



SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

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NH-40, Nandyal – 518501 :: Kurnool Dist. A.P.

DEPARTMENT:- ELECTRONICS & COMMUNICATION ENGINEERING

COURSE OUTCOMES

REGULATION : R19

Year/Sem	S.No.	Subject Name	SUB CODE	COURSE OUTCOMES	
	1	Complex Variables and Transforms	19A54302	CO1	Understand the analyticity of complex functions and conformal mappings.
				CO2	To Evaluate improper integrals of complex functions using Residue theorem.
				CO3	To Evaluate of complex functions using Cauchy's Integral Formula and Complex Power Series.
				CO4	Understand the usage of Laplace Transforms, Fourier Transforms and Z transforms
				CO5	Evaluate the Fourier series expansion of periodic functions.
	2	Signals & Systems	19A04301	CO1	Understand the mathematical description and representation of continuous-time and discrete-time signals and systems. & Also Understand the concepts of various transform techniques.
				CO2	Analyze the continuous-time and discrete-time signals and systems using Laplace and Z-transforms
				CO3	Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems
				CO4	Analyze the frequency spectra of various continuous-time and discrete-time signals using different transform methods.
				CO5	Classify the systems based on their properties and determine the response of them.
	3	Electronic Devices and Circuits	19A04302T	CO1	Explain the concept of PN junction diode and apply concept to developing rectifiers.
				CO2	Study the characteristics of special purpose diodes and BJT with characteristics.
				CO3	Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze low frequency and high frequency models of BJT and FET.
				CO4	Design various biasing circuits for BJT and FET.
				CO5	Compare the performance of various semiconductor devices.

**II YEAR-I
SEM**

4	Probability Theory and Stochastic Processes	19A04303	CO1	To understand the concepts of a Random Variable and operations that may be performed on a single Random variable.
			CO2	To understand the concepts of Multiple Random Variables and operations that may be performed on a multiple Random variable.
			CO3	Apply the different operations to multiple random variables and also Understand the concepts of linear transformation of Gaussian random variables .
			CO4	Understand and analyze continuous and discrete-time random processes , Analyze the concepts and its properties of auto correlation, cross correlation functions and power spectral density
			CO5	Describe the theory of stochastic processes to analyze linear systems Apply the knowledge to linear systems; low pass and band pass noise models for random processes
5	Digital Electronics and Logic DesignPROCESS ES	19A04304	CO1	To understand and analyze the different types of number systems, Boolean algebra, its simplification and K – map and tabular simplification techniques
			CO2	Apply Boolean algebra for describing combinational digital circuits, various Combinational logic circuits such as decoders and multiplexers.
			CO3	To Design synchronous sequential circuits using flip flops and construct digital systems using components such as registers and counters .
			CO4	ToDesign the different types of RAM & ROM, Programmable Logic Devices.
			CO5	To Summarize significance of various TTL , I2L, ECL and CMOS subfamilies. Analyze the characteristics of digital ICs such as speed, power dissipation, figure of merit, fan-out, noise immunity etc
6	Electrical Technology	19A02304T	CO1	Understanding and analyzing of Construction, working, classification of generators and analyzing the characteristics and applications of DC generators.
			CO2	Understanding and analyzing the DC motors and its types, able to perform the different tests on dc motors and determine the performance
			CO3	Understanding and analyzing the transformers and its types, able to perform the different tests on transformers and determine the performance.
			CO4	Understanding and analyzing the three phase induction motors and its types.
			CO5	To Explain the Construction, Principle of operation of Synchronous Machines.

7	Electronic Devices and Circuits Lab	19A04302P	CO1	Understand the basic characteristics and applications of basic electronic devices.
			CO2	Observe the characteristics of electronic devices by plotting graphs
			CO3	Analyze the Characteristics of UJT, BJT, FET, and SCR
			CO4	Design FET based amplifier circuits/BJT based amplifiers for the given specifications
			CO5	Simulate all circuits in PSPICE /Multisim
8	Electrical Technology Lab	19A02304P	CO1	To understand various characteristics of DC generators.
			CO2	To understand various characteristics of DC motors
			CO3	To predetermine the efficiency and regulation of a 1- ϕ transformer
			CO4	To know power measurement in 3- ϕ circuits
			CO5	To understand various characteristics of Induction motors, Synchronous machines
9	Basic Simulation Lab	19A04305	CO1	Understand the basic concepts of programming in MATLAB and explain use of built-in functions to perform assigned task.
			CO2	Generate signals and sequences, Input signals to the systems to perform various operations
			CO3	Analyze signals using Fourier, Laplace and Z-transforms
			CO4	Compute Fourier transform of a given signal and plot its magnitude and phase spectrum
			CO5	Verify Sampling theorem, Determine Convolution and Correlation between signals and sequences
1	Antennas and Wave Propagation	19A04502	CO1	Understand various antenna parameters, principle of operation of various antennas
			CO2	Derive expressions related to radiation mechanism for antennas
			CO3	Derive expressions related to radiation mechanisms for Horn antenna, Reflector antenna , lens antenna
			CO4	Derive various antennas namely microstrip antenna, lens antenna and aperture antenna
			CO5	Discuss various EM wave propagation methods in ionosphere and troposphere.
			CO6	Analyze mathematical aspects of wave propagation

2	English Language Skills	19A52601T	CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
			CO2	Apply grammatical structures to formulate sentences and correct word forms.
			CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions.
			CO4	Comprehend complex texts and identify the author's purpose
			CO5	Express thoughts and ideas with acceptable accuracy and fluency
			CO6	Demonstrate ability to use grammatically correct structures and a wide range of vocabulary
3	Digital Communications	19A04503T	CO1	To convert analog signal into digital and analyze, discuss various source encoding systems used in digital communications
			CO2	To design and analyze the baseband receivers which improves SNR, Probability of error in digital communications
			CO3	To Understand the concepts of signal space analysis and examine the characteristics of maximum likelihood decoder and to analyze correlation receiver
			CO4	To analyze & design the different digital modulation techniques, generation and detection, power spectra and their probability of error performance.
			CO5	To understand various error control encoding and decoding techniques & Apply information theory and linear algebra in source coding and channel coding.
			CO6	To Apply the knowledge of signals and system & statistical theory for geometric representation of Signals & evaluate the performance of digital communication systems
4	Integrated Circuits and Applications	19A04501T	CO1	Examine performance of Op-Amp in open loop and closed configurations and its characteristics.
			CO2	Design circuits such as amplifiers, comparator, differentiators and integrators using operational amplifiers for various applications, Design active filters and oscillators using Op amp for given specifications.

III YEAR I-SEM		Applications		CO3	To impart Knowledge on nonlinear applications of Op-Amp.
				CO4	To describe the operation and characteristics of data converters.
				CO5	To familiarize specialized IC's 555,VCO,PLL& voltage regulators
	5	Data Communications and Networks N	19A04504a	CO1	Remember & Understand the requirement of theoretical & practical aspects of computer networks,functions of various layers involved in data communications
				CO2	Understand principles of data communication using transmission (guided and wireless) media & concepts of switching techniques, basics of DSL, SONET, and IEEE standards.
				CO3	Understand the principles of error control protocols, multiple access protocols, routers and switches in data link layer & List the different connecting devices for networking
				CO4	Apply the knowledge on different routing algorithms and measure their performance metrics.
				CO5	Distinguish between the connection oriented and connection less transport protocols & explain the role of protocols in networking
				CO6	Discuss the importance of application layer and the terminology like FTP, HTTP, SMTP, SNMP, TFTP etc., & P2P file sharing and socket programming
	6	Technical Communication and Presentation Skills	19A52506a	CO1	Understand the importance of effective technical communication,
				CO2	Apply the knowledge of basic skills to become good orators
				CO3	Analyze non-verbal language suitable to different situations in professional life
				CO4	Evaluate different kinds of methods used for effective presentations
				CO5	Create trust among people and develop employability skills
	7	Integrated Circuits and Applications	19A04501P	CO1	Understand the working of Op amp ICs & Application specific analog ICs.
			CO2	Analyze operational amplifier based circuits for linear and non-linear applications	
			CO3	Design Operational amplifiers for linear and nonlinear application, Multivibrator circuits using 555 & application specific ICs.	

	Applications Lab		CO4	Simulate all linear and nonlinear application based Op amp Circuits and circuits based on application specific ICs
			CO5	Compare theoretical, practical & simulated results in integrated circuits.
8	English Language Skills Lab	19A52601P	CO1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
			CO2	Apply communication skills through various language learning activities
			CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for fluency in spoken English.
			CO4	Evaluate and exhibit acceptable etiquette essential in social and professional settings.
			CO5	Create awareness on mother tongue influence and neutralize it in order to improve better listening and speaking comprehension.
9	Digital Communications Lab	19A04503P	CO1	Understand real time behavior of different digital modulation schemes
			CO2	Technically visualize spectra of different digital modulation schemes.
			CO3	Design and implement different modulation and demodulation techniques.
			CO4	Analyze digital modulation & demodulation techniques.
			CO5	Simulate all digital modulation and demodulation techniques in MATLAB.
1	Electromagnetic Waves and Transmission lines	19A04401	CO1	Understand basic laws of static electric fields, Maxwell's equations for electrostatic fields, problems applying laws of electrostatics.
			CO2	Understand basic laws of static magnetic fields, Maxwell's equations for static magnetic fields, problems applying laws of magneto statics.
			CO3	Analyze electric and magnetic fields at the interface of different media, Understand concept of wave propagation through the Maxwell's equations.
			CO4	Understand principles of reflections and refraction for different incidences, concept of power flow using Poynting vector, Brewster angle, and surface impedance.
			CO5	Describes the transmission lines with equivalent circuit and explain their characteristic with various lengths.

2	Electronic Circuits – Analysis and Design	19A04402T	CO1	Understand the concept of small signal analysis of BJT & MOSFET amplifiers with different performance parameters like impedance, admittance and gain etc.
			CO2	Analyze the frequency responses of single stage amplifiers of BJT& FET at high and low frequencies.
			CO3	Understand the basic concept and need of Differential and Multistage Amplifiers with examples.
			CO4	Understand the effects and concept of feedback amplifiers and Oscillators with examples.
			CO5	Understand the Classes of Power amplifiers and Tuned amplifiers and determine Efficiency and resonant frequencies.
3	Control Systems	19A02404	CO1	To understand the basic Concepts of Control Systems Engineering
			CO2	Identify, formulate and Analyse the complex problems in control engineering
			CO3	Determine the absolute and relative stability of a system using RH and Root loci concepts.
			CO4	Analyse & Evaluate the stability of the system and design of Bode, polar, Nyquist and compensation networks
			CO5	Describe the state variable representation of physical system and solve the state equation
4	Analog Communications	19A04403T	CO1	Understand the concepts of various Amplitude, Angle and Pulse Modulation schemes & information theory with random processes.
			CO2	Apply the concepts to solve problems in analog and pulse modulation schemes.
			CO3	Analysis of analog communication system in the presence of noise
			CO4	Compare and contrast design issues, advantages, disadvantages and limitations of various modulation schemes in analog communication systems.
			CO5	Solve basic communication problems & calculate information rate and channel capacity of a discrete communication channel.
			CO1	Demonstrate the fundamentals of Python Programming and Solve the problems by applying Modularity Principles of Python.
			CO2	Evaluate Conditional Execution and Applying recursions to solve problems.

II YEAR II SEM	5	Python Programming	19A05304T	CO3	Use Data structures to enhance the execution and Designing programs for string operations
				CO4	Applying object oriented concepts and Organize data in the form of files.
				CO5	Illustrate the principles of inheritance and Define classes and its features.
	6	Computer Architecture and Organization	19A04404	CO1	represent various data types found in digital computers in binary form & Emphasize representation of numbers employed in arithmetic operations and on binary coding of symbols used in data processing.
				CO2	Describe organization and design of a basic digital computer & Illustrate techniques used in assembly language programming.
				CO3	Develop execution unit to show general register organization of a typical CPU & Discuss characteristics and advantages of reduced instruction set computer(RISC)
				CO4	Develop specific micro-programmed control unit to show how to write microcode for a typical set of instructions .
				CO5	Explain how processor interacts with external peripherals through Interface units & Compare different modes of data transfer.
	7	Universal Human Values	19A52301	CO1	Students are expected to understand the importance of human values and remember while dealing with their lives and their surroundings (family, society, nature)
				CO2	They understand and become more responsible in life, and apply values in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
				CO3	They would have better critical ability, analyze the practical life situations and apply morals in everyday life..
				CO4	They would also become sensitive to their commitment and evaluate what they have understood (human values, human relationship and human society).
				CO5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings and analyze in real life, a beginning would be made in the direction of creating harmony in self, family, society and nature..
				CO1	Understand Characteristics and frequency response of various amplifiers.

	8	Electronic Circuits – Analysis and Design Lab	19A04402P	CO2	Analyze negative feedback amplifier circuits, oscillators, Power amplifiers, Tuned amplifiers.
				CO3	Determine the efficiencies of power amplifiers
				CO4	Design RC and LC oscillators, Feedback amplifier for specified gain and multistage amplifiers for Low, Mid and high frequencies
				CO5	Simulate all the circuits and compare the performance
	9	Analog Communications Lab	19A04403P	CO1	Understand different analog modulation techniques & Radio receiver characteristics.
				CO2	Analyze different analog modulation techniques.
				CO3	Design and implement different modulation and demodulation techniques.
				CO4	Observe the performance of system by plotting graphs & Measure radio receiver characteristics.
				CO5	Simulate all digital modulation and demodulation techniques
	1	DIGITAL SIGNAL PROCESSING	19A04602T	CO1	Understand the basic concepts of IIR and FIR filters, DSP building blocks to achieve high speed in DSP processor, DSP TMS320C54XX architecture and instructions.
				CO2	Compute the fast Fourier transforms and find the relationship with other transforms. Realization of digital filter structures
				CO3	Design of FIR and IIR digital filters.
				CO4	Compare FIR and IIR filters.
				CO5	Analyze and implement the signal processing algorithms in DSPs.
	2	DIGITAL SYSTEM DESIGN THROUGH VHDL	19A04603	CO1	understand the architecture of FPGAs, tools used in modeling of digital design and Modeling styles in VHDL.
				CO2	learn the IEEE Standard 1076 Hardware Description Language (VHDL).
				CO3	Analyze and design basic digital circuits with combinatorial and sequential logic circuits Using VHDL.
				CO4	Model complex digital systems at several levels of abstractions, behavioral, structural.
			CO5	Design complex digital CPU, vending machine and washing machines and analyze the case studies.	

**III YEAR
II SEM**

3	MICROPROCESSORS AND MICROCONTROLLERS	19A04601T	CO1	Understand instruction set of 8086 microprocessor and ARM architecture
			CO2	Explain addressing modes of 8086 and develop assembly language programs for various problems.
			CO3	Describe interfacing of 8086 with peripheral devices.
			CO4	Understand the ARM Cortex M0 and develop assembly language programs ARM Cortex M
			CO5	Distinguish between microprocessor and microcontrollers of 8085& 8086 microprocessors and design applications using microcontrollers.
4	ELECTRICAL MEASUREMENTS & ELECTRONIC INSTRUMENTS	19A04605d	CO1	Remember the basic definitions of some important measurement parameters of electrical and electronic instruments.
			CO2	Understand the basic principles of different measuring meters (voltage, current, and other passive parameters), CROs, and transducers.
			CO3	Apply the knowledge of DC and AC meters while solving problems related to measurement errors
			CO4	Analyze the performance of various electric and electronic instruments like energy meters, analog & digital meters, CROs, function generators and signal generators
			CO5	Design the AC& DC multi-meters function generators and function generators for the given specifications
5	Soft Skills	19A52604a	CO1	Recognize the importance of verbal and non verbal skills
			CO2	Develop the interpersonal and intrapersonal skills
			CO3	Apply the knowledge in setting the smart goals and achieve the set goals.
			CO4	Analyze difficult situations and solve the problems in stress-free environment.
			CO5	Create trust among people and develop employability skills.
6	BUSINESS ETHICS AND CORPORATE GOVERNANCE	19A52602c	CO1	Understand business ethics and ethical practices in management.
			CO2	Understand the role of ethics in management
			CO3	Apply the knowledge in cross cultural ethics
			CO4	Analyze law and ethics
			CO5	Evaluate corporate governance
			CO1	Ability to design-test, to verify, to evaluate, and to benchmark a real-time DSP system.

	7	Digital Signal Processing Lab	19A04602P	CO2	Ability to calculate discrete time domain and frequency domain of signals using discrete Fourier series and Fourier transform.
				CO3	Ability to design, using MATLAB-based filter design techniques, FIR and IIR digital filters and Determine the frequency response of filters.
				CO4	Implementation of basic signal processing algorithms such as convolution, difference equation implementation and application of them in the construction of FIR and IIR filters.
				CO5	Design DSP based real time processing systems to meet desired needs of the society
	8	Microprocessors and Microcontrollers Lab	19A04601P	CO1	Execution of different programs for 8086 in Assembly Level Language using MASM Assembler
				CO2	Execution of different programs for 8051 in Assembly Level Language using MASM Assembler
				CO3	understanding to the Keil MDK-ARM tool & Processing C and Assembly coding.
				CO4	Execution of different programs for ARM Cortex M0 in Assembly Level Language
				CO5	Design and implement some specific real time applications.



HOD-ECE