DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING - B.TECH. COURSE OUTCOMES(2021-22)		
SEMESTER 1		
SUBJECT	**CO CODE**	**COURSE OUTCOME**
MAT 101: Linear Algebra And Calculus	C101.1	solve systems of linear equations, diagonalize matrices and characterise quadratic forms
	C101.2	compute the partial and total derivatives and maxima and minima of multivariable functions
	C101.3	compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
	C101.4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
	C101.5	determine the Taylor and Fourier series expansion of functions and learn their applications.
CYT 100: Engineering Chemistry	C100.1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
	C100.2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
	C100.3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterisation of nanomaterials.
	C100.4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
	C100.5	Study various types of water treatment methods to develop skills for treating wastewater.
EST 110: Engineering Graphics	C110.1	Draw the projection of points and lines located in different quadrants
	C110.2	Prepare multiview orthographic projections of objects by visualizing them in different positions
	C110.3	Draw sectional views and develop surfaces of a given object
	C110.4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
	C110.5	Convert 3D views to orthographic views
	C110.6	Obtain multiview projections and solid models of objects using CAD tools
EST 120: Basics Of Civil & Mechanical Engineering	C120.1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
	C120.2	Explain different types of buildings, building components, building materials and building construction
	C120.3	Describe the importance, objectives and principles of surveying.
	C120.4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
	C120.5	Discuss the Materials, energy systems, water management and environment for green buildings.
	C120.6	Analyse thermodynamic cycles and calculate its efficiency
	C120.7	Illustrate the working and features of IC Engines
	C120.8	Explain the basic principles of Refrigeration and Air Conditioning
	C120.9	Describe the working of hydraulic machines
	C120.10	Explain the working of power transmission elements
	C120.11	Describe the basic manufacturing, metal joining and machining processes
HUN 101: Life Skills	C101.1	Define and identify different life skills required in personal and professional life
	C101.2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
	C101.3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
	C101.4	Take part in group discussions
	C101.5	Use appropriate thinking and problem solving techniques to solve new problems
	C101.6	Understand the basics of teamwork and leadership

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SUBJECT	CO CODE	COURSE OUTCOME
CYL 120: Engineering Chemistry Lab	C120.1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
	C120.2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
	C120.3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
	C120.4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
	C120.5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
	C120.6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum
ESL 120: Civil & Mechanical Workshop	C120.1	Name different devices and tools used for civil engineering measurements
	C120.2	Explain the use of various tools and devices for various field measurements
	C120.3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
	C120.4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
	C120.5	Compare different techniques and devices used in civil engineering measurements
	C120.6	Identify Basic Mechanical workshop operations in accordance with the material and objects
	C120.7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
	C120.8	Apply appropriate safety measures with respect to the mechanical workshop trades
SEMESTER 2		
MAT 102: Vector Calculus,Differential Equations And Transforms	C102.1	Compute the derivatives and line integrals of vector functions and learn their applications
	C102.2	Evaluate surface and volume integrals and learn their inter-relations and applications.
	C102.3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
	C102.4	Compute Laplace transform and apply them to solve ODEs arising in engineering
	C102.5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering

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PHT 100: Engineering Physics A	C100.1	Compute the quantitative aspects of waves and oscillations in engineering systems.
	C100.2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
	C100.3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
	C100.4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
	C100.5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system
EST 100: Engineering Mechanics	C100.1	Recall principles and theorems related to rigid body mechanics
	C100.2	Identify and describe the components of system of forces acting on the rigid body
	C100.3	Apply the conditions of equilibrium to various practical problems involving different force system.
	C100.4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
	C100.5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses
EST 130: Basics Of Electrical And Electronics Engineering	C130.1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits
	C130.2	Develop and solve models of magnetic circuits
	C130.3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
	C130.4	Describe working of a voltage amplifier
	C130.5	Outline the principle of an electronic instrumentation system
	C130.6	Explain the principle of radio and cellular communication
HUN 102: Professional Communication	C102.1	Develop vocabulary and language skills relevant to engineering as a profession
	C102.2	Analyze, interpret and effectively summarize a variety of textual content
	C102.3	Create effective technical presentations
	C102.4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
	C102.5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
	C102.6	Create professional and technical documents that are clear and adhering to all the necessary conventions
EST 102: Programing In C	C102.1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
	C102.2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
	C102.3	Write readable C programs with arrays, structure or union for storing the data to be processed
	C102.4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
	C102.5	Write readable C programs which use pointers for array processing and parameter passing
	C102.6	Develop readable C programs with files for reading input and storing output

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PHL 120: Engineering Physics Lab	C120.1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
	C120.2	Understand the need for precise measurement practices for data recording
	C120.3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
	C120.4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
	C120.5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
ESL 130: Electrical & Electronics Workshop	C130.1	Demonstrate safety measures against electric shocks.
	C130.2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
	C130.3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
	C130.4	Identify and test various electronic components
	C130.5	Draw circuit schematics with EDA tools
	C130.6	Assemble and test electronic circuits on boards
	C130.7	Work in a team with good interpersonal skills
SEMESTER 3		
MAT201: Partial Differential Equations And Complex Analysis	C201.1	Understand the concept and the solution of partial differential equation.
	C201.2	Analyse and solve one dimensional wave equation and heat equation.
	C201.3	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.
	C201.4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
	C201.5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.
ECT201: Solid State Devices	C201.1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism
	C201.2	Explain drift and diffusion currents in extrinsic semiconductors and Compute current density due to these effects.
	C201.3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor.
	C201.4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions.
	C201.5	Discuss scaling of MOSFETs and short channel effects.

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ECT 203: Logic Circuit Design	C203.1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra
	C203.2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes
	C203.3	Compare different types of logic families with respect to performance and efficiency
	C203.4	Design a sequential logic circuit using the basic building blocks like flip-flops
	C203.5	Design and analyze combinational and sequential logic circuits through gate level Verilog models.
ECT205: Network Theory	C205.1	Apply Mesh / Node analysis or Network Theorems to obtain steady state response of the linear time invariant networks.
	C205.2	Apply Laplace Transforms to determine the transient behaviour of RLC networks.
	C205.3	Apply Network functions and Network Parameters to analyse the single port and two port networks.
EST 200: Design And Engineering	C200.1	Explain the different concepts and principles involved in design engineering.
	C200.2	Apply design thinking while learning and practicing engineering.
	C200.3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.
MCN201: Sustainable Engineering	C201.1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
	C201.2	Explain the different types of environmental pollution problems and their sustainable solutions
	C201.3	Discuss the environmental regulations and standards
	C201.4	Outline the concepts related to conventional and non-conventional energy
	C201.5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles
ECL 201: Scientific Computing Lab	C201.1	Describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization.
	C201.2	Approximate an array/matrix with matrix decomposition.
	C201.3	Implement numerical integration and differentiation.
	C201.4	Solve ordinary differential equations for engineering applications
	C201.5	Compute with exported data from instruments
	C201.6	Realize how periodic functions are constituted by sinusoids
	C201.7	Simulate random processes and understand their statistics.
ECL 203: Logic Design Lab	C203.1	Design and demonstrate the functioning of various combinational and sequential circuits using Ics
	C203.2	Apply an industry compatible hardware description language to implement digital circuits
	C203.3	Implement digital circuis on FPGA boards and connect external hardware to the boards
	C203.4	Function effectively as an individual and in a team to accomplish the given task

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SUBJECT	CO CODE	COURSE OUTCOME
		SEMESTER 4
MAT 204: Probability, Random Processes And Numerical Methods	C204.1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena.
	C204.2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena.
	C204.3	Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate.
	C204.4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
	C204.5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations.
ECT202: Analog Circuits	C202.1	Design analog signal processing circuits using diodes and first order RC circuit
	C202.2	Analyse basic amplifiers using BJT and MOSFET
	C202.3	Apply the principle of oscillator and regulated power supply circuits.
ECT 204: Signals And Systems	C204.1	Apply properties of signals and systems to classify them
	C204.2	Represent signals with the help of series and transforms
	C204.3	Describe orthogonality of signals and convolution integral.
	C204.4	Apply transfer function to compute the LTI response to input signals.
	C204.5	Apply sampling theorem to discretize continuous time signals
ECT 206: Computer Architecture And Microcontrollers	C206.1	Explain the functional units, I/O and memory management w.r.t a typical computer architecture.
	C206.2	Distinguish between microprocessor and microcontroller.
	C206.3	Develop simple programs using assembly language programming.
	C206.4	Interface 8051 microcontroller with peripheral devices using ALP/Embedded C
	C206.5	Familiarize system software and Advanced RISC Machine Architecture.
HUT 200: Professional Ethics	C200.1	Understand the core values that shape the ethical behaviour of a professional.
	C200.2	Adopt a good character and follow an ethical life.
	C200.3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
	C200.4	Solve moral and ethical problems through exploration and assessment by established experiments.
	C200.5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.
MCN202: Constitution Of India	C202.1	Explain the background of the present constitution of India and features.
	C202.2	Utilize the fundamental rights and duties.
	C202.3	Understand the working of the union executive, parliament and judiciary.
	C202.4	Understand the working of the state executive, legislature and judiciary.
	C202.5	Utilize the special provisions and statutory institutions.
	C202.6	Show national and patriotic spirit as responsible citizens of the country
ECL 202: Analog Circuits And Simulation Lab	C202.1	Design and demonstrate the functioning of basic analog circuits using discrete components.
	C202.2	Design and simulate the functioning of basic analog circuits using simulation tools.
	C202.3	Function effectively as an individual and in a team to accomplish the given task.
ECL 204: Microcontroller Lab	C204.1	Write an Assembly language program/Embedded C program for performing data manipulation.
	C204.2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals
	C204.3	Perform programming/interfacing experiments with IDE for modern microcontrollers.

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SUBJECT	CO CODE	COURSE OUTCOME
		SEMESTER 5
ECT301 Linear IntegratedCircuits	C301.1	Understand Op Amp fundamentals and differential amplifier configurations
	C301.2	Design operational amplifier circuits for various applications
	C301.3	Design Oscillators and active filters using opamps
	C301.4	Explain the working and applications of timer, VCO and PLL ICs
	C301.5	Outline the working of Voltage regulator IC's and Data converters
ECT303 Digital Signal Processing	C303.1	State and prove the fundamental properties and relations relevant to DFT and solve basic problems
	C303.2	involving DFT based filtering methods
	C303.3	Compute DFT and IDFT using DIT and DIF radix-2 FFT algorithms
	C303.4	Design linear phase FIR filters and IIR filters for a given specification
	C303.5	Illustrate the various FIR and IIR filter structures for the realization of the given system function
	C303.6	Explain the basic multi-rate DSP operations decimation and interpolation in both time and frequency domains using supported mathematical equations
	C303.7	Explain the architecture of DSP processor (TMS320C67xx) and the finite word length effects
ECT305 Analog and Digital Communication	C305.1	Explain the existent analog communication systems. C
	C305.2	Apply the concepts of random processes to LTI systems.
	C305.3	Apply waveform coding techniques in digital transmission.
	C305.4	Apply GS procedure to develop digital receivers.
	C305.5	Apply equalizer design to counteract ISI.
	C305.6	Apply digital modulation techniques in signal transmission
ECT307 Control Systems	C307.1	Analyse electromechanical systems by mathematical modelling and derive their transfer functions
	C307.2	Determine Transient and Steady State behaviour of systems using standard test signals
	C307.3	Determine absolute stability and relative stability of a system
	C307.4	Apply frequency domain techniques to assess the system performance and to design a control system
	C307.5	with suitable compensation techniques
	C307.6	Analyse system Controllability and Observability using state space representation

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SUBJECT	CO CODE	COURSE OUTCOME
HUT 310 Management for Engineers	C310.1	Explain the characteristics of management in the contemporary context (Cognitive Knowledge level: Understand).
	C310.2	Describe the functions of management (Cognitive Knowledge level: Understand).
	C310.3	Demonstrate ability in decision making process and productivity analysis (Cognitive Knowledge level: Understand).
	C310.4	Illustrate project management technique and develop a project schedule (Cognitive Knowledge level: Apply).
	C310.5	Summarize the functional areas of management (Cognitive Knowledge level: Understand).
	C310.6	Comprehend the concept of entrepreneurship and create business plans (Cognitive Knowledge level: Understand).
MCN301 Disaster Management	C301.1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
	C301.2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
	C301.3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
	C301.4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)
	C301.5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
	C301.6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).
ECL331 Analog IntegratedCircuits and Simulation Lab	C331.1	Use data sheets of basic Analog Integrated Circuits and design and implement application circuits using Analog ICs.
	C331.2	Design and simulate the application circuits with Analog Integrated Circuits using simulation tools.
	C331.3	Function effectively as an individual and in a team to accomplish the given task.
ECL333 Digital Signal Processing Lab	C333.1	Simulate digital signals.
	C333.2	verify the properties of DFT computationally
	C333.3	Familiarize the DSP hardware and interface with computer.
	C333.4	Implement LTI systems with linear convolution.
	C333.5	Implement FFT and IFFT and use it on real time signals.
	C333.6	Implement FIR low pass filter.
	C333.7	Implement real time LTI systems with block convolution and FFT

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SUBJECT	CO CODE	COURSE OUTCOME
		SEMESTER 6
ECT302 Electromagnetics	C302.1	To summarize the basic mathematical concepts related to electromagnetic vector fields.
	C302.2	Analyse Maxwell's equation in different forms and apply them to diverse engineering problems.
	C302.3	To analyse electromagnetic wave propagation and wave polarization
	C302.4	To analyse the characteristics of transmission lines and solve the transmission line problems using Smith chart.
	C302.5	To analyse and evaluate the propagation of EM waves in Wave guides.
ECT304 VLSI Circuit Design	C304.1	Explain the various methodologies in ASIC and FPGA design.
	C304.2	Design VLSI Logic circuits with various MOSFET logic families.
	C304.3	Compare different types of memory elements.
	C304.4	Design and analyse data path elements such as Adders and multipliers.
	C304.5	Explain MOSFET fabrication techniques and layout design rules.
ECT306 Information Theory and Coding	C306.1	Explain measures of information – entropy, conditional entropy, mutual information
	C306.2	Apply Shannon's source coding theorem for data compression.
	C306.3	Apply the concept of channel capacity for characterize limits of error-free
	C306.4	transmission.
	C306.5	Apply linear block codes for error detection and correction
	C306.6	Apply algebraic codes with reduced structural complexity for error correction
	C306.7	Understand encoding and decoding of covolutional and LDPC code
ECT352 Digital Image Processing	C352.1	Distinguish / Analyse the various concepts and mathematical transforms necessary for image processing
	C352.2	Differentiate and interpret the various image enhancement techniques
	C352.3	Illustrate image segmentation algorithm
	C352.4	Understand the basic image compression techniques
HUT 300 Industrial Economics & Foreign Trade	C300.1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
	C300.2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
	C300.3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
	C300.4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
	C300.5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)
ECT308 Comprehensive Course Work	C308.1	Apply the knowledge of circuit theorems and solid state physics to solve the problems in electronic Circuits
	C308.2	Design a logic circuit for a specific application
	C308.3	Design linear IC circuits for linear and non-linear circuit applications.
	C308.4	Explain basic signal processing operations and Filter designs
	C308.5	Explain existent analog and digital communication systems

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	Course :ECT401 MICROWAVES AND ANTENNAS
CO1	Understand the basic conceptofantennas and its parameters.
CO2	Analyze the far filed pattern of Short dipole and Half wave dipole antenna.
CO3	Design of various broad band antennas, arrays and its radiation patterns.
CO4	Illustratethe principle of operation of cavity resonators and various microwave sources.
CO5	Explain various microwave hybrid circuits and microwave semiconductor devices.

	Course :MCN401 INDUSTRIAL SAFETY ENGINEERING
CO1	Describe the theories of accident causation and preventive measures of industrialaccidents. (Cognitive Knowledge level: Understand)
CO2	Explain about personal protective equipment, its selection, safety performance &indicators and importance of housekeeping. (Cognitive Knowledge level:Understand)
CO3	Explain different issues in construction industries. (Cognitive Knowledge level:Understand)
CO4	Describe various hazards associated with different machines and mechanicalmaterial handling. (Cognitive Knowledge level: Understand)
CO5	Utilise different hazard identification tools in different industries with theknowledge of different types of chemical hazards. (Cognitive Knowledge level:Apply)

	Course :ECT433 OPTO-ELECTRONIC DEVICES
CO1	Understand physics of optical processes in semiconductors.
CO2	Distinguish different optical sources used in optoelectronic applications.
CO3	Analyse different types of photodetectors based on their performance parameters.
CO4	Explain various optical modulators and optoelectronic devices.
CO5	Explain various optical devices used for optical communication.

	Course :ECT425 BIOMEDICAL INSTRUMENTATION
CO1	Explainthe human anatomy and physiological signal Measurements.
CO2	Illustrate various techniques used for measurement of Blood flow, blood pressure, and respiration rate and body temperature.
CO3	Analyze the recording of ECG, EEG, EMG and ERG signals.
CO4	Summarize the concept of assisting and therapeutic devices.
CO5	Describe the advances in medical imaging techniques.

	Course :ECQ413 SEMINAR
CO1	Identify academic documents from the literature which are related to her/his areas of interest.
CO2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest.
CO3	Prepare a presentation about an academic document.
CO4	Give a presentation about an academic document.
CO5	Prepare a technical report.

	Course :ECD415 PROJECT PHASE I
CO1	Model and solve real world problems by applying knowledge across domains.
CO2	Develop products, processes or technologies for sustainable and socially relevant applications.
CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks.
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms.
CO5	Identify technology/research gaps and propose innovative/creative solutions.
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms.

	Course :ECL411 ELECTROMAGNETICS LAB
CO1	Familiarize the basic Microwave components and to analyse few microwavemeasurements and its parameters.
CO2	Understand the principles of fiber-optic communications and the different kind of losses, signal distortion and other signal degradation factors.
CO3	Design and simulate basic antenna experiments with simulation tools.

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	Course :ECT402 WIRELESS COMMUNICATION
CO1	Summarize the basics of cellular system and cellular design fundamentals.
CO2	Describe the wireless channel models and discuss capacity of wireless channels.
CO3	Analyze the performance of the modulation techniques for flat-fading channels and multicarrier modulation
CO4	Illustrate how receiver performance can be enhanced by various diversity techniques.
CO5	Identify advantages of various equalization techniques and multiple-access techniques in wireless communication
CO6	Calculate system parameters such antenna height, range, maximum usable frequency in different modes of radio wave propagation.

	Course :ECD416 PROJECT PHASE II
CO1	Model and solve real world problems by applying knowledge across domains
CO2	Develop products, processes or technologies for sustainable and socially relevant applications
CO3	Function effectively as an individual and as a leader in diverse teams and tocomprehend and execute designated tasks
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
CO5	Identify technology/research gaps and propose innovative/creative solutions
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms

	Course :ECT434 SECURE COMMUNICATION
CO1	Explain network security services and mechanisms and the types of attacks they are designed for
CO2	Model the symmetric encryption process and different encryption techniques
CO3	Apply the concepts of group, ring, field,modular arithmetic, Euclidean algorithm,Finite fields and polynomial arithmetic
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
CO5	Outline the concepts of public key cryptography, RSA algorithm, key distribution and management for public key systems
CO6	Explain the requirements for authentication and the types of functions used to produce an authenticator

	Course :ECT456 SPEECH AND AUDIO PROCESSING
CO1	Understand basic concepts of speech production, speech analysis, speech coding and parametric representation of speech and apply it in practical applications
CO2	Develop systems for various applications of speech processing
CO3	Learn Signal processing models of sound perception and application of perception models in audio signal processing
CO4	Implement audio compression algorithms and standards
CO5	Perform audio quality analysis

	Course :ECT458 INTERNET OF THINGS
CO1	Understand the IoT fundamentals and architecture modelling
CO2	Understand the smart things in IoT and functional blocks
CO3	To understand the communication networks and protocols used in IoT
CO4	To understand the cloud resources, data analysis and applications.
CO5	To apply the IoT processes in embedded applications.

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