ESWAR COLLEGE OF ENGINEERING

(Approved by AICTE, & Affiliated to JNTUK, A.P.)

KESANUPALLI (V), NARASARAOPETA-522549, AP

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Department of Electronics and Communication Engineering

Course Outcomes

A.Y:2023-2024

Regulation R20

Year/Sem: II B.Tech I SEM

Course Name: **Electronic Devices and Circuits**	
Course Code: **EC2101**	
EC2101.1	Apply the basic concepts of semiconductor physics.
EC2101.2	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
EC2101.3	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons
EC2101.4	Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
EC2101.5	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
EC2101.6	Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations

Course Name: **Switching Theory and Logic Design**	
Course Code: **EC2102**	
EC2102.1	Classify different number systems and apply to generate various codes
EC2102.2	Use the concept of Boolean algebra in minimization of switching functions
EC2102.3	Design different types of combinational logic circuits.
EC2102.4	Apply knowledge of flip-flops in designing of Registers and counters
EC2102.5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
EC2102.6	Produce innovative designs by modifying the traditional design techniques.

Course Name: **Signals and Systems**	
Course Code: **EC2103**	
EC2103.1	Differentiate the classification of signals as well as systems operations on signals and signal approximation.
EC2103.2	Analyse the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier series
EC2103.3	Analyse the spectral characteristics of continuous-time periodic and aperiodic signals Using Fourier transform.
EC2103.4	Able to learn sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back
EC2103.5	Define and evaluate the concept of convolution and filters such as LPF,HPF,BPF ,correlation functions.
EC2103.6	Apply laplace-transform to analyze continuous--time signals and systems and z-transform to analyze discrete-time signals and systems.

Course Name: **Probability Theory and Stochastic Processes**	
Course Code: **EC2105**	
EC2105.1	Able to Identify random variables and Define and manipulate distribution and densityfunctions.
EC2105.2	Able to Compute various operations like expectations, variances, etc. from probability density functions and probability distribution functions.
EC2105.3	Able to Characterize probability density and distribution function for multiple random variables
EC2105.4	Able to perform operations on Multiple random variables
EC2105.5	Explain the concept of random process, differentiate between stochastic and ergodic processes
EC2105.6	Illustrate the concept of random processes and determine covariance and spectral density of stationary random processes, Analyze the LTI systems with random inputs and understand the concept of noise

Course Name: DS Through Python Lab	
Course Code: **EC2106**	
EC2106.1	Identify classes, objects, members of a class and the relationship among them needed for as pacific problem
EC2106.2	Implement programs to distinguish different forms of inheritance
EC2106.3	Create packages and to reuse them
EC2106.4	Develop programs using Exception Handling mechanism
EC2106.5	Develop multithreaded application using synchronization concept
EC2106.6	Design GUI based applications using Swings and AWT.

Course Name: Electronic Devices and Circuits Lab	
Course Code: **EC2107**	
EC2107.1	Ability to analyze PN junctions in semiconductor devices under various conditions.
EC2107.2	Ability to analyzeZener in semiconductor devices under various conditions.
EC2107.3	Ability to design and analyze simple rectifiers and voltage regulators using diodes
EC2107.4	Ability to design and analyze simple BJT and FET circuits.
EC2107.5	Know the CRO and CRO uses
EC2107.6	Ability to design and amplify the BJT and FET

Course Name: Switching Theory and Logic Design–Lab	
Course Code: **EC2108**	
EC2108.1	Test the operation of different logic gates using relevant IC's.
EC2108.2	Examine the operation of different combinational logic circuits.
EC2108.3	Apply the concept of Boolean algebra or k-maps to reduce and Construct logic circuit for given function
EC2108.4	Analyse the Truth tables of different Flip-Flops.
EC2108.5	Design of registers using sequential logic circuits.
EC2108.6	Design of Synchronous and Asynchronous counters using Flip-Flops

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Year/Sem: III B.Tech I SEM

Course Name: Analog ICs and Applications	
Course Code **EC3101**	
EC3104.1	Describe the characteristics of operational amplifiers.
EC3104.2	Design the various linear and non-linear applications of op-amp.
EC3104.3	Design the Active filters using Operational Amplifier
EC3104.4	Describe the Op-Amp and internal Circuitry: 555 Timer, PLL
EC3104.5	Discuss the Applications of Operational amplifier: 555 Timer, PLL
EC3104.6	Use the Op-Amp in A to D & D to A Converters

Course Name: Electromagnetic Waves and Transmission Lines	
Course Code: **EC3102**	
EC3102.1	Acquire knowledge on various types of transmission lines, derive transmission-line equations from a circuit model in terms of primary and secondary constants
EC3102.2	Derive and Calculate the expressions for input impedance of transmission lines, reflection coefficient, VSWR etc. using smith chart
EC3102.3	Determine E and H using various laws and applications of electric & magnetic fields
EC3102.4	Apply the Maxwell equations to analyze the time varying behaviour of EM waves
EC3102.5	Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media
EC3102.6	. Calculate Brewster angle, critical angle and total internal reflection

Course Name: Digital Communications	
Course Code: **EC3103**	
EC3103.1	Define and Determine the performance of pulse digital modulation techniques such as PCM,DPCM,DM,ADM.
EC3103.2	Elaborate the principles of digital modulation techniques like ASK, FSK, PSK, DPSK, and QPSK.
EC3103.3	Determine the probability of error for digital modulation schemes such as FSK,ASK, BPSK
EC3103.4	Determine the probability of error for digital modulation schemes such as BPSK, BFSK, and QPSK.
EC3103.5	Understand the concept of digital information over the channel, Analyze different source coding techniques Shanon-Fano coding, Huffman coding etc.
EC3103.6	Able to Compute and analyze different error control coding schemes along with different domain approaches.

Course Name: **Professional Elective courses -1 (Electronic Measurements and Instrumentation)**	
Course Code: **EC3105**	
EC3105.1	Select the instrument to be used based on the requirements.
EC3105.2	Understand and analyze different signal generators and analyzers.
EC3105.3	Understand the design of oscilloscopes for different applications
EC3105.4	Understand the design of Digital oscilloscopes for different applications
EC3105.5	Design and derive the different bridges
EC3105.6	Design different transducers for measurement of different parameters

Course Name: **Analog ICs and Applications LAB**	
Course Code: **EC3106**	
EC3106.1	Design and analyse the various linear application of op-amp
EC3106.2	Design and analyse the various non-linear application of op-amp
EC3106.3	Design and analyse filter circuits using op-amp
EC3106.4	Design and analyse oscillators and multivibrator circuits using op-amp
EC3106.5	Design and analyse the various application of 555 timer
EC3106.6	Analyse the performance of oscillators and multivibrators using PSPICE.

Course Name: **Digital Communications Lab**	
Course Code: **EC3107**	
EC3107.1	Able to understand basic theories of Digital communication system in practical.
EC3107.2	Able to design and implement different modulation and demodulation techniques.
EC3107.3	Able to analyze digital modulation techniques
EC3107.4	Able to identify and describe different techniques in modern digital communications, in particular in source coding
EC3107.5	Able to perform channel coding.
EC3107.6	Able to detect and correct errors using LBC,Binary Cyclic codes & detect dual bit errors in Convolution codes

Course Name: **Data Structures using Java Lab**	
Course Code: **EC3108**	
EC3108.1	To examine the components that form an abstract data type(ADT),also implement a programmer – defined ADT in Java
EC3108.2	Create to implementations of the Stack ADT and Queue ADT one based on an array representation of stack and the other based on a singly linked list representation.
EC3108.3	Determining and Analyzing the execution times of sorting and searching routines .
EC3108.4	Computation of shortest paths by dfs and bfs for a given graph
EC3108.5	Simulating the flow of tasks in an operating system using priority queue ADT
EC3108.6	Computation of shortest paths by dfs and bfs for a given graph Implementation of KMP pattern matching algorithm using JAVA.

Course Name:**Indian Traditional Knowledge**	
Course Code: **EC3109**	
EC3109.1	Identify the concept of Traditional knowledge and its importance.
EC3109.2	Explain the need for and importance of protecting traditional knowledge
EC3109.3	Illustrate the various enactments related to the protection of traditional knowledge.
EC3109.4	Interpret the concepts of Intellectual property to protect the traditional knowledge.
EC3109.5	Explain the importance of Traditional knowledge in Agriculture and Medicine.
EC3109.6	Explain the importance of Traditional knowledge in Agriculture and Medicine.

Course Name: **Summer Internship 2 Months**	
Course Code: **EC3110:**	
EC3104.1	Understanding the modern tools used in the field of Electronics and Communication engineering for product development
EC3104.2	Work in real time situations in industries through hands on job execution
EC3104.3	Apply theoretical aspects to solve engineering problems in the industries
EC3104.4	Understand the resources requirement and planning to facilitate the Internship success.

Year/Sem: IV B.Tech I SEM

Course Name: **Professional Elective courses -3 (Digital Image Processing)**	
Course Code **EC4101**	
EC4101.1	Know the fundamentals of a digital image processing; representation of digital images in transform domain; and various mathematical transforms necessary for image processing.
EC4101.2	Learn and implement various Intensity transformations and spatial filtering methods in image enhancement and image restoration process.
EC4101.3	To know Image Restoration and Reconstruction process by using different mathematical approaches.
EC4101.4	To understand compressing images by using different mathematical approaches.
EC4101.5	To know image segmentation by the detection of point,line and edges in images, edge linking through local/global processing.
EC4101.6	To Analyze pseudo and full color image processing techniques

Course Name: **Professional Elective courses -4 (Satellite Communications)**	
Course Code: **EC4102**	
EC4102.1	Able to learn the basic concepts of applications, frequencies used and types of satellite communication.Able to Explore the concepts of orbital mechanics and launchers in
EC4102.2	Able to learn satellite sub systems used for tracking and commanding
EC4102.3	Derive the expression for G/T ratio and C/N Ratio of the satellite system
EC4102.4	Able to analyse the satellite link with specified G/T and C/N Ratios
EC4102.5	Know various types of multiple access techniques and Understand Earth station

	technology with earth orbits.
EC4102.6	Define the concepts of GPS and its architecture, Know architecture of earth station and constellation Designs

Course Name: **Professional Elective courses -5 (Internet of Things)**	
Course Code: **EC4103**	
EC4103.1	Explain in a concise manner how the general Internet as well as Internet of Things work
EC4103.2	Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
EC4103.3	Use basic sensing and measurement and tools to determine the real-time performance of network of devices.
EC4103.4	Apply knowledge of security aspects for data acquiring, and authentication.
EC4103.5	Develop prototype models for various applications using IoT technology.
EC4103.6	

Course Name: **Open Elective Courses/ Job oriented elective -3 (Cloud Computing)**	
Course Code: **EC4104**	
EC4104.1	Understand and analyze the architecture of Cloud (Analyze).
EC4104.2	Cloud Service Models Software as a Service (SaaS)(PAAS)
EC4104.3	What is Virtualization
EC4104.4	Types of Hypervisor, and Load balancing.
EC4104.5	Identify and apply deployment and management options of AWS Cloud Architecture (Apply).
EC4104.6	Design architectures to decouple infrastructure and reduce interdependencies (Create).

Course Name: **Open Elective Courses/ Job oriented elective -4 (Cyber Security)**	
Course Code: **EC4105**	
EC4105.1	Understanding Cyber Security architecture principles
EC2105.2	Identifying system and application security threats and vulnerabilities
EC2105.3	Identifying different classes of attacks
EC2105.4	Cyber security incidents to apply appropriate response
EC2105.5	Describing risk management processes and practices
EC2105.6	Evaluation of decision making outcomes of Cyber Security scenarios

Course Name: **Humanities and Social Science Elective(UNIVERSAL HUMAN VALUES)**	
Course Code: **EC4106**	
EC4106.1	By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature)
EC4106.2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
EC4106.3	They would have better critical ability. They would also become sensitive to their commitment towards
EC4106.4	They have understood (human values, human relationship and human society).

EC4106.5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
EC4106.6	This is only an introductory foundational input. It would be desirable to follow it up by a) faculty-student or mentor-mentee programs throughout their time with the institution b) Higher level courses on human values in every aspect of living. E.g. as a professional

Course Name: **Designer tools Lab**	
Course Code: **EC4107**	
EC4107.1	Able to propose a complex engineering problem using mathematical knowledge
EC4107.2	Able to identify problems those are carried by engineering knowledge
EC4107.3	Able to learn how to conduct detailed investigation on a research problem
EC4107.4	Able to learn how to use modern tools to carry the research problem
EC4107.5	Design a model using contextual knowledge useful for social need
EC4107.6	Able to learn regarding development of a system in an ethical way.