

Course Code	Subject	Course Outcomes
C101	Math-I	<ol style="list-style-type: none"> 1. Apply the basic Principle of graphs and functions in different mathematical modelling. 2. Differentiate between differential equation and Partial differential equation and Linear differential equation of different order and degree. 3. Application of Bernoulli's equation, Euler-Cauchy equation to different real-life problems. 4. Modelling of an electric circuit and Bernoulli's equation to different fields of engineering. 5. Demonstrate different solutions by the Power series method and analyze the Legendre equation, Legendre Polynomial, Bessel's function, and its application. 6. Apply the phenomena of Laplace Transform, Convolution, and integral equations in different engineering fields.
C102	Chemistry	<ol style="list-style-type: none"> 1. Understand the various applications of chemistry, thermo chemistry and electrochemistry. 2. Apply the basic concept of quantum mechanics and its application in bonding. 3. Implement the basic concepts of kinetics of reactions. 4. Knowledge about various materials, its specific application and their properties. 5. Idea about calorimetric sensors and bio-sensors. 6. Acquire knowledge about thermodynamics and equilibria, energy and heat flow in the system.
C103	Basic Electronics Engineering	<ol style="list-style-type: none"> 1. Describe the basic principles of Semiconductor Diode, V-I characteristics and AC and DC Resistance of Diode. 2. Explain various diode circuits and its applications as rectifier, clipper, clamper, Zener diode, BJT. 3. Illustrate about the construction of JFET & MOSFET with their principle of operation. 4. Design Op-Amp along with their application in Integration, Differentiation and Summing Circuit. 5. Explain about digital signal, digital circuits, logic gates, their use and the concept of Boolean function. 6. Design NAND, NOR Gates & adder circuit.

C104	Basic Civil Engineering	<ol style="list-style-type: none"> 1. Acquire knowledge on building materials and building construction 2. Survey using chains, compass, the odolite and other modern equipment 3. List the fundamentals of soil and its classification. 4. Differentiate traffic and urban engineering. 5. Summarize the importance of irrigation 6. To know the types of steel and concrete used in civil engineering
C105	Communicative English	<ol style="list-style-type: none"> 1. Understanding and learning different formats of business correspondence at the workplace through which communication takes place. 2. Importance of writing an effective Resume and Cover letter in the professional world and its uses. 3. Learning the concept and the use of oral presentation to improve professional presentation and the importance of Personal Interview. 4. Learning the concept and procedure of Group Discussion. 5. Developing reading and writing skills.
C106	Chemistry Lab	<ol style="list-style-type: none"> 1. Standardize KMnO_4 using $\text{Na}_2\text{C}_2\text{O}_4$ solution 2. Determine ferrous iron in Mohr's salt by potassium permanganate. 3. Determine the percentage of available chlorine in a sample of bleaching powder. 4. Determine the Total hardness of water by EDTA method. 5. Determine the Dissolved oxygen in a sample of water 6. Determine sodium hydroxide & sodium carbonate in a Mixture and Estimate Calcium in limestone.
C107	Basic Electronics Engineering Lab	<ol style="list-style-type: none"> 1. Understand the basic concept of electronics components and their specifications. 2. Learn the use and application of CRO in measuring different wave forms and the use of function generator and multimeter. 3. Understand V~I characteristics of diode and application of diode as full wave and half wave rectifiers. 4. Design inverting and non-inverting amplifier using OP-AMP and design the circuits using breadboard and trainer kit. 5. Able to acquire the fundamental engineering knowledge about the different logic gates and will able to learn the designing and application of clipper and clamper circuit.

C108	Basic Civil Engineering Lab	<ol style="list-style-type: none"> 1 Demonstrate different tests on bricks 2. Test a chain and measure the correct length 3. Study the principles and working of total station 4. Calculate the setting time of cement 5. Compute the bearing of a line 6. Determine the tensile strength of steel and compressive strength of concrete
C109	Workshop	<ol style="list-style-type: none"> 1. Know about different machine tools and its various components with its function. 2. Understand the safety precaution to be maintained inside workshop. 3. Know the different hand tools used in Fitting, and to how to prepare a given job in fitting shop. 4. Get knowledge over different engineering materials and their properties for a specific job. 5. Prepare a job with the given dimensions by following the methods stepwise. 6. Understand the basics of welding and its requirement.
C110	English Language Lab	<ol style="list-style-type: none"> 1. Acquire knowledge about the principles of communication and understand its various stages, the role of audience & purpose, deal with the barriers that affect communication in a professional set-up. 2. Understand the different channels of communication that are functional in the workplace. 3. Learn the importance of verbal and non-verbal communication in the professional world along with its uses. 4. Learning the uses and application of RP to improve pronunciation. 5. Understanding the importance of intonation, word and sentence stress for improving communicative competence, identifying & overcoming problem sounds and learning the varieties of spoken English.
C111	Math-II	<ol style="list-style-type: none"> 1. Acquire knowledge about matrix algebra and its application through Gauss-elimination and Gauss-Jordan methods. 2. Explain vector space, Gauss elimination method, rank, and inverse of a matrix. 3. Differentiate different types of the matrix, then compute the Eigen values and Eigen vectors of a matrix. 4. Explain the vector function, scalar function, curl, divergent and gradient, and directional derivatives of a function of several variables.

		<p>5. Extend the concept of vector integral calculus to the field of engineering and application of Green's theorem, Gauss' theorem, and Stoke's theorem.</p> <p>6. Explain Fourier series, Fourier transform, and Fourier integral.</p>
C112	Engineering Mechanics	<p>1. Apply analytical methods, graphical methods in engineering design, mechanical and civil application.</p> <p>2. Understand the concept of different types of forces, various laws related to the forces and their applications.</p> <p>3. Understand the concepts of centroids, moment of inertia of planes, solids and composite sections.</p> <p>4. Understand the equilibrium condition of different bodies.</p> <p>5. Understand the motion of a body in a trajectory path, principle of virtual work and its applications.</p> <p>6. Understand the concepts of collision of bodies.</p>
C113	Physics	<p>1. Classify various oscillatory systems and waves, which generalized in everyday life with appropriate illustration.</p> <p>2. Apply the knowledge of Interference and diffraction of light to Calculate fringe width and diameter of Newton's ring.</p> <p>3. Explain the basic principle of LASER and its applications and implement the optical fiber principles to calculate the acceptance angle, critical angle and fractional refractive index change.</p> <p>4. Identify the crystalline and amorphous solid, unit cell and primitive unit cell to demonstrate and calculate the Miller indices of crystal plane and interpret the materials like conductor, semi-conductor and insulator in terms of Band theory.</p> <p>5. Evaluate gradient, divergence, curl of the physical quantity and apply Gauss-divergence theorem to calculate the volume of sphere and implement Maxwell's equations to E.M wave equations.</p> <p>6. Analyze Einstein photoelectric equation and Heisenberg's uncertainty principle and apprehend the Schrodinger's wave equation to various quantum mechanical problems like particle in 1-D box.</p>
C114	Basic Electrical Engineering	<p>1. Analyze the behavior of linear electric circuits on time space.</p> <p>2. Apply techniques for frequencies in electric circuits analysis using AC current.</p> <p>3. Understand the operating principles of electric circuits to solve problems.</p> <p>4. Use suitable instrumentation to carry out experimental investigations to validate the theoretical investigations.</p>

		<ol style="list-style-type: none"> 5. Know about electric power generation, transmission & distribution. 6. Know about electrical safety rules, grounding, general house wiring and three phase power system.
C115	Basic Mechanical Engineering	<ol style="list-style-type: none"> 1. Outline the concepts & laws of thermodynamics. 2. Discuss basic components and common configuration of robots. 3. Apply principles of thermodynamics to steam power plant, air compressor, refrigerator, heat pump & I.C Engine. 4. Examine the working principle of belt, rope, gear, coupling, clutch and brakes. 5. Calculate enthalpy, specific volume, internal energy & dryness fraction of different types of steam using Steam table . 6. Analyze working of Various instruments used for measuring temperature, pressure, flow, strain, force & torque.
C116	Programming for problem solving using C	<ol style="list-style-type: none"> 1. Acquire knowledge about the basic concept of writing a program and understand the working of different operating systems. 2. Identify and understand the various kinds of input-output devices and different types of storage media commonly associated with a computer. 3. Understand, analyze and implement software development tools like algorithm, pseudo codes and programming structure. 4. Study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language. 5. Study, analyze and understand simple data structures, use of pointers, memory allocation and data handling through files in 'C'. 6. Programming using GCC compiler in Linux.
C117	Physics Lab	<ol style="list-style-type: none"> 1. Know to calculate Young's modulus and rigidity modulus of a wire. 2. Know the concept of different vibration. 3. Determine the surface tension of liquid, the grating element of grating and the acceleration due to gravity. 4. Find the variation of $I \sim V$ of BJT. 5. Determine the wavelength of any light using Newton's ring and know the importance of capacitor in A.C. and D.C. circuit

C118	Basic Electrical Engineering Lab	<ol style="list-style-type: none"> 1. Identify and use various electrical measuring devices and requirements of electric machines for domestic & industrial purpose. 2. Aware of various electric safety rules used while working in electric circuits & equipments. 3. Know about concept of Electric Power & Electric Energy. 4. Realize requirement of Power Transformers in Power Systems. 5. Know about concept of Power Factor variation in control of Electric Power.
C119	Basic Mechanical Engineering Lab	<ol style="list-style-type: none"> 1. Understand and Use the concepts of thermodynamics to steam power plants, refrigerators & air conditioners 2. Identify various types of I.C Engine & cycles of operation 3. Calculate Velocity ratio of Gear & Belt drive. 4. Examine the importance of different parts & systems in Automobiles. 5. Apply Bernoulli's principle to the venturi meter 6. Evaluate the pressure using manometers
C120	Engineering Graphics & Design Lab	<ol style="list-style-type: none"> 1. Perform free hand sketching of basic geometrical constructions and multiple views of objects. 2. Do orthographic projection of lines and plane surfaces. 3. Draw projections and solids and development of surfaces. 4 Prepare isometric and perspective sections of simple solids. 5 Demonstrate computer aided drafting. 6. Develop graphic skills for communication of concepts, ideas and design of Engineering products.
C121	Programming for problem solving using C Lab	<ol style="list-style-type: none"> 1. Acquire knowledge about the basic concept of writing a program. 2. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language. 3. Use of conditional expressions and looping statements, functions, array and pointers, structures and unions. 4. File Handling for permanent storage of data or record. 5. Applications of self-referential structure.

C201	Math-III	<p>1. Derive numerical methods for various mathematical operations and tasks for interpolation</p> <p>2. Derive numerical methods for various mathematical operations and solution of linear and nonlinear equations</p> <p>3. Derive numerical methods for various mathematical operations and task for differentiation</p> <p>4. Derive numerical methods for various mathematical operations and tasks for integration</p> <p>5. Gain knowledge about the foundation of probabilistic and statistical analysis basically use in engineering.</p> <p>6. Acquire knowledge on vital statistics and explain how supply and demand between the price of a product and quantity of same product</p>
C202	Object Oriented Programming using JAVA	<p>1. Description of Compiler and Interpreter, Advantage of Object Oriented Programming and study the Architecture of JVM.</p> <p>2. Apply the knowledge of operators Conditional Statements, Loops/ Iterators, Jumping Statements, Java Arrays, Multidimensional Arrays, Taking Input from keyboard, Command Line Arguments, Using Scanner Class, Using Buffered Reader class.</p> <p>2. Description of data hiding and data encapsulation, Constructors, Use of static Keyword in Java and explain the Significance of Inheritance and Types of polymorphism</p> <p>3. Explain the String Manipulations instructions and introduction to wrapper classes.</p> <p>4. Apply the knowledge of Packages, Java API Packages, User-Defined Packages, Accessing Packages</p> <p>5. Understanding the Abstract classes, Introduction to error and exception and Hierarchy of Exception classes</p> <p>6. Evaluate the concept of multithreading and its implementation.</p>
C203	Analog Electronics Circuits	<p>1. Formulate and analyze problems involving biasing, bias stabilization of BJT, JFET, MOSFET</p> <p>2. Develop the ability to analyze and design analog electronic circuits using discrete components and modeling techniques (re model & h-parameter) of BJT, JFET & MOSFET & effect of Source Resistor and Load Resistor of BJT, JFET.</p> <p>3. Acquire knowledge about frequency response of BJT, JFET, and</p>

		<p>effect of multistage amplifiers, feedback in amplifier and oscillator circuits, Power Amplifiers and their efficiency calculations</p> <p>4. Identifying cascade, Darlington Connection and current mirror Circuits using BJTs and analysis of Source Follower and cascaded System using FETs.</p> <p>5. Solve and design an amplifier to meet the requirement within realistic constraints such as economic, environmental, social and sustainable contexts.</p> <p>6. Recognize different types of operational amplifier circuit to pursue research on the design Field.</p>
C204	Signals and Systems	<p>1. Describe the different types of Discrete-Time Signal. And system the interconnection between.</p> <p>2. Explain LTI Systems, Response of LTI system, Properties of convolution and system describe by difference equation. As well as cross-correlation and auto-correlation</p> <p>3. Apply Fourier series and Fourier transformation with properties in continuous time signals</p> <p>4. Analysis of LTI system and Application of Z-transform</p> <p>5. Analysis of system function of a linear Time Invariant system, like inversion of Z-transform by power series expansion and Partial fraction expansion Method</p> <p>6. Design and Application on properties of DFT in case frequency Domain Sampling</p>
C205	Organisational Behaviour	<p>1. Acquire knowledge about meaning and structure of one organization; explain the importance, types, gateways and barriers to communication and analyze the group behaviour and the process to improve group cohesiveness.</p> <p>2. Able to use different types of learning and application of learning process in organizations and acquire knowledge about the perceptual processes and the factors influencing the perception.</p> <p>3. Determine the nature and importance of motivation and able to analyze the best theory of motivation to apply.</p> <p>4. Acquire knowledge about an effective leader and different theories of leadership with their traits, behaviour and effectiveness.</p> <p>5. Determine the cause behind conflict and its resolutions (inter-personal, intra-personal and inter-group).</p>

		6. Explore the nature of organizational culture to improve its effectiveness, acquire knowledge about human resource management policy for the betterment of the organizations and analyze the trends in international business, cultural, differences and similarities.
C206	Analog Electronics Circuits Lab	<ol style="list-style-type: none"> 1. Design, assemble and testing of BJT common-emitter and BJT emitter follower, JFET biasing circuits. 2. Apply the concept of frequency response of a common-emitter amplifier under low frequency, high frequency and mid frequency values and compare the result with square wave testing of an amplifier. 3. Study the differential amplifier circuits under D.C bias and A.C operation without and with current source. 4. Study the OP-Amp frequency response and compensation and its application as differentiator, integrator, square wave generator and Design the R.C phase shift oscillator/Wien-Bridge Oscillator using OP-Amp/Crystal Oscillator. 5. Study the Class A and Class B power amplifier, Darlington connection and current mirror circuits.
C207	Signals and Systems Lab	<ol style="list-style-type: none"> 1. Understand the basic knowledge in the generation of discrete/digital signals using MATLAB. 2. Analyze the basic operation of signal processing such as Linear Convolution and Circular Convolution. 3. Compute the auto correlation and cross correlation of two sequences using MATLAB. 4. Implementation of FIR filters using windowing techniques using MATLAB . 5. Design of IIR Filters and convolution of long duration sequences and implementation of adaptive filter for noise cancellation.
C208	Object Oriented Programming using JAVA Lab	<ol style="list-style-type: none"> 1. Acquire knowledge on object-oriented design and the difference between procedure-oriented design and object-oriented design and model the system using object model. 2. Optimize execution time of the program, function call without passing all its argument, and provide same name to multiple functions, declaration of class and its member function.

		<ol style="list-style-type: none"> 3. Auto initialization, cleanup and convert one object type to another and create generic Class and generic function to handle the code properly from the abnormal situation. 4. Acquire knowledge about software design methodologies. 5. Use of graphics to know the true power of virtual function.
C209	Electromagnetic Theory	<ol style="list-style-type: none"> 1. Describe basic concepts and principles of Electromagnetic fields. 2. Assimilate the practical significance of theory in developing a clear perceptive of engineering applications 3. Analyze and solve simple problems requiring estimation of magnetic field or electric field quantities based on laws. 4. Identifying Maxwell's equation and be able to manipulate and apply them to Problems. 5. Be conversant with wave motion in Electromagnetic fields. 6. Recognize the applications of EM waves in different medias and to find out the time average power density.
C210	Digital Systems Design	<ol style="list-style-type: none"> 1. Analyze the digital signal, positive and negative logic, number systems, Boolean algebra, logic gates, the truth table, codes and their conversion. 2. Analyze K-map to simplify different Boolean expressions and design of universal logic gate. 3. Outline the working mechanism and design guidelines of different combinational, sequential circuits and their role in the digital system design. 4. Apply the knowledge to identify various types of components i.e. ADC, DAC and memory elements and the timing circuits to generate different waveforms. 5. Synthesize the sequential networks using counters and shift registers. 6. Describe the performance of logic families with respect to their speed, power consumption, number of ICs and cost.
C211	Engineering Economics	<ol style="list-style-type: none"> 1. Recognize financial statements, their importance and usages 2. Understand major principles of financial accounting, cost accounting and financial management. 3. Utilize the tools and techniques for economic analysis of alternative opportunities, considering time value of money and risk associated with returns. 4. Appraise investment opportunities considering forthcoming changes in the economy, including inflation and their effect. 5. Rank the opportunities with proper justifications.

		6. Make optimal engineering investment decisions
C212	Network Theory	<ol style="list-style-type: none"> 1. Identify the main circuit elements and apply Kirchhoff's Laws and reduce more complicated circuits into Thevenin's and Norton's equivalent circuits. 2. Define basic parameters describing a sine wave and evaluate the steady state time response of R, L and C elements supplied by sinusoidal voltage or current sources. 3. Perform sinusoidal steady-state analysis using phasors and evaluate the time response of basic circuits with one energy storage element 4. Represent the mathematical modeling of a coupled circuit and the applications of Laplace transform and Fourier series 5. Analyze the network using network function and know about fundamental principles of designing a network 6. To synthesis a filter network.
C213	Sensors and Transducers	<ol style="list-style-type: none"> 1. Discuss knowledge of instruments for understanding the basic parameters of measurement used in the operation of sensors and transducers. 2. Identify various transducers and apply the acquired knowledge to measure strain, temperature and displacement. 3. Categorize suitable methods for measurement of resistance, inductance and capacitance. 4. To analyze the theory behind Op-amp and application in technology. 5. Explain and formulate the basic operations of sensing elements like thermocouple, accelerometers, temperature sensor, bourdon tube etc. 6. Evaluate the use of electromagnetic transducer in the measurement of velocity.
C214	Data Structure	<ol style="list-style-type: none"> 1. Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs. 2. Demonstrate understanding of various searching and sorting algorithms. 3. Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths. 4. Program multiple file programs in a manner that allows for reusability of code. 5. Compare different implementations of data structures and recognize the advantages and disadvantages of the different implementations. 6. Trace and code recursive functions and write complex applications using structured programming methods.

C215	Electronic Device Laboratory	<ol style="list-style-type: none"> 1. Acquire knowledge on Wave-propagation in conductors and dielectrics using MATLAB and current and charge flow in a rectangular waveguide using HFSS. 2. Understand Plane Wave Propagation in an Arbitrary Direction and Transverse electric wave in a Parallel- Plate Waveguide. 3. Design Rectangular Waveguide and Cavity Resonator. 4. Analyze the modes of a rectangular Waveguide. 5. Show the azimuth and elevation patterns.
C216	Digital System Design Laboratory	<ol style="list-style-type: none"> 1. Design, implement and testing of different digital logic gates, Inverter and buffer gates and the use of universal NAND Gate. 2. Design, assemble and testing of combinational circuits like adders, subtractors, code converters, gray code to binary and 7 segment display, multiplexers and de-multiplexers; SR, D and J-K flipflops, shift registers with parallel load and various counters. 3. Simulation and implementation of various combinational and sequential circuits using Verilog/VHDL. 4. Investigate the behaviour of RAM unit and its storage capacity (16 X 4 RAM) and memory expansion concepts. 5. Design of a circuit that multiplies 4-bit unsigned numbers to produce an 8-bit product.
C217	Network Theory Laboratory	<ol style="list-style-type: none"> 1. Verification of Network Theorems and study of DC and AC Transients. 2. Determination of circuit parameters: open circuit and short circuit parameters, hybrid and transmission parameters. 3. Study the frequency response of low pass, high pass, band pass and band elimination filters. 4. Determination of self-inductance, mutual inductance and coupling coefficient of a single phase two winding transformer representing a coupled circuit. 5. Study of resonance in R-L-C series and parallel circuit. 6. Observe the spectral analysis of a non-sinusoidal waveform.
C301	Analog and Digital	<ol style="list-style-type: none"> 1. Analyze various analog continuous wave modulation and demodulation techniques including AM, FM and PM and Evaluate

	Communication	<p>the modulation index, bandwidth and power requirements.</p> <p>2. Understand the importance of probability theory and the properties of Fourier Transform for the Analysis of Analog Communication Systems.</p> <p>3. Evaluate the performance of the communication system in the presence of noise.</p> <p>4 Analyze different digital modulation techniques such as PCM, DM and various shift keying techniques like ASK, PSK, & FSK.</p> <p>5. Evaluate different parameters like power spectrum density, probability of error etc of Base Band signal for optimum transmission.</p> <p>6 Analyze the error detection and correction capabilities of linear, and convolution codes and discusses about various equalization techniques.</p>
C302	Digital Signal Processing	<p>1. Describe the different signal and systems and analyze LTI system using Z-transform.</p> <p>2. Explain DFT as a Linear Transformation, properties of DFT and design linear filters for long data sequence using DFT, IDFT and DCT.</p> <p>3. Realize discrete time systems using FIR and IIR filters and implementation of various FIR & IIR structures.</p> <p>4. Design FIR filters using window technique and design of IIR filters using Bilinear transformation.</p> <p>5. Analyze the computational algorithm and Design Radix-2 Decimation-In-Time and Decimation-In-Frequency of real sequence.</p> <p>6. Design adaptive filters and implement in the field of research work.</p>
C303	Microprocessors & Microcontrollers	<p>1. Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.</p> <p>2. Identify a detailed s/w & h/w structure of the Microprocessor</p> <p>3. Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.</p> <p>4. Distinguish and analyze the properties of Microprocessors & Microcontrollers.</p> <p>5. Analyze the data transfer information through serial & parallel ports.</p> <p>6. Give a comparison of advanced microprocessors</p>
C304	Control System	<p>1. Understand linear and nonlinear system and to develop a mathematical model for a system, block diagram reduction technique and Mason gain formula, second order system and parameters associated with it.</p>

		<ol style="list-style-type: none"> 2. Know about Routh array & root locus technique to verify stability of a system. 3. Acquire knowledge about frequency domain techniques like Nyquist stability criterion and Bode plot technique called for design & system stability. 4. Investigate PD, PI & PID controller for the Industrial application and servo control mechanism applied in the field of Robotics 5. Learn about PLC for industrial switching & control. 6. Design the control system which is required in the process
C305	Digital VLSI Design	<ol style="list-style-type: none"> 1. Understand basic features of VLSI design methodologies, VLSI design flow, fabrication processes flow, formation of CMOS n-well process, different layout design rules and stick diagrams. 2. Acquire knowledge about MOS structure, V-I characteristics, effect of scaling and capacitance on the structure and switching characteristics of MOSFET. 3. Familiarize with the design of different kind of combinational and sequential logic circuits and design of different dynamic circuits such as NORA, Domino, NP-DOMINO logic circuits. 4. Acquire knowledge of different testing techniques such as BIST, scan based and current monitoring. 5. Acquire knowledge on developing dynamic combinational logic circuits and memory circuits with the help of design & simulation software like Tanner Tools. 6. Acquire the knowledge about the different kind of memory circuits like volatile and non-volatile and flash memory and describe the different testing techniques such as BIST, scan based and current monitoring.
C306	Analog and Digital Communication Lab	<ol style="list-style-type: none"> 1. Analyze and interpret the results in frequency domain using the spectrum Analyzer. 2. Implement and illustrate the different techniques in Amplitude Modulation & Frequency Modulation. 3. Demonstrate the different Pulse Modulation and Demodulation Techniques. 4. Demonstrate the knowledge in base band signalling schemes through implementation of ASK, FSK, and PSK. 5. Demonstrate Multiplexing of two Band limited Signals through TDM and FDM
C307	Digital Signal Processing Lab	<ol style="list-style-type: none"> 1. Familiarization with the architecture of a standard DSP kit (Preferably TMS 320C6XXX DSP kit of Texas Instruments)

		<ol style="list-style-type: none"> 2. Generation of various types of waveforms (sine, cosine, square, triangular etc.) using MATLAB and DSP kit. 3. Computation of autocorrelation, cross correlation, convolution (linear convolution and circular convolution) and power spectral density of sequences using MATLAB and DSP kit. 4. Implementation of FFT algorithm by decimation in time, decimation in frequency, FFT of a given 1-D signal and computation of convolution of a periodic sequence using DFT and IDFT using MATLAB and DSP kit. 5. Design and implementation of FIR and IIR filters in MATLAB and DSP kit and implementation of noise cancellation using adaptive filters using DSP kit.
C308	Microprocessors & Microcontrollers Lab	<ol style="list-style-type: none"> 1. Understand and apply the fundamental knowledge for arithmetic and logical operations in 8086 microprocessors. 2. Develop the programs for sorting Application. 3. Develop programs for string manipulation programs. 4. Analyse the concept of interfacing of the I/O devices with the processors. 5. Design and implement 8051 microcontroller-based system.
C309	Microwave Engineering	<ol style="list-style-type: none"> 1. Understand various techniques to analyze different kinds of transmission lines. 2. Understand different modes for waveguides, power dividers, couplers and microwave filters. 3. Know about the complete analysis of Reflex klystron, microwave transistor, microwave hazards, electronic admittance, output power of reflex klystron and multicavity magnetron. 4. Understand the concept of microwave device acting as an amplifier, rotating field of magnetron and trans-conductance of different types of microwave transistors. 5. Use Smith Chart to solve problems (reflection coefficient problems, terminated lines, single stub matching, double stub matching). 6. Understand basics of microwave transistors like modes of operation, transconductance, max operating frequency, Gunn oscillator principle.
C310	Wireless Communication	<ol style="list-style-type: none"> 1. Illustrate the design fundamentals of cellular systems and system capacity enhancement techniques. 2. Explain the concept of location management and hand off management. 3. Describe the characteristics of wireless channel and propagation path loss models 4. Calculate key performance metrics of different multiple access techniques in cellular communication system.

		<ol style="list-style-type: none"> 5. Classify different generations of mobile networks 6. Explain various applications of RF technology like Wi-Fi, Bluetooth, ATS and GPS
C311	Optimization in Engineering	<ol style="list-style-type: none"> 1. Apply the theory of optimization methods and algorithms to develop and for solving various types of optimization problems. 2. Develop and promote research interest in applying optimization techniques in problems of Engineering and Technology. 3. Apply the mathematical results and numerical techniques of optimization theory to concrete Engineering problems. 4. Apply Classical methods for solving nonlinear optimization problems with and without constraints, and nonlinear equations. 5. Understanding the construction and main solution ideas for nonlinear optimization problems. 6. Design and analysis of systems and networks in Software/Manufacturing/Scheduling companies
C312	Micro Electronic Mechanical Systems	<ol style="list-style-type: none"> 1. Identify the different MEMS fabrication process and materials used for MEMS Technology and State the scaling laws that are used extensively in the conceptual design of micro devices and systems. 2. Discuss and distinguish various micromachining techniques, such as bulk micromachining and surface micromachining and LIGA for a specific MEMS fabrication process. 3. Simplify the design of micro devices by applying basic fundamentals of engineering mechanics. 4. Analyze basic approaches for various sensors and actuators design. 5. Explain the different applications of MEMS in MOEMS and RF MEMS. 6. Gain the technical knowledge required for computer-aided design, fabrication, analysis and characterization of micro scale devices.
C313	Artificial Intelligence and Machine Learning	<ol style="list-style-type: none"> 1. Identify the importance of artificial intelligence and applications in modern technologies. 2. Select a search algorithm for a problem and estimate the time complexities and space complexities. 3. Apply AI techniques for game playing, logic propositions and inference in logics. 4. Point out the probabilistic reasoning in various networks.

		<p>5. Develop a novel method for enhancing semantics of Bayesian networks to improve inference accuracy</p> <p>6. Explain learning methods by taking advice and in problem solving from expert systems.</p>
C314	Microwave Engineering Lab	<ol style="list-style-type: none"> 1. Understand reflex klystron characteristics, scattering parameters of circulator /isolators and directional coupler characteristics. 2. Analyse the measurement of voltage standing wave ratio, phase shift, scattering parameters and dielectric constant. 3. Evaluate the measurement of impedance, wavelength and frequency and get an idea on radiation pattern measurement and determination of polarization of horn antenna. 4. Evaluate the coupling measurement of H-plane, E-Plane and Magic Tee junctions. 5. Study the Gun diode characteristics.
C315	Wireless Communication Lab	<ol style="list-style-type: none"> 1. Evaluate and estimate the signal power, path loss and shadowing in mobile cellular communication. 2. Calculate the boundary coverage probability and demonstrate the impact of the received power levels in mobile cellular communication. 3. Estimate the impact of sectoring in increasing cellular system and examine the impact of co-channel interface in cellular mobile communication. 4. Study of protocols for WLAN system and configuration of ZigBee module. 5. Study and interfacing of RFID and GSM modem received power levels in mobile cellular communication.
C316	Future-ready Contributor Program	<ol style="list-style-type: none"> 1.Improve the employability of students by giving them the right work ethic and thinking that employers are looking for. 2.Build their confidence with which they can go into any job and contribute meaningfully. 3.Improve their ability to engage better in the workplace and to be able to handle the challenges that come up there. 4.Build their career-worthiness and help them develop into future-ready contributors with the ability to navigate a career in a volatile, changing world. 5.Widen their choices of career and success, so that they are able to open up more opportunities for themselves and take up unconventional career pathways. 6.Enable them recognize how they as technical professionals, can participate and make a positive contribution to their communities and to their state.
C317	Seminar - I	<ol style="list-style-type: none"> 1. Prepare and deliver a seminar. 2. Come across various research areas in the domain of Electrical Engineering.

		<ol style="list-style-type: none"> 3. Improve the skill of presentation of Seminars 4. Evaluate and synthesize information in order to draw consistent conclusions 5. Compose text characterized by clear and careful organization, coherent paragraphs and well-constructed sentences that employ the conventions of Standard Written English and appropriate diction.
C401	Entrepreneurship Development	<ol style="list-style-type: none"> 1. Understand the role of entrepreneurship in economic development. 2. Identify the general characteristics of entrepreneurs. 3. Know the differences between entrepreneurial and managerial type jobs. 4. Understand the significance and sources of capital. 5. Participate in the preparation of a complete business plan. 6. Develop confidence in their ability to effectively express themselves to a group.
C402	Digital Image Processing	<ol style="list-style-type: none"> 1. Comprehend the image processing fundamentals and analyze the need of different types of transforms with their properties. 2. Explain the techniques for image enhancement both in spatial and frequency domains for noise removal and better appearance. 3. Examine the different causes of image degradation and evaluate the mathematical modelling for image restoration. 4. Outline the design of color models and explain the utility of wavelet decomposition in image processing. 5. State the need for image compression and use of image compression techniques for storage and transmission purpose. 6. Describe the morphological operations and its use in object and boundary detection.
C403	Radar and TV Engineering	<ol style="list-style-type: none"> 1. Understand the knowledge about RADAR and RADAR Equations. 2. Acquire knowledge about MTI, Pulsed RADAR and LORAN and implement the idea of RADAR Receivers to find noise figure. 3. Familiarize the students with basic features and block diagram of TV transmitter & receiver, scanning process and analyze transmission & reception of video signal, aspect ratio & rectangular scanning of TV screen. 4. Study the chromaticity diagram, color TV signals & transmission and gain knowledge about NTSC & PAL system, color TV receiver & specification, Digital TV signal & transmission, digitized video parameters. 5. Outline the study of Digital video and apply it to JPED, MPEG compression of videos.

		6. Evaluate the modulation techniques used for Digital TV transmission using QAM, OFDM and study the different Display techniques.
C404	Internet of Things	<ol style="list-style-type: none"> 1. State the application areas of IoT in various fields and sectors. 2. Classify the various IoT levels and deployment templates 3. Apply the knowledge to build an IoT system involving prototyping and programming 4. Appreciate the role of data analytics in IoT systems 5. Design and develop and working IoT model by using Raspberry Pi /node MCU 6. Explain the industry 4.0 concepts, ICT Industry, and possible future trends.
C405	Green Technology	<ol style="list-style-type: none"> 1. Knowledge about global warming, global emission situation and its effects in India. 2. Apprehend the use of promotional and punitive mechanisms for reducing carbon emission and action plans on climate change. 3. Acquire knowledge about control of carbon emission and accumulation and procedure to develop own priorities business opportunities in India. 4. Know about the Green technologies for energy production, various technologies and cost comparison for power generation and explain the use of green technologies in R & D work. 5. Analyze and demonstrate carbon emission reduction at citywide level for specific application. 6. Evaluate SWOT analysis and analysis of case studies on projects related to climate change.
C406	Soft Computing	<ol style="list-style-type: none"> 1. Learn about soft computing techniques and their applications and Analyse various neural network architectures. 2. List the facts and outline the different processes carried out in fuzzy logic, ANN and Genetic Algorithms. 3. Explain the concepts and meta-cognitive of soft computing. 4. Apply and compute soft computing techniques to solve character recognition, pattern classification, regression and similar problems. 5. Outline facts to identify process/procedures to handle real world problems using soft computing and evaluate various techniques of soft computing to defend the best working solutions.

		6. Design hybrid system to revise the principles of soft computing in various applications and analyse the genetic algorithms and their applications.
C407	Minor Project	<ol style="list-style-type: none"> 1. Undertake domain selection, formulation, problem identification and solution. 2. Demonstrate a thorough and systematic understanding of project contents with sound technical knowledge of their selected project topic and prepare road map of project 3. Design and simulation of different schematic diagrams using EDA tools. 4. Implement electronic hardware implementation skills to develop technical projects 5. Develop effective communication skill by delivering a seminar based on Project demonstration 6. Apply the knowledge of circuit design in developing real time projects.
C408	Seminar - II	<ol style="list-style-type: none"> 1. Select topics from research areas like Mobile Communication, Mobile Computing, Image Processing, MEMS, VLSI and Embedded Systems, Microprocessors & Microcontrollers etc. 2. Able to comprehend an activity and put forth effective reports, design proper documentation, make lucid presentations and give and receive valid instructions. 3. Improve the skill of presentation of Seminars 4. Evaluate and synthesize information in order to draw consistent conclusions 5. Compose text characterized by clear and careful organization, coherent paragraphs and well-constructed sentences that employ the conventions of Standard Written English and appropriate diction.
C409	Comprehensive Viva	<ol style="list-style-type: none"> 1. Able to gain comprehensive knowledge on all subjects related to B. Tech covered in four years. 2. Able to understand on basic concepts of core subjects of B. Tech. 3. Able to focus to apply the knowledge and ideas gained in real world 18 problems and issues. 4. Able for efficient oral communication and presentation skills. 5. Able to gain the confidence and versatility in answering the varieties of questions posed by a group of faculty members in a moderately short duration.
C410	Major Project / Internship	<ol style="list-style-type: none"> 1. Select industry based projects with commercial viability.

		<ol style="list-style-type: none">2. Understand Advance Matlab, LabVIEW, Proteus software, Keil compiler, Microwind, Xilinx, Orcad (Pspice), and their applications in different fields.3. Acquire knowledge about AVR studio, Code composer studio and Sinapro software.4. Able to know about burning a microcontroller using burner kit.5. Interfacing LED, LCD and IR sensor into 8051and Atmega16 and develop hardware models of the project.6. Implement the IoT based projects for real time applications.
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