Institute of Engineering
Department of Electronics & Telecommunication Engineering

Course Outcomes

FE		
FE-2015	**COs**	**Course Outcome**
104012 Basic Electronics Engineering	**104012.1**	To give knowledge of some basic electronic components and circuits.
	104012.2	To introduce basics of diode and transistor circuits
	104012.3	To understand working of some I C based circuits
	104012.4	To study logic gates and their usage in digital circuit s.
	104012.5	To expose the students to working of some power electronic dev ices, transducers and application of transducers.
	104012.6	To introduce basic aspect of electronic communication systems.
	104012.7	The associated Laboratory Practical course is designed to understand working of various Electronic circuits. The students will u understand how to u se the basic test and measuring instruments to test the circuits.
SE semester-I		
SE-2015	**COs**	**Course Outcome**
204181 Signals & Systems	**204181 .1**	Understand mathematical description and representation of continuous and discrete time signals and systems.
	204181 .2	Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system
	204181 .3	Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.
	204181 .4	Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.
	204181 .5	Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event

204182 **Electronic Devices & Circuits**	**204182 .1**	Comply and verify parameters after exciting devices by any stated method.
	204182.2	Implement circuit and test the performance
	204182 .3	Analyze small signal model of FET and MOSFET
	204182 .4	Explain behavior of FET at low frequency
	204182.5	Design an adjustable voltage regulator circuits
204183 **Electrical Circuits and Machines**	**204183.1**	Analyze basic AC & DC circuit for voltage, current and power by using KVL, KCL, and network theorems
	204183.2	Explain the working principle of different electrical machines.
	204183.3	Select proper electrical motor for given application.
	204183.4	Design and analyze transformers
204184 **Data Structures and Algorithms**	**204184 .1**	Discuss the computational efficiency of the principal algorithms such as sorting & searching.
	204184 .2	Write and understand the programs that use arrays & pointers in C
	204184 .3	Describe how arrays, records, linked structures are represented in memory and use them in algorithms.
	204184 .4	Implement stacks & queues for various applications.
	204184 .5	Understand various terminologies and traversals of trees and use them for various applications.
	204184 .6	Understand various terminologies and traversals of graphs and use them for various applications.
204185 **Digital Electronics**	**204185 .1**	Use the basic logic gates and various reduction techniques of digital logic circuit in detail
	204185 .2	Design combinational and sequential circuits
	204185.3	Design and implement hardware circuit to test performance and application.
	204185 .4	Understand the architecture and use of microcontrollers for basic operations and Simulate using simulation software.
204186 **Electronic Measuring Instruments & Tools**	**204186 .1**	Understand fundamental of various electrical measurements
	204186.2	Understand and describe specifications, features and capabilities of electronic instruments
	204186 .3	Finalize the specifications of instrument and select an appropriate instrument for given measurement
	204186 .4	Carry out required measurement using various instruments under different setups.
	204186 .5	Able to compare measuring instruments for performance parameters
	204186 .6	Select appropriate instrument for the measurement of electrical parameter professionally
SE semester-II		
SE-2015	**COs**	**Course Outcome**
	207005.1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits

207005 Engineering Mathematics -III	**207005.2**	Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing
	207005.3	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing
	207005.4	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields
	207005.5	Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.
204187 Integrated Circuits	**204187.1**	Understand the characteristics of IC and Op-Amp and identify the internal structure
	204187.2	Understand and identify various manufacturing techniques
	204187.3	Derive and determine various performances based parameters and their significance for Op-Amp
	204187.4	Comply and verify parameters after exciting IC by any stated method
	204187.5	Analyze and identify the closed loop stability considerations and I/O limitations
	204187.6	Analyze and identify linear and nonlinear applications of Op-Amp
	204187.7	Understand and verify results (levels of V & I) with hardware implementation
	204187.8	Implement hardwired circuit to test performance and application for what it is being designed
	204187.9	Understand and apply the functionalities of PLL to Frequency synthesizer, multiplier, FM, and AM demodulators
204188 Control Systems	**204188.1**	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems
	204188.2	Determine the (absolute) stability of a closed-loop control system
	204188.3	Perform time domain and frequency domain analysis of control systems required for stability analysis
	204188.4	Perform time domain and frequency domain correlation analysis.
	204188.5	Apply root-locus, Frequency Plots technique to analyze control systems
	204188.6	Express and solve system equations in state variable form
204189 Analog Communications	**204189.1**	Understand and identify the fundamental concepts and various components of analog communication systems
	204189.2	Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system
	204189.3	Describe analog pulse modulation techniques and digital modulation technique.
	204189.4	Develop the ability to compare and contrast the strengths and weaknesses of various communication systems
204190 Object Oriented Programming	**204190.1**	Describe the principles of object oriented programming
	204190.2	Apply the concepts of data encapsulation, inheritance in C++
	204190.3	Understand basic program constructs in Java
	204190.4	Apply the concepts of classes, methods and inheritance to write programs Java
	204190.5	Use arrays, vectors and strings concepts and interfaces to write

		programs in Java
	204190.6	Describe and use the concepts in Java to develop user friendly program
204191 EMPLOYABILITY SKILL DEVELOPMENT	**204191.1**	Have skills and preparedness for aptitude tests
	204191.2	Be equipped with essential communication skills (writing, verbal and non-verbal)
	204191.3	Master the presentation skill and be ready for facing interviews
	204191.4	Build team and lead it for problem solving
TE semester-I		
TE-2012	**COs**	**Course Outcome**
304181 Digital Communication	**304181.1**	Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency
	304181.2	Perform the time and frequency domain analysis of the signals in a digital communication system.
	304181.3	Select the blocks in a design of digital communication system
	304181.4	Analyze Performance of spread spectrum communication system.
304182 Digital Signal Processing	**304182.1**	Understand use of different transforms and analyze the discrete time signals and systems
	304182.2	Realize the use of LTI filters for filtering different real world signals
	304182.3	Capable of calibrating and resolving different frequencies existing in any signal
	304182.4	Design and implement multistage sampling rate converter
304183 MicroController and Applications	**304183.1**	Learn importance of microcontroller in designing embedded application
	304183.2	Learn use of hardware and software tools
	304183.3	Develop interfacing to real world devices
304184 Electromagnetics and Transmission Lines	**304184.1**	Interpret the electromagnetic problem and solve using Maxwell's equations.
	304184.2	Apply boundary conditions to different media, and formulate uniform plane wave equation, which is the basic of Antenna and wave propagation.
	304184.3	Analyze the transmission line problem, use the Smith chart for impedance calculations
304185 System Programming And Operating System	**304185.1**	Demonstrate the knowledge of Systems Programming and Operating Systems
	304185.2	Formulate the Problem and develop the solution for same
	304185.3	Compare and analyze the different implementation approach of system programming and operating system abstractions
	304185.4	Interpret various OS functions used in Linux / Ubuntu
304186 Digital	**304186.1**	Able to understand basic theories of Digital communication system

Communication and Signal Processing Lab		for practical applications.
	304186.2	Able to design and implement various digital modulation and demodulation techniques.
	304186.3	Able to identify and describe different techniques in modern digital communications, in particular in source coding using MATLAB or similar tools.
	304186.4	Able to understand and verify sampling theorem for practical applications.
	304186.5	Able to implement and verify DFT property using MATLAB
	304186.6	Able to comment on Stability and Causality of Discrete time system using Z-transform on MATLAB tool.
	304186.7	Able to design and implement digital filter and use of various windows
304187 System Programming and Microcontroller Applications Lab	**304187.1**	Learn various hardware and software tools used for developing applications
	304187.2	Design and implementation of Basic Microcontroller Based system using 8051 and PIC Microcontroller
	304187.3	Learn to interfacing of real world with 8051 and PIC Microcontroller
	304187.4	Demonstrate the knowledge of system programming & operating system.
	304187.5	Able to implement various scheduling techniques & deadlock avoidance scheme in operating system.
304188 Employability Skills in Electronics Design	**304188.1**	Shall be able to understand and interpret the specifications
	304188.2	Shall be able to select optimal design topologies
	304188.3	Shall be able to interpret datasheets and thus select appropriate components and devices
	304188.4	Shall be able to use an EDA tool for circuit schematic and simulation
	304188.5	Shall be able to design an electronic system/sub-system and validate its performance by simulating the same
TE semester-II		
TE-2012	**COs**	**Course Outcome**
304189 Information Theory and Coding Techniques	**304189.1**	Perform information theoretic analysis of communication system
	304189.2	Design a data compression scheme using suitable source coding technique
	304189.3	Design a channel coding scheme for a communication system
	304189.4	Evaluate performance of a communication system

304190 Antenna and Wave Propagation	**304190.1**	Formulate the wave equation and solve it for uniform plane wave
	304190.2	Analyze the given wire antenna and its radiation characteristics
	304190.3	Identify the suitable antenna for a given communication system
304191 Embedded Processors	**304191.1**	Describe the ARM microprocessor architectures and its feature
	304191.2	Interface the advanced peripherals to ARM based microcontroller
	304191.3	Design embedded system with available resources
304192 Industrial Management	**304192.1**	Get overview of Management Science aspects useful in Industry
	304192.2	Get motivation for Entrepreneurship
304193 Power Electronics	**304193.1**	To introduce students to different power devices to study their construction &characteristics
	304193.2	Understand, perform & analyze different controlled converters
	304193.3	Evaluate battery backup time & design a battery charger
	304193.4	Design & implement over voltage / over current protection circuit
304194 Communication Lab	**304194.1**	Able to analyze various parameters of different antennas using trainer kit
	304194.2	Able to know standing wave ratio for open, short and matched terminations on trainer kit
	304194.3	Able to implement the radiation pattern of different antenna array using MATLAB
	304194.4	Able to determine various entropies of a given channel using MATLAB
	304194.5	Able to understand and implement Huffman Source Coding
	304194.6	Able to know and design channel coding & decoding for correcting the errors in codewords
304195 Power Electronics and Embedded Lab	**304195.1**	To understand architecture and features of typical ARM7& ARM CORTEX-M3Microcontroller.
	304195.2	Interface the advanced peripherals to ARM based microcontroller
	304195.3	Design embedded system with available resources.
	304195.4	Learn to Design & implement a triggering / gate drive circuit for a power device like SCR,MOSFET etc.
	304195.5	Able to Understand, perform & analyze different controlled converters.
304196 Mini project and Seminar	**304196.1**	Understand, plan and execute a Mini Project with team
	304196.2	Implement electronic hardware by learning PCB artwork design, soldering techniques, trouble shooting etc
	304196.3	Prepare a technical report based on the Mini project.

	304196.4	Deliver technical seminar based on the Mini Project work carried out.
BE semester-I		
BE-2012	**COs**	**Course Outcome**
404181 **VLSI Design & Technology**	**404181.1**	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
	404181.2	Understand chip level issues and need of testability.
	404181.3	Design analog & digital CMOS circuits for specified applications.
404182 Computer Networks	**404182.1**	Understand fundamental underlying principles of computer networking
	404182.2	Describe and analyze the hardware, software, components of a network and the interrelations.
	404182.3	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
	404182.4	Have a basic knowledge of the use of cryptography and network security;
	404182.5	Have a basic knowledge of installing and configuring networking applications.
	404182.6	Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.
404183 **Microwave Engineering**	**404183.1**	Formulate the wave equation in wave guide for analysis.
	404183.2	Identify the use of microwave components and devices in microwave applications.
	404183.3	Understand the working principles of all the microwave tubes
	404183.4	Understand the working principles of all the solid state devices
	404183.5	Choose a suitable microwave tube and solid state device for a particular application
	404183.6	Carry out the microwave network analysis
	404183.7	Choose a suitable microwave measurement instruments and carry out the required measurements.
404184 **(Elective I) Embedded Systems & RTOS**	**404184.1**	Get insight of design metrics of Embedded systems to design real time applications to match recent trends in technology.
	404184.2	Understand Real time systems concepts.
	404184.3	Understand Linux operating system and device drivers.
	404184.4	Get to know the hardware – software co design issues and testing methodology for Embedded system.
404185 (Elective II) PLC& Automation	**404185.1**	Understand PLC architecture, PLC addressing concepts.
	404185.2	Develop PLC ladder programs for simple industrial applications.
	404185.3	Design Automation systems for industrial applications.

404186 Lab Practice I (CN & MWE)	**404186.1**	Understand fundamental underlying principles of computer networking
	404186.2	Describe and analyze the hardware, software, components of a network and the interrelations.
	404186.3	Have a basic knowledge of the use of cryptography and network security;
	404186.4	Have a basic knowledge of installing and configuring networking applications.
	404186.5	Identify the use of microwave components and devices in microwave applications.
	404186.6	Choose a suitable microwave measurement instruments and carry out the required measurements.
404187 Lab Practice II (VLSI &Elective I)	**404187.1**	Knowledge of HDL and write code for digital circuits.
	404187.2	Simulate, Synthesis and Implement design using PLD
	404187.3	Prepare layout of digital circuits
	404187.4	Understand Real time systems concepts.
	404187.5	Understand Linux operating system and device drivers.
	404187.6	Get to know the hardware – software co design issues and testing methodology for Embedded system.
404188 Project Phase I	**404188.1**	Get to know the hardware and software co design issues and testing methodology of related Project.
	404188.2	Understand the importance of team work.
	404188.3	Understand the basic power supply design and PCB fabrication.
BE Semester-II		
BE-2012	**COs**	**Course Outcome**
404189 Mobile Communication	**404189.1**	Explain and apply the concepts telecommunication switching, traffic and networks
	404189.2	Analyze the telecommunication traffic.
	404189.3	Analyze radio channel and cellular capacity.
	404189.4	Explain and apply concepts of GSM and CDMA system.
404190 Broadband Communication systems	**404190.1**	Carry out Link power budget and Rise Time Budget by proper selection of components and check its viability.
	404190.2	Carry out Satellite Link design for Up Link and Down Link.
404191 (Elective III) Audio Video Engineering	**404191.1**	To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver, Picture Tubes and Television Camera Tubes.
	404191.2	To study the various Colour Television systems with a greater emphasis on television standards.
	404191.3	To study the advanced topics in Digital Television and High Definition Television.

	404191.4	To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles.
404192 (Elective IV) Wireless Networks	**404192.1**	Keep himself updated on latest wireless technologies and trends in the communication field
	404192.2	Understand the transmission of voice and data through various networks.
404193 Lab Practice III(MC & BCS)	**404193.1**	Able to carry out link power budget and rise time budget
	404193.2	Able to measure and understand different characteristics of source and receiver
	404193.3	Able to carry out satellite link design
	404193.4	Able to carry out set up on CDMA and GSM
	404193.5	Able to carry out set up on spread spectrum techniques
404194 Lab Practice IV(Elective III)	**404194.1**	To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver, Picture Tubes and Television Camera Tubes.
	404194.2	To study the various Colour Television systems with a greater emphasis on television standards.
	404194.3	To study the advanced topics in Digital Television and High Definition Television.
	404194.4	To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles.
404195 Project Phase II	**404195.1**	Understanding of management principles and cost estimation
	404195.1	Work in multidisciplinary environments