Annamacharya Institute of Technology and Sciences, Tirupati
Department of Electronics and Communication Engineering
Course Outcomes(COs)
R-15 Regulations

Course Title	Course Outcomes(COs)	
Functional English (15A52101)	CO1	To improve the language proficiency of the students in English with an emphasis on LSRW skills
	CO2	To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus
	CO3	To develop study and listening skills as well as communication skills in formal, informal situations and social purpose.
Engineering chemistry (15A51101)	CO1	Understand the behavior of matter and materials using fundamental knowledge of their nature (i.e. Electrons and intermolecular forces) and hard and soft water its usage and treatment.
	CO2	Understand the electrochemical sources of energy, as well as to analyze, interpret data on Experiments relevant to chemical engineering practice
	CO3	The broad education necessary to understand the impact of Chemical engineering solutions in a global and societal context to get through all sorts of competitive exams.
Mathematics –I (15A54101)	CO1	Ability to solve partial and ordinary differential equations.
	CO2	Ability to use Laplace transform in solving differential equations
	CO3	Ability to represent a function by using Taylor's series
	CO4	Understood the use mathematical knowledge to analyze and solve problems in engineering applications.
Computer Programming (15A05101)	CO1	Understand problem solving techniques and representation of a solution to a problem
	CO2	Understand the syntax and semantics of C programming language and features of C language
	CO3	Understand the significance of Control structures
Environmental Science (15A01101)	CO1	Scope and awareness on about Environment.
	CO2	Analyze on Disaster management, Ecosystem, Biodiversity, Population and pollution
	CO3	Students will analyze causes and evaluate possible solutions to environmental problems and related health issues at the local/regional level
English Language and Communications Skills Lab (15A52102)	CO1	To train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills.
	CO2	To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning.
	CO3	To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.

Engineering chemistry Lab (15A51102)	CO1	Understand about redox reaction.
	CO2	To know preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications.
	CO3	Understand the hygiene aspects of water and would be in a position to design methods to produce potable water using modern technology.
C Programming Lab (15A05102)	CO1	Apply problem solving techniques to find solutions to problems.
	CO2	Able to use C language features effectively and implement solutions using C language.
	CO3	Be capable to identity the appropriate data structure for a given problem or application.
	CO4	Improve logical skills.
English for professional communication (15A52201)	CO1	Ability to participate effectively in group discussions.
	CO2	Develop ability in writing in various contexts.
	CO3	Proper level of competence for employability.
Mathematics – II (15A54201)	CO1	Ability to use numerical differentiation and integration.
	CO2	Ability to apply Fourier series, Fourier transforms and z transform for engineering problems.
	CO3	Ability to apply matrices operations in solving in engineering.
	CO4	Ability to solve algebraic and polynomial equations.
Network Analysis (15A04201)	CO1	Understood the concept of circuit elements, lumped circuits, waveforms, circuit laws and network reduction
	CO2	Solved the electrical networks using mesh & nodal analysis by applying network theorems
	CO3	Understood the concept of active, reactive, apparent and power factor, resonance and filters
	CO4	Analyzed the transient response of AC circuits and DC circuits
Engineering Physics (15A56101)	CO1	The development and application of semiconductors, optical fibers ,lasers and nano materials in day to day Science
	CO2	The application of different materials like dielectrics, Magnetic and semiconductors in the field of electronics and Communication systems
	CO3	The Role of physics principles & logical relationships of various fields and designing .
Engineering Drawing (15A03101)	CO1	Able to Draw 2D and 3D diagrams of various objects.
	CO2	Learning conventions of Drawing
	CO3	Able to Drafting projections of points, planes and solids.

Network Analysis Lab (15A04202)	CO1	Solved the electrical networks using mesh & nodal analysis by applying network theorems
	CO2	Understood the concept of resonance and filters
Engineering and IT Workshop (15A99201)	CO1	Familiarize with basic tools and equipment used in carpentry, Tin Smithy, welding and house wiring.
	CO2	Make various basic prototypes in the trade of Tin smithy such as plain Cylindrical pipe, Cylindrical pipe one end inclined, Cylindrical pipe both ends inclined, Hexagonal pipe one end inclined, and funnel preparations.
	CO3	Perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring
	CO4	Understand the concept of Information and Technology
	CO5	Knowledge in applying various tools of MS-Office using Internet
	CO6	Explain the operation of Computer
	CO7	Execution of Simple DOS Commands COPY, REN, DIR, TYPE, CD, MD, BACKUP
	CO8	Create your Bio-Data in MSWord giving Educational and Personal Details.
	CO9	Practice in installing a Computer System by giving connection and loading System Software and Application Software.
	CO10	Accessing and Changing BIOS settings.
	CO11	Installing Windows XP operating System.
	CO12	Assembling of PC. Disassembling of PC.
Engineering Physics lab (15A56102)	CO1	Elucidate the concepts of physics through involvement in the experiment by applying theoretical knowledge.
	CO2	Illustrate the basics of electro magnetism, optics, mechanics, semi- conductors& quantum theory.
	CO3	Develop an ability to apply the knowledge of physics experiments in the later studies.
	CO4	Perform the analytical experiments; improve analytical skills and attitude which help them to apply these skills in their field of engineering.
Mathematics-III (15A54301)	CO1	Ability to understand and use complex analysis.
	CO2	Ability to apply and solve transformation mapping on formal mapping in two dimensional potential theory.

	CO3	Ability to solve by using Cauchy's theorem , Roche's theorem and complex integration
Probability Theory and Stochastic Processes (15A04304)	CO1	Familiar the concepts of Probability, Random Variables and Distribution functions.
	CO2	Ability to solve the problems related to operations on Random Variables, Multiple Random Variables and operations on multiple Random variables.
	CO3	Familiar the concepts of Stochastic processes and its characteristics
Electronic Devices and Circuits (15A04301)	CO1	Ability to understand the operation of diodes and transistors with their characteristics.
	CO2	Ability to understand importance of biasing and design of DC biasing circuits.
	CO3	Ability to understand small signal model and design of amplifiers with BJTs and FETs.
	CO4	Ability to understand applications of diodes, transistors and special electronic devices.
Electrical Technology (15A02306)	CO1	Understood the concept of two port networks
	CO2	Able to Analyze and design filters & attenuators
	CO3	Able to analyze the construction of Generators, Motors Transformers and calculated The efficiency and losses of DC machines.
Switching Theory and Logic Design (15A04302)	CO1	Ability to realize and implement Boolean and switching functions.
	CO2	Ability to minimize switching functions.
	CO3	Ability to design combinational and sequential logic circuits.
	CO4	Ability to understand concepts of PLD's
Electronic Devices and Circuits Laboratory (15A04305)	CO1	Test and Operate different electronic devices
	CO2	Obtain the characteristics of transistors and diodes experimentally
	CO3	Design electronic circuits
Signals and Systems (15A04303)	CO1	Under stood the concepts of Vectors, Signals with Orthogonality, Properties of Signals and Systems.
	CO2	Ability to represent the signals using Fourier series, systems using Fourier Transforms and basics of Laplace Transforms & Z-Transforms.
	CO3	LTI System Analysis, Sampling theorem verification, its applications, properties of convolution and Correlation functions

Electrical Technology and Basic Simulation Laboratory (15A02307)	CO1	Experimentally obtain the load characteristics of DC motors and generators.
	CO2	control the speed of DC motors and test DC machines
	CO3	Writing programs in matlab
	CO4	Representation of signals using matlab and basic simulation of programs
Mathematics –IV (15A54402)	CO1	knowledge to analyse the problems using the methods of special functions and complex variables
	CO2	understand the mathematical concepts of special functions & complex variables and their applications in science and engineering
Electronic Circuit Analysis (15A04401)	CO1	ability to understand singlestage and multi stage amplifiers using BJT and FET
	CO2	ability to understand high frequency model and analyze its frequency responses.
	CO3	ability to understand feedback amplifiers and oscillators along with design.
	CO4	ability to understand power amplifiers and tuned amplifiers with applications
Electromagnetic Theory & Transmission Lines (15A04403)	CO1	Understands the fundamentals of Laws and mathematical basics.
	CO2	Ability to study the laws, theory and applications
	CO3	Ability to solve problems of time varying waves and transmission line smith charts design.
Analog Communication Systems (15A04402)	CO1	Ability to understand basic principles of modulation and demodulation in communications Systems
	CO2	Ability to understand and analyze Noise interference in Communication medium
	CO3	Ability to model and design transmitter, and receiver to minimize noise effect in channel
Data Structures (15A05201)	CO1	Understand different Data Structures
	CO2	Understand Searching and Sorting techniques
Control Systems Engineering (15A02303)	CO1	Represent the mathematical model of a system.
	CO2	Determine the response of differential order systems for various step inputs.
	CO3	Analysis of the stability of the system.

	CO4	Analysis of time response and frequency response of the system.
Electronic Circuit Analysis Laboratory (15A04404)	CO1	Ability to design various amplifiers and oscillator circuits.
	CO2	Simulation of various analog circuits.
Analog Communication Systems Laboratory (15A04405)	CO1	To experience real time behavior of different analog modulation schemes
	CO2	Technically visualize spectra of different analog modulation schemes
	CO3	Measure characteristics of radio receiver and antenna measurements
Computer Organization (15A05402)	CO1	The basic knowledge the designs of digital logic circuits and apply to computer organization.
	CO2	Be familiar with assembly language programming.
	CO3	The cost performance issues and design tradeoffs in designing and constructing computer processor including memory.
	CO4	The basics of systems topics: parallel, pipelined, superscalar, and RISC/CISC architectures.
Antennas and Wave Propagation (15A04501)	CO1	Understands the concept of different parameters to measure the performance of an antenna.
	CO2	Ability to know about the different types of antennas operating at different frequencies.
	CO3	Able to know the concept to EM wave propagation through different layers of the atmosphere
	CO4	
Digital Communication Systems (15A04502)	CO1	Ability to represent signals using basis functions
	CO2	Ability to use channel coding and source coding techniques in digital communication systems.
	CO3	Ability to use modulation techniques in communication systems.
	CO4	Ability to design receivers in communication systems.
Linear Integrated Circuits and Applications (15A04503)	CO1	Able to Understand the basic concepts of Differential Amplifier and OPAMPs
	CO2	Understand the characteristics of OPAMP
	CO3	Design of different mathematical operations using OPAMP

	CO4	Able to design circuits using 555 Timer, Multivibrator, ADCs and DACs.
Digital System Design (15A04504)	CO1	Able to understand the design and implementation of CMOS, TTL digital circuits.
	CO2	Able to design various Sequential and Combinational circuits.
	CO3	Able to write the programs in Structural modeling, Dataflow modeling, and Behavioral modeling in VHDL.
	CO4	Able to understand about the various memory devices and their applications.
Linux Programming & Scripting (15A04505)	CO1	Ability to create and run scripts using Perl / TCL / Python
	CO2	Ability to use Linux environment and write programs
MEMS & Microsystems (15A04506)	CO1	Understands MEMS fabrication concepts
	CO2	Understands the mem sensors and accelerometers and its working and its application
	CO3	Understands the mems in biomedical applications
IC Applications Laboratory (15A04507)	CO1	Ability to design and perform different OP-AMP applications like adder, subtractor, comparator circuits.
	CO2	Ability to design function generator, voltage regulator, multi vibrator circuits and 4- bit DAC using OP-AMPS.
Digital Communication Systems Laboratory (15A04508)	CO1	will be able to experience real time behavior of different digital modulation schemes and technically visualize spectra of different digital modulation schemes
Social Values & Ethics (15A99501)	CO1	This course deals with professional ethics which includes moral issues and virtues, social responsibilities of an engineer, right, qualities of Moral Leadership
Managerial Economics and Financial Analysis (15A52301)	CO1	Awareness about economics and financial accounting.
	CO2	To understand the concepts and apply in real life by developing the marketing and financial decision making skills.
	CO3	To impart knowledge about the organization and its functioning.
Microprocessors and microcontrollers (15A04601)	CO1	Able to Do programming with 8086 microprocessors
	CO2	Understand concepts of Intel x86 series of processors
	CO3	Able to Program MSP 430 for designing any basic Embedded System

	CO4	Able to Design and implement some specific real time applications Using MSP 430 low power microcontroller.
Electronic Measurements And Instrumentation (15A04602)	CO1	Understand basic principles involved in the meters for measuring voltage, current, resistance, frequency and so on. .
	CO2	Employ CRO for measuring voltage, current, resistance, frequency and so on.
	CO3	Understand principles of measurements associated with different bridges.
	CO4	Get complete knowledge regarding working of advanced instruments such as logic analyzers and spectrum analyzers
Microprocessors & Microcontrollers Laboratory (15A04607)	CO1	Able to write programs for 8086
	CO2	Able to write programs for msp430
Digital Signal Processing (15A04603)	CO1	Able to Formulate engineering problems in terms of DSP tasks.
	CO2	Able to Apply engineering problems solving strategies to DSP problems. Analyze and compare different signal processing strategies.
	CO3	Able to Design and test DSP algorithms.
	CO4	Able to Analyze digital and analog signals and systems.
VLSI Design (15A04604)	CO1	Complete Knowledge about Fabrication process of ICs
	CO2	Able to design VLSIcircuits as per specifications given.
	CO3	Capable of optimizing the design of Arithmetic / logic building Blocks at all levels of Design/Fabrication.
	CO4	Can implement circuit through various design styles (semi-Custom, Full Custom)
MATLAB Programming (15A04605)	CO1	Be able to do simple and complex calculation using MATLAB
	CO2	Be able to carry out numerical computations and analyses
	CO3	Understand the tools that are essential in solving engineering problems
Industrial Electronics (15A04606)	CO1	Understand the characteristics of AC to DC converters.

	CO2	Understand about the practical applications Electronics in industries
Neural Networks & Fuzzy (15A02605)	CO1	Get an overview of different types of neural network models.
	CO2	Understand the functioning of single; multi-layer feed forward neural networks, associative memories and their rules and algorithms.
	CO3	Understand about fundamentals of fuzzy logic, their rules and applications.
Intellectual Property Rights (15A01608)	CO1	Able to understand the basics of Intellectual Property Rights, Copy Right Laws Trade Marks and Issues related to Patents.
	CO2	Able to understanding things to setup for startups and innovations
Digital Signal Processing Laboratory (15A04608)	CO1	Able to design real time DSP systems and real world applications.
	CO2	Able to implement DSP algorithms using both fixed and floating point processors.
Advanced English Language Communication Skills (AELCS) Laboratory (15A52602)	CO1	Accomplishment of sound vocabulary and its proper use contextually
	CO2	Flair in Writing and felicity in written expression.
	CO3	Enhanced job prospects.
	CO4	Effective Speaking Abilities
Optical Fiber Communication (15A04701)	CO1	Analyze the performance of both digital and analog optical fiber systems
	CO2	Calculate the system bandwidth, noise, probability of error and maximum usable bit rate of a digital fiber system
	CO3	Calculate the system link loss, distortion and dynamic range of an RF photonic link
	CO4	To perform characteristics of fiber sources and detectors, design as well as conduct experiment in software and hardware, and analyze the results to provide valid conclusions
Embedded Systems (15A04702)	CO1	Design of embedded systems leading to 32-bit application development.
	CO2	Understand hardware-interfacing concepts to connect digital as well as analog sensors while ensuring low power considerations.
	CO3	Review and implement the protocols used by microcontroller to communicate with external sensors and actuators in real world.
	CO4	Understand Embedded Networking and IoT concepts based upon connected MCUs

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Microwave Engineering (15A04703)	CO1	Ability to analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.
	CO2	Ability to Use S-parameter terminology to describe circuits and to explain how microwave devices and circuits are characterized in terms of their "S"- Parameters.
	CO3	Ability to understanding of microwave transmission lines and how to Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc.
Data Communications and Networking (15A04704)	CO1	Able to understand Key Design issues of various layers of OSI model.
	CO2	Understand various networking and data protocols.
	CO3	Understand the issues related to security in application layer.
	CO4	Able to understand The Implementation of the Interoperability techniques for implementing multi- protocol Internet, and techniques.
Radar Systems (15A04705)	CO1	Understand radar fundamentals and analysis of the radar signals.
	CO2	Understand various radar transmitters and receivers.
	CO3	Understand various radar like MTI, Doppler and tracking radar and their comparison.
Adaptive Signal Processing (15A04706)	CO1	Get complete knowledge regarding adaptive systems
	CO2	Design various linear optimum filters by employing different techniques associated with them
	CO3	Understand various techniques related to with linear and nonlinear adaptive filtering and their design considerations
FPGA Design (15A04707)	CO1	Understands the various FPGA architectures ,design and synthesis
	CO2	Understand the implementation of FPGA by using DFG
Digital Image Processing (15A04708)	CO1	Able to apply the Image processing concept for various fields of engineering and real life to process as per needs &specifications.
	CO2	Get the skills to Heuristically develop new techniques to process images of any context
	CO3	Can experiment, analyze & interpret image data /processing data
Cellular & Mobile Communication (15A04709)	CO1	will be able to understand impairments due to multipath fading channel.
	CO2	Understand the fundamental techniques to overcome the different fading effects.
	CO3	To understand Co-channel and Non Co-channel interferences.
	CO4	Able to familiar with cell coverage for signal and traffic, diversity techniques and mobile antennas.
Real Time Systems (15A04710)	CO1	Know about the basic concepts of embedded systems
	CO2	Understand the different architectural features of embedded systems
	CO3	Understand the goal embedded systems in real time design applications
Microwave and Optical Communication Laboratory (15A04711)	CO1	Capable of Applying microwave Concepts/ Microwave components and test them .
	CO2	Able to design and analyse an optical fiber communications

		link
VLSI & Embedded Systems Laboratory (15A04712)	CO1	Design and draw the internal structure of the various digital integrated circuits
	CO2	Develop VHDL/Verilog HDL source code, perform simulation using relevant simulator andanalyze the obtained simulation results using necessary synthesizer.
	CO3	Verify the logical operations of the digital IC"s (Hardware) in the laboratory
Advanced Digital Signal Processing-Multirate & Wavlet (15A04801)	CO1	Get complete knowledge regarding various algorithms associated with Digital signal processing and multi rate signal processing.
	CO2	Verify the power spectral estimation by using Barlett, Welch &Blackmann& Tukey methods.
	CO3	Understand the effects of finite word length in fixed-point DSP systems by using ADC and FFT algorithms
	CO4	Gets complete knowledge regarding various algorithms associated with Digital signal processing and multi rate signal processing.
Low Power VLSI Circuits & Systems (15A04802)	CO1	Understand the concepts of velocity saturation, Impact Ionization and Hot Electron Effect
	CO2	Implement Low power design approaches for system level and circuit level measures.
	CO3	Design low power adders, multipliers and memories for efficient design of systems.
Pattern Recognition & Applications (15A04803)	CO1	Understands the concepts of pattern recognition
	CO2	Understand the supervised and unsupervised learning and its applications
RF Integrated Circuits (15A04804)	CO1	Able to understand RF integrated circuit fabrication and design
	CO2	Able to analyze and understand noise in RF circuits
	CO3	Able to design mixers, amplifiers and frequency synthesizers