**LOYOLA INSTITUTE OF TECHNOLOGY**
Palanchur, Chennai – 600 123
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai (An ISO Certified Institution)

# Department of ECE

## 2017 Regulations

## Course Outcomes (COs)

### ODD SEM

**II YEAR (6 Theory + 3 Labs)**

| Si.No | Name of the Subject (In Abbreviation) | Course Outcomes | Statement |
|---|---|---|---|
| 1 | MA8352 Linear Algebra and Partial Differential Equations | CO1 | Relate the basic concepts of groups, rings and fields which will then be used to solve related problems. |
| | | CO2 | Discuss the concepts of vector space, linear transformations and diagonalization. |
| | | CO3 | Relate the concept of inner product spaces in orthogonalization |
| | | CO4 | Solve Linear Partial differential equations of first and second order. |
| | | CO5 | Express general Fourier series, sine and cosine series. |
| | | CO6 | Associate the concepts of Fourier series in solving boundary value problems. |
| | | CO5 | Analyze the various searching & sorting algorithms and appropriately choose it for an given real world. |
| | | CO6 | Suggest a new data structure for an application |

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| 2 | EC8393 Fundamentals of Data Structures In C | CO1 | Understand the basic features of C Programming and their applications |
| | | CO2 | Enumerate the structured data types and dynamic memory objects and apply for real world scenario |
| | | CO3 | Implement various linear data structures operations in C |
| | | CO4 | Implement various nonlinear data structures operations in C |
| | | CO5 | Analyze the various searching & sorting algorithms and appropriately choose it for an given real world. |
| | | CO6 | Suggest a new data structure for an application |

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| 3 | EC8351 Electronic Circuits- I | CO1 | Acquire knowledge of working principles, characteristics and applications of BJT and FET |
| | | CO2 | Analyze the performance of small signal BJT and FET amplifiers |
| | | CO3 | Describe the equivalence circuits of BJT, FET and MOSFET. |
| | | CO4 | Analyze the frequency response characteristics of amplifiers. |
| | | CO5 | Design and testing power supply circuits. |
| | | CO6 | Apply the knowledge gained in the design of SMPS |
| 4 | EC8352 Signals and Systems | CO1 | Able to classify signals as Periodic/ Energy/Causal/Odd & to determine if a given system is Linear/Causal/Stable/Time variant |
| | | CO2 | Able to determine if a given system is Linear/Causal/Stable/Time variant |
| | | CO3 | Analyze the frequency Components Present in the deterministic signal |
| | | CO4 | Characterize Continuous LTI System in time domain and Frequency domain |
| | | CO5 | Analyze the frequency component present in the Discrete time signal |
| | | CO6 | Characterize Discrete time LTI System in time domain and Frequency domain |
| 5 | EC8392 Digital Electronics | CO1 | Realize Boolean expression using logic gates. |
| | | CO2 | Design various Combinational digital circuits using logic gates. |
| | | CO3 | Analze and design Synchronous sequential circuits for a given application. |
| | | CO4 | Design Asynchronous sequential circuits for a given application. |
| | | CO5 | Implement the combinational logic circuits using Programmable Logic Devices. |
| | | CO6 | Describe the types logic families in the design of logic gates. |

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| | EC8391 Control Systems Engineering | CO1 | Compute the transfer function model of electrical and mechanical systems Statement |
| | | CO2 | Describe the methods to determine time response of a system |

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| 6 | | CO3 | Describe the methods to determine frequency response of a system |
| | | CO4 | Design the compensation techniques to stabilize the control system |
| | | CO5 | Test the stability of a control system. |
| | | CO6 | Analyze the system using state variable method |
| 7 | EC8381 Fundamentals of Data Structures in C Laboratory | CO1 | Apply the concepts of OOPS to write C++ programs |
| | | CO2 | Implements ADTs in C++ |
| | | CO3 | Compare various File handling methods. |
| | | CO4 | Implement simple Java applications. |
| | | CO5 | Develop simple packages in Java |
| | | CO6 | Exhibit ethical principles in engineering practices |
| 8 | EC8361 Analog and Digital Circuits Laboratory | CO1 | Design and Test rectifiers, filters and regulated power supplies |
| | | CO2 | Design and Test BJT/JFET amplifiers. |
| | | CO3 | Analyze the limitation in bandwidth of single stage and multi stage amplifier |
| | | CO4 | Measure CMRR in differential amplifier |
| | | CO5 | Simulate and analyze amplifier circuits using PSpice. |
| | | CO6 | Design and Test the digital logic circuits |
| 9 | HS8381 Interpersonal Skills/Listening &Speaking | CO1 | Involves the students in Presentations & Group Discussions to improve the listening & speaking skills |
| | | CO2 | Analyse, distinguish and Prepare their own resume and report. |
| | | CO3 | Practice on national and international exams to improve the verbal ability of the students |
| | | CO4 | Fosters interview skills so as to be successful in them. |
| | | CO5 | Promotes adequate Soft Skills required for the workplace and long-term career. |
| | | CO6 | Exhibit ethical principles in engineering practices |

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## 2017 Regulations

## Course Outcomes (COs)

### EVEN SEM

**II YEAR (6 Theory + 2 Labs)**

| Si.No | Name of the Subject (In Abbreviation) | Course Outcomes | Statement |
|---|---|---|---|
| 1 | MA8451 Probability and Random Processes | CO1 | Apply the fundamental probability concepts and random variables. |
| | | CO2 | Apply the concepts of Standard distributions which can describe real life phenomena. |
| | | CO3 | Interpret the concepts of covariance, correlation and regression. |
| | | CO4 | Analyze the discrete and Markov chain in terms of a transition matrix and transition diagram. |
| | | CO5 | Analyze various types of functions with spectral properties in the frequency domain. |
| | | CO6 | Analyze the response of random inputs to linear time invariant systems. |
| | | CO5 | Analyze the various searching & sorting algorithms and appropriately choose it for an given real world. |
| | | CO6 | Suggest a new data structure for an application |
| 2 | EC8452 Electronic Circuits II | CO1 | Design and analyze feedback amplifiers |
| | | CO2 | Analyse transistorized LC and RC oscillators |
| | | CO3 | Design tuned amplifiers |
| | | CO4 | Design wave shaping circuits, multivibrators |
| | | CO5 | Design power amplifiers |
| | | CO6 | Design DC convertors |
| | EC8491 Communication Theory | CO1 | Describe the various types of amplitude modulation systems such as DSBSC, SSB, and VSB. |
| | | CO2 | Discuss the various types of angle modulation system such as narrow band FM and wide band FM. |

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| 3 | | CO3 | Apply the concepts of Random process in the desiogn of communication system. |
| | | CO4 | Classify the types of noise sources added in communication channel and analyze the noise performance of AM and FM systems. |
| | | CO5 | Describe sampling and quantization techniques. |
| | | CO6 | Describe various pulse modulation techniques and multiplexing techniques. |
| 4 | EC8451 Electromagnetic Fields | CO1 | Display and understanding of fundamental electromagnetic laws and concepts |
| | | CO2 | Write Maxwell equations in integral, differential and phasor form and explain their physical meanings |
| | | CO3 | Explain electromagnetic wave propagation in lossy and lossless medium |
| | | CO4 | solve simple problems requiring estimation of electric and magnetic field quantities based on their laws and concepts |
| | | CO5 | Describe the concept of faradays law , induced emf Maxwell equations |
| | | CO6 | Explain the basic concepts of electromagnetic waves, parameters and it's propagation losy in medium |
| 5 | EC8453 Digital Linear Integrated CircuitsElectronics | CO1 | Describe the characteristics of operational amplifiers. |
| | | CO2 | Design the various linear and non-linear applications of op-amp. |
| | | CO3 | Apply the multiplier IC’s and PLL in various applications |
| | | CO4 | Compare the specifications of ADC and DAC. |
| | | CO5 | Design oscillators and voltage regulators |
| | | CO6 | Infer the applications of special function IC’s. |
| 6 | GE8291 Environmental Science and Engineering | CO1 | Interpret the basic concept of Ecosystems and Biodiversity. |
| | | CO2 | Distinguish the types of pollution and its control measures. |
| | | CO3 | Describe the importance of natural resources and Disaster management. |
| | | CO4 | Illustrate the importance of environment by assessing its impact on the human world. |
| | | CO5 | Summarize the population related issues and types of welfare programmes in the society. |
| | | CO6 | Discuss scientific, technological, economic and social solutions to environmental problems |
| | EC8461 Circuits Design and Simulation Laboratory | CO1 | Analyze various types of feedback amplifiers |
| | | CO2 | Design of oscillators |

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| 7 | | CO3 | Design of tuned amplifiers |
| | | CO4 | Design of wave-shaping circuits and multivibrators |
| | | CO5 | Design and simulate feedback amplifiers, oscillators, tuned amplifiers |
| | | CO6 | Design and simulate wave-shaping circuits and multivibrators using SPICE Tool. |
| 8 | EC8462 Linear Integrated Circuits Laboratory | CO1 | Verify the operation of circuits using various Analog IC's |
| | | CO2 | Discuss the working of various function generating cirucits using discrete elements & SPICE Software |
| | | CO3 | Design Instrumentation amplifier using OPAMP and Frequency Multiplier PLL |
| | | CO4 | Verify working of Mulivibrators using Analog IC's |
| | | CO5 | Build first and second order practical active filters using Analog IC's |
| | | CO6 | Test A/D and D/A converters, Multipliers and Modulators using SPICE Software |

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## 2017 Regulations

## Course Outcomes (COs)

### ODD SEM

**III YEAR (6 Theory + 3 Labs)**

| Si.No | Name of the Subject (In Abbreviation) | Course Outcomes | Statement |
|---|---|---|---|
| 1 | EC8501 Digital Communication | CO1 | Describe the concepts of sampling and quantization. |
| | | CO2 | Compare the various Source coding techniques. |
| | | CO3 | Describe the base band transmission schemes. |
| | | CO4 | Illustrate the different modulation schemes and equalization techniques. |
| | | CO5 | Examine the PSD and BER of various modulation schemes. |
| | | CO6 | Generate different error control codes. |
| 2 | EC8553 Discrete-Time Signal Processing | CO1 | Compute DFT for a given sequence. |
| | | CO2 | Compare the Discrete Fourier Transform (DFT) and and Fast Fourier Transform (FFT). |
| | | CO3 | Design IIR Digital filters. |
| | | CO4 | Realize FIR digital for various specifications. |
| | | CO5 | Illustrate various types of finite word length effects. |
| | | CO6 | Summarize the architcture, addressing modes and instruction sets of DSP processors. |
| 3 | EC8552 Computer Architecture and Organization | CO1 | Identify and describe the major components of computer system |
| | | CO2 | Distinguish various multiplication and division algorithms |
| | | CO3 | Interpret and apply various addressing modes |
| | | CO4 | Analyze pipelined control units and various types of hazards in the instructions |
| | | CO5 | Compare properties of shared memory and distributed multiprocessor systems and cache |

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| | | | coherency protocols. |
| | | CO6 | Analyze the performance of memory using performance equation in a digital computer |
| 4 | EC8551 Communication Networks | CO1 | Identify the components required to build different types of networks |
| | | CO2 | Choose the required functionality at each layer for given application |
| | | CO3 | Identify solution for each functionality at each layer |
| | | CO4 | Trace the flow of information from one node to another node in the network |
| | | CO5 | Discuss various congestion and flow control algorithms |
| | | CO6 | Examine the need for security over application layer |

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| 5 | GE8077 Total Quality Management | CO1 | Discuss various dimensions of product and service quality |
| | | CO2 | Apply the TQM principles for quality improvement in organization |
| | | CO3 | Distinguish various TQM tools and techniques used in Manufacturing and Service sectors |
| | | CO4 | Use QFD tool to design and develop a new product as per customer requirements. |
| | | CO5 | Explain various ISO Standards and Quality systems practiced in various sector |
| | | CO6 | Summarize the basic concepts in total quality management relevant to manufacturing and service Sectors |
| 6 | OMD551 Basic of Biomedical Instrumentation | CO1 | To Learn the different bio potential and its propagation |
| | | CO2 | To get Familiarize the different electrode placement for various physiological recording |
| | | CO3 | Students will be able design bio amplifier for various physiological recording |
| | | CO4 | Students will understand various technique non electrical physiological measurements |
| | | CO5 | To learn the about different bio-chemical electrodes |

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| | | CO6 | Understand the different biochemical measurements |
| 7 | EC8561 Communication Systems Laboratory | CO1 | Practice analog and digital modulation Schemes |
| | | CO2 | Implement sampling theorem and Time Division Multiplexing |
| | | CO3 | Implement Line Coding Schemes |
| | | CO4 | Simulate Various modulation Schemes using Matlab |
| | | CO5 | Investigate the performance of Communication systems |
| | | CO6 | Test Error Control Coding Schemes in Communication System |
| 8 | EC8562 Digital Signal Processing Laboratory | CO1 | Generate Various Signals using MATLAB and DSP Processor |
| | | CO2 | Implement Linear and circular convolution programs and frequency Analysis using DFT in MATLAB |
| | | CO3 | Implement Auto Correlation and Cross Correlation using MATLAB |
| | | CO4 | Design FIR Filters using MATLAB and DSP Processor |
| | | CO5 | Design IIR Filters using MATLAB and DSP Processor |
| | | CO6 | Analyze the architecture of DSP Processor |
| 9 | EC8563 Communication Networks Laboratory | CO1 | Communicate between two desktop computers |
| | | CO2 | Implement the different protocols |
| | | CO3 | Program using sockets. |
| | | CO4 | Implement and compare the various routing algorithms |
| | | CO5 | Use the simulation tool |
| | | CO6 | Familiar with IP configuration |

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## 2017 Regulations

## Course Outcomes (COs)

### EVEN SEM

**III YEAR (6 Theory + 2 Labs)**

| | | | |
|---|---|---|---|
| 1 | EC8691 Microprocessors and Microcontrollers | CO1 | Explain the architecture and instruction set of 8086 microprocessor |
| | | CO2 | Discuss about System Bus Structure for Multiprocessor Configuration |
| | | CO3 | Infer the functions of various interfacing IC's |
| | | CO4 | Explain the architecture and instruction set of 8051 microprocessor |
| | | CO5 | Illustrate the functions of various interfacing devices with Microcontroller |
| | | CO6 | Build an 8051 assembly language program for interfacing |
| 2 | EC8095 VLSI Design | CO1 | Reliaze the concept of digital building blocks using MOS transistor |
| | | CO2 | Design combinational MOS logic circuits and power strategies |
| | | CO3 | Design and construct sequential circuits and timings system |
| | | CO4 | Design arithmetic building blocks and memory subsystems |
| | | CO5 | Apply and implement FPGA design flow and testing |
| | | CO6 | Different FPGA architecture and testability of VLSI circuits |
| 3 | EC8652 Wireless Communication | CO1 | Characterize a wireless channel and evolve the system design specifications |
| | | CO2 | Design a cellular system based on resource availability and traffic demands |
| | | CO3 | Implement various signaling schemes for fading channels |
| | | CO4 | Identify suitable signaling and multipath mitigation techniques for the wireless channel |
| | | CO5 | Design and implement systems with transmit / receive diversity |
| | | CO6 | Analyze the performance of MIMO systems. |

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| 4 | MG8591 Principles of Management | CO1 | Summarize the evolution of management thoughts and various challenges of managerial activities in a global |
| | | CO2 | Explain the types of Planning and Decision making at various levels management in the Organizations.. |
| | | CO3 | Discuss various types of Organization structure. |
| | | CO4 | List out the steps in Staffing process and stages in Career development. |
| | | CO5 | Explain the elements in Direction. |
| | | CO6 | Generalize various Controlling techniques to maintain standards in Organizations. |
| 5 | EC8651 Transmission Lines and RF Systems | CO1 | Analyze the line parameters and various losses in transmission lines. |
| | | CO2 | Demonstrate the concept of standing wave ratio and input impedance in high frequency transmission lines |
| | | CO3 | Analyze Impedance matching by stubs using smith charts |
| | | CO4 | Analyze the characteristics of TE waves |
| | | CO5 | Analyze the characteristics of TM waves |
| | | CO6 | Design a RF transceiver system for wireless communication |

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| 6 | EC8004 Wireless Networks | CO1 | Conversant with latest wireless LAN technologies |
| | | CO2 | Explain the mobile IP and various routing techniques |
| | | CO3 | Familiar with 3G technologies |
| | | CO4 | Explain about the internetworking between WLANS and WWANS |
| | | CO5 | Acquired knowledge about 4G networks and its technologies |
| | | CO6 | Implement different types of applications for smart phones and mobile devices with latest network strategies |
| | EC8681 Microprocessors and Microcontrollers | CO1 | Write and execute ALP program using 8086 microprocessor |
| | | CO2 | Interface different I/Os with microprocessor |

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| 7 | Laboratory | CO3 | Generate waveforms using Microprocessors |
| | | CO4 | Execute Programs in 8051 Microcontroller |
| | | CO5 | Develop a program to communicate Microprocessor with Personal Computer |
| | | CO6 | Use a combination of hardware and software to solve a real time problem |
| 8 | EC8661 VLSI Design Laboratory | CO1 | write HDL code for basic as well as advanced digital integrated circuits |
| | | CO2 | Import logic modules into FPGA board |
| | | CO3 | Synthesis place and route the digital ICs |
| | | CO4 | Design, simulate and extract the layout of digital and analog ICs block using EDA tools |
| | | CO5 | Design the sequential logic circuit using HDL code |
| | | CO6 | Execute the simple analog circuits using SPICE |

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## 2017 Regulations

## Course Outcomes (COs)

### ODD SEM

**IV YEAR (5 Theory + 2 Labs)**

| Si.No | Name of the Subject (In Abbreviation) | Course Outcomes | Statement |
|---|---|---|---|
| 1 | EC8701 Antennas and Microwave Engineering | CO1 | Apply the basic principles and evaluate antenna parameters and link power budgets |
| | | CO2 | Compare the radiation mechanisms of wire and loop antennas |
| | | CO3 | Design and assess the performance of aperture and frequency independent antennas |
| | | CO4 | Distinguish the radiation pattern of end fire and broad side arrays |
| | | CO5 | Describe the working principle of active and passive microwave components |
| | | CO6 | Design a microwave system given the application specifications |
| 2 | EC8751 Optical Communication | CO1 | Realize basic elements of optical fibers, different modes and configurations |
| | | CO2 | Analyze the transmission characteristics associated with dispersion and polarization techniques |
| | | CO3 | Design LED and LASER optical sources and analyse their characteristics for fiber optic commjnication |
| | | CO4 | Design photo detectors and analyze their suitability in optical fiber Communication |
| | | CO5 | Construct fiber optic receiver systems, analyse measurements and coupling techniques |
| | | CO6 | Design optical communication systems and its networks |
| 3 | EC8791 Embedded and Real Time Systems | CO1 | Explain the various embedded system technologies |
| | | CO2 | Describe the architecture and programming of ARM processor |
| | | CO3 | Develop and analyze software modules for embedded system |
| | | CO4 | Differentiate between the general purpose operating system and the real time operating system. |
| | | CO5 | Apply system design flow to develop embedded systems |
| | | CO6 | Implement real-time applications using embedded-system concepts |

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| 4 | EC8702 Ad hoc and Wireless Sensor Networks | CO1 | Know the basics of Ad hoc networks and wireless Sensor Networks |
| | | CO2 | Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement. |
| | | CO3 | Apply the knowledge to identify appropriate physical and MAC layer protocols |
| | | CO4 | Understand the transport layer and security issues possible in Ad hoc and sensor networks. |
| | | CO5 | Getting familiar with the OS used in Wireless Sensor Networks. |
| | | CO6 | know the various sensor and ad hoc networks, their protocols and tools. |
| 5 | EC8071 Cognitive Radio | CO1 | To understand the concepts of software defined radios |
| | | CO2 | To describe the principles of self-aware cognitive radios |
| | | CO3 | To compare various approaches for optimizing radio resources |
| | | CO4 | To classify the various networking techniques for cognitive Radio |
| | | CO5 | To Illustrate various security issues in cognitive radio |
| | | CO6 | To explain the role of cognitive radio in next generation applications |
| 6 | EC8711 Embedded Laboratory | CO1 | Summarize about ARM Tiva Launch-pad TM4C123 |
| | | CO2 | Experiment with A/D and D/A convertors using ARM system |
| | | CO3 | Implement communication protocols with ARM |
| | | CO4 | Compare the interrupt performance of ARM and FPGA |
| | | CO5 | Develop C programs for interfacing keyboard, display, motor and sensor. |
| | | CO6 | Demonstrate a mini project using embedded system |
| 7 | EC8761 Advanced Communication Laboratory | CO1 | Illustrate the characteristics of microwave components |
| | | CO2 | Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber |
| | | CO3 | Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER |
| | | CO4 | Examine the Wireless Channel Characteristics and the performance of Wireless Communication System |
| | | CO5 | Calculate different losses in fiber optic cables |
| | | CO6 | Determine modes and acceptance angle of fiber optic cables |

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## Course Outcomes (COs)

### EVEN SEM

**IV YEAR (5 Theory + 2 Labs)**

| Si.No | Name of the Subject (In Abbreviation) | Course Outcomes | Statement |
|---|---|---|---|
| 1 | GE8076 Professional Ethics In Engineering | CO1 | Recognize the core values that shape the ethical behavior of an engineer and create awareness on professional ethics and human values |
| | | CO2 | Examine the major moral and social theories |
| | | CO3 | Develop comprehension of professional and ethical responsibilities of engineers, including code of ethics of professional societies |
| | | CO4 | Examine basic risk assessment techniques in the engineering decision-making process |
| | | CO5 | Discriminate Collective Bargaining, Confidentiality and Intellectual Property Rights |
| | | CO6 | Organize the common ethical challenges that arise in engineering, business, technology and environmental aspects |
| 2 | EC8094 Satellite Communication | CO1 | Analyze the satellite orbits |
| | | CO2 | Analyze the earth segment and space segment |
| | | CO3 | Analyze the satellite Link design |
| | | CO4 | Examine Satellite access and coding methods |
| | | CO5 | Design various satellite application |
| | | CO6 | Recognize various Satellite Services |
| 27 | EC8811 Project Work | CO1 | Identify challenging practical problems, solutions to cope up with present scenario of Electronics and Communication Engineering. |
| | | CO2 | Analyze the various methodologies and technologies and discuss with team for solving the problem. |
| | | CO3 | Apply technical knowledge and project management skills for solving the problem. |
| | | CO4 | Design and develop hardware and/or software for their project specific problem. |
| | | CO5 | Learn the various system modules for implementing the project useful for the society; and testing with the experimental data |
| | | CO6 | Prepare the project reports and give proper explanation during the presentation and demonstration. |
| | | CO6 | Design optical communication systems and its networks |