | | IIP4802 | Internship Project | <ol style="list-style-type: none"> Identify the project/problem in the domain of program relevant to the company Collect the information to the pertaining to the problem identified Analyze the information using statistical tools/ techniques Suggest the feasible alternative solution to select best solution Present the solution to the company and seek assistance in the implementation |

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| | | | | 6. Measure the impact of the project on the performance of company/ department/ section |
| 77. | | REM4001 | Research Methodology | <ol style="list-style-type: none"> 1. Select on the literature in the field, analyze and interpret research evidence publication on a topic to establish a suitable research problem/issue or opportunity to explore further 2. Design the research study using a suitable paradigm, associated methodologies and data collection and analysis 3. Write a research proposal (research blue print)describing the topic 4. Demonstrate the quality to use the statistical software to solve problems |
| 78. | | RE1ECSP RE1ECCM RE1ECES RE1ECVL RE1ECAC | Research Elective I | Develop Fundamental knowledge required to pursue selected research project |
| 79. | | RE2ECSP RE2ECCM RE2ECES RE2ECVL RE2ECAC | Research related Elective II Self Study/ Online// certification/NPTEL course approved by BOS | Gain the useful knowledge required to pursue selected research project |
| 80. | | RELECS RELECCM RELECES RELECVL RELECAC | Research Laboratory (Elective-1) | Gain the practical knowledge required to pursue selected research project |
| 81. | | REPRJEC | Research Project Phase II | <ol style="list-style-type: none"> 1. Search the technical literature. 2. Understand and critically evaluate theories, practices, and/or research on a chosen topic by conducting a thorough literature review and submitting a written integrative, critical summary of the current literature. 3. Approach a research problem and develop a methodology. 4. Develop and implement an advanced original research or creative project. 5. Develop the ability to explain the conceptual viability of the project and describe the major components |

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| | | | | involved. 6. Develop the ability to explain how the project will impact the relevant body of work. 7. Develop advanced discipline-relevant skills and competencies. 8. Properly keep an accurate record of research performed. 9. Write a research report and paper. |
| 82. | | ED4002 | Project feasibility Study | 1. Prepare business Plan for selected business 2. Make risk analysis & market analysis of selected project 3. Make technical appraisal of selected project 4. Make financial appraisal of selected project |
| 83. | | ED4004 | Finance for entrepreneurs | 1. Understand basic financial terminologies 2. Prepare & analyze financial statements. 3. Prepare financial Plan for his own venture. 4. Make & analyze investment decisions for business opportunity. 5. Calculate working capital requirement |
| 84. | | ED4006 | Marketing for Entrepreneurs | 1. Apply basic principles of marketing for various products. 2. Prepare market survey for selected product. 3. Select proper product mix & pricing decision for selected product 4. Select proper digital marketing technique for selected business. |
| 85. | | ED4008 | Entrepreneurship Development Lab | 1. Apply different softwares for preparing financial projections of selected project. |
| 86. | | ED4010 | Product/Start up Complete techno economic feasibility assessed by funding agencies and approved for funding | 1. Apply knowledge of engineering, economics, marketing and finance for preparation of project report 2. Make commercial, technical and financial appraisal of project |
| 87. | | ED 4012 | EDP Program (short term Intensive Program either in house/by any authorized | Apply knowledge of engineering, economics, marketing and finance for formulation of business plan, starting and managing new business |

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