BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLGY & SCIENCE
(Approved by AICTE, Permanently Affiliated to JNTUK, Kakinada, Accredited by NAAC with 'A' Grade)
Batlapalem, Amalapuram, Indupalli Post, Dr. B. R. A. Konaseema Dist. AP, INDIA – 533201.
Phone No: 08856 – 235416, e – Mail: bvts@bvcgroup.in , Website: www.bvcits.edu.in
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

3.1.1. Course Outcomes (COs) (SAR should include course outcomes of one course from each semester of study, however, should be prepared for all courses and made available as evidence, if asked) (05)

2018 – 22 Batch

AY: 2019 – 20

Electronics Devices and Circuits (C211)	
C211.1	Explain the Semiconductor physics concepts
C211.2	Summarize the formation of junctions in PN junction diode and characteristics of various special diodes
C211.3	Understand the working principal of rectifiers with and without filters
C211.4	Understand the principal of operation and characteristics of bipolar junction transistors and FET
C211.5	Demonstrate the need of biasing and also examine various biasing concepts
C211.6	Analysis the performance of small signal low frequency transistor amplifier models of BJT and FET
Electromagnetic Waves and Transmission Lines (C223)	
C223.1	Summarize coordinate systems and vector algebra and Define coulombs law and Gauss law for the electrostatic fields
C223.2	Explain magneto static fields and important deductions made from Maxwell's equations.
C223.3	Analyze A uniform plane equation and EM wave characteristics in different propagating mediums
C223.4	Analyze and solve the problems of EM wave propagation in both perfect conductor and perfect dielectrics for normal and oblique incidences and compute Brewster angle and critical angle
C223.5	Choose transmission lines with equivalent circuit and compute the input impedance of transmission lines

C223.6	Solve the reflection coefficient, VSWR by using smith chart for UHF transmission lines

AY: 2020 – 21

Digital Communications (C314)	
C314.1	Understand basic pulse digital modulation schemes of Digital Communication Systems.
C314.2	Discuss various Digital Modulation techniques.
C314.3	Analyze the error performance of Digital Modulation Techniques
C314.4	Apply information theory and source coding techniques to increase coding efficiency.
C314.5	Analyze various source coding techniques and capacity of analog, digital and Gaussian channel
C314.6	Identify error detection and error correction capabilities of linear block and convolution codes.
Digital Signal Processing (C324)	
C324.1	Explain the Discrete Time Signals and Systems
C324.2	Explain the importance of FFT algorithm for computation of Discrete Fourier Transform
C324.3	Classify of various implementations of digital filter structures
C324.4	Examine the function of FIR and IIR Filter design procedures
C324.5	Explain the Multi-rate Processing
C324.6	Examine the concepts of DSP Processors

AY: 2021 – 22

Electronic Switching Systems (C415)	
C415.1	Explain the need for switching systems and their evolution from analog to digital.
C415.2	Explain and discuss the public switched telephone network.
C415.3	Define private networks and integrated networks.
C415.4	Classify and compare the different types of networks.
C415.5	Illustrate the cellular telephone system.
C415.6	Examine the integrated services digital network and voice data integration.
Cellular Mobile Communications (C421)	
C421.1	Identify the limitations of conventional Mobile Telephone Systems; define the basic cellular mobile system.
C421.2	Explain Co-channel interference. Explain adjacent channel interference, near and far end interference.
C421.3	Distinguish cell site and mobile antennas.

C421.4	Analyze frequency management and mobile antennas.
C421.5	Define Handoff, Distinguish types of handoffs.
C421.6	Compare and contrast different multiple access schemes.

Coordinator

HOD

Head of the Department
Electronics & Communication Engineering
B.V.C. Institute of Technology and Science
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2019 – 23 Batch

AY: 2020 – 21

Random Variables and Stochastic Processes (C214)		
C214.1	Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena.	Understand
C214.2	Identify different types of random variables and compute statistical averages of these random variables.	Understand
C214.3	Analyze the joint distribution and marginal distribution functions of multiple random variables	Analyze
C214.4	Classify the random processes in the time and frequency domains	Analyze
C214.5	Analyze the LTI systems with random inputs.	Analyze
Electronic Circuit Analysis (C221)		
C221.1	Explain classification of amplifiers and analyze the CE, CB, CC amplifiers using small signal hybrid model and derive the voltage gain, current gain, input impedance and output impedance.	Understand
C221.2	Illustrate various methods of coupling in multistage amplifiers by using Transistors.	Apply
C221.3	Develop and classify the different types of feedback amplifiers.	Analyze
C221.4	Design and analyze different types of oscillators	Analyze
C221.5	Classify various power amplifiers. Design and analyze the effects of cascading on single, double tuned amplifiers on bandwidth and explain their stability	Analyze

AY: 2021 – 22

Linear Integrated Circuits and Applications (C311)		
C311.1	Summarize types of Differential Amplifier configurations & performance parameters of differential amplifiers.	Understand
C311.2	Construct the Linear & Non-Linear applications of Op-Amp.	Apply
C311.3	Analyze different types of Op-Amp Active filters to solve the frequency response characteristics and summarize the Analog multipliers and Sample & Hold circuits.	Analyze
C311.4	Understand the functional blocks & Explain the applications of IC's 555 Timer,565 PLL and 566 VCO	Understand

C311.5	Analyze various types of DAC and ADC techniques and characteristics.	Analyze
Digital Signal Processing (C323)		
C323.1	Analyze the Discrete Time Signals and Systems in Time and Frequency Domain and Review of Z-Transforms.	Analyze
C323.2	Examine the properties of Discrete Fourier Series and Discrete Fourier Transforms and Explain the linear filtering methods based on DFT and FFT algorithms.	Apply
C323.3	Illustrate the analog filter approximations techniques and various implementations of IIR digital filter structures.	Apply
C323.4	Determine the different window techniques and frequency sampling techniques of FIR digital filter	Apply
C323.5	Explain the programmable DSPs features and architectural features of different ARM processors	Understand

AY: 2022 – 23

Data Communications & Computer networks (C412)		
C412.1	Have knowledge on the data communication components, types of networks, distributed processing Reference model and TCP/IP protocol suite, addressing concepts, and wireless LANs	Understand
C412.2	Have knowledge about services performed by data link layer such as error detection and error correction and analyses the noisy and noiseless channels completely	Analyze
C412.3	Have knowledge on functions of networks layer, forwarding and routing, and the Internet Protocol (IP) and its versions	Understand
C412.4	Analyze about the services offered by transport layer and study the TCP and UDP protocols concepts related to them	Analyze
C412.5	Apply the transport layer protocols to applications and application layer functions	Apply
Wireless Communication (C421)		
C422.1	Explain About Various Wireless Communication Concepts Like 2G,3G,4G Wireless Communication.	Understand
C422.2	Analyze CDMA Process and Related Topics of Wireless Communication	Analyze
C422.3	Analyze The Multiple-Input Multiple-Output of Wireless Communication	Analyze
C422.4	Apply OFDM Concept to Wireless Communication	Apply
C421.5	Explain About Satellite Wireless System Like Transponders and Geostationary Satellites	Understand

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COURSE OUTCOMES

BATCH 2018-22

FIRST YEAR FIRST SEMESTER (I – I)		
ENGLISH- I (C111)		
CO #	**COURSE OUTCOME**	**BTL**
C111.1	Classify and compare different resources to serve the needs of the society in different ways.	Understand
C111.2	Apply road safety measures in day to day life in different modes of transport and Write paragraphs effectively.	Apply
C111.3	Apply science and technology in inventing latest engineering tools to discern their advantages and disadvantages.	Apply
C111.4	Choose viable and alternative sources of energy to tide over the crisis of depleting sources.	Evaluate
C111.5	Grasp the significance of bio-diversity and ecological balance like preservation of Flora and Fauna and enhance skills in writing.	Understand
C111.6	Identify safety measures against hazards at home, labs, industry and work places as well and familiarize themselves with office etiquette, ethics and enhance skills in writing.	Analyze
Mathematics – I (C112)		
C112.1	Solve the first order differential equations and able to Apply physical problems.	Apply
C112.2	Solve higher order linear differential equations with constant coefficients.	Apply
C112.3	Find the Laplace transform of functions and evaluation of integrals and inverse Laplace transform of different functions and solve the differential equations using Laplace transform.	Evaluate
C112.4	Find the partial derivative of different orders, finding maxima and minima of function of two variable, three variables and functional dependence.	Evaluate
C112.5	: Find the partial derivative by elimination of arbitrary function and arbitrary constant. Solve the linear and non-linear PDE's.	Analyze
C112.6	Solve the partial differential equations using homogenous and non-homogenous.	Apply
Mathematics - II (C113)		
C113.1	Solve the algebraic and transcendental equations by different methods.	Apply
C113.2	Solve the different interpolation formulae to find a polynomial or the value of the polynomial at a given point.	Apply
C113.3	Find the Quadrature, the solutions of ordinary differential equations by different formulae.	Evaluate
C113.4	Interpret a function as a Fourier series Dirichlet's conditions.	Apply
C113.5	Solve the problems on Fourier transforms using real and complex functions.	Apply

C113.6	Demonstrate capacity to mode physical phenomena using PDE's and to Apply problem solving using concepts and techniques from PDE and Fourier analysis applied to diverse situation in physics, engineering mathematics.	Apply
	Applied Physics (C114)	
C114.1	Explain the physical significance of optics and hence estimate the speed of light, wave length, refractive index by using interference	Understand
C114.2	Explain the resolving power of various optical instruments like grating, telescope and micro scope	Understand
C114.3	Explain about polarized light and optical activity using polarization and describe the construction and working of various lasers	Understand
C114.4	Develop various engineering applications involving electromagnetic fields	Analyze
C114.5	Apply the knowledge of basic quantum mechanics and summarize the importance of free electrons in determine the properties of metals	Apply
C114.6	Classify materials as metals, insulators, semiconductors and explain the properties of semiconductors with application to the hall effect	Analyze
	Computer Programming (C115)	
C115.1	Demonstrate the basic components and software's used in computer programming language	Understand
C115.2	Develop and compile and debug programs in C language and Demonstrate syntaxes, predefine functions & operators in computer programming language.	Apply
C115.3	Build the c programs involving decision making statements, looping statements and understand the control flow of the program.	Create
C115.4	Choose Functions and Recursion concepts to solve the complex c programs.	Evaluate
C115.5	Discuss arrays, strings and develop c programs using string manipulation functions.	Create
C115.6	Analyze different file handling functions and dynamic memory management functions.	Analyze
	Engineering Drawing (C116)	
C116.1	Classify the basic concepts, methodologies of engineering drawing, visualize and construct curved profiles in developing new products like gears and other engineering applications.	Understand
C116.2	Construct various types of scales for engineering application like maps, buildings, bridges	Apply
C116.3	Analyze the concept of projections involving points and lines.	Analyze
C116.4	Analyze the theory of projection in planes and Apply in manufacturing processes.	Analyze
C116.5	Analyze the concept of projection of solids inclined to both the planes	Analyze
C116.6	Develop the orthographic projections and imagine the components by isometric projection by representing three dimensional objects in 2D in technical and engineering drawings.	Apply
	English - Communication Skills Lab I (C117)	
C117.1	Classify why study spoken English among the students to become successful in the competitive world.	Understand
C117.2	Analyze the students to make request asking for, giving and refusing permissions, asking for and giving directions in live situations.	Analyze
C117.3	Explain the students in classifying, inviting, complaining, congratulating, apologizing, advising, suggesting, agreeing and disagreeing and expressing sympathy.	Understand
C117.4	Evaluate the students about the English phonetics knowledge and the lack of one to one correspondence between the alphabet and the sounds of English,	Evaluate
C117.5	Analyze the students to know about consonant clusters in English in order to improve their pronunciation.	Analyze

C117.6	Identify the students about the principles of silent letters and pronunciation of inflections in English and enable the students to learn the important features of spoken language like stress and intonation.	Apply
Applied / Engineering Physics Lab (C118)		
C118.1	Explain the physical significance of optics and hence estimate the speed of light, wavelength, refractive index, etc. using interference.	Understand
C118.2	Explain the Resolving power of various optical instruments like grating, telescope & microscope.	Understand
C118.3	Explain the about polarized light and optical activity using polarization and describe the construction and working of various lasers.	Understand
C118.4	Analyze the certain physical quantities of a certain wire, tuning fork and compound pendulum	Analyze
C118.5	Apply the knowledge of basic quantum mechanics and summarize the importance of free electrons in determining the properties of Metals.	Apply
C118.6	Classify materials as metals, insulators, or semiconductors, and Explain the quantified properties of semiconductors with application to the Hall effect.	Analyze
Applied / Engineering Physics –Virtual Labs – Assignments (C119)		
C119.1	Explain the slit width, wavelength using LASER	Understand
C119.2	Explain the Numerical Aperture by using optical fiber.	Understand
C119.3	Verify the photo electric effect.	Understand
C119.4	Verify the laws of Damped oscillations and simple pendulum	Understand
C119.5	Determining the value by using B-H curve and Hysteresis	Understand
C119.6	Determining the value by using Hall effect.	Understand
Engineering Workshop & IT Workshop(C1110)		
C1110.1	Understand the basic components and peripherals of a computer	Understand
C1110.2	Demonstrate to become familiar in configuring a system.	Create
C1110.3	Analyze the usage of productivity tools.	Create
C1110.4	Evaluate the acquire knowledge about the netiquette and cyber hygiene.	Evaluate
C1110.5	Apply the effective decentralization and sustainable management at different level.	Apply
C1110.6	Create the concepts of patterns decentralization implementation	Create
FIRST YEAR SECOND SEMESTER (I – II)		
ENGLISH-II (C121)		
C121.1	Learn that the very purpose of education is to enhance knowledge and wisdom.	Understand
C121.2	Develop global harmony and peaceful co-existence among people and society.	Apply
C121.3	Discover different cultures due to globalization and manage different cultural shocks.	Analyze
C121.4	Examine outdated traditions in society with the application of wisdom.	Understand
C121.5	Learn to protect environment for peaceful existence of future generations and learn report writing for media.	Understand
C121.6	Get influenced by eminent personalities and build luminous future successfully with their inherent passion, interest and burning desire in their areas of interests.	Remember
Mathematics – III (C122)		
C122.1	Find Rank and Solve the linear system of equations by using different methods.	Apply
C122.2	Find the eigen values and eigen vectors and also finding inverse and power of a matrix by using Cayley Hamilton theorem. And also, diagonalize the matrix by using various methods. Finding Rank, Index, Signature and Nature of a Quadratic form.	Remember
C122.3	Tracing the curve for the given equation, evaluate the double and triple integrals by direct methods, change of order of integration and change of variables.	Analyze
C122.4	Evaluate the given integrals by using Beta and Gamma functions.	Evaluate

C122.5	Find the gradient of a scalar field, divergence and curl of vector field and vector identities.	Remember
C122.6	Evaluate the line, surface and volume integrals. Solve the problems using Vector integral theorems.	Evaluate
	Applied Chemistry (C123)	
C123.1	Analyze the concept of improvement of impact strength of plastic materials	Analyze
C123.2	Make use of electrochemical series while preparing different cells.	Apply
C123.3	Analyze and interprets the formation of different nano materials	Analyze
C123.4	Explain different forms of energy in atoms and molecules change upon interacting with electromagnetic radiation	Understand
C123.5	Utilizes the non- conventional energy resources purposefully	Apply
C123.6	obtain the knowledge of computational chemistry and molecular machines	Remember
	Electrical and Mechanical Technology (C124)	
C124.1	Explain the constructional details and principle of operation of dc machines and Acquire knowledge about the constructional details, principle of operation of transformers.	Understand
C124.2	Recall the constructional details and principle of operation of alternators and induction motors.	Remember
C124.3	Build various instruments and equipment's used for the measurement of various electrical engineering parameters.	Apply
C124.4	Classify the energy forms & its conversions, working of I.C. Engines & its performance parameters.	Understand
C124.5	Analyze the modes of Heat transfer for simple geometries.	Analyze
C124.6	Explain the Power transmission by drives and different manufacturing methods.	Understand
	Environmental Studies (C125)	
C125.1	Explain the eco system and its function in the Environment	Understand
C125.2	Aware the importance of natural resources and it's conservation	Understand
C125.3	Analyzes the diversity of life on Earth and its importance	Analyze
C125.4	Execute different programs in ecofriendly way	Apply
C125.5	Describe the different laws to protect our Environment	Analyze
C125.6	Conduct research in safe and Responsible manners communicating the Environmental subjects more effectively	Apply
	Data Structures (C126)	
C126.1	Obtained knowledge on understanding of the concepts that underlie linear and non-linear data structures.	Understand
C126.2	Be familiar in define mechanisms and analyze different operations like creation, insertion, deletion, traversing mechanism etc. on various data structures.	Analyze
C126.3	Obtained knowledge on understand and evaluate the given problem by choosing appropriate data structure.	Evalate
C126.4	Be familiar in learn about different trees like binary, threaded binary, heap etc.	Create
C126.5	Be analyzing different paths algorithms related to the issue of how to find a shortest path with minimum cost.	Analyze
C126.6	Obtained knowledge on to create different sorting techniques in data structures.	Apply
	Applied / Engineering Chemistry Lab (C127)	
C127.1	Develop better understanding of titration	Understand
C127.2	Explain the difference between solubility and dissociation in water and Apply this knowledge to acids and bases	Understand
C127.3	Estimate the hardness of water in terms of calcium and magnesium ions	Evaluate
C127.4	Apply safety rules in practice of laboratory investigations	Apply

C127.5	Analyze the strength of acids and bases by using conductometric titration	Analyze
C127.6	Explain the different instrumental methods of chemical analysis	Analyze
	English Communications Skills Lab II (C128)	
C128.1	Classify the students to participate in Debate as a competitive event.	Understand
C128.2	Analyze the students actively participate in group discussions following all the rules and using proper expressions.	Analyze
C128.3	Explain the students to impart various skills in making various types of presentations.	Understand
C128.4	Evaluate the students for an interview, the final stage in the selection process.	Evaluate
C128.5	Analyze the students with email writing, techniques and etiquette, to guide the students to write CV to suit different contexts.	Analyze
	Computer Programming Lab (C129)	
C129.1	Explain C programming development environment, compiling, debugging, and linking and executing a program using the development environment	Understand
C129.2	Develop real time applications using the power of C language features	create
C129.3	Apply the in-built functions and customized functions for solving the problems.	Apply
C129.4	Analyze logical thinking, Implement the algorithms and analyze their complexity, Identify the correct and efficient ways of solving problems	Analyze
C129.5	Create complexity of problems, modularize the problems into small modules and then convert them into programs	create
C129.6	Evaluate the Arrays, Strings, pointers, memory allocation techniques and use of files for dealing with variety of problems.	Evaluate
	SECOND YEAR FIRST SEMESTER (II – I)	
	Electronics Devices and Circuits (C211)	
C211.1	Explain the Semiconductor physics concepts	Understand
C211.2	Summarize the formation of junctions in PN junction diode and characteristics of various special diodes	Understand
C211.3	Understand the working principal of rectifiers with and without filters	Understand
C211.4	Understand the principal of operation and characteristics of bipolar junction transistors and FET	Understand
C211.5	Demonstrate the need of biasing and also examine various biasing concepts	Apply
C211.6	Analysis the performance of small signal low frequency transistor amplifier models of BJT and FET	Analyze
	Switching Theory and Logic Design (C212)	
C212.1	Explain about number systems, compliments form, 4-bit codes and conversion from one radix to another, Illustrate on logic gates, universal gates and error detection & correction codes.	Understand
C212.2	Explain about various theorems and postulates of Boolean algebra, solve logic functions using Boolean theorems and k-maps up to 6 variables	Apply
C212.3	Construct various combinational logic circuits like adders & multiplexers etc., Build Boolean functions using decoders and multiplexers	Apply
C212.4	Illustrate the PLD's and Develop Boolean functions by using PLA, PAL and PROM	Apply
C212.5	Construct various sequential logic circuits like flip-flops & counters etc., conversion from one Flip-flop to another,	Apply
C212.6	Explain about finite state machine and Analyze the clocked sequential circuits using state diagrams, state tables and Melay to Moore conversion.	Analyze
	Signals and Systems (C213)	
C213.1	Describe the concepts of various signals and systems and Orthogonal functions.	Understand
C213.2	Analyze the spectral characteristics of signals using Fourier analysis.	Analyze
C213.3	Apply sampling theorem to convert continuous time signals to discrete time signals.	Apply

C213.4	Analyze the convolutions and co-relations of LTI and LTV with relative functions.	Analyze
C213.5	Analyze the behavior of unstable systems using Laplace transforms.	Analyze
C213.6	Apply z transform for Discrete time signals and systems.	Apply
	Network Analysis (C214)	
C214.1	Make use of various laws and techniques to solve basic DC RLC circuits.	Apply
C214.2	Utilize Mesh and Node analysis and solve AC RLC circuits	Apply
C214.3	Experiment with the behavior of steady states and transient states in RLC circuits	Apply
C214.4	Identify the suitable theorem for solving various circuits	Apply
C214.5	Experiment with the two port network parameters	Apply
C214.6	Develop the filter design concepts in real world applications	Apply
	Random Variables and Stochastic Process (C215)	
C215.1	Demonstrate the random variables and Define and manipulate distribution and density functions	Apply
C215.2	Apply various operations like expectations, variances, etc. from probability density functions and probability distribution functions	Apply
C215.3	Compare probability models and function of random variables based on single & multiples random variables.	Analyze
C215.4	Explain the concept of random process, differentiate between stochastic and ergodic processes.	Understand
C215.5	Illustrate the concept of random processes and determine covariance and spectral density of stationary random processes.	Apply
C215.6	Apply the principles of a random process in system concepts.	Apply
	Managerial Economics and Financial Analysis (C216)	
C216.1	Explain the fundamental concepts of managerial economics	Understand
C216.2	Analyze various cost concepts.	Analyze
C216.3	Classify various pricing strategies and market structures	Understand
C216.4	Identify various forms of business organization.	Apply
C216.5	Analyze fundamental concepts of accounting and financial statements.	analyze
C216.6	Evaluate various alternative investment proposals to make a better capital budgeting decision	evaluate
	Electronic Devices and Circuits Lab (C217)	
C217.1	Explain about analog meters, digital meters, RPS, DMM and CRO	Understand
C217.2	Utilize the voltage and current relationships of PN Diode and Zener diode	Apply
C217.3	Construct and Develop efficiency and % regulations of Halfwave and Full wave rectifiers with and without filters	Apply
C217.4	Identify and compare the characteristics of BJT, FET, SCR and UJT in different configurations	Apply
C217.5	Construct the different amplifier circuits for BJT and FET	Apply
	Networks and Electrical Technology Lab (C218)	
C218.1	Analyze RLC circuits and understand resonant frequency and Q-factor.	Analyze
C218.2	Apply network theorems to analyze the electrical network.	Apply
C218.3	Explain the performance of dc shunt machine.	Understand
C218.4	Analyze the performance of 1-phase transformer. .	Analyze
C218.5	Determine regulation of alternators through synchronous impedance method.	Evaluate
	SECOND YEAR SECOND SEMESTER (II – II)	
	Electronic Circuit Analysis (C221)	
C221.1	Develop and Explain about small signal high frequency transistor amplifiers using BJT & FET with the help of Hybrid π model.	Apply
C221.2	Develop various multistage amplifiers using BJT & FET and Analyze them.	Analyze

C221.3	Explain various types of feedback amplifiers and their topologies and Analyze the performance of feedback amplifiers.	Analyze
C221.4	Explain the principle and condition for oscillators, analyze various types of oscillators using BJT & FET.	Analyze
C221.5	Classify power amplifiers and Analyze various power amplifiers	Analyze
C221.6	Explain about Q-factor and analyze the bandwidth of different types of tuned amplifiers	Analyze
	Control Systems (C222)	
C222.1	Solve the transfer function of physical systems using block diagram algebra and signal flow graphs.	Apply
C222.2	Analyze the time response specifications of second order systems and to estimate error constants.	Analyze
C222.3	Analyze absolute stability and relative stability of LTI systems using Routh 's stability criterion and root locus method.	Analyze
C222.4	Analyze stability of LTI systems using frequency response methods.	Analyze
C222.5	Analyze Lag, Lead, Lag-Lead compensators to improve systems performance using Bode diagram.	Analyze
C222.6	Model the physical systems as state models and to determine their system response to judge systems controllability and observability.	Apply
	Electromagnetic Waves and Transmission Lines (C223)	
C223.1	Summarize coordinate systems and vector algebra and Define coulombs law and Gauss law for the electrostatic fields	Understand
C223.2	Explain magneto static fields and important deductions made from Maxwell's equations.	Understand
C223.3	Analyze A uniform plane equation and EM wave characteristics in different propagating mediums	Analyze
C223.4	Analyze and solve the problems of EM wave propagation in both perfect conductor and perfect dielectrics for normal and oblique incidences and compute Brewster angle and critical angle	Analyze
C223.5	Choose transmission lines with equivalent circuit and compute the input impedance of transmission lines	Apply
C223.6	Solve the reflection coefficient, VSWR by using smith chart for UHF transmission lines	Apply
	Analog Communications (C224)	
C224.1	Illustrate the concepts of basic communication system, types of analog modulation, Amplitude modulation and demodulation techniques	Understand
C224.2	Explain the types of Amplitude modulation and demodulation and Apply the concept in the time and frequency domain techniques	Apply
C224.3	Apply the concepts of Angle modulation and demodulation techniques in the time and frequency domain techniques	Apply
C224.4	Summarize the concepts of different types of Radio transmitter and receivers.	Understand
C224.5	Identify the SNR and Figure of merit for different analog modulation techniques	Apply
C224.6	Compare the concepts of Pulse Analog modulation and demodulation techniques and Time division multiplexing technique.	Understand
	Pulse and Digital Circuits (C225)	
C225.1	Analyze and Develop linear wave shaping circuits for various input signals.	Analyze
C225.2	Construct the nonlinear wave shaping circuits for generating desired wave shapes using diodes and transistors.	Apply
C225.3	Apply the fundamental concepts of wave shaping for various switching & signal generation circuits.	Apply

C225.4	Analyze and Develop the different multivibrators to generate various non sinusoidal signals for various electronic applications.	Analyze
C225.5	Know the methods of generating voltage sweep wave forms and construct the time base generators.	Apply
C225.6	Realize the logic gates using diodes and transistors, distinguish between logic gates and sampling gates & Apply the operating principles of sampling gates for their applications.	Analyze
	Management Science (C226)	
C226.1	Explain the management functions and decision-making process	Understand
C226.2	Analyze the materials management and inventory management techniques	Analyze
C226.3	Explain the concepts of functional management and marketing management	Understand
C226.4	Solve the concepts of project management problems	Apply
C226.5	Interpret the concepts of strategic management	Understand
C226.6	Elaborate the contemporary Management Practices	Create
	Electronic Circuit Analysis Lab (C227)	
C227.1	Find the response and fT of a given transistor	Understand
C227.2	Analyze the feedback amplifier circuits and tuned amplifier circuits working principle and obtain its response using hardware and software	Analyze
C227.3	Examine and draw the response of oscillator circuits using hardware equipment and MULTISIM software	Analyze
C227.4	Assess the coupled amplifier circuits using hardware equipment and software.	Evaluate
C227.5	Determine the characteristics of power amplifier circuit using software and hardware.	Evaluate
	Analog Communications Lab (C228)	
C228.1	Demonstrate about Spectrum Analyzer, MATLAB Simulink and MATLAB Communication Tool box.	Understand
C228.2	Utilize the Spectrum Analyzer, MATLAB Simulink and MATLAB Communication Tool box to perform the relevant experiments	Apply
C228.3	Experiment with Time domain of Analog Modulation and Demodulation techniques and also to find the Modulation Index.	Apply
C228.4	Construct the Sampling theorem and to Apply in Time & Frequency Domain of Pulse modulation and Demodulation techniques.	Apply
C228.5	Experiment with Pre-emphasis & De-emphasis to understand the FM concept.	Apply
C228.6	Identify the characteristics of Radio Receiver, AGC and PLL.	Apply
	THIRD YEAR FIRST SEMESTER (III – I)	
	Computer Architecture and Organization (C311)	
C311.1	Understand the architecture of modern computer.	Understand
C311.2	Apply the machine level instructions and design the program.	Apply
C311.3	Analyze the effective address of an operand by addressing modes.	Analyze
C311.4	Apply the organization of I/O and memory devices.	Apply
C311.5	Understand various memory systems to store the data.	Understand
C311.6	Develop micro programs using micro instructions.	Creating
	Linear IC Applications (C312)	
C312.1	Summarize types of Differential Amplifier configurations and Level translator to Apply for the design of Op-Amp.	Apply
C312.2	Understand the particulars of Op-Amp with its DC and AC characteristics	Understand
C312.3	Develop circuits using Op-Amp for various Linear & Non-Linear applications	Apply
C312.4	Design and Analysis of types of filters both 1st order and 2nd order	Analyze
C312.5	Understand the functional blocks & Explain the applications of IC's 555 Timer,565 PLL and 566 VCO	Understand

C312.6	Analyze various types of DAC and ADC techniques and characteristics.	Analyze
	Digital IC Applications (C313)	
C313.1	Understand various Digital Logic Families and their Interfacing	Understand
C313.2	Discuss the basics of VHDL and programming models	Understand
C313.3	Illustrate and implement digital systems using VHDL	Apply
C313.4	Design combinational circuits using VHDL code and relevant ICs	Apply
C313.5	Design and implement sequential circuits using VHDL code and relevant ICs	Apply
C313.6	Design and Implement Synchronous and Asynchronous Logic Circuits	Apply
	Digital Communications (C314)	
C314.1	Understand basic pulse digital modulation schemes of Digital Communication Systems.	Understand
C314.2	Discuss various Digital Modulation techniques.	Understand
C314.3	Analyze the error performance of Digital Modulation Techniques	Analyze
C314.4	Apply information theory and source coding techniques to increase coding efficiency.	Apply
C314.5	Analyze various source coding techniques and capacity of analog, digital and Gaussian channel	Analyze
C314.6	Identify error detection and error correction capabilities of linear block and convolution codes.	Apply
	Antenna and Wave Propagation (C315)	
C315.1	Apply principles of electromagnetic to explain antenna radiation. Explain various Antenna parameters	Apply
C315.2	Explain dipole antenna, Establish mathematical equations for various parameters of thin linear antenna.	Understand
C315.3	Analyze Broadside array and End fire Array Yagi-uda array.	Analyze
C315.4	Analyze long wire antenna, Micro strip Antennas, and helical antenna.	Analyze
C315.5	Explain VHF and UHF microwave antenna and Analyze antenna measurements to asses antenna performance.	Understand
C315.6	Identify the characteristics, Atmospheric and terrestrial effects on radio propagation.	Apply
	Pulse and Digital Circuits Lab (C316)	
C316.1	Analyze and Develop the pulse shaping circuits to process sinusoidal and non-sinusoidal signals.	Analyze
C316.2	Interpret the switching characteristics of a transistor.	Understand
C316.3	Demonstrate the fundamentals of logic gates, flip flops and some applications.	Understand
C316.4	Apply the operating principle of sampling gates to transmit the input signal to output for specified time interval.	Apply
C316.5	Develop and Analyze the different multivibrators to generate various non sinusoidal signals for required applications.	Analyze
C316.6	Experiment with UJT Relaxation oscillator and Bootstrap sweep circuit to generate sweep waveforms.	Apply
	Linear IC Applications Lab (C317)	
C317.1	Summarize functioning, parameters and Specifications of IC 741, IC 555, IC 565, IC 566, IC 1496.	Understand
C317.2	Analyze and Develop various circuits using IC 741 op-amp for various applications.	Analyze
C317.3	Analyze first order Active filter circuits using IC 741 op-amp Analyze and design amplifiers, active filters and waveform generators.	Create
C317.4	Analyze the various applications of 555 timers.	Analyze
C317.5	Experiment with IC 565 – PLL and IC 566 – VCO to implement PLL and VCO applications	Apply

C317.6	Analyze the fixed voltage regulators of IC 78XX, IC 79XX series and variable voltage regulator of IC 723.	Analyze
	Digital IC Applications Lab (C318)	
C318.1	Develop VHDL/Verilog HDL Source code for combinational and sequential circuits.	Create
C318.2	Simulate combinational and sequential circuits using Xilinx Vivado software simulator.	Create
C318.3	Analyze the obtained simulation results using XST synthesizer.	Analyze
C318.4	Synthesize the logical operations of combinational and sequential circuits on the Xilinx FPGA Hardware.	Create
	Professional Ethics & Human Values (C319)	
C319.1	Define the basic insights and inputs to the student on ethics, values, morals.	Remember
C319.2	Illustrate maintain ethical conduct and discharge their professional duties.	Understand
C319.3	Explain the concepts of engineering ethics.	Understand
C319.4	Analyze engineers' responsibilities towards safety and risk	Analyze
C319.5	Find out the engineers' duties and rights.	Remember
C319.6	Identify various ethical issues at global level.	Apply
	THIRD YEAR SECOND SEMESTER (III – II)	
	Microprocessors and Microcontrollers (C321)	
C321.1	understand the Architecture, Pin diagram, Minimum mode, maximum mode, System timing diagrams and interrupts of 8086 Microprocessor	Understand
C321.2	Design and Develop various assembly language programs by using the addressing modes and the Instruction set.	Apply
C321.3	Develop the memory interfacing problems and interfacing various modules like 8254 Timer, Interrupt controller, DMA, IO devices, ADC/DAC and Stepper motor with 8080 Microprocessor.	Apply
C321.4	Explain the special purpose registers, memory organization and different operating modes of 80386 & 80486.	Understand
C321.5	Illustrate the 8051 architecture, SFRs and various interfacing modules of 8051 Microcontroller and also Develop sample programs using ALP.	Apply
C321.6	Explain the memory, timers, parallel and serial IOs, interrupts & architecture of PIC 16F877.	Understand
	Microwave Engineering (C322)	
C322.1	Understand completely the rectangular waveguides, their mode characteristics	Understand
C322.2	Understand completely circular waveguides, Cavity Resonators, Microstrip lines	Understand
C322.3	Classify various microwave tubes their power generation and amplification and performance characteristics.	Analyze
C322.4	Examine the performance characteristics of HELIX TWTS and M-type Tubes	Understand
C322.5	Compare various properties of Scattering Matrix, and understand the utility of S-parameters in microwave component design	Analyze
C322.6	Examine solid state microwave sources and establish the measurement procedure of various microwave parameters.	Apply
	VLSI Design (C323)	
C323.1	Explain various IC fabrication process and various electrical properties of MOS transistors	Understand
C323.2	summarize the design rules, concepts of stick diagrams, layouts for various MOS technologies and design various logic circuits	Understand
C323.3	Demonstrate basic circuit concepts and determine impact of scaling on MOS circuit	Apply
C323.4	Examine the I/O circuits in VLSI design for reliability and methods of fault detection techniques	Apply

C323.5	Explain the concept of FPGA design process and FPGA families for implementing different logic circuits, able to define synthesis process	Understand
C323.6	Summarize different methods and techniques for low power VLSI design	Understand
	Digital Signal Processing (C324)	
C324.1	Explain the Discrete Time Signals and Systems	Understand
C324.2	Explain the importance of FFT algorithm for computation of Discrete Fourier Transform	Understand
C324.3	Classify of various implementations of digital filter structures	Analyze
C324.4	Examine the function of FIR and IIR Filter design procedures	Analyze
C324.5	Explain the Multirate Processing	Understand
C324.6	Examine the concepts of DSP Processors	Analyze
	OOPS through Java (C325)	
C325.1	Illustrate Java based software code of medium-to-high complexity.	Understand
C325.2	Define basic concepts of java programming language.	Remember
C325.3	Demonstrate the basic approaches to design software applications by using an integrated development environment to develop object-oriented java programs.	Understand
C325.4	Read and make elementary modifications to Java programs that solve real world problems.	Apply
C325.5	Design applications of Java Applets & Event handling.	Create
C325.6	Explain the basic principles of creating java applications with Graphical user interface.	Understand
	Microprocessors and Microcontrollers Lab (C326)	
C326.1	Explain Find how different instructions are affected before and after execution.	Understand
C326.2	Experiment with various 8086 ALP microprocessor programs like arithmetic operations, sorting and factorial of given numbers using MASM Software	Apply
C326.3	Demonstrate various interfacing modules of 8255PPI, ADC, DAC Keyboard/Display and generates different waveforms using ALPs with 8086 microprocessors	Apply
C326.4	Experiment with various assembly language programs of 8051 microcontroller using Keilμ Vision software	Apply
C326.5	Construct various interfacing modules using ALPs of 8051 microcontroller that operates LED display, Stepper motor and Traffic light controller	Apply
	VLSI Design Lab (C327)	
C327.1	Develop the schematic and layout of inverter, universal gates and analyze the output characteristics using EDA tool.	Analyze
C327.2	Build the schematic and layout of combinational circuits and verify its output using EDA tool.	Apply
C327.3	Examine the characteristics of schematic and layout of sequential circuits using EDA tool.	Analyze
C327.4	Construct Static RAM cell and 8-bit DAC using R-2R latter network and analyze the output using EDA tool.	Apply
	Digital Communications Lab (C328)	
C328.1	Develop multiplexing and demultiplexing technique.	Apply
C328.2	Develop analogue to digital converters like PCM, DM.	Apply
C328.3	Demonstrate digital modulation and demodulation techniques.	Understand
C328.4	Analyze the performance of Companding technique and its performance.	Analyze
C328.5	Make use of Encoding and Decoding process of block codes, convolution codes.	Apply
	COURSE NAME: IPR & Patents(C329)	
C329.1	Interpret the Concept of IPR Importance and mechanisms.	Understand
C329.2	Evaluate the copyrights and copyright registration.	Evaluate
C329.3	Identify the patents and Patent Cooperation Treaty.	Apply

C329.4	Formulate Trademarks and Likelihood of Confusion - Dilution of Ownership.	Create
C329.5	Identify the concepts of trade secrets Trade Secret Litigation.	Apply
C329.6	Formulating the cyber laws and cybercrimes.	Create
FOURTH YEAR FIRST SEMESTER (IV – I)		
Radar Systems (C411)		
C411.1	Explain the basic principle of radar and radar range Equation.	Understand
C411.2	Classify the types of radars	Understand
C411.3	Compare the different radar systems.	Analyze
C411.4	Compare different Tracking Techniques of Radar.	Analyze
C411.5	Apply the Characteristics of a Matched filter to reduce the noise.	Apply
C411.6	Illustrate the basic concepts of radar receiver.	Understand
Digital Image Processing (C412)		
C412.1	Apply the Different Transforms Techniques & Their Use in Image Processing Applications.	Apply
C412.2	Demonstrate Spatial & Frequency Domain Filtering (Like Smoothing & Sharpening Operations) of Images.	Understand
C412.3	Apply Restoration Operations/Techniques on Images.	Apply
C412.4	Apply Different Color Image Processing Techniques on Images.	Apply
C412.5	Explain the Image Compression Techniques and Multi-Resolution Processing of Images.	Understand
C412.6	Explain Morphological Operations of Images & Image Segmentation.	Apply
Computer Networks (C413)		
C413.1	Discuss Basic terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model	Understand
C413.2	Understand the properties of Physical Layer and Different Multiplexing Techniques	Understand
C413.3	Analyze data communication link considering elementary concepts of data link layer protocols for error detection and correction.	Analyze
C413.4	Analyze Medium Access Control Sub layer and performance of LAN protocols	Analyze
C413.5	predict Network Layer concepts, design issues, protocols and congestion	Apply
C413.6	Explain application layer protocols and internet applications such as network security, Email and DNS.	Understand
Optical Communications (C414)		
C414.1	Explain the overview of the optical fiber communication and show the functionality of components in a fiber optic communication system	Understand
C414.2	Summarize various optical fiber materials interpret numerous types of losses in different fibers during optical signal transmission	Understand
C414.3	Explain various optical fiber connectors, joints and losses associated with them	Understand
C414.4	Compare characteristics of fiber sources and detectors & interpret various optical receivers and their performance measures	Analyze
C414.5	Summarize the basics of power launching and coupling from optical sources to fiber and interpret various optical receivers and their performance measures	Understand
C414.6	Analyze the digital optical link, Wavelength division multiplexing	Analyze
Electronic Switching Systems (C415)		
C415.1	Explain the need for switching systems and their evolution from analog to digital	Understand
C415.2	Explain and discuss the public switched telephone network	Understand
C415.3	Define private networks and integrated networks	Analyze
C415.4	Classify and compare the different types of networks	Apply
C415.5	Illustrate the cellular telephone system	Apply
C415.6	Examine the integrated services digital network and voice data integration	Analyze

Embedded Systems (C416)		
C416.1	Understand the basic concepts of an embedded system and know the characteristics of an embedded system	Understand
C416.2	Explain the components required for an embedded system	Understand
C416.3	Analyze various embedded firmware design approaches on embedded environment.	Analyze
C416.4	Discuss the operating system basics and its components, list operating systems and know hardware software co-design	Understand
C416.5	Describe the embedded system development and its tools	Understand
C416.6	Classify various implementation tools and learn the testing process	Analyze
Micro Wave Engineering & Optical Lab (C417)		
C417.1	Determine characteristics of various microwave devices	Apply
C417.2	Determine various parameters of various waveguide components	Apply
C417.3	Experiment on antenna design using simulator	Analyze
C417.4	Demonstrate characteristics of various light sources	Apply
C417.5	Determine various measurements for optical links	Apply
Digital Signal Processing Lab(C418)		
C418.1	Analyze Linear and Circular Convolutions domain and frequency domain in time	Analyze
C418.2	Build the Waveform Generation related to Sine wave	Apply
C418.3	Construct of Butterworth Filter and Chebyshev Filter using IIR filters for band pass, band stop, low pass and high pass filters	Apply
C418.4	Develop windows – Rectangular, Hamming window	Apply
FOURTH YEAR SECOND SEMESTER (IV – II)		
Cellular Mobile Communications(C421)		
C421.1	Identify the limitations of conventional Mobile Telephone Systems; define the basic cellular mobile system.	Apply
C421.2	Explain Co-channel interference. Explain adjacent channel interference, near and far end interference.	Understand
C421.3	Distinguish cell site and mobile antennas.	Analyze
C421.4	Analyze frequency management and mobile antennas.	Analyze
C421.5	Define Handoff, Distinguish types of handoffs.	Remember
C421.6	Compare and contrast different multiple access schemes.	Understand
Electronic Measurements and Instrumentation(C422)		
C422.1	Summarize performance characteristics of instruments and multi-meters for voltage, current and resistance measurements	Understand
C422.2	Identify various signal generators and wave analyzers	Apply
C422.3	Experiment with various types of CROs (analog and digital)	Apply
C422.4	Construct AC bridges	Apply
C422.5	Utilize active and passive transducers	Apply
C422.6	Outline measurement of physical parameters and DAQs	Understand
Satellite Communications (C423)		
C423.1	Summarize the basic concepts, applications, frequencies used and types of satellite communications	Understand
C423.2	. Examine the concept of look angles, launches and launch vehicles and orbital effects in satellite communications	Apply
C423.3	Demonstrate the various satellite subsystems and its functionality.	Apply
C423.4	Analyze the concepts of satellite link design and calculation of C/N ratio	Analyze
C423.5	Demonstrate the concepts of multiple access and various types of multiple access techniques in satellite systems	Apply
C423.6	Understand the concepts of satellite navigation, architecture and applications of GPS.	Understand

Wireless Sensors and Networks (C424)		
C424.1	Summarize the overview of WSN and its architectures.	Understand
C424.2	Explain the Networking technologies and its topologies.	Understand
C424.3	Diagram illustrate the Mac protocols for wireless sensor networks.	Analyze
C424.4	Illustrate routing protocols and its classification based on application.	Apply
C424.5	Discuss the issues in designing the transport layers protocol for Ad-hoc wireless networks.	Understand
C424.6	Outline security in WSN, various sensor network platforms and tools, and applications of WSN	Analyze
Seminar (C425)		
C425.1	Explain motivation for any topic of interest and develop a thought process for technical presentation.	Understand
C425.2	Study research papers for understanding of a new field, in the absence of a textbook, to summarize and review them.	Understand
C425.3	Organize a detailed literature survey	Analyze
C425.4	Analyze and comprehend proof-of-concept and related data.	Analyze
C425.5	Impart skills in preparing detailed report describing the topic.	Apply
C425.6	Communicate effectively by making an oral presentation.	Apply
Project (C426)		
C426.1	Outline detailed study of topic assigned	Understand
C426.2	Organize a literature survey using latest journals in the preferred field of study	Apply
C426.3	Develop a detailed plan for conducting project including teamwork	Apply
C426.4	Build detailed analysis/modeling/simulation/design/problem solving as needed	Apply
C426.5	Develop a final product/process, Organize testing	Apply
C426.6	Identify conclusions and suggest future scope. Show thesis to review panel and explain the work.	Understand

Coordinator

HOD

Head of the Department
Electronics & Communication Engineering
B.V.C. Institute of Technology and Science
Batlapalem, Amalapuram - 533 201

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLGY & SCIENCE
(Approved by AICTE, Permanently Affiliated to JNTUK, Kakinada, Accredited by NAAC with 'A' Grade)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE OUTCOMES

BATCH: 2019-23

FIRST YEAR FIRST SEMESTER (I – I)		
English (C111)		
CO #	**COURSE OUTCOME**	**BTL**
C111.1	Classify and compare different things and cultures and behaviors of people from generation to generation.	Understand
C111.2	Select an inspiring personality and to achieve the new heights in personal and professional life.	Apply
C111.3	Apply Science and Technology to transform lives despite physical disabilities and to invent latest Engineering tools for the needs of the Society.	Apply
C111.4	Actively take part in protecting environment and the rights of the underprivileged despite challenges in personal and public life.	Analyze
C111.5	Develop the spirit of inquisitiveness in the areas of interest chosen and to offer insight into how to lead a successful life.	Create
Mathematics – I (C112)		
C112.1	Utilize mean value theorems to relate to various engineering fields.	Apply
C112.2	Solve the first order differential equations and able to apply physical problems.	Apply
C112.3	Solve higher order linear differential equations with constant coefficients. (Application)	Apply
C112.4	Find the partial derivative of different orders, finding maxima and minima of function of two variable, three variables and functional dependence.	Evaluate
C112.5	Apply double integration techniques in evaluating areas bounded by region and also learn important tools of calculus in higher dimensions like 2-dimensional and 3-dimensional coordinate systems.	Apply
Applied Chemistry (C113)		
C113.1	Define composite plastic materials and study the mechanism of conduction in conducting polymers	Understand
C113.2	Classify different types of electrodes and batteries for technological applications	Remember
C113.3	Summarize the importance of engineering materials like nano materials, plastics and rubbers	Understand
C113.4	Explain various methods of preparation and applications of liquid crystals	Understand
C113.5	Explain various models for energy by different natural sources	Understand
Programming for Problem Solving Using C (C114)		
C114.1	Discuss the basic rules of programming to construct algorithms, flowcharts, programs and to compile & debug programs in C.	Understand

C114.2	Develop the various programs by using different types of operators, data types, two-way/ multi-way selection and iterative statements	Apply
C114.3	Demonstrate the usage of arrays, strings and various types of user defined data types	Understand
C114.4	Design and implements programs to analyze the different pointer applications and processor commands	Creating
C114.5	Make use of Files concepts and Standard functions, to decompose a problem into functions and to develop modular reusable code	Apply
English Lab (C116)		
C116.1	Develop the nuances of Pronunciation and make use of International Phonetic Alphabet in order to improve pronunciation while Speaking and Listening.	Apply
C116.2	Divide the words properly into syllables and identify the word stress in di-syllabic, Poly-syllabic words.	Analyze
C116.3	Analyze and understand the stress in compound words, Stress Timed Rhythm and accent neutralizations while listening and speaking.	Analyze.
C116.4	Classify the words into syllables and spell and stress them as per conventions.	Apply
C116.5	Identify the context and specific information while reading and listening to various pieces of texts.	Apply
Applied Chemistry Lab (C117)		
C117.1	Develop better Understanding of titration	Apply
C1117.2	Explain the difference between Solubility and dissociation in water and apply this knowledge to acids and bases	Understand
C117.3	Estimate the hardness of water in terms of calcium and magnesium ions	Evaluate
C117.4	Apply safety rules in practice of laboratory investigations	Apply
C117.5	Explain the different instrumental methods of chemical analysis	Understand
Programming for Problem Solving Using C Lab (C118)		
C118.1	Discuss the basic rules of programming to construct algorithms, flowcharts, programs and to compile & debug programs in C.	Understand
C118.2	Develop the various programs by using different types of operators, data types, two-way/ multi-way selection and iterative statements	Apply
C118.3	Demonstrate the usage of arrays, strings and various types of user defined data types	Understand
C118.4	Design and implements programs to analyze the different pointer applications and processor commands	Creating
C118.5	Make use of Files concepts and Standard functions, to decompose a problem into functions and to develop modular reusable code	Apply
Environmental Science (C119)		
C119.1	Explain the Ecosystem and its function in the environment	Understand
C119.2	Aware the importance of natural resources and its conservation	Understand
C119.3	Analyze the diversity of life on earth and its importance	Analyze
C119.4	Execute different programmes in ecofriendly way	Apply
C119.5	Describe the different laws to protect our environment	Analyze
C119.6	conduct research in safe and responsible manners communicating the environmental subject more effectively	Apply

FIRST YEAR SECOND SEMESTER (I – II)		
COURSE NAME: Mathematics – II C121)		
C121.1	Find Rank and Solve the linear system of equations by using different methods.	Apply
C121.2	Find the inverse and power of a matrix by using Cayley Hamilton theorem. And also, diagonalize the matrix by using various methods. Finding Rank, Index, Signature and Nature of a Quadratic form.	Apply
C121.3	Solve the algebraic and transcendental equations by different methods.	Apply
C121.4	Apply Newton's forward and back ward interpolation and Lagrange's formulae for equal and unequal intervals.	Apply
C121.5	Find the Quadrature, the solutions of ordinary differential equations by different formulae.	Apply
Mathematics - III(C122)		
C122.1	Utilize the vector differential operators (Gradient, Divergence and Curl) and Estimate the work done against a field, circulation and flux using vector.	Evaluate
C122.2	Solve the differential equations using Laplace transforms.	Apply
C122.3	Find the Fourier series of periodic signals.	Apply
C122.4	Form the PDE and identify the solutions of linear and nonlinear PDE	Apply
C122.5	Identify the solution methods for 2nd order partial differential equations representing physical problems.	Apply
Applied Physics (C123)		
C123.1	Explain concept of interference, Diffraction, resolving power of Microscope, Telescope and Grating	Understand
C123.2	Explain concept of Davisson Germier experiment, G.P Thomson experiment and derive Schrodinger wave equations	Understand
C123.3	Explain the concept of K-P model, classical and quantum free electron theories, effective mass of electron.	Apply
C123.4	Explain the concept of types of semiconductors, hall effect and drift, diffusion currents.	Understand
C123.5	Describe the concept of classification of magnetic materials, domain concept, Hysteresis-soft, hard magnetic materials and dielectric materials, types of polarization, Lorentz internal field and Clausius - myosotis equation	Analyze
Network Analysis (C124)		
C124.1	Solve AC and DC circuits using Mesh, Nodal and AC circuit parameters	Apply
C124.2	Analyze RC, RL, RLC transient circuits with DC and AC excitation	Analyze
C124.3	Analyze steady state AC circuits & coupled circuits	Analyze
C124.4	Solve DC and AC circuits using network theorems	Apply
C124.5	Experiment with the two port network parameters	Apply
Basic Electrical Engineering (C125)		
C125.1	Discussed To understand the principle of operation, constructional details and operational characteristics of DC generators.	Understand
C125.2	Discussed To understand the principle of operation, characteristics of DC motor. Methods of starting and speed control methods of DC motors	Understand

FIRST YEAR SECOND SEMESTER (I – II)		
COURSE NAME: Mathematics – II C121)		
C121.1	Find Rank and Solve the linear system of equations by using different methods.	Apply
C121.2	Find the inverse and power of a matrix by using Cayley Hamilton theorem. And also, diagonalize the matrix by using various methods. Finding Rank, Index, Signature and Nature of a Quadratic form.	Apply
C121.3	Solve the algebraic and transcendental equations by different methods.	Apply
C121.4	Apply Newton's forward and back ward interpolation and Lagrange's formulae for equal and unequal intervals.	Apply
C121.5	Find the Quadrature, the solutions of ordinary differential equations by different formulae.	Apply
Mathematics - III(C122)		
C122.1	Utilize the vector differential operators (Gradient, Divergence and Curl) and Estimate the work done against a field, circulation and flux using vector.	Evaluate
C122.2	Solve the differential equations using Laplace transforms.	Apply
C122.3	Find the Fourier series of periodic signals.	Apply
C122.4	Form the PDE and identify the solutions of linear and nonlinear PDE	Apply
C122.5	Identify the solution methods for 2nd order partial differential equations representing physical problems.	Apply
Applied Physics (C123)		
C123.1	Explain concept of interference, Diffraction, resolving power of Microscope, Telescope and Grating	Understand
C123.2	Explain concept of Davisson Germier experiment, G.P Thomson experiment and derive Schrodinger wave equations	Understand
C123.3	Explain the concept of K-P model, classical and quantum free electron theories, effective mass of electron.	Apply
C123.4	Explain the concept of types of semiconductors, hall effect and drift, diffusion currents.	Understand
C123.5	Describe the concept of classification of magnetic materials, domain concept, Hysteresis-soft, hard magnetic materials and dielectric materials, types of polarization, Lorentz internal field and Clausius - myosotis equation	Analyze
Network Analysis (C124)		
C124.1	Solve AC and DC circuits using Mesh, Nodal and AC circuit parameters	Apply
C124.2	Analyze RC, RL, RLC transient circuits with DC and AC excitation	Analyze
C124.3	Analyze steady state AC circuits & coupled circuits	Analyze
C124.4	Solve DC and AC circuits using network theorems	Apply
C124.5	Experiment with the two port network parameters	Apply
Basic Electrical Engineering (C125)		
C125.1	Discussed To understand the principle of operation, constructional details and operational characteristics of DC generators.	Understand
C125.2	Discussed To understand the principle of operation, characteristics of DC motor. Methods of starting and speed control methods of DC motors	Understand

C125.3	Discussed to learn the constructional details, principle of operation and performance of transformers	Understand
C125.4	Discussed To study the principle of operation, construction and details of synchronous machines.	Understand
C125.5	Discussed To learn the principle of operation, constructional details, performance, torque – slip characteristics and starting methods of 3-phase induction motors.	Understand
Electronic workshop (C126)		
C126.1	To familiarize students with various Electronic devices and their specifications.	Apply
C126.2	To distinguish between active and passive elements	Apply
C126.3	Develop skill for Design and Testing of different types of Electronic subsystems using Analog and Digital IC's	Understand
C126.4	Familiarize students with PCB layout tool to prepare PCB print for assigned project.	Analyze
C126.5	To understand the basic concept of Layout Creation.	Apply
Basic Electrical Engineering Lab(C127)		
C127.1	Determine and predetermine the performance and control of DC machines. (Evaluating)	Evaluating
C127.2	Compute the performance of 1-phase transformer. (Evaluating)	Evaluating
C127.3	Perform tests on 3-phase induction motor and alternator to determine their performance characteristics. (Evaluating)	Evaluating
Applied Physics Lab (C128)		
C128.1	Apply the knowledge of interference, determine wavelength of a source-diffraction grating, radius of curvature of Plano convex lens using Newton's rings	Apply
C128.2	Analyze the knowledge of semiconductors determine energy gap of p-n junction diode, study of B-H curve, Hall voltage and Hall coefficients.	Apply
C128.3	Explain the resolving power of telescope, grating and dispersive power of diffraction grating.	Understand
C128.4	Analyze the variation of dielectric constant with temperature and also explain dielectric constant by charging and discharging method.	Analyze
C128.5	Analyze the characteristics of Thermistor- temperature coefficients.	Analyze
Communication Skills Lab (C129)		
C129.1	Develop the skills and confidence to speak publicly, which is valuable in both personal and professional settings. (Apply)	Apply
C129.2	Apply the knowledge of telephonic interviews to get ready for them, establish a rapport with the interviewer, and build trust over the phone. (Apply)	Apply
C129.3	Select a suitable presentation with proper presentational aids to present the information. (Apply)	Apply
C129.4	Analyze the given topic, share the opinions and act efficiently as an individual and team member in Group Discussion. (Analyze)	Analyze
C129.5	Develop an idea about various kinds and stages of interviews to face interviews confidently. (Apply)	Apply
Engineering Exploration Project (C1210)		

C1210.1	Develop idea(s) and knowledge into tangible form in order to achieve some objective.	Apply
C1210.2	Identify to enhance teamwork and interpersonal skills.	Apply
C1210.3	To incorporate the ability to identify the need, convert it into an objective statement and come up with a solution.	Apply
C1210.4	To understand and apply project management concepts.	Apply
C1210.5	Take part in several design challenges and work towards the final prototypes	Create
SECOND YEAR FIRST SEMESTER (II – I)		
Electronics Devices and Circuits (C211)		
C211.1	summarize the Semiconductor physics concepts and also understand the formation of junctions in PN junction diode	Understand
C211.2	Explain the concepts of special diodes Like Zener, tunnel, photo diode, LED and know the working principal of rectifiers with and without filters	Understand
C211.3	Explain the operation of bipolar junction transistors and FET	Understand
C211.4	Understand the need of biasing and also summarize biasing concepts	Understand
C211.5	Analyze the small signal low frequency transistor amplifier models of FET and BJT.	Analyze
Switching Theory and Logic Design (C212)		
C212.1	Summarize concepts of various types' number systems and their conversions and Boolean algebra for logic gates.	Understand
C212.2	To Build simple logical operations using combinational logic circuits with minimization techniques.	Apply
C212.3	To Develop combinational logic circuits and programmable logic devices.	Apply
C212.4	To construct sequential logic circuits with flip-flops and their applications.	Apply
C212.5	To demonstrate advanced sequential circuits.	Understand
Signals and Systems (C213)		
C213.1	Illustrate the basic idea of signals and systems	Understand
C213.2	Analyze the frequency domain representation of signals using FS and FT	Analyze
C213.3	Analyze the systems based on their properties and determine the response of LTI and LTV Systems	Analyze
C213.4	Apply sampling theorem to convert continuous time signals to discrete time signals.	Apply
C213.5	Apply Laplace and z-transforms to Solve Signals and Systems (continuous & discrete).	Apply
Random Variables and Stochastic Processes (C214)		
C214.1	Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena.	Understand
C214.2	Identify different types of random variables and compute statistical averages of these random variables.	Understand
C214.3	Analyze the joint distribution and marginal distribution functions of multiple random variables	Analyze
C214.4	Classify the random processes in the time and frequency domains	Analyze
C214.5	Analyze the LTI systems with random inputs.	Analyze

Object Oriented Programming through Java (C215)		
C226.1	Identify Object oriented concepts Through Constructs of JAVA	Understand
C226.2	Analyze and implement the role of packages, interfaces in program design using JAVA.	Analyze
C226.3	Choose the basic principles of creating java applications with Graphical user interface	Evaluate
C226.4	Design Java programs that uses Input and Output File Streams.	Create
C226.5	Analyze applications of Java Multi-Threading and Exception Handling.	Analyze
Managerial Economics and Financial Analysis (C216)		
C216.1	Define the fundamental concepts of managerial economics.	Remember
C216.2	Classify and compare various costs in managerial decision-making process	Analyze
C216.3	Identify the features of different market structures and various forms of Business organizations	Apply
C216.4	Identify fundamental concepts of accounting and Analyze financial statements.	Apply
C216.5	Evaluate various alternative investment proposals to make a better capital budgeting decision	Evaluate
Electronic Devices and Circuits Lab (C217)		
C217.1	Explain about analog meters, digital meters, RPS, DMM and CRO	Understand
C217.2	Utilize the voltage and current relationships of PN Diode and Zener diode	Apply
C217.3	Construct and Develop efficiency and % regulations of Halfwave and Full wave rectifiers with and without filters	Apply
C217.4	Identify and compare the characteristics of BJT, FET, SCR and UJT in different configurations	Apply
C217.5	Construct the different amplifier circuits for BJT and FET	Apply
Switching Theory and Logic Design - Lab (C218)		
C218.1	Demonstrate various ICs like 74LSXX Family with their specification.	Understand
C218.2	Solve the given expression and Develop it using Basic gates and Universal gates.	Apply
C218.3	Develop Full adders using two Half-adders and verify the functionality using IC's.	Apply
C218.4	Construct various combinational logic circuits like adders & multiplexers etc., Build Boolean functions using decoders and multiplexers	Apply
C218.5	Construct various sequential logic circuits like flip-flops, counters and shift Registers.	Apply
Constitution of India (C219)		
C219.1	Apply the knowledge on Directive principle of state policy	Apply
C219.2	Explain the role of President and Prime Minister, the structure of Supreme Court and High court.	Understand
C219.3	Analyze the role of Governor and Chief Minister	Analyze
C219.4	Differentiate between structure and functions of state secretariat.	Understand
C219.5	Analyze the role of Mayor and elected representatives of Municipalities.	Analyze
SECOND YEAR SECOND SEMESTER (II – II)		
Electronic Circuit Analysis (C221)		

C221.1	Explain classification of amplifiers and analyze the CE, CB, CC amplifiers using small signal hybrid model and derive the voltage gain, current gain, input impedance and output impedance.	Understand
C221.2	Illustrate various methods of coupling in multistage amplifiers by using Transistors.	Apply
C221.3	Develop and classify the different types of feedback amplifiers.	Analyze
C221.4	Design and analyze different types of oscillators	Analyze
C221.5	Classify various power amplifiers. Design and analyze the effects of cascading on single, double tuned amplifiers on bandwidth and explain their stability	Analyze
Linear Control Systems (C222)		
C222.1	Understand the basic concepts of control systems, Translational and rotational mechanical Systems	Understand
C222.2	Understand and implement mathematical tools (such as Block Diagram reduction and SFG) to analyze a complete system and analyze the Time Response analysis of the system.	Understand
C222.3	Analyze system's absolute, relative stability using different s-domain methods.	Analyze
C222.4	Sketch the Frequency response plots and analyze the system performance	Apply
C224.5	Design compensators and their selection to meet desired response and analyze the control system using state space analysis	Create
Electromagnetic Waves and Transmission Lines (C223)		
C223.1	To solve the basic Transmission Line Equations and telephone line parameters and estimate the distortions present.	Apply
C223.2	To summarize the concepts of RF Lines and their characteristics, Smith Chart and its applications.	Understand
C223.3	To summarize the concept of co-ordinate systems and vector algebra and their applications in free space to Concepts and proofs related to Electrostatic Fields.	Understand
C223.4	To analyze Magneto static Fields, and apply them to solve physics and engineering problems and distinguish between static and time-varying fields.	Analyze
C223.5	To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media.	Understand
Analog Communications (C224)		
C224.1	Illustrate various continuous wave Amplitude modulation and demodulation techniques	Understand
C224.2	Explain the basic concepts of DSB & SSB MODULATION schemes and Applications of different AM Systems	Understand
C224.3	Apply the concepts of angle modulation and demodulation techniques on the time and frequency domain techniques.	Apply
C224.4	Attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.	Understand
C224.5	Examine SNR and Figure of merit for different analog modulation techniques and Pulse Modulation Techniques	Analyze
Computer Architecture and Organization (C225)		

C225.1	Summarize the functional units and basic operational concepts of a computer, examine the performance of a computer using performance equation and different instruction types.	Apply
C225.2	Calculate the effective address of an operand using addressing modes and explain various types of instructions.	Apply
C225.3	Explain the organization of input and output devices connected to a computer.	Understand
C225.4	Classify various memory systems/devices used in a computer and explain mapping techniques of cache.	Understand
C225.5	Examine the process of execution of complete instruction and outline micro programmed control.	Analyze
Management and Organizational Behavior (C226)		
C226.1	Explain the fundamental concepts of management and organization	Understand
C226.2	Identify the functional areas of management	Apply
C226.3	Examine various elements of strategic management	Analyze
C226.4	find the impact of motivation and other factors which shape individual behavior	Remembering
C226.5	Interpret the strategies for effective management of groups, culture and conflicts in an organization	Evaluate
Electronic Circuit Analysis Lab (C227)		
C227.1	Recognize the response and fT of a given transistor.	Understand
C227.2	Analyze the feedback amplifier circuits and tuned amplifier circuits working principle and obtain its Frequency response using hardware and software.	Analyze
C227.3	Calculate the frequency response of oscillator's circuits both theoretical and practical on both hardware components and software.	Apply
C227.4	Design the multistage amplifiers circuits and Measure the voltage gain and bandwidth by using hardware components and software.	Evaluate
C227.5	Analyze the experiments with various signal and power amplifier circuits using BJTs.	Analyze
Analog Communications Lab (C228)		
C228.1	Demonstrate about spectrum analyzer, MATLAB communication tool box	Understand
C228.2	Utilize the spectrum analyzer, MATLAB Simulink and MATLAB communication Tool box to perform the relevant experiments	Apply
C228.3	Experiment with time domain of Analog modulation and Demodulation Techniques and also find the modulation index and characteristics of Radio receiver	Apply
C228.4	Construct the sampling theorem and to apply in time and frequency domain of pulse modulation and Demodulation techniques	Apply
C228.5	Experiment with time domain of Analog modulation and Demodulation Techniques and also find the modulation index and observe the characteristics of AGC, PLL	Apply
THIRD YEAR FIRST SEMESTER (III – I)		
COURSE NAME: Linear Integrated Circuits and Applications (C311)		
C311.1	Summarize types of Differential Amplifier configurations & performance parameters of differential amplifiers.	Understand
C311.2	Construct the Linear & Non-Linear applications of Op-Amp.	Apply

C311.3	Analyze different types of Op-Amp Active filters to solve the frequency response characteristics and summarize the Analog multipliers and Sample & Hold circuits.	Analyze
C311.4	Understand the functional blocks & Explain the applications of IC's 555 Timer,565 PLL and 566 VCO	Understand
C311.5	Analyze various types of DAC and ADC techniques and characteristics.	Analyze
Microprocessor and Microcontrollers (C312)		
C312.1	Discover Harvard, Von Neumann, RISC, CISC, 8086 processors architecture types	Analyze
C312.2	Compile ALP for 8086 using program development tools	Create
C312.3	Examine 8086 based system using memory, PPI, UART, DMA A/D and D/A devices	Analyze
C312.4	Evaluate 8051 microcontroller system.	Evaluate
C312.5	Compile software delay, loops, stack and subroutines for ARM Cortex 3 Processor.	Create
Digital Communications (C313)		
C313.1	Express basic theories of Digital communication system and different techniques.	Understand
C313.2	Build digital modulation techniques power and bandwidth requirements of modern communication system.	Apply
C313.3	Analyze probability of error of various filters and digital modulation techniques.	Analyze
C313.4	Identify basic concepts of Information theory and source coding techniques for Communication Systems.	Apply
C313.5	Utilize different error control coding schemes.	Apply
Electronic Measurements & Instrumentation (C314)		
C314.1	Summarize performance characteristics of instruments and multi-meters for voltage, current and resistance measurements	Understand
C314.2	Identify various signal generators and wave analyzers	Apply
C314.3	Experiment with various types of CROs (analog and digital)	Apply
C314.4	Construct AC bridges	Apply
C314.5	Utilize active and passive transducers	Apply
Digital System Design using HDL (C315)		
C315.1	Understand the architecture of FPGA'S and EXPLAIN the different modules in Verilog HDL	Understand
C315.2	Discuss the various data types and Operators in Verilog HDL	Understand
C315.3	Design the combinational circuit by using Verilog HDL	Apply
C315.4	Design the Sequential circuit by using Verilog HDL	Apply
C315.5	Implement various Applications and Digital Interfacing in Verilog HDL	Apply
Linear Integrated Circuits and Applications - Lab (C316)		
C316.1	Summarize functioning, parameters and Specifications of IC 741, IC 555, IC 565, IC 566, IC 1496.	Understand
C316.2	Analyze and Develop various circuits using IC 741 op-amp for Linear and Non Linear applications.	Analyze
C316.3	Analyze and design amplifiers, active filters and waveform generators.	Create

C316.4	Analyze the various applications of 555 timer, IC 565 – PLL and IC 566 – VCO	Analyze
C316.5	Experiment with IC 78XX and 79XX to build dual power supply.	Apply
Digital Communications Lab (C317)		
C317.1	Develop multiplexing and demultiplexing technique.	Apply
C317.2	Develop analogue to digital converters like PCM, DM.	Apply
C317.3	Demonstrate digital modulation and demodulation techniques.	Understand
C317.4	Analyze the performance of Companding technique and its performance.	Analyze
C317.5	Make use of Encoding and Decoding process of block codes, convolution codes.	Apply
Microprocessor and Microcontrollers - Lab (C318)		
C326.1	Explain Find how different instructions are affected before and after execution.	Understand
C326.2	Experiment with various 8086 ALP microprocessor programs like arithmetic operations, sorting and factorial of given numbers using MASM Software	Apply
C326.3	Demonstrate various interfacing modules of 8255PPI, ADC, DAC Keyboard/Display and generates different waveforms using ALPs with 8086 microprocessors	Aplly
C326.4	Experiment with various assembly language programs of 8051 microcontroller using Keilμ Vision software	Apply
C326.5	Construct various interfacing modules using ALPs of 8051 microcontroller that operates LED display, Stepper motor and Traffic light controller	Apply
Mini Project with Hardware Development (C319)		
C319.1	Choose proposal which is relevant to subject of engineering (Apply)	Apply
C319.2	Design the system components and process and identify the engineering tools (Create)	Create
C319.3	Use management skills and implement task, manages problems encountered, work as a team and present the work progress (Apply)	Apply
C319.4	Incorporate the suggestions made and manages resources and work as team. (Apply)	Apply
C319.5	Develop a final product/ process, organize testing and conclude the suggested future scope (Apply)	Apply
Essence of Indian Traditional Knowledge (C3110)		
C3110.1	Identify the concept of Traditional knowledge and its importance	Apply
C3110.2	Explain the need and importance of protecting traditional knowledge.	Understand
C3110.3	Illustrate the various enactments related to the protection of traditional knowledge.	Understand
C3110.4	Interpret the concepts of Intellectual property to protect the traditional knowledge.	Understand
C3110.5	Explain the importance of Traditional knowledge in Agriculture and Medicine.	Understand
Third year second semester (III – II)		
Wired and Wireless Transmission Devices (C321)		
C321.1	Discuss different types of waveguides and their respective modes of propagation and Microstrip line concept.	Understand

C321.2	Illustrate basic terminology and concepts of Antennas	Apply
C321.3	Analyze the field components, parameters of thin linear wire antennas and understand the antenna arrays and characteristics.	Analyze
C321.4	Analyze geometry, basic properties, and parameters of non-resonant radiators and understand the vhf, uhf and microwave antennas.	Analyze
C321.5	Analyze the characteristics of radio wave propagation and antenna measurements	Analyze
VLSI Design (C322)		
C322.1	Explain IC fabrication process of NMOS, PMOS, CMOS and various electrical properties of MOS transistors	Understand
C322.2	Summarize basic circuit concepts and determine impact of scaling on MOS circuits	Understand
C322.3	Design basic building blocks in Analog IC design	Apply
C322.4	Analyze the behavior of static and dynamic logic circuits	Apply
C322.5	Explain the concept of FPGA design process and FPGA families for implementing different logic circuits and advanced technologies	Understand
Digital Signal Processing (C323)		
C323.1	Analyze the Discrete Time Signals and Systems in Time and Frequency Domain and Review of Z-Transforms.	Analyze
C323.2	Examine the properties of Discrete Fourier Series and Discrete Fourier Transforms and Explain the linear filtering methods based on DFT and FFT algorithms.	Apply
C323.3	Illustrate the analog filter approximations techniques and various implementations of IIR digital filter structures.	Apply
C323.4	Determine the different window techniques and frequency sampling techniques of FIR digital filter	Apply
C323.5	Explain the programmable DSPs features and architectural features of different ARM processors	Understand
Cellular & Mobile Communication (C324)		
C324.1	Explain cellular radio concepts	Understand
C324.2	Identify various interferences	Apply
C324.3	Analyze frequency management, channel assignment and discuss cell coverage for signal and traffic.	Analyze
C324.4	Summarize types of Handoff strategies	Understand
C324.5	Classify multiple access techniques in mobile communication.	Analyze
MEMS and its applications (C325)		
C325.1	Discover the overview of MEMS and Microsystems with broad category of MEMS & Micro system applications.	Understand
C325.2	Demonstrate the working principles of Microsystems	Understand
C325.3	Discuss the Scaling Laws in Miniaturization and Outline Materials for MEMS and Microsystems	Understand
C325.4	Discuss the Micro system Fabrication Processes, different Micro manufacturing processes and Applications.	Understand
C325.5	Identify the different types of RF switches, Various Switching Mechanism and their applications.	Understand
COURSE NAME: Internet of Things (C326)		

C326.1	Explain the basics, definition and vision of Internet of Things (IoT), Understand the IOT architectural domains and relationships of an M2M system with an IoT system and explain the business process and cloud computing in IoT	Understand
C326.2	Understand the Hardware Components- Computing- Arduino, Raspberry Pi, ARM Cortex-A class processor, Embedded Devices – ARM Cortex-M, Cortex-M0 Architecture, Block Diagram, Instruction Set, ARM and Thumb Instruction Set	Understand
C326.3	Analyze Communication, IoT Applications, Sensing, Actuation, I/O interfaces. Software Components- Programming API's (using Python/Node.js/Arduino) for Communication Protocols, Bluetooth overview, Bluetooth Key Versions, Bluetooth Low Energy (BLE) Protocol, BLE architecture and Component Overview	Analyze
C326.4	Discuss the Implementation of Device integration, Data acquisition and integration, Device data storage Unstructured data storage on cloud/local server, Authentication, authorization of devices.	Understand
C326.5	Use the IoT concepts to IoT case studies and mini projects based on Industrial automation, Transportation, Agriculture, Healthcare, Home Automation	Apply
VLSI Lab (C327)		
C327.1	Developed VHDL source code for logic gates using Xilinx's software tool	Apply
C327.2	develop VHDL source code for combinational & sequential circuits using Xilinx's software tool	Apply
C327.3	design basic logic circuits in backend environment using mentor graphics tool	Apply
C327.4	design combinational &sequential circuits in backend environment using mentor graphics tool	Apply
Digital Signal Processing Lab (C328)		
C328.1	Understand the mathematical operation on discrete signals.	Understand
C328.2	Sketch the magnitude and phase response of DFT, Inverse DFT and FFT of discrete time signals.	Apply
C328.3	Calculate linear and circular convolution of discrete sequences.	Analyze
C328.4	Analyze IIR and FIR digital filters	Analyze
C328.5	Develop and Implement DSP algorithms in software using a computer language such as C with TI DSP Starter Kit	Apply
Intellectual Property Rights (IPR) & Patents (C329)		
C329.1	Interpret the Concept of IPR Importance and mechanisms.	Understand
C329.2	Utilize knowledge regarding copyrights to get them registered.	Apply
C329.3	Identify the filing procedure of patents and role of Patent Cooperation Treaty.	Apply
C329.4	Analyze rights and responsibilities of holder of Trademarks and Likelihood of Confusion - Dilution of Ownership.	Analyze
C329.5	Illustrate the concepts of trade secrets and cyber laws.	Understand
FINAL YEAR FIRST SEMESTER (IV – I)		
Microwave and Optical Communication Engineering (C411)		
C411.1	Understand the fundamental characteristics of Microwave guides sources and amplifiers through electromagnetic field analysis.	Understand

C411.2	Understand the basic properties of waveguide components and Ferrite materials composition.	Understand
C411.3	Learn and the basic elements of optical fiber transmission link, fiber modes configurations and structures and joints.	Remember
C411.4	Analyze the various Optical sources and detectors and Optical system design	Analyze
C411.5	Analyze Microwave Measurements & Optical Measurements	Analyze
Data Communications & Computer networks (C412)		
C412.1	Have knowledge on the data communication components, types of networks, distributed processing, OSI Reference model and TCP/IP protocol suite, addressing concepts, and wireless LANs	Understand
C412.2	Have knowledge about services performed by data link layer such as error detection and error correction and analyses the noisy and noiseless channels completely	Analyze
C412.3	Have knowledge on functions of networks layer, forwarding and routing, and the Internet Protocol (IP) and its versions	Understand
C412.4	Analyze about the services offered by transport layer and study the TCP and UDP protocols concepts related to them	Analyze
C412.5	Apply the transport layer protocols to applications and application layer functions	Apply
Digital Image and Video Processing (C413)		
C413.1	Explain the digital image, representation of digital image, importance of image resolution, applications in image processing. And to Explain the advantages of representation of digital images in transform domain, application of various image transforms.	Understand
C413.2	To explain how an image can be enhanced by using histogram techniques, filtering techniques etc. and image degradation, image restoration techniques using spatial filters and frequency domain	Understand
C413.3	make use of segmentation process to know detection of point, line and edges in images, edge linking through local processing, global processing and Understand the redundancy in images and make use the concept of Image compression to know various image compression techniques	Apply
C413.4	To understand the video technology from analog color TV systems to digital video systems, how video signal is sampled and filtering operations in video processing	Understand
C413.5	To demonstrate the general methodologies for 2D motion estimation and Application of motion estimation in Video coding	Understand
Communication Standards and Protocols (C414)		
C414.1	Illustrate various communication and communication networking types and their characteristics.	Understand
C414.2	Identify OSI communication layers and their applications	Understand
C414.3	Examine wired communication protocols and Inspect their advantages and disadvantages, applications	Analyze
C414.4	Analyze various wireless communications protocols and their advantages and disadvantages and applications	Analyze
C414.5	Categorize various network types and Routing algorithm and its applications	Analyze
COURSE NAME: Embedded Systems (C415)		

C415.1	Understand the basic concepts of an embedded system and know the characteristics of an embedded system	Understand
C415.2	Explain the components required for an embedded system	Understand
C415.3	Analyze various embedded firmware design approaches on embedded environment.	Analyze
C415.4	Discuss the operating system basics and its components, list operating systems and know hardware software co-design	Understand
C415.5	Describe the embedded system development tools and learn the testing process	Understand
Internet of Things LAB (C416)		
C416.1	Understand the concept of Internet of Things	Understand
C416.2	Implement the interfacing of various sensors with Arduino/Raspberry Pi/Node MCU	Apply
C416.3	Demonstrate the ability to transmit data wirelessly between different devices.	Analyze
C416.4	Set up a Bluetooth Smart connection between the PSoC, BLE kit and a smart phone and use an app to send and receive data	Analyze
Microwave and Optical Communication Engineering LAB (C417)		
C417.1	Make use of Microwave sources and identify the characteristics for the transmission of the microwave signal.	Apply
C417.2	Experiment with waveguide components and Determine various parameters for them.	Apply
C417.3	Demonstrate characteristics of various light Sources.	Apply
C417.4	Determine various measurements for optical Links.	Apply
C417.5	Utilize antenna available to determine radiation pattern.	Apply
Project - Part I (C418)		
C418.1	Outline detailed study of topic assigned	Understand
C418.2	Organize a literature survey using latest journals in the preferred field of study	Apply
FINAL YEAR SECOND SEMESTER (IV – II)		
Wireless Communication (C421)		
C422.1	Explain About Various Wireless Communication Concepts Like 2G,3G,4G Wireless Communication.	Understand
C422.2	Analyze CDMA Process and Related Topics of Wireless Communication	Analyze
C422.3	Analyze the Multiple-Input Multiple-Output of Wireless Communication	Analyze
C422.4	Apply OFDM Concept to Wireless Communication	Apply
C421.5	Explain About Satellite Wireless System Like Transponders and Geostationary Satellites	Understand
Cyber Security &Cryptography (C422)		
C422.1	Able to identify security risks and take preventive steps	Understand
C422.2	To understand the forensics fundamentals.	Understand
C422.3	To understand the evidence capturing process and Analyze various tools.	Analyze
C422.4	To understand the preservation of digital evidence and APPLY various tools in collection of digital evidence	Apply
C422.5	To Understand and implement various Acts in cybercrime and to implement laws in cybercrime.	Understand

COURSE NAME: Project - Part II (C423)		
C423.3	Develop a detailed plan for conducting project including teamwork	Apply
C423.4	Build a detailed analysis/modelling/simulation/design/problem-solving as needed	Apply
C423.5	Develop a final product/process, organize testing and show thesis to review panel and explain the work	Understand

Coordinator

HOD

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