



## BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & 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](mailto:bvts@bvcgroup.in) , Website: [www.bvcits.edu.in](http://www.bvcits.edu.in)

### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

#### 3.1 Establish the correlation between the courses and the Program Outcomes (Pos) and

#### Program Specific Outcomes (PSOs) (20)

PO #	Program Outcome
PO1	<b>ENGINEERING KNOWLEDGE:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	<b>PROBLEM ANALYSIS:</b> Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	<b>DESIGN/DEVELOPMENT OF SOLUTIONS:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	<b>CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	<b>MODERN TOOL USAGE:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	<b>THE ENGINEER AND SOCIETY:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

	<b>ENVIRONMENT AND SUSTAINABILITY:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8</b>	<b>ETHICS:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	<b>INDIVIDUAL AND TEAM WORK:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10</b>	<b>COMMUNICATION:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
<b>PO11</b>	<b>PROJECT MANAGEMENT AND FINANCE:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b>	<b>LIFE-LONG LEARNING:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Program Specific Outcomes are framed by Department Advisory Committee (DAC)**

<b>PSO 1</b>	<b>Professional Skills:</b> An ability to design, analyze and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.
<b>PSO 2</b>	<b>Soft-Skills &amp; Ethics:</b> Ability to communicate effectively and practice professional ethics for societal benefit.

  
Coordinator

  
HOD



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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**

<b>Electronics Devices and Circuits (C211)</b>	
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
<b>Electromagnetic Waves and Transmission Lines (C223)</b>	
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
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**AY: 2020 – 21**

<b>Digital Communications (C314)</b>	
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.
<b>Digital Signal Processing (C324)</b>	
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**

<b>Electronic Switching Systems (C415)</b>	
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.
<b>Cellular Mobile Communications (C421)</b>	
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

  
Head of the Department  
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Ballapalem, Anjalapuram - 533 201



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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

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
<b>Digital Signal Processing (C323)</b>		
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

<b>Data Communications &amp; Computer networks (C412)</b>		
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
<b>Wireless Communication (C421)</b>		
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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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

#### 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
<b>Applied Physics (C114)</b>		
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
<b>Computer Programming (C115)</b>		
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
<b>Engineering Drawing (C116)</b>		
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
<b>English - Communication Skills Lab I (C117)</b>		
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
<b>Applied / Engineering Physics Lab (C118)</b>		
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
<b>Applied / Engineering Physics –Virtual Labs – Assignments (C119)</b>		
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
<b>Engineering Workshop &amp; IT Workshop(C1110)</b>		
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
<b>FIRST YEAR SECOND SEMESTER (I – II)</b>		
<b>ENGLISH-II (C121)</b>		
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
<b>Mathematics – III (C122)</b>		
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
<b>Applied Chemistry (C123)</b>		
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
<b>Electrical and Mechanical Technology (C124)</b>		
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
<b>Environmental Studies (C125)</b>		
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
<b>Data Structures (C126)</b>		
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.	Evaluate
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
<b>Applied / Engineering Chemistry Lab (C127)</b>		
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
<b>English Communications Skills Lab II (C128)</b>		
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
<b>Computer Programming Lab (C129)</b>		
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
<b>SECOND YEAR FIRST SEMESTER (II – I)</b>		
<b>Electronics Devices and Circuits (C211)</b>		
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
<b>Switching Theory and Logic Design (C212)</b>		
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
<b>Signals and Systems (C213)</b>		
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
<b>Network Analysis (C214)</b>		
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
<b>Random Variables and Stochastic Process (C215)</b>		
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
<b>Managerial Economics and Financial Analysis (C216)</b>		
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
<b>Electronic Devices and Circuits Lab (C217)</b>		
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
<b>Networks and Electrical Technology Lab (C218)</b>		
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
<b>SECOND YEAR SECOND SEMESTER (II – II)</b>		
<b>Electronic Circuit Analysis (C221)</b>		
C221.1	Develop and Explain about small signal high frequency transistor amplifiers using BJT & FET with the help of Hybrid $\pi$ 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
<b>Control Systems (C222)</b>		
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
<b>Electromagnetic Waves and Transmission Lines (C223)</b>		
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
<b>Analog Communications (C224)</b>		
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
<b>Pulse and Digital Circuits (C225)</b>		
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
<b>Management Science (C226)</b>		
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
<b>Electronic Circuit Analysis Lab (C227)</b>		
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
<b>Analog Communications Lab (C228)</b>		
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
<b>THIRD YEAR FIRST SEMESTER (III – I)</b>		
<b>Computer Architecture and Organization (C311)</b>		
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
<b>Linear IC Applications (C312)</b>		
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
<b>Digital IC Applications (C313)</b>		
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
<b>Digital Communications (C314)</b>		
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
<b>Antenna and Wave Propagation (C315)</b>		
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
<b>Pulse and Digital Circuits Lab (C316)</b>		
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
<b>Linear IC Applications Lab (C317)</b>		
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
<b>Digital IC Applications Lab (C318)</b>		
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
<b>Professional Ethics &amp; Human Values (C319)</b>		
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
<b>THIRD YEAR SECOND SEMESTER (III – II)</b>		
<b>Microprocessors and Microcontrollers (C321)</b>		
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
<b>Microwave Engineering (C322)</b>		
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
<b>VLSI Design (C323)</b>		
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
<b>Digital Signal Processing (C324)</b>		
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
<b>OOPS through Java (C325)</b>		
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
<b>Microprocessors and Microcontrollers Lab (C326)</b>		
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
<b>VLSI Design Lab (C327)</b>		
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 ladder network and analyze the output using EDA tool.	Apply
<b>Digital Communications Lab (C328)</b>		
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
<b>COURSE NAME: IPR &amp; Patents(C329)</b>		
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
<b>FOURTH YEAR FIRST SEMESTER (IV – I)</b>		
<b>Radar Systems (C411)</b>		
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
<b>Digital Image Processing (C412)</b>		
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
<b>Computer Networks (C413)</b>		
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
<b>Optical Communications (C414)</b>		
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
<b>Electronic Switching Systems (C415)</b>		
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

<b>Embedded Systems (C416)</b>		
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
<b>Micro Wave Engineering &amp; Optical Lab (C417)</b>		
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
<b>Digital Signal Processing Lab(C418)</b>		
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
<b>FOURTH YEAR SECOND SEMESTER (IV – II)</b>		
<b>Cellular Mobile Communications(C421)</b>		
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
<b>Electronic Measurements and Instrumentation(C422)</b>		
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
<b>Satellite Communications (C423)</b>		
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

<b>Wireless Sensors and Networks (C424)</b>		
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
<b>Seminar (C425)</b>		
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
<b>Project (C426)</b>		
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

  
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## BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & 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
<b>English Lab (C116)</b>		
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
<b>Applied Chemistry Lab (C117)</b>		
C117.1	Develop better Understanding of titration	Apply
C117.2	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
<b>Programming for Problem Solving Using C Lab (C118)</b>		
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
<b>Environmental Science (C119)</b>		
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

<b>FIRST YEAR SECOND SEMESTER (I – II)</b>		
<b>COURSE NAME: Mathematics – II C121)</b>		
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
<b>Mathematics - III(C122)</b>		
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
<b>Applied Physics (C123)</b>		
C123.1	Explain concept of interference, Diffraction, resolving power of Microscope, Telescope and Grating	Understand
C123.2	Explain concept of Davisson Germer 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
<b>Network Analysis (C124)</b>		
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
<b>Basic Electrical Engineering (C125)</b>		
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



<b>FIRST YEAR SECOND SEMESTER (I – II)</b>		
<b>COURSE NAME: Mathematics – II C121)</b>		
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 formulac for equal and unequal intervals.	Apply
C121.5	Find the Quadrature, the solutions of ordinary differential equations by different formulac.	Apply
<b>Mathematics - III(C122)</b>		
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
<b>Applied Physics (C123)</b>		
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
<b>Network Analysis (C124)</b>		
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
<b>Basic Electrical Engineering (C125)</b>		
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
<b>Electronic workshop (C126)</b>		
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
<b>Basic Electrical Engineering Lab(C127)</b>		
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
<b>Applied Physics Lab (C128)</b>		
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
<b>Communication Skills Lab (C129)</b>		
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
<b>Engineering Exploration Project (C1210)</b>		

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
<b>SECOND YEAR FIRST SEMESTER (II – I)</b>		
<b>Electronics Devices and Circuits (C211)</b>		
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
<b>Switching Theory and Logic Design (C212)</b>		
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
<b>Signals and Systems (C213)</b>		
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
<b>Random Variables and Stochastic Processes (C214)</b>		
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

<b>Object Oriented Programming through Java (C215)</b>		
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
<b>Managerial Economics and Financial Analysis (C216)</b>		
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
<b>Electronic Devices and Circuits Lab (C217)</b>		
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
<b>Switching Theory and Logic Design - Lab (C218)</b>		
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
<b>Constitution of India (C219)</b>		
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
<b>SECOND YEAR SECOND SEMESTER (II – II)</b>		
<b>Electronic Circuit Analysis (C221)</b>		

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
<b>Linear Control Systems (C222)</b>		
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
<b>Electromagnetic Waves and Transmission Lines (C223)</b>		
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
<b>Analog Communications (C224)</b>		
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
<b>Computer Architecture and Organization (C225)</b>		

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
<b>Management and Organizational Behavior (C226)</b>		
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
<b>Electronic Circuit Analysis Lab (C227)</b>		
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
<b>Analog Communications Lab (C228)</b>		
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
<b>THIRD YEAR FIRST SEMESTER (III – I)</b>		
<b>COURSE NAME: Linear Integrated Circuits and Applications (C311)</b>		
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
<b>Microprocessor and Microcontrollers (C312)</b>		
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
<b>Digital Communications (C313)</b>		
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
<b>Electronic Measurements &amp; Instrumentation (C314)</b>		
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
<b>Digital System Design using HDL (C315)</b>		
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
<b>Linear Integrated Circuits and Applications - Lab (C316)</b>		
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
<b>Digital Communications Lab (C317)</b>		
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
<b>Microprocessor and Microcontrollers - Lab (C318)</b>		
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
<b>Mini Project with Hardware Development (C319)</b>		
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
<b>Essence of Indian Traditional Knowledge (C3110)</b>		
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
<b>Third year second semester (III – II)</b>		
<b>Wired and Wireless Transmission Devices (C321)</b>		
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
<b>VLSI Design (C322)</b>		
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
<b>Digital Signal Processing (C323)</b>		
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
<b>Cellular &amp; Mobile Communication (C324)</b>		
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
<b>MEMS and its applications (C325)</b>		
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
<b>COURSE NAME: Internet of Things (C326)</b>		

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
<b>VLSI Lab (C327)</b>		
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
<b>Digital Signal Processing Lab (C328)</b>		
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
<b>Intellectual Property Rights (IPR) &amp; Patents (C329)</b>		
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
<b>FINAL YEAR FIRST SEMESTER (IV – I)</b>		
<b>Microwave and Optical Communication Engineering (C411)</b>		
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
<b>Data Communications &amp; Computer networks (C412)</b>		
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
<b>Digital Image and Video Processing (C413)</b>		
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
<b>Communication Standards and Protocols (C414)</b>		
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
<b>COURSE NAME: Embedded Systems (C415)</b>		

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
<b>Internet of Things LAB (C416)</b>		
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
<b>Microwave and Optical Communication Engineering LAB (C417)</b>		
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
<b>Project - Part I (C418)</b>		
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
<b>FINAL YEAR SECOND SEMESTER (IV – II)</b>		
<b>Wireless Communication (C421)</b>		
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
<b>Cyber Security &amp; Cryptography (C422)</b>		
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

<b>COURSE NAME: Project - Part II (C423)</b>		
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**  
Head of the Department  
Electronics & Communication Engineering  
B.V.C. Institute of Technology and Science  
Ballapalem, Amalapuram - 533 201



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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

3.1.2 – A – CO – PO matrices of courses selected in 3.1.1 (six matrices to be mentioned;  
one per semester from 3<sup>rd</sup> to 8<sup>th</sup> semester)

2018 – 22 Batch

AY: 2019– 20

ELECTRONIC DEVICES AND CIRCUITS (C211)												
CO – PO Matrix												
CO #	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C211.1	3	2	-	-	-	-	-	-	-	-	-	-
C211.2	2	2	-	-	-	-	-	-	-	-	-	-
C211.3	1	2	2	-	-	-	-	-	-	-	-	-
C211.4	1	2	3	-	-	-	-	-	-	-	-	-
C211.5	1	3	3	-	-	-	-	-	-	-	-	-
C211.6	1	2	1	-	-	-	-	-	-	-	-	-
C211	1.5	2.17	2.25	-	-	-	-	-	-	-	-	-

CO – PSO MATRIX		
CO #	PSO 1	PSO 2
C211.1	2	-
C211.2	2	-
C211.3	2	-
C211.4	2	-
C211.5	2	-
C211.6	2	-
C211	2	-

**ELECTROMAGNETIC WAVES AND TRANSMISSION LINES**

**CO – PO MATRIX**

CO #	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C223.1	3	3	2	-	-	-	-	-	-	-	-	1
C223.2	2	1	3	-	-	-	-	-	-	-	-	1
C223.3	2	2	3	1	-	-	-	-	-	-	-	1
C223.4	2	2	3	2	-	-	-	-	-	-	-	1
C223.5	2	3	2	1	-	-	-	-	-	-	-	1
C223.6	2	-	2	3	-	-	-	-	-	-	-	1
C223	2.17	2.2	2.5	1.75	-	-	-	-	-	-	-	1

**CO – PSO Matrix**

CO #	PSO 1	PSO 2
C223.1	2	-
C223.2	1	-
C223.3	1	-
C223.4	1	-
C223.5	1	-
C223.6	1	-
C223	1.17	-

AY: 2020 – 21

**DIGITAL COMMUNICATIONS**

**CO – PO MATRIX**

CO #	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C314.1	3	1	-	-	-	-	-	-	-	-	-	-
C314.2	1	3	-	2	2	-	-	-	-	-	-	-
C314.3	3	1	2	-	-	-	-	-	-	-	-	-
C314.4	2	2	3	-	-	-	-	-	-	-	-	-
C314.5	1	3	1	-	-	-	-	-	-	-	-	-
C314.6	2	3	3	-	-	-	-	-	-	-	-	-
C314	2	2.17	2.25	2	2	-	-	-	-	-	-	-

CO – PSO MATRIX		
CO #	PSO 1	PSO 2
C314.1	2	-
C314.2	3	-
C314.3	2	-
C314.4	2	-
C314.5	2	-
C314.6	3	-
C314	2.33	-

DIGITAL SIGNAL PROCESSING												
CO – PO MATRIX												
CO #	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C324.1	3	3	-	-	-	-	-	-	-	-	-	-
C324.2	2	3	-	1	-	-	-	-	-	-	-	-
C324.3	3	3	-	2	-	-	-	-	-	-	-	-
C324.4	-	2	-	-	3	-	-	-	-	-	-	-
C324.5	-	3	-	1	-	-	-	-	-	-	-	-
C324.6	-	-	-	2	3	-	-	-	-	-	-	-
C324	2.67	2.80		1.50	3.00							

CO – PSO MATRIX		
CO#	PSO 1	PSO 2
C324.1	2	-
C324.2	2	-
C324.3	2	-
C324.4	2	-
C324.5	2	-
C324.6	2	-
C324	2.00	



AY: 2021 – 22

ELECTRONIC SWITCHING SYSTEMS												
CO – PO MATRIX												
CO #	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C415.1	2	3	1	-	-	-	-	-	-	-	-	-
C415.2	2	1	3	-	-	-	-	-	-	-	-	-
C415.3	3	2	-	-	-	-	-	-	-	-	-	-
C415.4	1	3	-	-	-	-	-	-	-	-	-	-
C415.5	2	-	2	-	-	-	-	-	-	-	-	-
C415.6	1	1	3	-	-	-	-	-	-	-	-	-
C415	1.83	2	2.25	-	-	-	-	-	-	-	-	-

CO – PSO MATRIX		
CO #	PSO 1	PSO 2
C415.1	2	-
C415.2	2	-
C415.3	2	-
C415.4	2	-
C415.5	2	-
C415.6	2	-
C415	2	-

CELLULAR MOBILE COMMUNICATIONS												
CO – PO MATRIX												
CO #	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
C421.1	3	-	2	-	-	-	-	-	-	-	-	-
C421.2	3	1	3	-	-	-	-	-	-	-	-	-
C421.3	1	3	-	2	-	-	-	-	-	-	-	-
C421.4	3	2	-	-	-	-	-	-	-	-	-	-
C421.5	2	3	-	-	-	-	-	-	-	-	-	-
C421.6	1	2	-	-	2	-	-	-	-	-	-	-
C421	2.4	2.2	2.5	2	2	-	-	-	-	-	-	-

CO – PSO MATRIX		
CO #	PSO 1	PSO 2
C421.1	2	-

C421.2	2	-
C421.3	2	-
C421.4	2	-
C421.5	2	-
C421.6	2	-
C421	2	-

  
Coordinator

  
HOD  
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C421.2	2	2	-	-	-	-	-	-	-	-	-	-
C421.3	2	1	1	-	-	-	-	-	-	-	-	-
C421.4	3	1	-	-	-	-	-	-	-	-	-	-
C421.5	2	-	-	-	-	-	-	-	-	-	-	-
C421	2.4	1.5	1	-	-	-	-	-	-	-	-	-

CO - PSO MATRIX		
CO #	PSO 1	PSO 2
C421.1	2	-
C421.2	2	-
C421.3	2	-
C421.4	2	-
C421.5	2	-
C421	2	-

  
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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CO - PO/PSO Mapping [revised]															
BATCH: 2018-22															
COURSE NAME	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
English I	C111.1	3	-	-	-	2	-	-	-	-	1	-	-	-	2
	C111.2	-	-	-	-	2	-	-	1	-	2	-	-	-	2
	C111.3	-	-	3	-	2	-	-	-	-	-	-	-	-	2
	C111.4	-	-	-	-	2	-	1	-	-	-	-	-	-	2
	C111.5	-	-	-	-	2	-	1	-	-	3	-	-	-	2
	C111.6	-	-	-	-	2	-	-	3	-	-	-	-	-	2
	C111	3	-	3	-	2	-	1	2	-	2	-	-	-	2
Mathematics I	C112.1	3	2	1	1	-	-	-	-	-	-	-	-	-	-
	C112.2	3	2	1	2	-	-	-	-	-	-	-	-	-	-
	C112.3	2	2	2	1	-	-	-	-	-	-	-	-	-	-
	C112.4	1	3	2	1	-	-	-	-	-	-	-	-	-	-
	C112.5	2	3	1	2	-	-	-	-	-	-	-	-	-	-
	C112.6	2	2	2	2	-	-	-	-	-	-	-	-	-	-
	C112	2.17	2.33	1.5	1.5	-	-	-	-	-	-	-	-	-	-
Mathematics II	C113.1	2	3	1	-	-	-	-	-	-	-	-	-	-	-
	C113.2	2	3	1	-	-	-	-	-	-	-	-	-	-	-
	C113.3	2	2	2	-	-	-	-	-	-	-	-	-	-	-
	C113.4	2	2	2	-	-	-	-	-	-	-	-	-	-	-
	C113.5	2	3	1	-	-	-	-	-	-	-	-	-	-	-
	C113.6	3	1	2	-	-	-	-	-	-	-	-	-	-	-
	C113	2.17	2.33	1.5	-	-	-	-	-	-	-	-	-	-	-
Applied Physics	C114.1	3	2	-	-	-	-	-	-	-	-	-	-	-	1
	C114.2	3	2	-	-	-	-	-	-	-	1	-	-	-	1
	C114.3	3	2	-	-	-	-	-	-	-	1	-	-	-	1
	C114.4	3	2	-	-	-	-	-	-	-	-	-	-	-	1
	C114.5	3	2	-	-	-	-	-	-	-	-	-	-	-	1
	C114.6	3	2	1	-	-	-	-	-	-	-	-	-	-	1
	C114	3	2	1	-	-	-	-	-	-	1	-	-	-	1

Computer Programming	C115.1	-	3	2	-	-	-	-	-	-	-	-	-	-	-
	C115.2	-	3	-	2	-	-	-	-	-	-	-	-	-	2
	C115.3	-	3	3	-	-	-	-	-	-	-	-	-	2	-
	C115.4	-	-	-	2	3	-	-	-	-	-	-	-	-	1
	C115.5	3	-	2	-	-	-	-	-	-	-	-	-	2	-
	C115.6	-	2	-	-	2	-	-	-	-	-	-	-	-	-
	C115	3	2.75	2.33	2	2.5	-	-	-	-	-	-	-	2	1.5
Engineering Drawing	C116.1	2	2	1	-	1	-	-	1	1	2	-	1	2	2
	C116.2	2	2	2	-	1	-	-	2	1	2	-	1	2	3
	C116.3	2	2	2	-	1	-	-	2	1	2	-	1	2	2
	C116.4	2	2	2	-	1	-	-	2	1	2	-	1	2	2
	C116.5	2	2	2	-	1	-	-	2	1	2	-	1	3	3
	C116.6	2	2	2	-	1	-	-	2	1	3	-	1	3	3
	C116	2	2	1.83		1			1.83	1	2.17		1	2.33	2.5
English - Communication Skills Lab I	C117.1	-	-	-	-	2	-	-	-	2	2	-	1	1	2
	C117.2	-	-	-	-	2	-	-	-	2	3	-	1	1	2
	C117.3	-	-	-	-	2	-	-	-	2	2	-	1	1	2
	C117.4	-	-	-	-	2	-	-	-	-	3	-	1	1	2
	C117.5	-	-	-	-	2	-	-	-	-	3	-	1	1	2
	C117.6	-	-	-	-	2	-	-	-	-	3	-	2	1	2
	C117	-	-	-	-	2	-	-	-	2	2.67	-	1.17	1	2
Applied / Engineering Physics Lab	C118.1	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C118.2	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C118.3	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C118.4	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C118.5	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C118.6	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C118	3	2	-	-	2	-	-	-	-	-	-	-	-	-
Applied / Engineering Physics - Virtual Labs - Assignments	C119.1	3	2	1	-	2	-	-	-	-	-	-	-	-	-
	C119.2	3	2	1	-	2	-	-	-	-	-	-	-	-	-
	C119.3	3	2	1	-	2	-	-	-	-	-	-	-	-	-
	C119.4	3	2	1	-	2	-	-	-	-	-	-	-	-	-
	C119.5	3	2	1	-	2	-	-	-	-	-	-	-	-	-
	C119.6	3	2	1	-	2	-	-	-	-	-	-	-	-	-
	C119	3	2	1	-	2	-	-	-	-	-	-	-	-	-
Engineering Workshop & IT Workshop	C1110.1	3	3	-	-	-	-	-	-	3	3	-	-	-	-
	C1110.2	3	3	-	-	-	-	-	-	3	3	-	-	-	-
	C1110.3	3	2	-	-	-	-	-	-	3	3	-	-	-	-
	C1110.4	3	2	-	-	-	-	-	-	3	3	-	-	-	-























Seminar	C425.1	-	3	-	-	-	-	-	-	-	-	-	-	-	3
	C425.2	-	-	-	3		3	3	-	-	-	-	-	3	3
	C425.3	-	-	-	3	3	3		-	-	-	-	-	3	3
	C425.4	-	-	-	-	3	-	-	3	-	-	-	-	3	3
	C425.5	-	-	-	-	3	-	-	3	-	3	-		3	3
	C425.6	-	-	-	-	-	-	-		-	3	-	3	3	3
	C425	-	3	-	3	3	3	3	3	-	3	-	3	3	3
Project	C426.1	-	3	-	-	-	-	-	-	-	-	-	-	-	3
	C426.2	-	-	3	3	-	-	-	-	-	-	-	-	3	3
	C426.3	-	-	-	3	-	-	-	-	-	-	-	-	3	3
	C426.4	-	-	-	-	3	-	-	3	3	-	3	-	3	3
	C426.5	-	-	-	-	-	3	3	-	-	-	-	-	3	3
	C426.6	-	-	-	-	-	-	-	-	-	3	-	3	3	3
	C426	-	3	3	3	3	3	3	3	3	3	3	3	3	3

  
Coordinator

  
HOD  
Head of the Department  
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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CO - PO/PSO Mapping [REVISED]															
BATCH: 2019-23															
COURSE NAME	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
English	C111.1	-	-	-	-	-	-	-	-	-	2	-	2	-	2
	C111.2	-	-	-	-	-	-	-	-	-	2	-	2	-	2
	C111.3	-	-	-	-	2	-	-	-	-	2	-	2	-	2
	C111.4	-	-	-	-	-	-	2	-	-	2	-	2	-	2
	C111.5	-	-	-	-	-	2	-	-	2	2	-	2	-	2
	C111	-	-	-	-	2	2	2	-	-	2	2	2	-	2
Mathematics - I	C112.1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
	C112.2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C112.3	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C112.4	1	3	-	-	-	-	-	-	-	-	-	-	-	-
	C112.5	2	-	2	-	-	-	-	-	-	-	-	-	-	-
	C112	2	2.25	2	-	-	-	-	-	-	-	-	-	-	-
Applied Chemistry	C113.1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	C113.2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C113.3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
	C113.4	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C113.5	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	C113	2	1.6	-	-	-	-	-	-	-	-	-	-	-	-
Programming for Problem Solving Using C	C114.1	3	2	-	-	-	-	-	-	-	-	-	-	2	-
	C114.2	2	3	-	-	-	-	-	-	-	-	-	-	2	-
	C114.3	2	1	2	-	-	-	-	-	-	-	-	-	2	-
	C114.4	3	2	2	-	-	-	-	-	-	-	-	-	2	-
	C114.5	2	3	2	-	-	-	-	-	-	-	-	-	2	-
	C114	2.4	2.2	2	-	-	-	-	-	-	-	-	-	2	-
Engineering Drawing	C115.1	2	1	2	-	-	-	-	-	-	2	-	1	2	2
	C115.2	3	1	-	-	-	-	-	-	-	2	-	1	2	2
	C115.3	2	1	-	-	-	-	-	-	-	2	-	1	2	2
	C115.4	3	1	-	-	-	-	-	-	-	3	-	1	3	3
	C115.5	3	1	3	-	-	-	-	-	-	3	-	2	3	3
	C115	2.6	1	2.5	-	-	-	-	-	-	2.4	-	1.2	2.4	2.4
English Lab	C116.1	-	-	-	-	-	-	-	-	1	2	-	3	-	2



Network Analysis	C124.1	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C124.2	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C124.3	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C124.4	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C124.5	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C124.6	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C124	2	1	-	-	-	-	-	-	-	-	-	-	2	-
Basic Electrical Engineering	C125.1	3	3	2	2	-	-	2	-	-	-	-	-	2	-
	C125.2	3	2	2	2	-	-	2	-	-	-	-	-	2	-
	C125.3	2	3	3	2			2	-	-	-	-	-	2	-
	C125.4	2	2	3	2	-	-	2	-	-	-	-	-	2	-
	C125.5	2	2	3	2	-	-	2	-	-	-	-	-	2	-
	C125	2.4	2.4	2.6	2	-	-	2	-	-	-	-	-	2	-
Electronic workshop	C126.1	1	3											1	-
	C126.2	2	-	3	-	2	-	-	-	-	-	-	-	1	-
	C126.3	1	-	3	-	2	-	-	-	-	-	-	-	1	-
	C126.4	2	-	3	-	2	-	-	-	-	-	-	-	1	-
	C126.5	2	-	2	-	3	-	-	-	-	-	-	-	1	-
	C126	1.6	3	2.75	-	2.25	-	-	-	-	-	-	-	1	
Basic Electrical Engineering Lab	C127.1	3	3	-	-	-	-	-	-	3	3	-	-	-	3
	C127.2	3	3	-	-	-	-	-	-	3	3	-	-	-	3
	C127.3	3	3	-	-	3	-	-	-	3	3	-	-	-	3
	C127	3	3	-	-	3	-	-	-	3	3	-	-	-	3
Applied Physics Lab	C128.1	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C128.2	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C128.3	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C128.4	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C128.5	3	2	-	-	2	-	-	-	-	-	-	-	-	1
	C128	3	2	-	-	2	-	-	-	-	-	-	-	-	1
Communication Skills Lab	C129.1	-	-	-	-	-	-	-	-	2	3	-	2	-	2
	C129.2	-	-	-	-	-	-	-	-	2	3	-	2	-	2
	C129.3	-	-	-	-	-	-	-	-	2	3	-	2	-	2
	C129.4	-	-	-	-	-	-	-	-	2	2	-	2	-	2
	C129.5	-	-	-	-	-	-	-	-	2	2	-	2	-	2
	C129	-	-	-	-	-	-	-	-	2	2.6	-	2	-	2
Engineering Exploration Project	C1210.1	2													2
	C1210.2	2		2	2								2	2	2
	C1210.3	2			2						2			2	2
	C1210.4	2				2			2	2		2		2	2
	C1210.5	2					2	2						2	2













	C328.4	3	3	3	-	2	-	-	-	-	-	-	-	2	-
	C328.5	3	2	3	-	2	-	-	-	-	-	-	-	2	-
	C328	3	2.6	3	-	2	-	-	-	-	-	-	-	2	-
Intellectual Property Rights (IPR) & Patents	C329.1	-	-	2	-	-	2	-	-	-	-	-	-	-	-
	C329.2	-	-	2	-	-	2	-	-	-	-	-	-	-	-
	C329.3	-	-	2	-	-	2	-	-	-	-	-	-	-	-
	C329.4	-	-	2	-	-	2	-	-	-	-	-	-	-	-
	C329.5	-	-	2	-	-	2	-	-	-	-	-	-	-	-
	C329			2			2								
Microwave and Optical Communication Engineering	C411.1	3	3	2	-	-	-	-	-	-	-	-	-	2	-
	C411.2	2	2	2	-	-	-	-	-	-	-	-	-	2	-
	C411.3	3	3	3	-	1	1	-	-	-	-	-	-	2	-
	C411.4	2	2	-	2	-	-	2	-	-	-	-	-	2	-
	C411.5	2	2	-	2	-	-	-	-	-	-	-	-	2	-
	C411	2.4	2.4	2.33	2	1	1	2	-	-	-	-	-	2	-
Data Communications & Computer networks	C412.1	3	-	-	-	-	-	-	-	-	-	-	-	2	-
	C412.2	2	2	-	2	-	-	-	-	-	-	-	-	2	-
	C412.3	3	-	-	-	-	-	-	-	-	-	-	-	2	-
	C412.4	3	2	-	2	-	-	-	-	-	-	-	-	2	-
	C412.5	2		-	-	-	-	-	-	-	-	-	-	2	-
	C412	2.6	2	-	2	-	-	-	-	-	-	-	-	2	-
Digital Image and Video Processing	C413.1	3	2	2	-	-	-	-	-	-	-	-	-	2	-
	C413.2	2	2	-	1	2	-	-	-	-	-	2	-	2	-
	C413.3	2	2	2	2	2	-	-	-	-	-	2	-	2	-
	C413.4	3	-	2	1	2	-	-	-	-	-	-	-	2	-
	C413.5	2	-	2	2	-	-	-	-	-	-	-	-	2	-
	C413	2.4	2	2	1.5	3	-	-	-	-	-	2	-	2	-
Communication Standards and Protocols	C414.1	2	-	1	-	-	-	-	-	-	-	-	-	2	-
	C414.2	2	2	1	-	-	-	-	-	-	-	-	-	2	-
	C414.3	2	-	1	-	-	-	1	-	-	-	-	-	2	-
	C414.4	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C414.5	2	2	1	-	-	-	-	-	-	-	-	-	2	-
	C414	2	1.66	1	-	-	-	1	-	-	-	-	-	2	-
Embedded Systems	C415.1	3	2	1										2	
	C415.2	1												2	
	C415.3	2		2										2	
	C415.4	2		3										2	
	C415.5	2	3											2	
	C415	2	2.5	2										2	
Internet of Things Lab	C416.1	2	-	3	-	2	1	-	-	-	-	-	-	2	-
	C416.2	2	1	-	2	3	2	-	-	-	-	2	-	3	-
	C416.3	3	1	2	2	3	2	-	-	-	-	3	-	2	-

	C416.4	2	-	2	1	2	1	-	-	-	-	-	-	2	-
	C416	2.25	1	2.3	1.6	2.5	1.5					2.5		2.25	
Microwave and Optical Communication Engineering LAB	C417.1	1	3	-	-	2	-	-	-	-	-	-	-	2	-
	C417.2	1	3	-	-	2	-	-	-	-	-	-	-	2	-
	C417.3	1	3	-	-	3	-	-	-	-	-	-	-	2	-
	C417.4	1.33	3	-	-	2.33	-	-	-	-	-	-	-	2	-
	C417.5	1	3	-	-	2	-	-	-	-	-	-	-	2	-
	C417	1.07	3	-	-	2.27	-	-	-	-	-	-	-	2	-
Project - Part I	C418.1	1	3	3	-	3	-	3	2	3	3	3	3	3	2
	C418.2	3	3	3	-	2	-	3	3	2	3	3	2	3	3
	C418	2	3	3	-	2.5	-	3	2.5	2.5	3	3	2.5	3	2.5
Wireless Communication	C421.1	3	2	1	-	-	-	-	-	-	-	-	-	2	-
	C421.2	2	2	-	-	-	-	-	-	-	-	-	-	2	-
	C421.3	2	1	1	-	-	-	-	-	-	-	-	-	2	-
	C421.4	3	1	-	-	-	-	-	-	-	-	-	-	2	-
	C421.5	2	-	-	-	-	-	-	-	-	-	-	-	2	-
	C421	2.4	1.5	1	-	-	-	-	-	-	-	-	-	2	-
Cyber Security & Cryptography	C422.1	3	2	1	-	-	-	-	-	-	-	-	-	2	-
	C422.2	2	1	-	-	-	-	-	-	-	-	-	-	2	-
	C422.3	2	1	1	-	-	-	-	-	-	-	-	-	2	-
	C422.4	3	1	-	-	-	-	-	-	-	-	-	-	2	-
	C422.5	2	-	-	-	-	-	-	-	-	-	-	-	2	-
	C422	2.4	1.25	1	-	-	-	-	-	-	-	-	-	2	-
Project - Part II	C423.1	2	1	1	3	1	2	1	-	-	-	2	3	2	2
	C423.2	3	-		3	2	3	2	-	-	2	1	2	2	2
	C423.3		-	1	-	1	2	3	-	2	3	2	2	1	2
	C423	2.5	1	1	3	1.33	2.33	2	-	2	2.5	1.67	2.33	1.67	2

  
Coordinator

  
HOD

Head of the Department  
Electronics & Communication Engineering  
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Ballapalem, Amalapuram - 533 201



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**

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Batlapalem, Amalapuram, Indupalli Post, Dr. B. R. A. Konaseema Dist. AP, INDIA – 533201.

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**3.1.3 – A –Program Level Course – PO Matrix of all courses INCLUDING First Year Courses**

**2018 – 22 BATCH**

COURSE-PO MAPPING REVISED																
BATCH: 2018-22																
S.No.	COURSE NAME	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	English I	C111	3	-	3	-	2	-	1	2	-	2	-	-	-	2
2	Mathematics I	C112	2.17	2.33	1.5	1.5	-	-	-	-	-	-	-	-	-	-
3	Mathematics II	C113	2.17	2.33	1.5	-	-	-	-	-	-	-	-	-	-	-
4	Applied Physics	C114	3	2	1	-	-	-	-	-	-	1	-	-	-	1
5	Computer Programming	C115	3	2.75	2.33	2	2.5	-	-	-	-	-	-	-	2	1.5
6	Engineering Drawing	C116	2	2	1.83		1			1.83	1	2.17		1	2.33	2.5
7	English - Communication Skills Lab I	C117	-	-	-	-	2	-	-	-	2	2.67	-	1.17	1	2
8	Applied / Engineering Physics Lab	C118	3	2	-	-	2	-	-	-	-	-	-	-	-	1
9	Applied / Engineering Physics –Virtual Labs - Assignments	C119	3	2	1	-	2	-	-	-	-	-	-	-	-	
10	Engineering Workshop & IT Workshop	C1110	3	2.6	-	-	-	-	-	-	3	3	-	-	-	-
11	English II	C121	2.33	-	-	-	3	1.25	1	-	2.5	2	-	2	-	3



44	Professional Ethics & Human Values	C319	-	-	-	-	-	-	-	3	-	2	-	-	-	-
45	Microprocessors and Microcontrollers	C321	1.79	1.67	3	-	2	-	-	-	-	-	-	-	2	-
46	Microwave Engineering	C322	2.2	1.8	2.3	-	-	-	-	-	-	-	-	-	2	-
47	VLSI Design	C323	1.83	2	2.2	-	-	-	-	-	-	-	-	-	2	-
48	Digital Signal Processing	C324	1.75	2.80		1.50	3	-	-	-	-	-	-	-	2	-
49	OOPs through Java	C325	2.33	2.5	1	2.5		2	-	-	-	-	-	-	2	2
50	Microprocessors and Microcontrollers Lab	C326	2.8	1.75	1.5	-	1.4	-	-	-	2	1.5	-	-	2	-
51	VLSI Design Lab	C327	2	-	3	-	2	-	-	-	-	-	-	-	1	-
52	Digital Communications Lab	C328	1.60	3	3	-	1	-	-	-	-	-	-	-	1	-
53	IPR & Patents	C329	-	-	3	-	-	2	-	-	-	-	-	-	-	-
54	Radar Systems	C411	1.3	2.3	2.5	-	-	-	-	-	-	-	-	-	2	-
55	Digital Image Processing	C412	1.83	1.67	3										2	
56	Computer Network	C413	2.16	1.83	2	2.5		-	-	-	-	-	-	-	2.33	-
57	Optical Communications	C414	2.4	2.75	2.5	-	2	-	-	-	-	-	-	2	2	-
58	Electronic Switching Systems	C415	1.83	2	2.25	-	-	-	-	-	-	-	-	-	2	-
59	Embedded Systems	C416	1.67	2.5	2										2	
60	Micro Wave Engineering & Optical Lab	C417	1	3	-	-	2.2	-	-	-	-	-	-	-	2	-
61	Digital Signal Processing Lab	C418	2.88	2.08	3	-	-	-	-	-	-	-	-	-	2	-
62	Cellular Mobile Communications	C421	2.4	2.2	2.5	2	2	-	-	-	-	-	-	-	2	-
63	Electronic Measurements and Instrumentation	C422	3	1.33	-	-	-	-	-	-	-	-	-	-	3	-
64	Satellite Communications	C423	2.4	2.67	2	-	1	-	-	-	-	-	-	2	2	-
65	Wireless Sensors and Networks	C424	2.8	1	2.5	2	2.5	-	-	-	-	-	-	-	2	-
66	Seminar	C425	-	3	-	3	3	3	3	3	-	3	-	3	3	3
67	Project	C426	-	3	3	3	3	3	3	3	3	3	3	3	3	3
PO-PSO			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
No of Courses Contributing to each PO-PSO			60	59	50	21	33	8	7	8	11	12	3	12	49	14

<b>% of Courses Contributing to each PO- PSO</b>	89.55	88.06	74.63	31.34	49.25	11.94	10.45	11.94	16.42	17.91	4.48	17.91	73.13	20.90
	2.15	2.23	2.14	2.01	2.11	1.78	1.83	2.30	2.17	2.30	2.30	1.72	1.84	1.77
<b>Target</b>	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	3.00	3.00	2.00	2.00	2.00

  
Coordinator

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





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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

COURSE-PO MAPPING																
BATCH: 2019-23																
S.No	COURSE NAME	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	English	C111	-	-	-	-	2.00	2.00	2.00		2.00	2.00		2.00	-	2.00
2	Mathematics - I	C112	2.00	2.25	2.00	-	-	-	-	-	-	-	-	-	-	-
3	Applied Chemistry	C113	2.00	1.60	-	-	-	-	-	-	-	-	-	-	-	-
4	Programming for Problem Solving Using C	C114	2.40	2.20	2.00	-	-	-	-	-	-	-	-	-	2.00	-
5	Engineering Drawing	C115	2.60	1.00	2.50	-	-	-	-	-	-	2.40	-	1.20	2.40	2.40








42	Linear Integrated Circuits and Applications - Lab	C316	2.23	2.45	2.21	2.00	-	-	-	-	2.00	-	-	-	1.47	-
43	Digital Communications Lab	C317	1.25	3.00	3.00	1.00	1.08								1.20	
44	Microprocessor and Microcontrollers - Lab	C318	3.00		2.00		2.00							1.00	2.00	
45	Mini Project with Hardware Development	C319	2.25	2.33	2.00	3.00	1.80	2.33	2.40	2.50	2.33	2.75	2.20	2.40	2.20	2.20
46	Essence of Indian Traditional Knowledge	C3110	-	-	-	-	-	2.60	-	3.00	-	2.70	-	-	-	-
47	Wired and Wireless Transmission Devices	C321	2.60	2.20	1.75	2.00	-	-	-	-	-	-	-	-	2.00	-
48	VLSI Design	C322	2.00	2.00	2.40	-	2.00	-	-	-	-	-	-	-	2.00	-
49	Digital Signal Processing	C323	2.20	2.00	1.50	-	-	-	-	-	-	-	-	-	2.00	-
50	Cellular & Mobile Communication	C324	2.50	2.75	2.33	2.00	-	-	-	-	-	-	-	-	2.00	-
51	MEMS and its applications	C325	2.60	-	-	2.67	-	-	-	-	-	-	-	3.00	2.00	-
52	Internet of Things	C326	2.20	-	1.80	1.75	2.00	1.50	-	-	-	-	2.00	-	2.00	-

53	VLSI Lab	C327	1.00	1.00	2.25	1.00	2.25								2.25	
54	Digital Signal Processing Lab	C328	3.00	2.60	3.00	-	2.00	-	-	-	-	-	-	-	2.00	-
55	Intellectual Property Rights (IPR) & Patents	C329			2.00			2.00								
56	Microwave and Optical Communication Engineering	C411	2.40	2.40	2.33	2.00	1.00	1.00	2.00	-	-	-	-	-	2.00	-
57	Data Communications & Computer networks	C412	2.60	2.00	-	2.00	-	-	-	-	-	-	-	-	2.00	-
58	Digital Image and Video Processing	C413	2.40	2.00	2.00	1.50	3.00	-	-	-	-	-	2.00	-	2.00	-
59	Communication Standards and Protocols	C414	2.00	1.66	1.00	-	-	-	1.00	-	-	-	-	-	2.00	-
60	Embedded Systems	C415	2.00	2.50	2.00										2.00	
61	Internet of Things Lab	C416	2.25	1.00	2.30	1.60	2.50	1.50					2.50		2.25	
62	Microwave and Optical Communication Engineering LAB	C417	1.07	3.00	-	-	2.27	-	-	-	-	-	-	-	2.00	-
63	Project - Part I	C418	2.00	3.00	3.00	-	2.50	-	3.00	2.50	2.50	3.00	3.00	2.50	3.00	2.50

64	Wireless Communication	C421	2.40	1.50	1.00	-	-	-	-	-	-	-	-	-	2.00	-
65	Cyber Security & Cryptography	C422	2.40	1.25	1.00	-	-	-	-	-	-	-	-	-	2.00	-
66	Project - Part II	C423	2.50	1.00	1.00	3.00	1.33	2.33	2.00	-	2.00	2.50	1.67	2.33	1.67	2.00
<b>PO-PSO</b>			<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
No of Courses Contributing to each PO-PSO			59	54	47	22	29	11	9	7	11	12	9	13	48	13
% of Courses Contributing to each PO-PSO			89.39 %	81.82 %	71.21 %	33.33 %	43.94 %	16.67 %	13.64 %	10.61 %	16.67 %	18.18 %	13.64 %	19.70 %	72.73 %	19.70 %
Target			2.24	2.18	2.10	1.88	2.12	1.93	2.06	2.29	2.08	2.37	2.24	1.96	1.93	1.93

  
Coordinator

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



## BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & 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

#### 3.2 Attainment of Course Outcomes (50)

##### 3.2.1. Describe the Assessment Processes used to Gather the Data upon which the evaluation of Course Outcome is based (10)

###### List of Assessment Processes

CO Assessment process is done based on the performance of the student using Direct Method (MID exam, Assignment, Semester End Examination) and Indirect Method (Course Semester End Feedback)

For the assessment of Course Outcomes, 80% weightage is given to Direct Assessment and 20% weightage is given to Indirect Assessment.

Table.3.2.1.1. List of Assessment Processes

Course Type	Direct Assessment Methods		Indirect Assessment Methods
	Internal	External	
Theory Course	<ul style="list-style-type: none"> <li>✓ Mid Examinations</li> <li>✓ Assignment</li> </ul>	<ul style="list-style-type: none"> <li>✓ End Examination</li> </ul>	<ul style="list-style-type: none"> <li>✓ Course End Feedback</li> </ul>
Lab Course	<ul style="list-style-type: none"> <li>✓ Day – to – Day work</li> <li>✓ Record</li> <li>✓ Internal Examination</li> </ul>	<ul style="list-style-type: none"> <li>✓ End Examination</li> </ul>	<ul style="list-style-type: none"> <li>✓ Course End Feedback</li> </ul>
Seminar	<ul style="list-style-type: none"> <li>✓ Synopsis</li> <li>✓ Mid Term Evaluation</li> </ul>	NA	NA



	✓ Internal Evaluation		
Project	✓ Synopsis ✓ Mid Term Evaluation ✓ Internal Evaluation	✓ End Evaluation	NA

### B. The Quality / Relevance of assessment processes & tools used

#### Theory Courses Evaluation:

For theory subjects, during the semester there shall be 2 tests. The weightage of Internal marks for 30 consists of Descriptive – 15, Assignment - 05 (Theory, Design, Analysis, Simulation, Algorithms, Drawing, etc. as the case may be and for Physics, Virtual Labs to be considered as Assignments) Objective -10 (Conducted at College level with 20 Multiple choice question with a weightage of ½ Mark each). The objective examination is for 20 minutes duration. The subjective examination is for 90 minutes duration conducted for 15 marks. Each subjective type test question papers shall contain 3 questions and all questions need to be answered. The Objective examination conducted for 10 marks and subjective examination conducted for 15 marks are to be added to the assignment marks of 5 for finalizing internal marks for 30.

Internal Marks can be calculated with 80% weightage for best of the two Mids. and 20% weightage for another Mid Exam. As the syllabus is framed for 6 units, the 1st mid examination (both Objective and Subjective) is conducted in 1-3 units and second test in 4-6 units of each subject in a semester.

The **end semester examination** is conducted covering the topics of all Units for 70 marks. End Exam Paper: Part-A 1st Question is mandatory covering all the syllabus which contains seven 2 marks questions for 14 marks with at least 2 marks of question for each of the six units and in Part-B 4 Questions out of 6 Questions are to be answered with each carrying 14 marks. Part-A & Part-B put together gives for 70 marks.

#### Direct Method:

Evaluation	Exam Mode	Max. Marks	Frequency	Duration
Internal	MID (Descriptive)	15	Twice per Semester	90 min.
	Objective Quiz (MCQ)	10	Twice per Semester	20 min.
	Assignment	5	Six per Course	-
	Internal Assessment (30 marks) = 80% of Best Mid Marks + 20% of the other Mid Marks			
External	Part A	14	Once per Semester	180 min.
	Part B	56		

#### Laboratory Course Evaluation:

For practical subjects there shall be continuous evaluation during the semester for 25 internal marks and 50 end examination marks. The internal 25 marks shall be awarded as follows: day to day work - 10 marks, Record – 5 marks and the remaining 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner.

#### Direct Method:

Evaluation	Exam Mode	Max. Marks	Frequency	Duration
Internal	Day – to – Day work	10	Once per Experiment	150 min.
	Laboratory Record	5	Once per Experiment	
	Internal Exam	10	Once per Semester	180 min.
External	End Exam	50	Once per Semester	180 min.

#### Rubrics used for laboratory Course

Parameters	Marks	Poor	Average	Good
Students' observation book preparation	5	Insufficient	Fair	Good
		0 – 2 Marks	3 – 4 Marks	5 Marks
Attendance	5	75 % - 80 %	80 % - 90 %	90 % - 100 %
		0 – 2 Marks	3 – 4 Marks	5 Marks
Record	5	Insufficient recording of content, calculations and conclusion	Fair recording of content, calculations and conclusion	Good recording of content, calculations and conclusion
		0 – 2 Marks	3 – 4 Marks	5 Marks

#### Rubrics used for Laboratory Internal Examination

Parameters	Marks	Poor	Average	Good
Experiment writeup	3	Not able to write procedure and calculations	Able to write procedure but not able to show calculations	Able to write procedure and show calculations
		0 – 1 Marks	1 – 2 Marks	3 Marks
Execution	4	Not executed	Partially executed	Completely executed
		0 – 1 Marks	2 – 3 Marks	4 – 5 Marks
Viva – Voce	3	Insufficient	Fair knowledge	Good knowledge

		Knowledge of experiment	of experiment	of experiment
		0 – 1 Mark	1 – 2 Marks	3 Marks

### CO Assessment Process for Engineering Drawing

#### Direct Method:

Evaluation	Method	Max. Marks	Frequency	Duration
Internal	Day-to-Daywork	20		
	Internal Test	10	Twice per semester	90Minutes
	Internal assessment(30marks)=80%ofBestMid+20%TheotherMid			
External	Exam	70	Once per semester	3Hours

**Mandatory Course (M.C):** There shall be Mandatory Course with zero credits. There shall be no external examination. However, a minimum of 75% attendance is mandatory and indirect assessment is taken in that particular subject.

#### Seminar

For the seminar, each student has to be evaluated based on the presentation of any latest topic with report of 10-15 pages and a ppt of min 10 slides. The student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for **50 marks**. There shall be **no external** examination for seminar.

#### CO Assessment Process for Seminar

Evaluation	Method	Marks	Weightage	Duration
Internal	Mid-term review 1	15	30% of max. marks	15 min. per student
	Mid-term review 2	15	30% of max. marks	
	Final review	20	40% of max. marks	

**Rubrics for seminar Internal Evaluation:**

Parameter	Rubric			Marks
	Poor	Average	Good	
Seminar report	Objectives not clear	Clear objectives and organized	Clear objectives, advanced technology based and organized	20
	1 – 6 Marks	7 – 14 Marks	15 – 20 Marks	
Preparation	Contents are inappropriate	Appropriate contents, not well arranged	Appropriate contents and well arranged	20
	1 – 6 Marks	7 – 14 Marks	15 – 20 Marks	
Queries answered	No answer or explanation	Inappropriate answer and explanation	Clear, concise answer with explanation and with supported facts	10
	1 – 3 Marks	4 – 6 Marks	7 – 10 Marks	

## Project

Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination. The End Semester Examination (Viva – Voce) shall be conducted by the committee. The committee consists of an external examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project and evaluated by an internal committee.

### CO Assessment Process for Project

Review #	Coverage Points	Marks	Weightage
1	Project Proposal Evaluation	20	30%
2	Mid – Term Evaluation	20	
3	Final Evaluation	20	
<b>External Project Evaluation</b>		140	70%
<b>Total</b>		<b>200</b>	<b>100%</b>

### Rubrics for Project Internal Evaluation

Review #	Parameter	Rubric			Marks
		Poor	Average	Good	
1	Objectives, Project Synopsis, Literature Survey	Need Improvement	Clear and Moderate	Well defined and good	20
		0 – 7 Marks	8 – 14 Marks	15 – 20 Marks	

2	Proposed Methodology & Project execution progress	Need Improvement	Clear and Satisfactory	Well defined and good	20
		0 – 7 Marks	8 – 14 Marks	15 – 20 Marks	
3	Result, Conclusion and Presentation	Inappropriate	Average	Effective	20
		0 – 7 Marks	8 – 14 Marks	15 – 20 Marks	

### Indirect Method

The indirect assessment for course outcome is done by the Semester End Course Feedback taken at the end of each course from the students. For each CO, there will be three options with weightage namely **GOOD (3), AVERAGE (2) AND POOR (1)**, out of which the student has to select one option.

Sl. No.	Method	Frequency
1	Feedback	Per course at the end of each semester

  
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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

#### 3.2.2. Record the attainment of Course Outcomes of all courses with respect to set attainment levels (40)

Program shall have set Course Outcome attainment levels for all courses.

(The attainment levels shall be set considering average performance levels in the university examination or any higher value set as target for the assessment years. Attainment level is to be measured in terms of student performance in internal assessments with respect to the Course Outcomes of a course in addition to the performance in the University examination)

#### Measuring Course Outcomes attained through University Examinations

Target may be stated in terms of percentage of students getting more than the university average marks or more as selected by the Program in the final examination. For cases where the university does not provide useful indicators like average or median marks etc., the program may choose an attainment level on its own with justification.

University Result grading system is as follows:

Marks Range Theory (Max – 100)	Marks Range Lab (Max – 75)	Letter Grade	Level	Grade Point
≥ 90	≥ 67	O	Outstanding	10
≥ 80 to < 90	≥ 60 to < 67	S	Excellent	9
≥ 70 to < 80	≥ 52 to < 60	A	Very Good	8
≥ 60 to < 70	≥ 45 to < 52	B	Good	7
≥ 50 to < 60	≥ 37 to < 45	C	Fair	6
≥ 40 to < 50	≥ 30 to < 37	D	Satisfactory	5
< 40	< 30	F	Fail	0
			Absent	0

Grade points are obtained from grades and calculate the class average. The attainment level got from the class average will be distributed to all CO's in equal proportion.



### **Attainment levels vs. targets:**

Attainment Level 1: up to **55%** students scoring more than threshold value

Attainment Level 2: in between **55% to 80%** students scoring more than threshold value

Attainment Level 3: more than **80%** students scoring more than threshold value

- Attainment is measured in terms of actual percentage of students getting set percentage of marks.
- If targets are achieved then all the course outcomes are attained for that year.
- Program is expected to set higher targets for the following years as a part of continuous improvement.
- If targets are not achieved the program should put in place an action plan to attain the target in subsequent years.

### **Measuring CO attainment through Internal Assessments**

(The examples indicated are for reference only. Program may appropriately define levels)

Target may be stated in terms of percentage of students getting more than class average marks or set by the program in each of the associated COs in the assessment instruments (midterm tests, assignments, mini projects, reports and presentations etc. as mapped with the COs)

Internal Examination I address CO1, CO2, CO3 and Internal Examination II addresses CO4, CO5, CO 6.

Each Internal examination evaluation includes descriptive for 15 marks (for each CO 5 marks), objective for 10 marks (equal proportion to all CO's) and assignments for 5 marks (equal proportion to all CO's).

Each CO attainment level is obtained from the class average marks of descriptive, objective and assignments.

### **Attainment levels Vs. targets**

Attainment Level 1: up to **55%** students scoring more than threshold value

Attainment Level 2: in between **55% to 80%** students scoring more than threshold value

Attainment Level 3: more than **80%** students scoring more than threshold value

- Attainment is measured in terms of actual percentage of students getting set percentage of marks.
- If targets are achieved by particular CO then those COs are attained for that year.
- Program is expected to set higher targets for the following years as a part of continuous improvement.
- If targets are not achieved the program should put in place an action plan to attain the target in subsequent years.
- Similar targets and achievement are to be stated for the other midterm tests/internal assessment instruments

**Course Outcome Attainment:**

- Calculate 50% of Internal examination and 50% of university examination considered to be the direct attainment.
- Course semester end feedback taken from all students for each CO and the average value for each CO is considered to be the indirect attainment.
- The overall CO attainment is 80% of Direct attainment and 20% of Indirect attainment.
- The average of overall CO attainment is the Course attainment.

S.No	Interval Examination-1										Interval Examination-2										Internal	End Semester grade	Grade Point
	1(A)	1(B)	2(A)	2(B)	3(A)	3(B)	Total	Assign	Quiz	Total	1(A)	1(B)	2(A)	2(B)	3(A)	3(B)	Total	Assign	Quiz	Total			
Maximum Marks	2	3	2	3	3	2	18	8	10	30	2	3	2	3	3	2	18	8	10	30	50	A+	10
Class Average Mark	235	101	117	111	117	139	839	422	271	1052	173	182	138	172	187	157	820	300	300	1120	1232		8.25
Student Scored above average mark	67	29	31	19	69	47	66	86	82	60	94	19	81	19	72	58	61	132	132	61	67		64
Students attempted the question	103	70	63	44	89	34	132	132	132	122	34	101	35	82	77	132	132	132	132	132		132	
% students scored above average mark	62.04	40.00	49.21	43.18	100.00	55.95	50.00	65.15	60.61	50.00	77.07	55.95	60.19	77.54	57.69	72.73	46.21	100.00	100.00	46.21	50.58	45.48	
Attainment level	2	1	1	1	3	2	1	2	2	1	2	2	3	2	3	2	3	3	3	1	1		

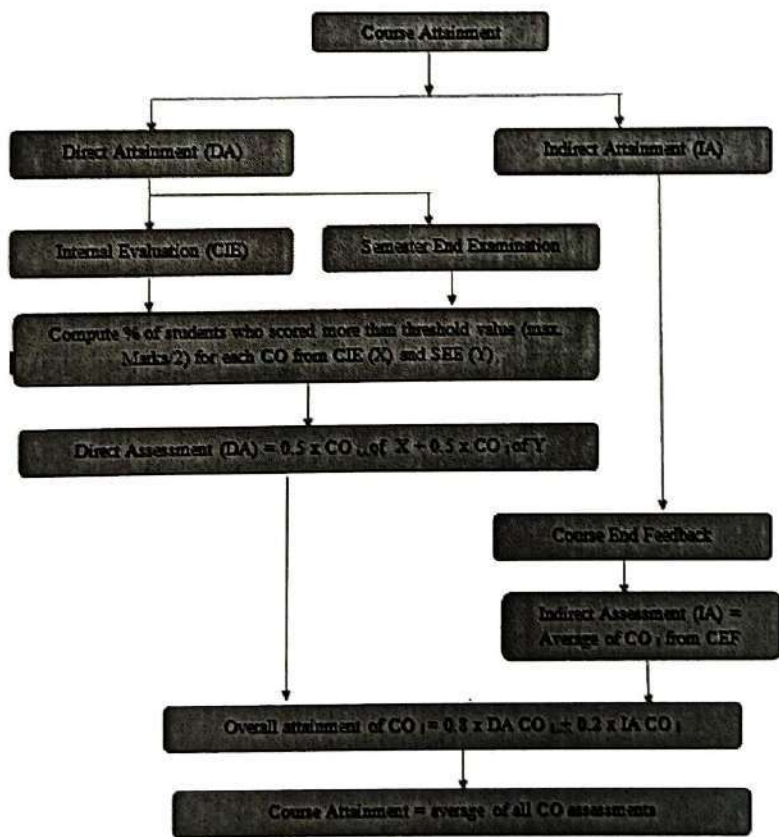
	Internal	Unit Exam	CO Attainment from Assessment	CO Attainment from Feedback	Overall CO Attainment
CO1			1.4875	1.91	1.68
CO2			1.525	1.89	1.66
CO3			1.8125	1.85	1.83
CO4			1.875	2.02	1.88
CO5			2.1375	1.91	2.1
CO6			2.1375	1.85	2.11
Overall Course attainment					1.85
Set target for course attainment					1.688
Status of the course attainment (Yes/No)					Yes

Rubrics	Level
>80% students	3
80 to 55% students	2
<55 % students	1

**Attainment Levels vs Targets for Overall CO Assessment:**

**CO ATTAINMENT PROCESS [FLOW CHART]**



**CO ATTAINMENT SUMMARY**

**BATCH: 2018-22**

S.No.	COURSE NAME	COURSE CODE	CO1		CO2		CO3		CO4		CO5		CO6	
			TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT
1	English I	C111	1.71	2.03	1.71	2.21	1.71	2.02	1.71	2.03	1.71	2.01	1.71	2.22
			57.00 %	67.67%	57.00 %	73.67%	57.00 %	67.33 %	57.00 %	67.67 %	57.00 %	67.00 %	57.00 %	74.00 %
2	Mathematics I	C112	1.50	1.86	1.50	1.71	1.50	1.71	1.50	1.72	1.50	1.55	1.50	1.72
			50.00 %	62.00%	50.00 %	57.00%	50.00 %	57.00 %	50.00 %	57.33 %	50.00 %	51.67 %	50.00 %	57.33 %
3	Mathematics II	C113	1.60	1.71	1.60	1.73	1.60	1.72	1.60	1.9	1.60	1.89	1.60	1.72
			53.33 %	57.00%	53.33 %	57.67%	53.33 %	57.33 %	53.33 %	63.33 %	53.33 %	63.00 %	53.33 %	57.33 %
4	Applied Physics	C114	1.28	1.84	1.28	1.81	1.28	1.99	1.28	2	1.28	2	1.28	2.17
			42.67 %	61.33%	42.67 %	60.33%	42.67 %	66.33 %	42.67 %	66.67 %	42.67 %	66.67 %	42.67 %	72.33 %
5	Computer Programming	C115	1.86	1.76	1.86	1.79	1.86	1.5	1.86	1.76	1.86	1.56	1.86	1.77
			62.00 %	58.67%	62.00 %	59.67%	62.00 %	50.00 %	62.00 %	58.67 %	62.00 %	52.00 %	62.00 %	59.00 %
6	Engineering Drawing	C116	1.41	1.77	1.41	1.81	1.41	1.79	1.41	1.52	1.41	1.5	1.41	1.79
			47.00 %	59.00%	47.00 %	60.33%	47.00 %	59.67 %	47.00 %	50.67 %	47.00 %	50.00 %	47.00 %	59.67 %
7	English - Communication Skills Lab I	C117	1.45	2.51	1.45	2.63	1.45	2.45	1.45	2.6	1.45	2.55	1.45	2.45
			48.33 %	83.67%	48.33 %	87.67%	48.33 %	81.67 %	48.33 %	86.67 %	48.33 %	85.00 %	48.33 %	81.67 %
8	Applied / Engineering Physics Lab	C118	1.60	2.12	1.60	2.12	1.60	2.12	1.60	2.11	1.60	2.2	1.60	2.15
			53.33 %	70.67%	53.33 %	70.67%	53.33 %	70.67 %	53.33 %	70.33 %	53.33 %	73.33 %	53.33 %	71.67 %
9	Applied / Engineering	C119	1.60	2.8	1.60	2.79	1.60	2.78	1.60	2.79	1.60	2.79	1.60	2.78

	ng Physics -Virtual Labs - Assignmen ts		53.33 %	93.33%	53.33 %	93.00%	53.33 %	92.67 %	53.33 %	93.00 %	53.33 %	93.00 %	53.33 %	92.67 %
10	Engineeri ng Workshop & IT Workshop	C1110	2.32	1.76	2.32	1.94	2.32	1.87	2.32	1.59	2.32	1.76	-	-
			77.33 %	58.67%	77.33 %	64.67%	77.33 %	62.33 %	77.33 %	53.00 %	77.33 %	58.67 %	-	-
11	English II	C121	1.51	1.58	1.76	1.77	1.76	1.8	1.76	1.94	1.76	1.97	1.76	1.99
			50.33 %	52.67%	58.67 %	59.00%	58.67 %	60.00 %	58.67 %	64.67 %	58.67 %	65.67 %	58.67 %	66.33 %
12	Mathemat ics III	C122	1.96	1.98	1.96	1.83	1.96	1.81	1.96	2.19	1.96	2.17	1.96	2.18
			65.33 %	66.00%	65.33 %	61.00%	65.33 %	60.33 %	65.33 %	73.00 %	65.33 %	72.33 %	65.33 %	72.67 %
13	Applied Chemistry	C123	1.08	1.91	1.08	1.78	1.08	1.76	1.08	1.91	1.08	1.87	1.08	2.03
			36.00 %	63.67%	36.00 %	59.33%	36.00 %	58.67 %	36.00 %	63.67 %	36.00 %	62.33 %	36.00 %	67.67 %
14	Electrical and Mechanica I Technolog y	C124	1.57	1.49	1.57	1.67	1.57	1.52	1.57	2.02	1.57	2.02	1.57	1.86
			52.33 %	49.67%	52.33 %	55.67%	52.33 %	50.67 %	52.33 %	67.33 %	52.33 %	67.33 %	52.33 %	62.00 %
15	Environm ental Studies	C125	1.56	2	1.56	1.91	1.56	1.87	1.56	1.91	1.56	1.8	1.56	2.11
			52.00 %	66.67%	52.00 %	63.67%	52.00 %	62.33 %	52.00 %	63.67 %	52.00 %	60.00 %	52.00 %	70.33 %
16	Data Structures	C126	1.68	1.93	1.68	1.62	1.68	1.76	1.68	1.93	1.68	1.73	1.68	1.77
			56.00 %	64.33%	56.00 %	54.00%	56.00 %	58.67 %	56.00 %	64.33 %	56.00 %	57.67 %	56.00 %	59.00 %
17	Applied / Engineeri ng Chemistry Lab	C127	2.22	2.81	2.22	2.79	2.22	2.8	2.22	2.8	2.22	2.83	2.22	2.81
			74.13 %	93.67%	74.13 %	93.00%	74.13 %	93.33 %	74.13 %	93.33 %	74.13 %	94.33 %	74.13 %	93.67 %
18	English Communi cations Skills Lab II	C128	1.55	2.01	1.55	1.99	1.55	2.01	1.55	1.99	1.55	2.03	1.55	1.95
			51.67 %	67.00%	51.67 %	66.33%	51.67 %	67.00 %	51.67 %	66.33 %	51.67 %	67.67 %	51.67 %	65.00 %
19	Computer Programm ing Lab	C129	2.16	2.46	2.16	2.47	2.16	2.55	2.16	2.6	2.16	2.55	2.16	1.86
			72.00	82.00%	72.00	82.33%	72.00	85.00	72.00	86.67	72.00	85.00	72.00	62.00

			%		%		%	%	%	%	%	%	%	%
20	Electronic Devices and Circuits	C211	1.58	1.53	1.58	1.69	1.58	1.68	1.58	1.7	1.58	1.71	1.58	1.7
			52.67 %	51.00%	52.67 %	56.33%	52.67 %	56.00 %	52.67 %	56.67 %	52.67 %	57.00 %	52.67 %	56.67 %
21	Switching Theory and Logic Design	C212	1.57	1.71	1.57	1.61	1.57	1.61	1.57	1.71	1.57	1.86	1.57	1.74
			52.33 %	57.00%	52.33 %	53.67%	52.33 %	53.67 %	52.33 %	57.00 %	52.33 %	62.00 %	52.33 %	58.00 %
22	Signals and Systems	C213	1.65	1.63	1.65	1.67	1.65	1.62	1.65	1.79	1.65	1.93	1.65	1.78
			55.00 %	54.33%	55.00 %	55.67%	55.00 %	54.00 %	55.00 %	59.67 %	55.00 %	64.33 %	55.00 %	59.33 %
23	Network Analysis	C214	1.69	1.5	1.69	1.37	1.69	1.35	1.69	1.48	1.69	1.48	1.69	1.5
			56.33 %	50.00%	56.33 %	45.67%	56.33 %	45.00 %	56.33 %	49.33 %	56.33 %	49.33 %	56.33 %	50.00 %
24	Random Variables and Stochastic Process	C215	1.66	1.29	1.66	1.31	1.66	1.3	1.66	1.69	1.66	1.7	1.66	1.7
			55.33 %	43.00%	55.33 %	43.67%	55.33 %	43.33 %	55.33 %	56.33 %	55.33 %	56.67 %	55.33 %	56.67 %
25	Managerial Economics and Financial Analysis	C216	1.69	2.05	1.69	2.04	1.69	2.02	1.69	1.82	1.69	1.86	1.69	1.86
			56.33 %	68.33%	56.33 %	68.00%	56.33 %	67.33 %	56.33 %	60.67 %	56.33 %	62.00 %	56.33 %	62.00 %
26	Electronic Devices and Circuits Lab	C217	1.58	2.48	1.58	2.48	1.58	2.49	1.58	2.5	1.58	2.48	-	-
			52.67 %	82.67%	52.67 %	82.67%	52.67 %	83.00 %	52.67 %	83.33 %	52.67 %	82.67 %	-	-
27	Networks and Electrical Technology Lab	C218	2.00	2.14	2.00	2.27	2.00	2.21	2.00	2.08	2.00	2.15	-	-
			66.67 %	71.33%	66.67 %	75.67%	66.67 %	73.67 %	66.67 %	69.33 %	66.67 %	71.67 %	-	-
28	Electronic Circuit Analysis	C221	1.43	1.43	1.43	1.6	1.43	1.6	1.43	1.6	1.43	1.77	1.43	1.78
			47.67 %	47.67%	47.67 %	53.33%	47.67 %	53.33 %	47.67 %	53.33 %	47.67 %	59.00 %	47.67 %	59.33 %
29	Control Systems	C222	1.87	1.61	1.87	1.61	1.87	1.59	1.87	2.13	1.87	2.13	1.87	2.06
			62.33 %	53.67%	62.33 %	53.67%	62.33 %	53.00 %	62.33 %	71.00 %	62.33 %	71.00 %	-	-
30	Electromagnetic	C223	1.44	1.96	1.44	1.97	1.44	1.86	1.44	2.23	1.44	2.09	1.44	2.1

	Waves and Transmission Lines		48.00 %	65.33%	48.00 %	65.67%	48.00 %	62.00 %	48.00 %	74.33 %	48.00 %	69.67 %	48.00 %	70.00 %
31	Analog Communications	C224	1.44	1.81	1.44	1.50	1.44	1.58	1.44	2.29	1.44	1.96	1.44	2.15
			48.00 %	60.33%	48.00 %	53.00%	48.00 %	52.67 %	48.00 %	76.33 %	48.00 %	65.33 %	48.00 %	71.67 %
32	Pulse and Digital Circuits	C225	1.60	1.49	1.60	1.75	1.60	1.87	1.60	1.61	1.60	1.89	1.60	1.93
			53.33 %	49.67%	53.33 %	58.33%	53.33 %	62.33 %	53.33 %	53.67 %	53.33 %	63.00 %	53.33 %	64.33 %
33	Management Science	C226	1.80	1.72	1.80	1.72	1.80	1.58	1.80	1.91	1.80	1.88	1.80	1.73
			60.00 %	57.33%	60.00 %	57.33%	60.00 %	52.67 %	60.00 %	63.67 %	60.00 %	62.67 %	60.00 %	57.67 %
34	Electronic Circuit Analysis Lab	C227	1.60	1.7	1.60	1.61	1.60	1.7	1.60	1.9	1.60	1.61	-	-
			53.33 %	56.67%	53.33 %	53.67%	53.33 %	56.67 %	53.33 %	63.33 %	53.33 %	53.67 %	-	-
35	Analog Communications Lab	C228	1.69	2.27	1.69	2.14	1.69	2.12	1.69	2.34	1.69	2.14	-	-
			56.33 %	75.67%	56.33 %	71.33%	56.33 %	70.67 %	56.33 %	78.00 %	56.33 %	71.33 %	-	-
36	Computer Architecture and Organization	C311	1.68	1.75	1.68	1.94	1.68	1.89	1.68	1.68	1.68	1.55	1.68	1.8
			56.00 %	58.33%	56.00 %	64.67%	56.00 %	63.00 %	56.00 %	56.00 %	56.00 %	51.67 %	56.00 %	60.00 %
37	Linear IC Applications	C312	1.54	2.34	1.54	2.37	1.54	2.17	1.54	1.98	1.54	1.99	1.54	1.96
			51.33 %	78.00%	51.33 %	79.00%	51.33 %	72.33 %	51.33 %	66.00 %	51.33 %	66.33 %	51.33 %	65.33 %
38	Digital IC Applications	C313	1.61	2.05	1.61	2.22	1.61	2.23	1.61	2.04	1.61	2.02	1.61	2.03
			53.67 %	68.33%	53.67 %	74.00%	53.67 %	74.33 %	53.67 %	68.00 %	53.67 %	67.33 %	53.67 %	67.67 %
39	Digital Communications	C314	1.70	1.72	1.70	1.59	1.70	1.57	1.70	1.74	1.70	1.72	1.70	1.76
			56.67 %	57.33%	56.67 %	53.00%	56.67 %	52.33 %	56.67 %	58.00 %	56.67 %	57.33 %	56.67 %	58.67 %
40	Antenna and Wave Propagation	C315	1.70	2.21	1.70	2.24	1.70	2.22	1.70	2.04	1.70	2.01	1.70	2.06
			56.67 %	73.67%	56.67 %	74.67%	56.67 %	74.00 %	56.67 %	68.00 %	56.67 %	67.00 %	56.67 %	68.67 %
41	Pulse and Digital	C316	1.30	1.8	1.30	1.53	1.30	1.7	1.30	1.54	1.30	1.87	1.30	1.17


	Circuits Lab		43.33 %	60.00%	43.33 %	51.00%	43.33 %	56.67 %	43.33 %	51.33 %	43.33 %	62.33 %	43.33 %	39.00 %
42	Linear IC Applications Lab	C317	1.53	2.02	1.53	2.04	1.53	2.01	1.53	2.03	1.53	2.01	1.53	2.02
			51.00 %	67.33%	51.00 %	68.00%	51.00 %	67.00 %	51.00 %	67.67 %	51.00 %	67.00 %	51.00 %	67.33 %
43	Digital IC Applications Lab	C318	1.68	2.44	1.68	2.43	1.68	2.48	1.68	2.5	-	-	-	-
			56.00 %	81.33%	56.00 %	81.00%	56.00 %	82.67 %	56.00 %	83.33 %	-	-	-	-
44	Professional Ethics & Human Values	C319	2	2	2	2.22	2	2.13	2	2.12	2	2.01	2	2.22
			66.67 %	66.67%	66.67 %	74.00%	66.67 %	71.00 %	66.67 %	70.67 %	66.67 %	67.00 %	66.67 %	74.00 %
45	Microprocessors and Microcontrollers	C321	1.79	1.73	1.79	1.58	1.79	1.74	1.79	1.9	1.79	1.89	1.79	1.74
			59.67 %	57.67%	59.67 %	52.67%	59.67 %	58.00 %	59.67 %	63.33 %	59.67 %	63.00 %	59.67 %	58.00 %
46	Microwave Engineering	C322	1.73	2.37	1.73	2.21	1.73	2.03	1.73	2.04	1.73	2.01	1.73	1.87
			57.67 %	79.00%	57.67 %	73.67%	57.67 %	67.67 %	57.67 %	68.00 %	57.67 %	67.00 %	57.67 %	62.33 %
47	VLSI Design	C323	1.62	1.91	1.62	1.73	1.62	1.91	1.62	1.9	1.62	2.03	1.62	1.89
			54.00 %	63.67%	54.00 %	57.67%	54.00 %	63.67 %	54.00 %	63.33 %	54.00 %	67.67 %	54.00 %	63.00 %
48	Digital Signal Processing	C324	2.15	2.01	2.15	2.02	2.15	1.85	2.15	2.03	2.15	2.03	2.15	2.03
			71.67 %	67.00%	71.67 %	67.33%	71.67 %	61.67 %	71.67 %	67.67 %	71.67 %	67.67 %	71.67 %	67.67 %
49	OOPs through Java	C325	1.51	1.85	1.51	2.04	1.51	1.86	1.51	2.21	1.51	2.01	1.51	2.22
			50.33 %	61.67%	50.33 %	68.00%	50.33 %	62.00 %	50.33 %	73.67 %	50.33 %	67.00 %	50.33 %	74.00 %
50	Microprocessors and Microcontrollers Lab	C326	1.48	2.3	1.48	2.43	1.48	2.43	1.48	2.3	1.48	2.35	-	-
			49.33 %	76.67%	49.33 %	81.00%	49.33 %	81.00 %	49.33 %	76.67 %	49.33 %	78.33 %	-	-
51	VLSI Design Lab	C327	1.60	2.41	1.60	2.49	1.60	2.39	1.60	2.29	-	-	-	-
			53.33 %	80.33%	53.33 %	83.00%	53.33 %	79.67 %	53.33 %	76.33 %	-	-	-	-
52	Digital Communications Lab	C328	1.54	2.04	1.54	2.17	1.54	2.25	1.54	2.04	1.54	2.22	-	-
			51.33 %	68.00%	51.33 %	72.33%	51.33 %	75.00 %	51.33 %	68.00 %	51.33 %	74.00 %	-	-



53	IPR & Patents	C329	2.00	2	2.00	2.22	2.00	2.13	2.00	2.12	2.00	2.01	2.00	2.22
			66.67 %	66.67%	66.67 %	74.00%	66.67 %	71.00 %	66.67 %	70.67 %	66.67 %	67.00 %	66.67 %	74.00 %
54	Radar Systems	C415	1.62	2.14	1.62	2.15	1.62	2.15	1.62	2.32	1.62	2.14	1.62	2.14
			54.00 %	71.33%	54.00 %	71.67%	54.00 %	71.67 %	54.00 %	77.33 %	54.00 %	71.33 %	54.00 %	71.33 %
55	Digital Image Processing	C412	1.95	1.88	1.95	1.88	1.95	1.69	1.95	1.88	1.95	1.88	1.95	1.71
			65.00 %	62.67%	65.00 %	62.67%	65.00 %	56.33 %	65.00 %	62.67 %	65.00 %	62.67 %	65.00 %	57.00 %
56	Computer Network	C413	1.73	2.04	1.73	2.22	1.73	2.03	1.73	1.86	1.73	1.84	1.73	1.78
			57.67 %	68.00%	57.67 %	74.00%	57.67 %	67.67 %	57.67 %	62.00 %	57.67 %	61.33 %	57.67 %	59.33 %
57	Optical Communications	C416	1.82	2.31	1.82	2.32	1.82	2.15	1.82	2.11	1.82	1.96	1.82	1.97
			60.67 %	77.00%	60.67 %	77.33%	60.67 %	71.67 %	60.67 %	70.33 %	60.67 %	65.33 %	60.67 %	65.67 %
58	Electronic Switching Systems	C415	1.68	2.17	1.68	2.15	1.68	2.09	1.68	1.94	1.68	1.87	1.68	1.78
			56.00 %	72.33%	56.00 %	71.67%	56.00 %	69.67 %	56.00 %	64.67 %	56.00 %	62.33 %	56.00 %	59.33 %
59	Embedded Systems	C423	1.63	2.01	1.63	2	1.63	2.18	1.63	2.01	1.63	2.02	1.63	2.03
			54.33 %	67.00%	54.33 %	66.67%	54.33 %	72.67 %	54.33 %	67.00 %	54.33 %	67.33 %	54.33 %	67.67 %
60	Micro Wave Engineering & Optical Lab	C417	1.64	2.84	1.64	2.58	1.64	2.56	1.64	2.56	1.64	2.56	-	-
			54.67 %	94.67%	54.67 %	86.00%	54.67 %	85.33 %	54.67 %	85.33 %	54.67 %	85.33 %	-	-
61	Digital Signal Processing Lab	C418	1.99	2.76	1.99	2.75	1.99	2.77	1.99	2.78	-	-	-	-
			66.33 %	92.00%	66.33 %	91.67%	66.33 %	92.33 %	66.33 %	92.67 %	-	-	-	-
62	Cellular Mobile Communications	C421	1.75	1.79	1.75	1.77	1.75	1.96	1.75	2.01	1.75	1.77	1.75	1.94
			58.33 %	59.67%	58.33 %	59.00%	58.33 %	65.33 %	58.33 %	67.00 %	58.33 %	59.00 %	58.33 %	64.67 %
63	Electronic Measurements and Instrumentation	C422	1.69	1.9	1.69	2.22	1.69	2.19	1.69	2.2	1.69	2.19	1.69	2.04
			56.33 %	63.33%	56.33 %	74.00%	56.33 %	73.00 %	56.33 %	73.33 %	56.33 %	73.00 %	56.33 %	68.00 %

64	Satellite Communications	C423	1.61	1.78	1.61	1.78	1.61	1.79	1.61	1.78	1.61	1.78	1.61	1.65
			53.67 %	59.33%	53.67 %	59.33%	53.67 %	59.67 %	53.67 %	59.33 %	53.67 %	59.33 %	53.67 %	55.00 %
65	Wireless Sensors and Networks	C424	1.71	1.52	1.71	1.35	1.71	1.7	1.71	1.88	1.71	1.88	1.71	1.89
			57.00 %	50.67%	57.00 %	45.00%	57.00 %	56.67 %	57.00 %	62.67 %	57.00 %	62.67 %	57.00 %	63.00 %
66	Seminar	C425	2.40	3	2.40	3	2.40	2.88	2.40	2.88	2.40	2.75	2.40	2.75
			80.00 %	100.00 %	80.00 %	100.00 %	80.00 %	96.00 %	80.00 %	96.00 %	80.00 %	91.67 %	80.00 %	91.67 %
67	Project	C426	2.40	3	2.40	3	2.40	2.88	2.40	2.88	2.40	2.75	2.40	2.75
			80.00 %	100.00 %	80.00 %	100.00 %	80.00 %	96.00 %	80.00 %	96.00 %	80.00 %	91.67 %	80.00 %	91.67 %

  
Coordinator

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

CO ATTAINMENT SUMMARY

BATCH: 2019-23

S.No	COURSE NAME	COURSE CODE	CO1		CO2		CO3		CO4		CO5	
			TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT	TARGET	ATTAINMENT
1	English	C111	2.98	2.1	2.98	2.4	2.98	2.43	2.98	2.5	2.98	2.47
			99.33%	70.00 %	99.33 %	80.00 %	99.33 %	81.00 %	99.33 %	83.33 %	99.33 %	82.33 %
2	Mathemat	C112	2.34	1.53	2.34	1.73	2.34	1.53	2.34	1.53	2.34	1.53

	ics - I		78.00%	51.00 %	78.00 %	57.67 %	78.00 %	51.00 %	78.00 %	51.00 %	78.00 %	51.00 %		
3	Applied Chemistry	C113	2.26	1.53	2.26	1.73	2.26	1.73	2.26	1.53	2.26	1.53		
			75.33%	51.00 %	75.33 %	57.67 %	75.33 %	57.67 %	75.33 %	51.00 %	75.33 %	51.00 %		
4	Programing for Problem Solving Using C	C114	2.19	2.47	2.19	2.47	2.19	2.4	2.19	2.33	2.19	2.2		
			73.00%	82.33 %	73.00 %	82.33 %	73.00 %	80.00 %	73.00 %	77.67 %	73.00 %	73.33 %		
5	Engineering Drawing	C115	1.87	1.2	1.87	1.2	1.87	1.3	1.87	1.87	1.87	1.87		
			62.33%	40.00 %	62.33 %	40.00 %	62.33 %	43.33 %	62.33 %	62.33 %	62.33 %	62.33 %		
6	English Lab	C116	2.99	2.6	2.99	2.6	2.99	2.6	2.99	2.6	2.99	2.6		
			99.67%	86.67 %	99.67 %	86.67 %	99.67 %	86.67 %	99.67 %	86.67 %	99.67 %	86.67 %		
7	Applied Chemistry Lab	C117	3.00	3	0.00	2.6	3.00	2.6	3.00	2.6	3.00	2.6		
			100.00 %	100.00 %	0.00 %	86.67 %	100.00 %	86.67 %	100.00 %	86.67 %	100.00 %	86.67 %		
8	Programing for Problem Solving Using C Lab	C118	3.00	3	3.00	3	3.00	3	3.00	3	3.00	3		
			100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %		
9	Environmental Science	C119	2.47	1.82	2.47	2.8	2.47	2.7	2.47	2.84	2.47	2.71	2.47	3
			82.33%	60.67 %	82.33 %	93.33 %	82.33 %	90.00 %	82.33 %	94.67 %	82.33 %	90.33 %	82.33 %	100.00 %
10	Mathematics – II	C121	2.37	2.13	2.37	2	2.37	2.13	2.37	1.93	2.37	2		
			79.00%	71.00 %	79.00 %	66.67 %	79.00 %	71.00 %	79.00 %	64.33 %	79.00 %	66.67 %		
11	Mathematics – III	C122	2.20	1.53	2.20	1.6	2.20	1.67	2.20	1.53	2.20	1.4		
			73.33%	51.00 %	73.33 %	53.33 %	73.33 %	55.67 %	73.33 %	51.00 %	73.33 %	46.67 %		
12	Applied Physics	C123	2.15	2.33	2.15	2.33	2.15	2.33	2.15	2.33	2.15	2.33		
			71.67%	77.67 %	71.67 %	77.67 %	71.67 %	77.67 %	71.67 %	77.67 %	71.67 %	77.67 %		
13	Network Analysis	C124	2.28	2	2.28	1.9	2.28	1.67	2.28	2	2.28	1.9		
			76.00%	66.67 %	76.00 %	63.33 %	76.00 %	55.67 %	76.00 %	66.67 %	76.00 %	63.33 %		
14	Basic Electrical Engineering	C125	2.04	1.92	2.04	1.74	2.04	1.75	2.04	1.57	2.04	1.75		
			68.00%	64.00 %	68.00 %	58.00 %	68.00 %	58.33 %	68.00 %	52.33 %	68.00 %	58.33 %		

15	Electronic workshop	C126	2.70	2.8	2.70	2.8	2.70	2.8	2.70	2.8	2.70	2.8
			90.00%	93.33 %	90.00 %	93.33 %	90.00 %	93.33 %	90.00 %	93.33 %	90.00 %	93.33 %
16	Basic Electrical Engineering Lab	C127	3.00	2	3.00	2	3.00	2	3.00	2	3.00	-
			100.00 %	66.67 %	100.00 %	66.67 %	100.00 %	66.67 %	100.00 %	66.67 %	100.00 %	0%
17	Applied Physics Lab	C128	3.00	3	3.00	3	3.00	3	3.00	3	3.00	3
			100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
18	Communication Skills Lab	C129	3.00	3	3.00	3	3.00	3	3.00	3	3.00	3
			100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %	100.00 %
19	Engineering Exploration on Project	C1210	2.70	3	2.70	3	2.70	3	2.70	3	2.70	3
			90.00%	100.00 %	90.00 %	100.00 %	90.00 %	100.00 %	90.00 %	100.00 %	90.00 %	100.00 %
20	Electronic Devices and Circuits	C211	2.34	2.2	2.34	2.3	2.34	2.07	2.34	2.2	2.34	1.9
			78.00%	73.33 %	78.00 %	76.67 %	78.00 %	69.00 %	78.00 %	73.33 %	78.00 %	63.33 %
21	Switching Theory and Logic Design	C212	2.02	2.3	2.02	2.2	2.02	2.35	2.02	2.4	2.02	2.4
			67.33%	76.67 %	67.33 %	73.33 %	67.33 %	78.33 %	67.33 %	80.00 %	67.33 %	80.00 %
22	Signals and Systems	C213	2.35	1.73	2.35	1.73	2.35	1.93	2.35	2.00	2.35	2.00
			78.33%	57.67 %	78.33 %	57.67 %	78.33 %	64.33 %	78.33 %	66.67 %	78.33 %	66.67 %
23	Random Variables and Stochastic Processes	C214	2.10	2.2	2.10	2.1	2.10	2.06	2.10	2.1	2.10	2.1
			70.00%	73.33 %	70.00 %	70.00 %	70.00 %	68.67 %	70.00 %	70.00 %	70.00 %	70.00 %
24	Object Oriented Programming through Java	C215	2.49	2.53	2.49	2.53	2.49	2.67	2.49	2.8	2.49	2.67
			83.00%	84.33 %	83.00 %	84.33 %	83.00 %	89.00 %	83.00 %	93.33 %	83.00 %	89.00 %
25	Managerial Economics & Financial Analysis	C216	2.49	2.33	2.49	2.33	2.49	2.33	2.49	2.07	2.49	2.2
			83.00%	77.67 %	83.00 %	77.67 %	83.00 %	77.67 %	83.00 %	69.00 %	83.00 %	73.33 %
26	Electronic Devices and Circuits - Lab	C217	2.85	2.6	2.85	2.53	2.85	2.6	2.85	2.48	2.85	2.53
			95.00%	86.67 %	95.00 %	84.33 %	95.00 %	86.67 %	95.00 %	82.67 %	95.00 %	84.33 %

27	Switching Theory and Logic Design - Lab	C218	2.70	2.6	2.70	2.6	2.70	2.6	2.70	2.47	2.70	2.29
			90.00%	86.67%	90.00%	86.67%	90.00%	86.67%	90.00%	82.33%	90.00%	76.33%
28	Constitution of India	C219	2.70	2.81	2.70	2.84	2.70	2.83	2.70	2.8	2.70	2.82
			90.00%	93.67%	90.00%	94.67%	90.00%	94.33%	90.00%	93.33%	90.00%	94.00%
29	Electronic Circuit Analysis	C221	2.40	2.33	2.40	2.2	2.40	2.47	2.40	2.6	2.40	2.47
			80.00%	77.67%	80.00%	73.33%	80.00%	82.33%	80.00%	86.67%	80.00%	82.33%
30	Linear Control Systems	C222	2.27	2.6	2.27	2.5	2.27	2.47	2.27	2.4	2.27	2.3
			75.67%	86.67%	75.67%	83.33%	75.67%	82.33%	75.67%	80.00%	75.67%	76.67%
31	Electromagnetic Waves and Transmission Lines	C223	2.05	2.1	2.05	2.1	2.05	2.51	2.05	2.1	2.05	2.2
			68.33%	70.00%	68.33%	70.00%	68.33%	83.67%	2.05	70.00%	68.33%	73.33%
32	Analog Communications	C224	2.49	2.6	2.49	2.4	2.49	2.6	2.49	2.4	2.49	2.6
			83.00%	86.67%	83.00%	80.00%	83.00%	86.67%	83.00%	80.00%	83.00%	86.67%
33	Computer Architecture and Organization	C225	2.72	2.4	2.72	2.2	2.72	2.4	2.72	2.4	2.72	2.2
			90.67%	80.00%	90.67%	73.33%	90.67%	80.00%	90.67%	80.00%	90.67%	73.33%
34	Management and Organizational Behavior	C226	2.77	2.8	2.77	2.8	2.77	2.8	2.77	2.8	2.77	2.8
			92.33%	93.33%	92.33%	93.33%	92.33%	93.33%	92.33%	93.33%	92.33%	93.33%
35	Electronic Circuit Analysis - Lab	C227	2.97	3	2.97	3	2.97	3	2.97	3	2.97	3
			99.00%	100.00%	99.00%	100.00%	99.00%	100.00%	99.00%	100.00%	99.00%	100.00%
36	Analog Communications - Lab	C228	2.95	3	2.95	3	2.95	3	2.95	3	2.95	3
			98.33%	100.00%	98.33%	100.00%	98.33%	100.00%	98.33%	100.00%	98.33%	100.00%
37	Linear Integrated Circuits and Applications	C311	2.37	2.33	2.37	2.33	2.37	2.13	2.37	2.33	2.37	2.33
			79.00%	77.67%	79.00%	77.67%	79.00%	71.00%	79.00%	77.67%	79.00%	77.67%
38	Microprocessor and Microcont	C312	2.37	2.33	2.37	2.36	2.37	2.47	2.37	2.8	2.37	2.6
			79.00%	77.67%	79.00%	78.67%	79.00%	82.33%	79.00%	93.33%	79.00%	86.67%

	rollers											
39	Digital Communications	C313	2.34	1.87	2.34	2	2.34	2.07	2.34	2	2.34	2
			78.00%	62.33%	78.00%	66.67%	78.00%	69.00%	78.00%	66.67%	78.00%	66.67%
40	Electronic Measurements & Instrumentation	C314	2.75	2.53	2.75	2.53	2.75	2.53	2.75	2.53	2.75	2.53
			91.67%	84.33%	91.67%	84.33%	91.67%	84.33%	91.67%	84.33%	91.67%	84.33%
41	Digital System Design using HDL	C315	2.22	2.33	2.22	2.2	2.22	2.33	2.22	2.33	2.22	2.2
			74.00%	77.67%	74.00%	73.33%	74.00%	77.67%	74.00%	77.67%	74.00%	73.33%
42	Linear Integrated Circuits and Applications - Lab	C316	2.93	3	2.93	3	2.93	3	2.93	2.8	2.93	3
			97.67%	100.00%	97.67%	100.00%	97.67%	100.00%	97.67%	93.33%	97.67%	100.00%
43	Digital Communications Lab	C317	2.66	2.6	2.66	2.7	2.66	2.7	2.66	2.6	2.66	2.72
			88.67%	86.67%	88.67%	90.00%	88.67%	90.00%	88.67%	86.67%	-	-
44	Microprocessor and Microcontrollers - Lab	C318	2.96	3	2.96	3.00	2.96	3.00	2.96	3	2.96	3
			98.67%	100.00%	98.67%	100.00%	98.67%	100.00%	98.67%	100.00%	98.67%	100.00%
45	Mini Project with Hardware Development	C319	2.70	3	2.70	3	2.70	3	2.70	3	2.70	3
			90.00%	100.00%	90.00%	100.00%	90.00%	100.00%	90.00%	100.00%	90.00%	100.00%
46	Essence of Indian Traditional Knowledge	C3110	2.70	2.81	2.70	2.79	2.70	2.82	2.70	2.8	2.70	2.81
			90.00%	93.67%	90.00%	93.00%	90.00%	94.00%	90.00%	93.33%	90.00%	93.67%
47	Wired and Wireless Transmission Devices	C321	2.28	2.4	2.28	2.53	2.28	2.33	2.28	2.4	2.28	2.4
			76.00%	80.00%	76.00%	84.33%	76.00%	77.67%	76.00%	80.00%	76.00%	80.00%
48	VLSI Design	C322	2.52	2.40	2.52	2.40	2.52	2.53	2.52	2.80	2.52	2.80
			84.00%	80.00%	84.00%	80.00%	84.00%	84.33%	84.00%	93.33%	84.00%	93.33%

49	Digital Signal Processing	C323	2.30	2.73	2.30	2.6	2.30	2.47	2.30	2.33	2.30	2.2
			76.67%	91.00%	76.67%	86.67%	76.67%	82.33%	76.67%	77.67%	76.67%	73.33%
50	Cellular & Mobile Communication	C324	2.68	2.73	2.68	2.73	2.68	2.47	2.68	2.8	2.68	2.73
			89.33%	91.00%	89.33%	91.00%	89.33%	82.33%	89.33%	93.33%	89.33%	91.00%
51	MEMS and its applications	C325	2.40	2.5	2.40	2.5	2.40	2.47	2.40	2.8	2.40	2.50
			80.00%	83.33%	80.00%	83.33%	80.00%	82.33%	80.00%	93.33%	-	-
52	Internet of Things	C326	2.40	2.6	2.40	2.6	2.40	2.45	2.40	2.53	2.40	2.53
			80.00%	86.67%	80.00%	86.67%	80.00%	81.67%	80.00%	84.33%	80.00%	84.33%
53	VLSI Lab	C327	2.96	3	2.96	3	2.96	3	2.96	3	2.96	3
			98.67%	100.00%	98.67%	100.00%	98.67%	100.00%	98.67%	100.00%	98.67%	100.00%
54	Digital Signal Processing Lab	C328	2.99	3	2.99	3	2.99	3	2.99	3	2.99	3
			99.67%	100.00%	99.67%	100.00%	99.67%	100.00%	99.67%	100.00%	99.67%	100.00%
55	Intellectual Property Rights (IPR) & Patents	C329	2.70	2.85	2.70	2.81	2.70	2.88	2.70	2.84	2.70	2.84
			90.00%	95.00%	90.00%	93.67%	90.00%	96.00%	90.00%	94.67%	90.00%	94.67%
56	Microwave and Optical Communication Engineering	C411	2.54	2.53	2.54	2.53	2.54	2.4	2.54	2.67	2.54	2.67
			84.67%	84.33%	84.67%	84.33%	84.67%	80.00%	84.67%	89.00%	84.67%	89.00%
57	Data Communications & Computer networks	C412	2.84	2.8	2.84	2.8	2.84	2.73	2.84	2.8	2.84	2.8
			94.67%	93.33%	94.67%	93.33%	94.67%	91.00%	94.67%	93.33%	94.67%	93.33%
58	Digital Image and Video Processing	C413	2.62	2.8	2.62	2.8	2.62	2.77	2.62	2.8	2.62	2.73
			87.33%	93.33%	87.33%	93.33%	87.33%	92.33%	87.33%	93.33%	87.33%	91.00%
59	Communication Standards and Protocols	C414	2.40	1.92	2.40	1.74	2.40	1.75	2.40	1.57	2.40	1.75
			80.00%	64.00%	80.00%	58.00%	80.00%	58.33%	80.00%	52.33%	80.00%	58.33%
60	Embedde	C415	2.57	2.9	2.57	2.8	2.57	2.8	2.57	2.3	2.57	2.4

	d Systems		85.67%	96.67 %	85.67 %	93.33 %	85.67 %	93.33 %	2.57	76.67 %	85.67 %	80.00 %
61	Internet of Things Lab	C416	2.70	2.8	2.70	2.8	2.70	2.8	2.70	2.8	-	-
			90.00%	93.33 %	90.00 %	93.33 %	90.00 %	93.33 %	90.00 %	93.33 %	-	-
62	Microwave and Optical Communication Engineering LAB	C417	2.99	3	2.99	3	2.99	3	2.99	3	2.99	3
			99.67%	100.0 0%	99.67 %	100.0 0%	99.67 %	100.0 0%	99.67 %	100.0 0%	99.67 %	100.0 0%
63	Project - Part I	C418	2.70	3	2.70	3	-	-	-	-	-	-
			90.00%	100.0 0%	90.00 %	100.0 0%	-	-	-	-	-	-
64	Wireless Communication	C421	2.70	2.73	2.70	2.73	2.70	2.73	2.70	2.73	2.70	2.73
			90.00%	91.00 %	90.00 %	91.00 %	90.00 %	91.00 %	90.00 %	91.00 %	90.00 %	91.00 %
65	Cyber Security & Cryptography	C422	2.40	2.53	2.40	2.4	2.40	2.53	2.40	2.53	2.40	2.53
			80.00%	84.33 %	80.00 %	80.00 %	80.00 %	84.33 %	80.00 %	84.33 %	80.00 %	84.33 %
66	Project - Part II	C423	2.70	3	2.70	3	2.70	3	-	-	-	-
			90.00%	100.0 0%	90.00 %	100.0 0%	90.00 %	100.0 0%	-	-	-	-

  
Coordinator

  
HOD

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





## **BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & 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: [bvits@bvgroup.in](mailto:bvits@bvgroup.in) , Website: [www.bvits.edu.in](http://www.bvits.edu.in)

### **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

#### **3.3 Attainment of Program Outcomes and Program Specific Outcomes (50)**

##### **3.3.1. Describe assessment tools and processes used for measuring the attainment of each of the Program Outcomes and Program Specific Outcomes (10)**

(Describe the assessment tools and processes used to gather the data upon which the evaluation of each of the Program Outcomes and Program Specific Outcomes is based indicating the frequency with which these processes are carried out. Describe the assessment processes that demonstrate the degree to which the Program Outcomes and Program Specific Outcomes are attained and document the attainment levels).

##### **A. List of Assessment Tools and Processes**

Attainment of POs & PSOs is based on direct assessment tools as well as indirect assessment tools. Direct Assessment of POs & PSOs is based on the student's performance in both internal examinations and University Examinations for all courses.

Performance of the students in different assessments such as internal examinations and University examinations lead to attainment of COs and they in turn leads to attainment of POs & PSOs based on the mappings of CO-PO/PSO.

To evaluate the attainment of POs/PSOs the following tools are used.

- Direct Assessment Tools
  - Internal Examinations
    - Theory Courses
    - Lab Courses
    - Seminar
    - Project
  - University Examinations

- Theory Courses
- Lab Courses
- Project
- Indirect Assessment Tools
  - Student Exit Feedback
  - Alumni Feedback
  - Employer Feedback

### **B. Quality and Relevance of Assessment Tools and Processes**

The Programme Assessment and Quality Improvement Committee (PAQIC) decided to have the following PO Assessment methods for various POs, depending on the number of courses contributing to each PO.

**PO Attainment having more than 50% courses contributed to PO / PSO**

1	Assessment of COs & their contribution to PO Attainment	80 %
2	Indirect Assessment (Students Exit Feedback, Alumni Feedback, Employer Feedback)	20 %

**PO Attainment having less than 50% courses contributed to PO / PSO**

1	Assessment of COs & their contribution to PO Attainment	60%
3	Students Exit Feedback	20 %
2	Alumni Feedback	
3	Employer Feedback	

4	Assessment of student participation in Co/Extra curricular Activities & contribution to PO Attainment	20%
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**Rubrics for student participation in Co / Extra Curricular activities for attainment of PO / PSO**

S.No	Activity	Low (1)	Medium (2)	High (3)	Relevance toPOsandPSOs	Activities conducted	Assessment
1.	Guest Lectures (Co-Curricular)	1 Guest Lectures organized	2 Guest Lectures organized	>= 3 Guest Lectures organized	PO8,PO9,PO10,PO11, PO12,PSO1,PSO2	3	3
2.	Add-on courses (Co-Curricular)	Nil	1-2 programs organized	More than 2 programs organized	PO7, PO9,PO10,PO12,PSO1	2	2
3.	NSS Activities (Extra-Curricular)	Less than 25%student's participation	26-50%student's participation	Above 50% student's participation	PO6.PO7, PO8,PO9,PO12	50% student's	3
4.	Programs on Entrepreneurship	Nil	1-2 programs organized	More than 2 programs organized	PO9.PO12	1	2
5.	Job/Skill Oriented Programs	1-4 Programs	5-8 Programs	More Than 8 Programs	PO9,PO10,PO12	9	3

6.	Students participation in cultural activities	10-25% students participate	26-50% students participated	More than 50% students participated	PO6,PO7,PO9	25%	1
7.	Students internships	Less than 1% students	1-10% students	More than 10%	PO7,PO9,PO10,PO11, PSO1,PSO2	18%	3
8.	Workshop Conducted For Students	1-2 Workshop Conducted	3 -5 Workshop Conducted	More than 5 Workshop Conducted	PO8,PO10,PSO1,PSO2	18 %	1

# 1. Students Exit Feedback Sample:



BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE  
 AMALAPURAM  
 DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

## STUDENT EXIT FEEDBACK

The information you provide on this questionnaire will be kept completely confidential

Name of the Student	Adapa . T.S.S ProSod
Roll Number	1841A0402
Year of Graduation	2002
E-mail address	1841A0402 @ .bvc group .in

Please take a few minutes to answer the following questions. Your answers to the questions and your feedback will assist the department to continue upgrading the program and to better serve its students and the community. Some of the questions need to be answered on a scale of 1 to 5.

(Please circle a number, 1 = Poor, 2 = Good, 3 = Excellent)

### PART I: GENERAL

To what extent did each of the following contribute to: (Tick in the box)

S. No.	Specification	Rating		
1	How do you rate the training that you received in the mathematics and physics courses?	1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
2	How do you rate the overall training that you received?	1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
3	How did the faculty respond to your technical needs inside and outside of classrooms?	1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
4	How helpfully did the lab technicians respond to your needs?	1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3
5	How do you feel the program prepared you for the career in your branch of Engineering?	1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3
6	How would you rate the student/faculty interaction in the program?	1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
7	How effective was the counselling from your faculty advisor?	1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 3
8	How effective was the counselling from career guidance advisor?	1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3
9	How would you rate the laboratory facilities?	1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3

### PART II: PROGRAM OUTCOMES

At this time, you should have attained the required professional, technical, and social experience in the program to practice the following twelve program outcomes. Please mark on a scale of 1 to 5.

(Please circle a number, 1 = Poor, 2 = Good, 3 = Excellent) to indicate your knowledge with the ability to:

S. No.	Specification	Rating		
		1	2	3
1	I have gained an in-depth knowledge of mathematics, science and my branch of Engineering.	1	2	3
2	I have an ability to identify, formulate and solve engineering problems.	1	2	3
3	I am able to design digital and analog systems pertaining to electrical systems.	1	2	3
4	I am able to design electrical and electronics circuits and conduct experiments with electrical engineering as well as to analyze and interpret data.	1	2	3
5	I had the opportunity to acquire new knowledge to use modern engineering tools, software and equipment to analyze problems necessary for engineering practice.	1	2	3
6	I have an ability to recognize the impact of engineering on society.	1	2	3
7	I have an ability to recognize the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	1	2	3
8	I had the opportunity to understand professional and ethical responsibility.	1	2	3
9	I have an ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	1	2	3
10	I am able to communicate effectively in both verbal and written form.	1	2	3
11	I had Knowledge of contemporary issues to undertake innovative projects. I have the training necessary to visualize and work on multi-disciplinary tasks.	1	2	3
12	I am able to develop confidence for self-education and to understand the value of life-long learning. I had the opportunity to use the techniques and skills to face and succeed in competitive examinations like GATE, GRE, TOEFL, GMAT etc. and in my career growth	1	2	3

**PART III: COMMENTS**

Make additional comments as you desire.

Thanks for your time!

A. T. S. S. prasad  
Signature

**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

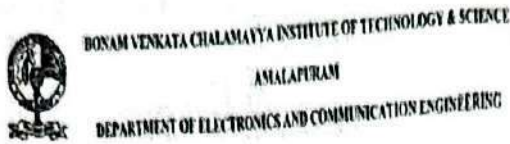
**EXIT FEEDBACK**

Regd. No.	POOR			MEDIUM			HIGH							
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02
17H41A0423	2	3	1	2	2	2	2	2	3	1	2	2	2	2
17221A0499	2	3	2	3	2	3	2	2	2	2	3	2	3	1
18H41A0401	3	3	2	1	1	2	3	3	3	2	1	1	2	3
18H41A0402	2	2	2	2	2	3	2	2	2	2	2	2	3	2
18H41A0403	3	1	1	3	1	2	3	3	1	1	3	1	2	2
18H41A0404	3	2	3	2	2	3	3	3	1	1	3	1	2	2
18H41A0406	3	3	2	1	3	2	3	3	3	2	3	2	2	3
18H41A0407	2	2	1	3	2	3	2	2	2	1	3	2	2	1
18H41A0409	2	2	3	2	1	2	2	2	2	3	2	1	2	2
18H41A0410	2	1	2	2	2	3	2	2	1	2	2	2	2	3
18H41A0412	3	3	2	2	3	2	3	3	1	2	2	3	2	2
18H41A0413	2	3	3	2	2	3	2	2	1	2	2	3	2	2
18H41A0414	2	3	3	2	3	3	2	2	2	3	2	2	2	3
18H41A0415	1	3	2	2	2	2	1	1	2	2	2	2	1	3
18H41A0416	2	2	1	1	3	2	2	2	2	1	1	3	1	2
18H41A0417	1	2	3	1	2	2	1	1	2	3	1	2	1	3
18H41A0418	2	3	2	1	3	2	2	2	3	2	1	3	2	2
18H41A0419	1	2	1	2	2	1	1	1	2	1	2	2	2	3
18H41A0420	1	3	3	2	3	2	1	1	3	3	2	3	2	2
18H41A0421	2	2	2	2	2	1	2	2	2	2	2	2	1	3
18H41A0422	2	3	1	1	3	2	2	2	3	1	1	3	3	2
18H41A0423	2	2	3	3	2	1	2	2	3	3	2	2	2	3
18H41A0424	1	3	2	2	3	2	1	1	3	2	2	3	1	2
18H41A0425	3	2	2	1	2	1	3	3	2	2	3	1	2	2
18H41A0426	3	2	3	3	3	2	3	3	2	2	1	2	3	3
18H41A0427	3	2	2	2	2	1	3	3	2	2	2	2	1	2
18H41A0428	3	2	1	1	2	2	3	3	2	1	1	2	3	2
18H41A0429	2	3	2	3	2	2	2	2	2	3	2	2	2	2
18H41A0430	3	3	3	2	2	3	3	3	2	3	2	2	1	1
18H41A0431	3	2	2	1	1	3	3	3	2	2	1	1	3	1
18H41A0432	3	2	1	3	1	3	3	3	2	1	3	1	2	1
18H41A0433	2	2	2	2	1	3	2	2	2	2	2	1	3	1
18H41A0434	2	3	3	3	1	2	2	2	2	3	3	1	2	1
18H41A0435	2	2	2	2	1	3	2	2	2	2	2	1	3	2
18H41A0436	2	2	1	3	2	2	2	2	2	1	3	2	2	3
18H41A0437	2	1	3	2	3	3	2	2	1	3	2	3	3	2

19H45A0416	2	2	3	2	1	2	1	1	3	3	2	3	2	2
19H45A0416	2	1	2	2	2	3	2	2	2	2	2	2	1	3
19H45A0417	3	1	1	2	3	1	2	2	3	1	1	3	3	2
19H45A0418	2	2	3	2	1	3	2	2	2	3	3	2	2	3
19H45A0419	2	3	3	1	3	1	1	1	3	2	2	3	1	2
19H45A0420	1	2	2	2	2	2	3	3	2	2	1	2	3	3
19H45A0421	2	2	1	1	3	2	3	3	2	3	3	3	3	3
19H45A0422	2	2	2	3	2	3	3	3	2	2	2	2	3	3
19H45A0423	3	3	1	2	2	3	1	1	2	3	1	2	1	3

<b>NUMBER OF STUDENTS</b>	<b>128</b>													
<b>PROGRAM OUTCOMES</b>	<b>P01</b>	<b>P02</b>	<b>P03</b>	<b>P04</b>	<b>P05</b>	<b>P06</b>	<b>P07</b>	<b>P08</b>	<b>P09</b>	<b>P010</b>	<b>P011</b>	<b>P012</b>	<b>PS01</b>	<b>PS02</b>
NUMBER OF STUDENT RELATED TO POOR	36	21	34	28	30	18	24	24	11	32	26	25	24	24
NUMBER OF STUDENT RELATED TO MEDIUM	55	58	45	56	66	64	60	60	80	52	61	68	62	65
NUMBER OF STUDENT RELATED TO HIGH	37	48	50	43	32	45	44	44	37	45	40	35	41	39
% OF ATTAINMENT	67.00	74.00	70.67	70.67	67.33	74.00	72.00	72.00	73.67	70.00	70.67	69.33	71.33	70.67
LEVEL OF ATTAINMENT	2.01	2.22	2.12	2.12	2.02	2.22	2.16	2.16	2.21	2.1	2.12	2.08	2.14	2.12

## 2. Alumni Feedback Sample:



### ALUMNI FEEDBACK FOR PO AND PSO ASSESSMENT

Student Name	Jagadam Swasree
Regd. No.	KH4-1A04-19
Passed Out Year	2020
Email ID	Swasree.Jagadam.999@gmail.com
Contact No.	9951467810

Dear Alumni,

As you are aware, in our attempt to match the quality of education to global standards, we have introduced outcome-based education system with well-defined Program Outcomes, and have placed special focus on student centric learning. We would like to know your views on how far we have been successful in this effort and what more we need to do in this direction.

Assessment of the Program Outcomes and Program Specific Outcomes

Twelve competencies are listed below; the entire program comprising of 8 semesters has made comprehensive attempt to provide these internationally accepted competencies to you. Which of these competencies in terms of following 3-point scale you have achieved?

3 = fully attained 2 = partly attained 1 = attained very little

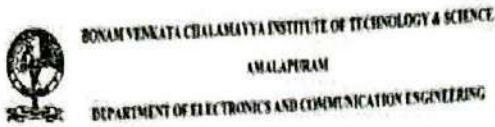
PO#	Programme Outcomes	Acquired Level
PO1	ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	3
PO2	PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	3
PO3	DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	1
PO4	CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.	1

PO5	MODERN TOOL USAGE: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.	3
PO6	THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	1
PO7	ENVIRONMENT AND SUSTAINABILITY: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for, sustainable development.	2
PO8	ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	2
PO9	INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	3
PO10	COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.	3
PO11	PROJECT MANAGEMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	2
PO12	LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	1
Program Specific Outcomes		
PSO1	Professional Skills: An ability to design, analyse and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.	3
PSO2	Soft Skills & Ethics: Ability to communicate effectively and practice professional ethics for societal benefit.	1

J.Sree  
Signature



### 3. Employer Feedback Sample:



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**  
**AMALAPURAM**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**EMPLOYER / INDUSTRY FEEDBACK FOR PO AND PSO ASSESSMENT**

Employer / Industry Expert	Gopal Krishna . ch
Address	Engg. Manager, DURA
Email ID	gopal.krishna@gmail.com
Contact No.	964280922

Dear Employer / Expert,

Many graduates of our Institute are already working in your organization. We are thankful to you for providing them employment with your prestigious Company/Organization. We shall very much appreciate and be grateful to you if you can spare some of your valuable time to fill up this feedback form. It will help us to improve the Institute further and give you better employees in future. The information collected will be kept confidential and used to improve our services or supporting the academic, personal and professional development of the students. Your feedback may also be shared with students' home Department if necessary. Thank you for your time and cooperation.

**Assessment of the Program Outcomes and Program Specific Outcomes**

Twelve competencies are listed below; the entire program comprising of 8 semesters has made comprehensive attempt to provide these internationally accepted competencies to you. Which of these competencies in terms of following 3-point scale the candidate you employed is equipped?

3 = fully attained 2 = partly attained 1 = attained very little

PO #	Programme Outcomes	Acquired Level
PO1	<b>ENGINEERING KNOWLEDGE:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	2
PO2	<b>PROBLEM ANALYSIS:</b> Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	3
PO3	<b>DESIGN/DEVELOPMENT OF SOLUTIONS:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	1
PO4	<b>CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	1

  
**Coordinator**

PO5	<b>MODERN TOOL USAGE:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.	3
PO6	<b>THE ENGINEER AND SOCIETY:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	2
PO7	<b>ENVIRONMENT AND SUSTAINABILITY:</b> Understand the impact of the professional engineering activities in societal and environmental contexts, and demonstrate the knowledge of, and need for, sustainable development.	1
PO8	<b>ETHICS:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	2
PO9	<b>INDIVIDUAL AND TEAM WORK:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	2
PO10	<b>COMMUNICATION:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.	2
PO11	<b>PROJECT MANAGEMENT AND FINANCE:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	2
PO12	<b>LIFE-LONG LEARNING:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	2
PSO #	<b>Program Specific Outcomes</b>	
PSO1	<b>Professional Skills:</b> An ability to design, analyze and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.	2
PSO2	<b>Soft Skills &amp; Ethics:</b> Ability to communicate effectively and practice professional ethics for societal benefit.	2

  
**Square**

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



## BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & 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](mailto:bvts@bvcgroup.in), Website: [www.bvcits.edu.in](http://www.bvcits.edu.in)

### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE-PO ATTAINMENT																
BATCH: 2018-22																
S.No	COURSE NAME	COURSE CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	English I	C111	2.03		2.02		2.07		1.98	2.22		2.07				2.07
2	Mathematics I	C112	1.72	1.70	1.71	1.69										
3	Mathematics II	C113	1.77	1.78	1.78											
4	Applied Physics	C114	1.97	1.97	2.17							1.90				1.97
5	Computer Programming	C115	1.56	1.70	1.59	1.78	1.76								1.53	1.78
6	Engineering Drawing	C116	1.70	1.70	1.69		1.70			1.69	1.70	1.70		1.70	1.69	1.70
7	English - Communication Skills Lab I	C117									2.53	2.54		2.52	2.53	2.53
8	Applied / Engineering Physics Lab	C118	1.71	1.71			1.71									1.71
9	Applied / Engineering Physics –Virtual Labs - Assignments	C119	2.79	2.79	2.79		2.79									
10	Engineering Workshop & IT Workshop	C1110	1.43	1.39							1.43	1.43				
11	English II	C121	1.81				1.99	1.78	1.65		1.88	1.84		1.68		1.84
12	Mathematics III	C122	2.02	2.03	2.01											
13	Applied Chemistry	C123	1.86	1.85	1.83	1.84	1.94	1.78	1.78							
14	Electrical and Mechanical	C124	1.78	1.74											1.94	1.97

	Technology															
15	Environmental Studies	C125	1.97	1.92	2.01			1.91	1.94	1.80						1.80
16	Data Structures	C126	1.81	1.80	1.75	1.81									1.76	
17	Applied / Engineering Chemistry Lab	C127	2.81	2.82			2.82									
18	English Communications Skills Lab II	C128					2.00				2.00	2.00		2.00		2.00
19	Computer Programming Lab	C129	2.55	2.04	2.52	2.54	1.56								2.55	2.51
20	Electronic Devices and Circuits	C211	1.64	1.67	1.70										1.67	
21	Switching Theory and Logic Design	C212	1.79	1.81	1.82	1.78	1.82							1.82	1.80	
22	Signals and Systems	C213	1.72	1.77	1.75		1.78								1.74	
23	Network Analysis	C214	1.45	1.44											1.45	
24	Random Variables and Stochastic Process	C215	1.45	1.45	1.45	1.46									1.46	
25	Managerial Economics and Financial Analysis	C216	1.96	1.94	2.02					1.84			1.94			
26	Electronic Devices and Circuits Lab	C217	2.49	2.49											2.49	
27	Networks and Electrical Technology Lab	C218	2.16	2.17							2.16	2.17				
28	Electronic Circuit Analysis	C221	1.60	1.64	1.67										1.63	
29	Control Systems	C222	1.94	2.04	2.07										1.99	
30	Electromagnetics Waves and Transmission Lines	C223	2.03	2.03	2.03	2.10								2.04	2.02	



	Java															
50	Microprocessors and Microcontrollers Lab	C326	2.36	2.38	2.33		2.38					2.30	2.34			2.36
51	VLSI Design Lab	C327	2.40		2.40	2.39	2.40									2.40
52	Digital Communications Lab	C328	1.86	1.02	2.11		2.15									1.79
53	IPR & Patents	C329			1.92			1.92								
54	Radar Systems	C415	2.17	2.14	2.18											2.17
55	Digital Image Processing	C412	1.83	1.87	2.80											2.00
56	Computer Network	C413	1.97	1.98	1.83	1.95										1.95
57	Optical Communications	C416	2.18	2.11	1.97		1.97							2.31	2.14	
58	Electronic Switching Systems	C415	2.03	2.04	1.97											2.00
59	Embedded Systems	C423	2.05	2.02	2.07											2.04
60	Micro Wave Engineering & Optical Lab	C417	2.62	2.62			2.61									2.62
61	Digital Signal Processing Lab	C418	2.77	2.76	2.76											2.77
62	Cellular Mobile Communications	C421	1.85	1.90	1.78	1.96	1.94									1.87
63	Electronic Measurements and Instrumentation	C422	2.12	2.12												2.12
64	Satellite Communications	C423	1.76	1.78	1.79		1.65							1.78	1.76	
65	Wireless Sensors and Networks	C424	1.72	1.88	1.77	1.52	1.67									1.70
66	Seminar	C425		2.25		2.25	2.08	2.25	2.25	2.00		1.75		1.75	2.05	2.08
67	Project	C426		2.25	2.25	2.25	2.25	1.75	1.75	2.25	2.25	1.75	2.25	1.75	2.05	2.08

No of Courses Contributing to each PO-PSO	60	59	49	21	33	8	7	8	11	12	3	12	49	14
% of Courses Contributing to each PO-PSO	90%	88%	73%	31%	49%	12%	10%	12%	16%	18%	4%	18%	73%	21%
PO ATTAINMENT LEVEL:	1.98	1.98	2.02	1.94	1.98	1.91	1.88	1.94	1.98	1.97	2.05	1.95	1.98	1.98

  
**Coordinator**

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







55	Intellectual Property Rights (IPR) & Patents	C329	-	-	2.80	-	-	2.80	-	-	-	-	-	-	-	-
56	Microwave and Optical Communication Engineering	C411	2.54	2.54	2.47	2.67	2.40	2.40	2.67	-	-	-	-	-	2.56	-
57	Data Communications & Computer networks	C412	2.78	2.80	-	2.80	-	-	-	-	-	-	-	-	2.79	-
58	Digital Image and Video Processing	C413	2.32	2.09	2.22	2.21	1.86	-	-	-	-	-	1.86	-	2.32	-
59	Communication Standards and Protocols	C414	1.75	1.71	1.79				1.75						1.75	
60	Embedded Systems	C415	2.65	2.60	2.57	-	-	-	-	-	-	-	-	-	2.64	-
61	Internet of Things Lab	C423	2.80	2.80	2.80	2.80	2.80	2.80	-	-	-	-	2.80	-	2.80	-
62	Microwave and Optical Communication Engineering LAB	C417	3.00	3.00	-	-	3.00	-	-	-	-	-	-	-	3.00	-
63	Project - Part I	C418	3.00	3.00	3.00		3.00		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
64	Wireless Communication	C421	2.73	2.73	2.73	-	-	-	-	-	-	-	-	-	2.73	-
65	Cyber Security & Cryptography	C422	2.51	2.50	2.53	-	-	-	-	-	-	-	-	-	2.50	-
66	Project - Part II	C423	3.00	3.00	3.00	3.00	3.00	3.00	3.00	-	3.00	3.00	3.00	3.00	3.00	3.00
No of Courses Contributing to each PO- PSO			59	54	47	22	29	11	9	7	11	12	9	13	48	13
% of Courses Contributing to each PO- PSO			88%	81%	70%	33%	43%	16%	13%	10%	16%	18%	13%	19%	72%	19%
PO ATTAINMENT LEVEL:			2.48	2.45	2.50	2.55	2.66	2.77	2.67	2.78	2.88	2.75	2.69	2.66	2.53	2.66

  
Coordinator

  
HOD  
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Electronics & Communication Engineering  
B.V.C. Institute of Technology and Science  
Battipalem, Amalapuram - 533 201



**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE**

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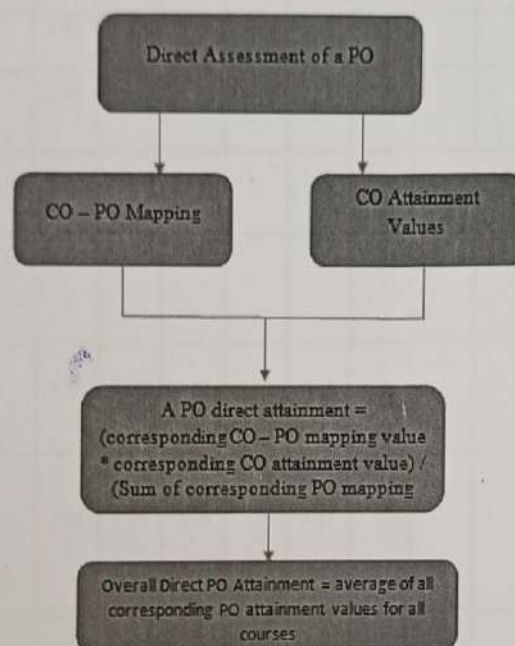
Batlapalem, Amalapuram, Indupalli Post, Dr. B. R. A. Konaseema Dist. AP, INDIA – 533201.

Phone No: 08856 – 235416, e – Mail: [bvts@bvcegroup.in](mailto:bvts@bvcegroup.in) , Website: [www.bvcits.edu.in](http://www.bvcits.edu.in)

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**3.3.2. Provide results of evaluation of PO & PSO**

**PO/PSO Attainment Process:**



**PO Attainment having more than 50% courses contributed to PO / PSO**

1	Assessment of COs & their contribution to PO Attainment	80 %
2	Indirect Assessment (Students Exit Feedback, Alumni Feedback, Employer Feedback)	20 %

**PO Attainment having less than 50% courses contributed to PO / PSO**

1	Assessment of COs & their contribution to PO Attainment	60%
3	Students Exit Feedback	20 %
2	Alumni Feedback	
3	Employer Feedback	
4	Assessment of student participation in Co/Extra-curricular Activities & contribution to PO Attainment	20%



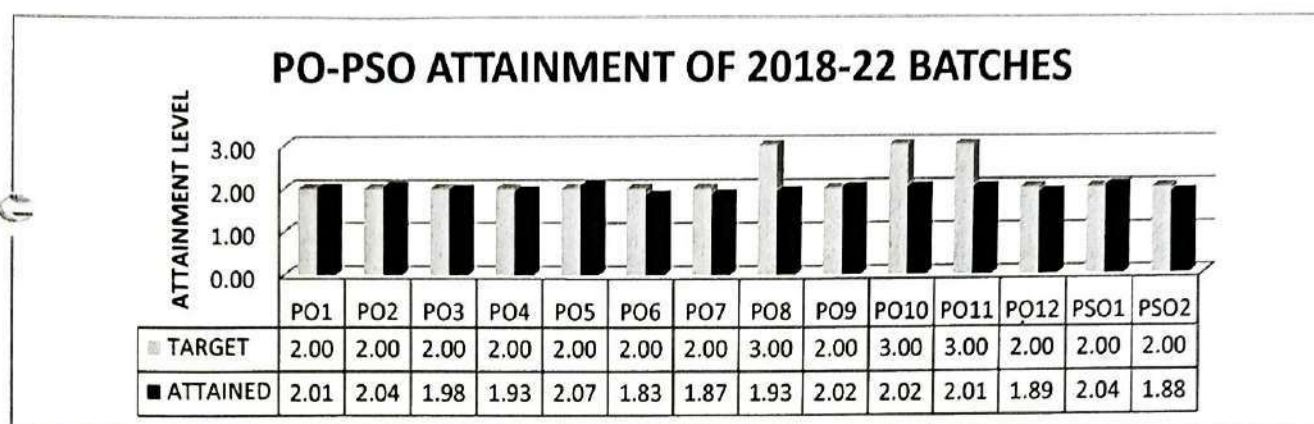
	Chemistry Lab															
18	English Communications Skills Lab II	C128					2.00				2.00	2.00		2.00		2.00
19	Computer Programming Lab	C129	2.55	2.04	2.52	2.54	1.56							2.55		2.51
20	Electronic Devices and Circuits	C211	1.64	1.67	1.70											1.67
21	Switching Theory and Logic Design	C212	1.79	1.81	1.82	1.78	1.82						1.82	1.80		
22	Signals and Systems	C213	1.72	1.77	1.75		1.78									1.74
23	Network Analysis	C214	1.45	1.44												1.45
24	Random Variables and Stochastic Process	C215	1.45	1.45	1.45	1.46										1.46
25	Managerial Economics and Financial Analysis	C216	1.96	1.94	2.02				1.84			1.94				
26	Electronic Devices and Circuits Lab	C217	2.49	2.49												2.49
27	Networks and Electrical Technology Lab	C218	2.16	2.17						2.16	2.17					
28	Electronic Circuit Analysis	C221	1.60	1.64	1.67											1.63
29	Control Systems	C222	1.94	2.04	2.07											1.99
30	Electromagnetics Waves and Transmission Lines	C223	2.03	2.03	2.03	2.10								2.04	2.02	
31	Analog Communications	C224	1.88	1.90	1.78		1.78							1.90	1.90	
32	Pulse and Digital Circuits	C225	1.74	1.75	1.78		1.73									1.76
33	Management Science	C226		1.82					1.81	1.63	1.78		1.96			



52	Digital Communications Lab	C328	1.86	1.02	2.11		2.15								1.70	
53	IPR & Patents	C329			1.92			1.92								
54	Radar Systems	C415	2.17	2.14	2.18										2.17	
55	Digital Image Processing	C412	1.83	1.87	2.80										2.00	
56	Computer Network	C413	1.97	1.98	1.83	1.95									1.95	
57	Optical Communications	C416	2.18	2.11	1.97		1.97							2.31	2.14	
58	Electronic Switching Systems	C415	2.03	2.04	1.97										2.00	
59	Embedded Systems	C423	2.05	2.02	2.07										2.04	
60	Micro Wave Engineering & Optical Lab	C417	2.62	2.62			2.61								2.62	
61	Digital Signal Processing Lab	C418	2.77	2.76	2.76										2.77	
62	Cellular Mobile Communications	C421	1.85	1.90	1.78	1.96	1.94								1.87	
63	Electronic Measurements and Instrumentation	C422	2.12	2.12											2.12	
64	Satellite Communications	C423	1.76	1.78	1.79		1.65							1.78	1.76	
65	Wireless Sensors and Networks	C424	1.72	1.88	1.77	1.52	1.67								1.70	
66	Seminar	C425		2.25		2.25	2.08	2.25	2.25	2.00		1.75		1.75	2.05	2.08
67	Project	C426		2.25	2.25	2.25	2.25	1.75	1.75	2.25	2.25	1.75	2.25	1.75	2.05	2.08
No of Courses Contributing to each PO-PSO			60	59	49	21	33	8	7	8	11	12	3	12	49	14
% of Courses Contributing to each PO-PSO			90%	88%	73%	31%	49%	12%	10%	12%	16%	18%	4%	18%	73%	21%
PO ATTAINMENT LEVEL:			1.98	1.98	2.02	1.94	1.98	1.91	1.88	1.94	1.98	1.97	2.05	1.95	1.98	1.98
DIRECTATTAINMENT			1.58	1.58	1.62	1.55	1.58	1.53	1.50	1.55	1.58	1.58	1.64	1.56	1.58	1.58

INDIRECT ATTAINMENT	2.11	2.28	1.82	1.89	2.45	1.53	1.83	1.87	2.18	2.20	1.84	1.51	2.29	1.47
	0.42	0.46	0.36	0.38	0.49	0.31	0.37	0.37	0.44	0.44	0.37	0.30	0.46	0.29
TARGET	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	3.00	3.00	2.00	2.00	2.00
ATTAINED	2.01	2.04	1.98	1.93	2.07	1.83	1.87	1.93	2.02	2.02	2.01	1.86	2.04	1.88

Bar Chart Representing PO-PSO ATTAINMENT OF 2018-22 BATCHES



### PO – ASSESSMENT ANALYSIS (2018-22)

#### Contribution of Courses to each PO:

ENGINEERING KNOWLEDGE										
PO Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.										
S.N O.	ASSESSMENT HOD	COUSES/ ACTIVITIES CONTRIBUTING TO PO1					OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION	
1	Direct	C111	C125	C222	C318	C415	1.98	80 %	1.58	
		C112	C126	C223	C321	C423				
		C113	C127	C224	C322	C417				
		C114	C129	C225	C323	C418				
		C115	C211	C227	C324	C421				
		C116	C212	C228	C325	C422				

		C118	C213	C311	C326	C423			
		C119	C214	C312	C327	C424			
		C1110	C215	C313	C328				
		C121	C216	C314	C415				
		C122	C217	C315	C412				
		C123	C218	C316	C413				
		C124	C221	C317	C416				
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				2.11	20%	0.42	
<b>Overall PO Attainment (On a Scale of 3)</b>								<b>2.01</b>	
<b>Target Level</b>								<b>2.00</b>	
<b>Target Achieved</b>								<b>YES</b>	

<b>PO2 PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.</b>										
S.NO.	ASSESSMENT METHOD	COUSES/ ACTIVITIES CONTRIBUTING TO PO1					OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION	
1	Direct	C112	C127	C224	C322	C418	1.98	80 %	1.58	
		C113	C129	C225	C323	C421				
		C114	C211	C226	C324	C422				
		C115	C212	C227	C325	C423				
		C116	C213	C228	C326	C424				
		C118	C214	C311	C328	C425				
		C119	C215	C312	C415	C426				
		C1110	C216	C314	C412					
		C122	C217	C315	C413					
		C123	C218	C316	C416					
		C124	C221	C317	C415					
		C125	C222	C318	C423					
		C126	C223	C321	C417					



3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback	2.28	20%	0.46
<b>Overall PO Attainment (On a Scale of 3)</b>					<b>2.04</b>
<b>Target Level</b>					<b>2.00</b>
<b>Target Achieved</b>					<b>YES</b>

<b>PO3</b>	<b>DESIGN/DEVELOPMENT OF SOLUTIONS:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.								
S.NO.	ASSESSMENT METHOD	COURSES/ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION	
1	Direct	C111	C212	C312	C328	C426	2.02	80 %	1.62
		C112	C213	C313	C329				
		C113	C215	C314	C415				
		C114	C216	C315	C412				
		C116	C221	C316	C413				
		C119	C222	C317	C416				
		C122	C223	C321	C415				
		C123	C224	C322	C423				
		C125	C225	C323	C418				
		C126	C227	C325	C421				
		C129	C228	C326	C423				
		C211	C311	C327	C424				
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				1.82	20%	0.36	
<b>Overall PO Attainment (On a Scale of 3)</b>								<b>1.98</b>	
<b>Target Level</b>								<b>2.00</b>	
<b>Target Achieved</b>								<b>NO</b>	

<b>PO4</b>	<b>CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.							
S.NO.	ASSESSMENT METHOD	COURSES/ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C112	C215	C317	C424	1.94	80 %	1.55
		C115	C223	C324	C425			
		C123	C311	C325	C426			
		C126	C314	C327				
		C129	C315	C413				
		C212	C316	C421				
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				1.89	20%	0.38
<b>Overall PO Attainment (On a Scale of 3)</b>								<b>1.93</b>
<b>Target Level</b>								<b>2.00</b>
<b>Target Achieved</b>								<b>NO</b>

<b>PO5</b>	<b>MODERN TOOL USAGE:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.							
S.NO.	ASSESSMENT METHOD	COURSES/ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111	C129	C313	C417	1.98	80 %	1.58
		C115	C212	C314	C421			
		C116	C213	C318	C423			
		C118	C224	C321	C424			
		C119	C225	C324	C425			
		C121	C227	C326	C426			

		C123 C127 C128	C228 C311 C312	C327 C328 C416			
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.89	20%	0.49
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.07</b>
<b>Target Level</b>							<b>2.00</b>
<b>Target Achieved</b>							<b>YES</b>

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<b>PO6 THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</b>							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C121 C123 C125	C311 C325 C329	C425 C426	1.91	60 %	1.15
2	Direct	Extra / Co-Curricular Activities			3	20%	0.60
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.53	20%	0.31
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.05</b>
<b>Target Level</b>							<b>2.00</b>
<b>Target Achieved</b>							<b>YES</b>

<b>PO7 ENVIRONMENT AND SUSTAINABILITY:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.							
S.NO.	ASSESSMENT METHOD	COURSES/ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111 C121 C123	C125 C226	C425 C426	1.88	60 %	1.13
2	Direct	Extra / Co-Curricular Activities			2.75	20%	0.55
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.83	20%	0.37
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.04</b>
<b>Target Level</b>							<b>2.00</b>
<b>Target Achieved</b>							<b>YES</b>

<b>PO8 ETHICS:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.							
S.NO.	ASSESSMENT METHOD	COURSES/ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111 C116 C125	C216 C226 C319	C425 C426	1.94	80 %	1.55

2	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback	1.87	20%	0.37
<b>Overall PO Attainment (On a Scale of 3)</b>					<b>1.93</b>
<b>Target Level</b>					<b>3.00</b>
<b>Target Achieved</b>					<b>NO</b>

<b>PO9</b>	<b>INDIVIDUAL AND TEAM WORK:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.				
S.NO.	ASSESSMENT METHOD	COUSES/ ACTIVITIES CONTRIBUTING TO PO1	OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C116 C121 C226 C326 C117 C128 C316 C426 C1110 C218 C317	1.98	80 %	1.58
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback	2.18	20%	0.44
<b>Overall PO Attainment (On a Scale of 3)</b>					<b>2.02</b>
<b>Target Level</b>					<b>2.00</b>
<b>Target Achieved</b>					<b>YES</b>

<b>PO10</b>	<b>COMMUNICATION:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.				
S.NO.	ASSESSMENT METHOD	COUSES/ ACTIVITIES CONTRIBUTING TO PO1	OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION

1	Direct	C111	C1110	C319	1.97	80 %	1.58
		C114	C121	C326			
		C116	C128	C425			
		C117	C218	C426			
2	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			2.20	20%	0.44
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.02</b>
<b>Target Level</b>							<b>3.00</b>
<b>Target Achieved</b>							<b>NO</b>

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<b>PO11 PROJECT MANAGEMENT AND FINANCE:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.							
S.NO.	ASSESSMENT METHOD	COUSES/ ACTIVITIES CONTRIBUTING TO PO1	OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION		
1	Direct	C216	2.05	80 %	1.64		
		C226					
		C426					
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.84	20%	0.37
<b>Overall PO Attainment (On a Scale of 3)</b>					<b>2.01</b>		
<b>Target Level</b>					<b>3.00</b>		
<b>Target Achieved</b>					<b>NO</b>		

PO12 LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C116	C212	C416	1.94	60 %	1.16
		C117	C223	C423			
		C121	C224	C425			
		C128	C315	C426			
2	Direct	Extra / Co-Curricular Activities			2.60	20%	0.52
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.51	20%	0.33
Overall PO Attainment (On a Scale of 3)							2.01
Target Level							2.00
Target Achieved							YES

### PSO – ASSESSMENT PROCESS (2018-22)

#### Contribution of Courses to each PSO:

PSO1 Professional Skills: An ability to design, analyze and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION

1	Direct	C115	C222	C318	C415	1.98	80 %	1.58
		C116	C223	C321	C423			
		C117	C224	C322	C417			
		C124	C225	C323	C418			
		C126	C227	C324	C421			
		C129	C228	C325	C422			
		C211	C311	C326	C423			
		C212	C312	C327	C424			
		C213	C313	C328	C425			
		C214	C314	C415	C426			
		C215	C315	C412				
		C217	C316	C413				
C221	C317	C416						
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			2.29	20%	0.46	
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.04</b>	
<b>Target Level</b>							<b>2.00</b>	
<b>Target Achieved</b>							<b>YES</b>	

<b>PSO2</b> Soft-Skills & Ethics: Ability to communicate effectively and practice professional ethics for societal benefit.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111	C118	C129	1.98	80 %	1.58
		C114	C121	C311			
		C115	C124	C425			
		C116	C125	C426			
		C117	C128				
3	Indir	Exit Survey, Alumni Feedback			1.47	20%	0.29



	ect	Survey, Industry Personnel Feedback			
Overall PO Attainment (On a Scale of 3)					1.88
Target Level					2.00
Target Achieved					NO

### IMPACT ANALYSIS [2018-22 BATCHES]

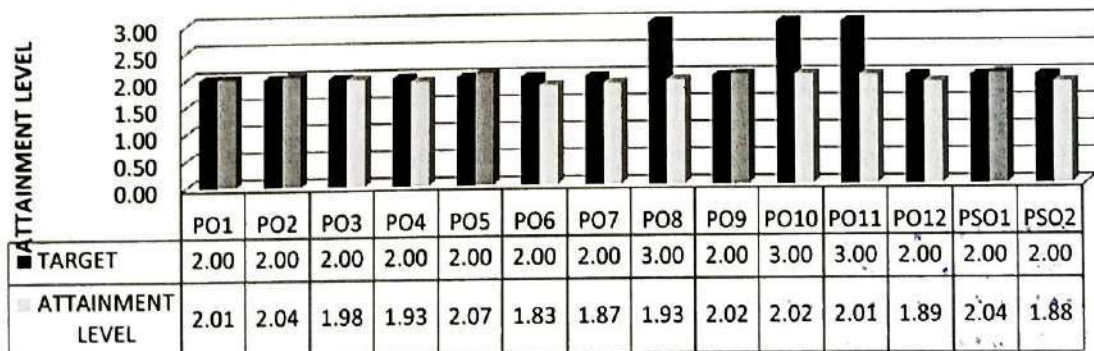
#### PO/PSO ATTAINMENT WITHOUT CO/EXTRA CURRICULAR ACTIVITIES

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
TARGET	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	3.00	3.00	2.00	2.00	2.00
ATTAINMENT LEVEL	2.01	2.04	1.98	1.93	2.07	1.83	1.87	1.93	2.02	2.02	2.01	1.89	2.04	1.88

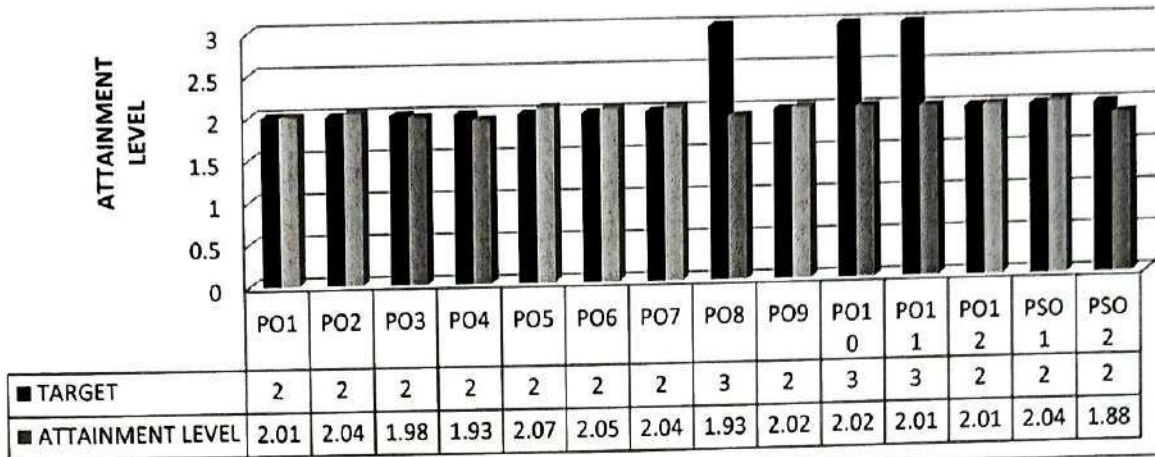
#### PO/PSO ATTAINMENT WITH CO/EXTRA CURRICULAR ACTIVITIES

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
TARGET	2	2	2	2	2	2	2	3	2	3	3	2	2	2
OVERALL ATTAINMENT	2.01	2.04	1.98	1.93	2.07	2.05	2.04	1.93	2.02	2.02	2.01	2.01	2.04	1.88

#### PO/PSO ATTAINMENT WITHOUT CO/EXTRA CURRICULAR ACTIVITIES



### PO/PSO ATTAINMENT WITH CO/EXTRA CURRICULAR ACTIVITIES



  
Coordinator

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





55	Intellectual Property Rights (IPR) & Patents	C329	-	-	2.80	-	-	2.80	-	-	-	-	-	-	-	-
56	Microwave and Optical Communication Engineering	C411	2.54	2.54	2.47	2.67	2.40	2.40	2.67	-	-	-	-	-	2.56	-
57	Data Communications & Computer networks	C412	2.78	2.80	-	2.80	-	-	-	-	-	-	-	-	2.79	-
58	Digital Image and Video Processing	C413	2.32	2.09	2.22	2.21	1.86	-	-	-	-	-	1.86	-	2.32	-
59	Communication Standards and Protocols	C414	1.75	1.71	1.79				1.75						1.75	
60	Embedded Systems	C415	2.65	2.60	2.57	-	-	-	-	-	-	-	-	-	2.64	-
61	Internet of Things Lab	C423	2.80	2.80	2.80	2.80	2.80	2.80	-	-	-	-	2.80	-	2.80	-
62	Microwave and Optical Communication Engineering LAB	C417	3.00	3.00	-	-	3.00	-	-	-	-	-	-	-	3.00	-
63	Project - Part I	C418	3.00	3.00	3.00		3.00		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
64	Wireless Communication	C421	2.73	2.73	2.73	-	-	-	-	-	-	-	-	-	2.73	-
65	Cyber Security & Cryptography	C422	2.51	2.50	2.53	-	-	-	-	-	-	-	-	-	2.50	-
66	Project - Part II	C423	3.00	3.00	3.00	3.00	3.00	3.00	3.00	-	3.00	3.00	3.00	3.00	3.00	3.00
No of Courses Contributing to each PO- PSO			59	54	47	22	29	11	9	7	11	12	9	13	48	13
% of Courses Contributing to each PO- PSO			88%	81%	70%	33%	43%	16%	13%	10%	16%	18%	13%	19%	72%	19%
PO ATTAINMENT LEVEL:			2.48	2.45	2.50	2.55	2.66	2.77	2.67	2.78	2.88	2.75	2.69	2.66	2.53	2.66

### PO – ASSESSMENT ANALYSIS (2019-23)

#### Contribution of Courses to each PO:

ENGINEERING KNOWLEDGE									
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION	
		C112	C1210	C228	C326				
1	Direct	C113	C211	C311	C327	2.48	80%	1.98	
		C114	C212	C312	C328				
		C115	C213	C313	C411				
		C117	C214	C314	C412				
		C118	C215	C315	C413				
		C119	C216	C316	C414				
		C121	C217	C317	C415				
		C122	C218	C318	C416				
		C123	C221	C319	C417				

		C124	C222	C321	C418			
		C125	C223	C322	C421			
		C126	C224	C323	C422			
		C127	C225	C324	C423			
		C128	C227	C325				
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				2.35	20%	0.47
<b>Overall PO Attainment (On a Scale of 3)</b>								<b>2.45</b>
<b>Target Level</b>								<b>2.24</b>
<b>Target Achieved</b>								<b>YES</b>

<b>PO2</b>		<b>PROBLEM ANALYSIS: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.</b>						
<b>S.NO.</b>	<b>ASSESSMENT METHOD</b>	<b>COUSES/ ACTIVITIES CONTRIBUTING TO PO1</b>				<b>OVERALL ASSESSMENT</b>	<b>ASSESSMENT WEIGHTAGE</b>	<b>CONTRIBUTION</b>
1	Direct	C112	C125	C218	C314	C411	80%	1.97
		C113	C126	C221	C316	C412		
		C114	C127	C222	C317	C413		
		C115	C128	C223	C318	C414		
		C117	C211	C224	C319	C415		
		C118	C212	C225	C321	C415		
		C119	C213	C227	C322	C417		
		C121	C214	C228	C323	C418		
		C122	C215	C311	C324	C421		
		C123	C216	C312	C327	C422		
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				2.45	20%	0.49
<b>Overall PO Attainment (On a Scale of 3)</b>								<b>2.46</b>
<b>Target Level</b>								<b>2.18</b>
<b>Target Achieved</b>								<b>YES</b>

<b>PO3</b>	<b>DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the</b>
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public health and safety, and the cultural, societal, and environmental considerations.

S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C112	C213	C313	C327	2.50	80%	2.00
		C114	C215	C314	C328			
		C115	C216	C315	C329			
		C118	C221	C316	C411			
		C119	C222	C317	C413			
		C121	C223	C318	C414			
		C122	C224	C319	C415			
		C125	C225	C321	C416			
		C126	C227	C322	C418			
		C1210	C228	C323	C421			
		C211	C311	C324	C422			
		C212	C312	C326	C423			
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				1.86	20%	0.37
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.36</b>	
<b>Target Level</b>							<b>2.10</b>	
<b>Target Achieved</b>							<b>YES</b>	

<b>PO4 CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C125	C319		2.55	60%	1.53
		C1210	C321				
		C212	C324				
		C214	C325				
		C215	C326				
		C218	C327				
		C222	C411				
		C223	C412				
		C313	C413				
		C316	C416				
		C317	C423				
2	Indirect	Extra / Co-Curricular Activities			0	20%	0
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.97	20%	0.30
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>1.92</b>
<b>Target Level</b>							<b>1.88</b>
<b>Target Achieved</b>							<b>YES</b>

<b>PO5 MODERN TOOL USAGE:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION



1	Direct	C111	C227	C326	2.66	60%	1.60
		C117	C228	C327			
		C126	C311	C328			
		C127	C312	C411			
		C128	C313	C413			
		C1210	C315	C416			
		C213	C317	C417			
		C215	C318	C418			
		C217	C319	C423			
		C224	C322				
2	Direct	Extra / Co-Curricular Activities			1	20%	0.20
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			2.50	20%	0.50
<b>Overall POA Attainment (On a Scale of 3)</b>							<b>2.30</b>
<b>Target Level</b>							<b>2.12</b>
<b>Target Achieved</b>							<b>YES</b>

<b>PO6 THE ENGINEER AND SOCIETY: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.</b>							
<b>S.NO.</b>	<b>ASSESSMENT METHOD</b>	<b>COUSES/ ACTIVITIES CONTRIBUTING TO PO1</b>			<b>OVERALL ASSESSMENT</b>	<b>ASSESSMENT WEIGHTAGE</b>	<b>CONTRIBUTION</b>
1	Direct	C111	C3110	C423	2.77	60%	1.66
		C119	C326				
		C1210	C329				
		C219	C411				
		C319	C416				

2	Direct	Extra / Co-Curricular Activities	2.00	20%	0.40
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback	1.91	20%	0.38
<b>Overall PO Attainment (On a Scale of 3)</b>					<b>2.44</b>
<b>Target Level</b>					<b>1.93</b>
<b>Target Achieved</b>					<b>YES</b>

<b>PO7</b>	<b>ENVIRONMENT AND SUSTAINABILITY:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.						
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111	C1210	C414	2.67	60%	1.60
		C119	C319	C418			
		C125	C411	C423			
2	Direct	Extra / Co-Curricular Activities			2	20%	0.40
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			2.	20%	0.40
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.40</b>
<b>Target Level</b>							<b>2.06</b>
<b>Target Achieved</b>							<b>YES</b>

PO8 ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C119	C219	C418	2.78	60%	1.67
		C1210	C319				
		C216	C3110				
2	Direct	Extra / Co-Curricular Activities			1.67	20%	0.33
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			2.04	20%	0.41
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.41</b>
<b>Target Level</b>							<b>2.29</b>
<b>Target Achieved</b>							<b>YES</b>

PO9 INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION

1	Direct	C111	C1210	C318	2.88	60%	1.67
		C116	C219	C319			
		C127	C226	C418			
		C129	C316	C423			
2	Direct	Extra / Co-Curricular Activities			1.86	20%	0.37
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			2.31	20%	0.46
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.56</b>
<b>Target Level</b>							<b>2.08</b>
<b>Target Achieved</b>							<b>YES</b>

<b>PO10 COMMUNICATION:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.							
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1			OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111	C1210	C3110	2.75	60%	1.65
		C115	C219	C418			
		C116	C226	C423			
		C127	C318				
		C129	C319				
2	Direct	Extra / Co-Curricular Activities			1.60	20%	0.32
3	Indirect	Exit Survey, Alumni Feedback			2.38	20%	0.48

	Survey, Industry Personnel Feedback	
<b>Overall PO Attainment (On a Scale of 3)</b>		<b>2.45</b>
<b>Target Level</b>		<b>2.37</b>
<b>Target Achieved</b>		<b>YES</b>

<b>PO11 PROJECT MANAGEMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.</b>														
<b>NO.</b>	<b>ASSESSMENT METHOD</b>	<b>COUSES/ ACTIVITIES CONTRIBUTING TO PO1</b>	<b>OVERALL ASSESSMENT</b>	<b>ASSESSMENT WEIGHTAGE</b>	<b>CONTRIBUTION</b>									
1	Direct	<table border="1"> <tr> <td>C1210</td> <td>C319</td> <td>C416</td> </tr> <tr> <td>C216</td> <td>C326</td> <td>C418</td> </tr> <tr> <td>C226</td> <td>C413</td> <td>C423</td> </tr> </table>	C1210	C319	C416	C216	C326	C418	C226	C413	C423	2.69	60%	1.61
C1210	C319	C416												
C216	C326	C418												
C226	C413	C423												
2	Direct	Extra / Co-Curricular Activities		20%	0.30									
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback	2.05	20%	0.41									
<b>Overall PO Attainment (On a Scale of 3)</b>					<b>2.32</b>									
<b>Target Level</b>					<b>2.24</b>									
<b>Target Achieved</b>					<b>YES</b>									

<b>PO12 LIFE-LONG LEARNING: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</b>					
<b>S.NO.</b>	<b>ASSESSMENT METHOD</b>	<b>COUSES/ ACTIVITIES CONTRIBUTING TO PO1</b>	<b>OVERALL ASSESSMENT</b>	<b>ASSESSMENT WEIGHTAGE</b>	<b>CONTRIBUTION</b>

1	Direct	C111	C1210	C224	2.66	60%	1.25
		C115	C212	C319			
		C116	C219	C325			
		C129	C223	C418			
		C423					
2	Direct	Extra / Co-Curricular Activities			2	20%	0.40
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.89	20%	0.40
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.37</b>
<b>Target Level</b>							<b>1.96</b>
<b>Target Achieved</b>							<b>YES</b>

**PSO – ASSESSMENT PROCESS (2019-23)**

**Contribution of Courses to each PSO:**

<b>PSO1</b>	<b>Professional Skills:</b> An ability to design, analyze and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.							
S.NO.	ASSESSMENT HOD	COURSE/ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C114	C218	C315	C328	2.53	60%	1.52
		C115	C221	C316	C411			
		C118	C222	C317	C412			
		C124	C223	C318	C413			
		C125	C224	C319	C414			
		C126	C225	C321	C415			
		C1210	C227	C322	C416			
		C211	C228	C323	C417			
		C212	C311	C324	C418			
		C213	C312	C325	C421			
		C214	C313	C326	C422			

1	Direct	C111	C1210	C224	2.66	60%	1.25
		C115	C212	C319			
		C116	C219	C325			
		C129	C223	C418			
				C423			
2	Direct	Extra / Co-Curricular Activities			2	20%	0.40
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback			1.89	20%	0.40
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.37</b>
<b>Target Level</b>							<b>1.96</b>
<b>Target Achieved</b>							<b>YES</b>

**PSO – ASSESSMENT PROCESS (2019-23)**

**Contribution of Courses to each PSO:**

<b>PSO1</b>	<b>Professional Skills:</b> An ability to design, analyze and implement Analog and Digital Electronics systems, Communication, Signal processing, VLSI, Embedded and IoT systems using hardware and software.							
S.NO.	ASSESSMENT HOD	COUSES/ ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C114	C218	C315	C328	2.53	60%	1.52
		C115	C221	C316	C411			
		C118	C222	C317	C412			
		C124	C223	C318	C413			
		C125	C224	C319	C414			
		C126	C225	C321	C415			
		C1210	C227	C322	C416			
		C211	C228	C323	C417			
		C212	C311	C324	C418			
		C213	C312	C325	C421			
		C214	C313	C326	C422			

		C217	C314	C327	C423			
2	Indirect	Extra / Co-Curricular Activities				0	20%	0
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				2.46	20%	0.49
<b>Overall PO Attainment (On a Scale of 3)</b>							<b>2.52</b>	
<b>Target Level</b>							<b>1.93</b>	
<b>Target Achieved</b>							<b>YES</b>	

PSO2		Soft-Skills & Ethics: Ability to communicate effectively and practice professional ethics for societal benefit.						
S.NO.	ASSESSMENT METHOD	COURSES/ ACTIVITIES CONTRIBUTING TO PO1				OVERALL ASSESSMENT	ASSESSMENT WEIGHTAGE	CONTRIBUTION
1	Direct	C111	C123	C1210	C423	2.66	60%	1.60
		C115	C127	C226				
		C116	C128	C319				
		C119	C129	C418				
2	Direct	Extra / Co-Curricular Activities				1.50	20%	0.30
3	Indirect	Exit Survey, Alumni Feedback Survey, Industry Personnel Feedback				1.88	20%	0.38

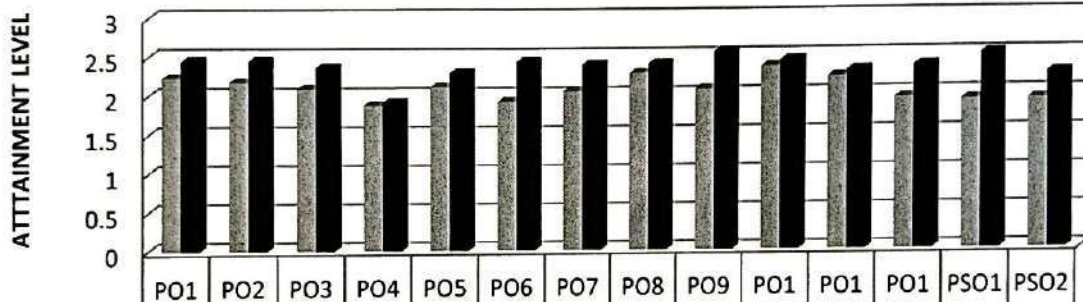


Overall PO Attainment (On a Scale of 3)	2.27
Target Level	1.93
Target Achieved	YES

### OVERALL ATTAINMENT [2019-23 BATCH]

TARGET from Course - PO mapping (2019-23)	2.24	2.18	2.1	1.88	2.12	1.93	2.06	2.29	2.08	2.37	2.24	1.96	1.93	1.93
Final PO attainment	2.45	2.45	2.37	1.92	2.30	2.44	2.40	2.41	2.56	2.45	2.32	2.37	2.52	2.27

### PO/PSO ATTAINMENT [2019-23]



■ Target	2.24	2.18	2.1	1.88	2.12	1.93	2.06	2.29	2.08	2.37	2.24	1.96	1.93	1.93
■ Final PO attainment	2.45	2.45	2.37	1.92	2.3	2.44	2.4	2.41	2.56	2.45	2.32	2.37	2.52	2.27

Coordinator

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