

KTU 2019 SCHEME

Semester	Course	Course Outcomes	
1	MAT101: LINEAR ALGEBRA AND CALCULUS	CO1	Solve systems of linear equations, diagonalize matrices and characterise quadratic forms
		CO2	Compute the partial and total derivatives and maxima and minima of multivariable functions
		CO3	Compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
		CO4	Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
		CO5	Determine the Taylor and Fourier series expansion of functions and learn their applications.
1	PHT100: ENGINEERING PHYSICS A	CO1	Compute the quantitative aspects of waves and oscillations in engineering systems.
		CO2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
		CO3	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.
		CO4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems.
		CO5	Analyze the principles behind various superconducting applications, explain the working of solid-state lighting devices and fibre optic communication system.
1		CO1	Draw the projection of points and lines located in different quadrants.

	EST110: ENGINEERING GRAPHICS	CO2	Prepare multiview orthographic projections of objects by visualizing them in different positions.
		CO3	Draw sectional views and develop surfaces of a given object.
		CO4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
		CO5	Convert 3D views to orthographic views.
		CO6	Obtain multiview projections and solid models of objects using CAD tools.
1	EST120: BASICS OF CIVIL & MECHANICAL ENGINEERING	CO1	Recall the role of civil engineer in society and to relate The various disciplines of Civil Engineering.
		CO2	Explain different types of buildings, building components, building materials and building construction.
		CO3	Describe the importance, objectives and principles of surveying.
		CO4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps.
		CO5	Discuss the Materials, energy systems, water management and environment for green buildings.
		CO6	Analyse thermodynamic cycles and calculate its efficiency.
		CO7	Illustrate the working and features of IC Engines.
		CO8	Explain the basic principles of Refrigeration and Air Conditioning.
		CO9	Describe the working of hydraulic machines.
		CO10	Explain the working of power transmission elements.

		CO11	Describe the basic manufacturing, metal joining and machining processes.
1	HUN101: LIFE SKILLS	CO1	Define and Identify different life skills required in personal and professional life.
		CO2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
		CO3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
		CO4	Take part in group discussions.
		CO5	Use appropriate thinking and problem solving techniques to solve new problems.
		CO6	Understand the basics of teamwork and leadership.
1	PHL120: ENGINEERING PHYSICS LAB	CO1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories.
		CO2	Understand the need for precise measurement practices for data recording.
		CO3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations.
		CO4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics.
		CO5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results.
1	ESL120: CIVIL & MECHANICAL	CO1	Name different devices and tools used for civil engineering measurements.
		CO2	Explain the use of various tools and devices for various field measurements.

	WORKSHOP	CO3	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.
		CO4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
		CO5	Compare different techniques and devices used in civil engineering measurements.
		CO6	Identify Basic Mechanical workshop operations in accordance with the material and objects.
		CO7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades.
		CO8	Apply appropriate safety measures with respect to the mechanical workshop trades.
2	MAT102: VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	CO1	Compute the derivatives and line integrals of vector functions and learn their applications.
		CO2	Evaluate surface and volume integrals and learn their inter-relations and applications.
		CO3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients.
		CO4	Compute Laplace transform and apply them to solve ODEs arising in engineering.
		CO5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering
2		CO1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.

	CYT100: ENGINEERING CHEMISTRY	CO2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
		CO3	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.
		CO4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
		CO5	Study various types of water treatment methods to develop skills for treating wastewater.
2	EST100: ENGINEERING MECHANICS	CO1	Recall principles and theorems related to rigid body mechanics.
		CO2	Identify and describe the components of system of forces acting on the rigid body.
		CO3	Apply the conditions of equilibrium to various practical problems involving different force system.
		CO4	Choose appropriate theorems, principles or formulae to solve problems of mechanics.
		CO5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses.
2	EST130: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	CO1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits.
		CO2	Develop and solve models of magnetic circuits.
		CO3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state.
		CO4	Describe working of a voltage amplifier.
		CO5	Outline the principle of an electronic instrumentation system.

		CO6	Explain the principle of radio and cellular communication.
2	HUN102: PROFESSIONAL COMMUNICATION	CO1	Develop vocabulary and language skills relevant to engineering as a profession.
		CO2	Analyze, interpret and effectively summarize a variety of textual content.
		CO3	Create effective technical presentations.
		CO4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus.
		CO5	Identify drawbacks in listening patterns and apply listening techniques for specific needs.
		CO6	Create professional and technical documents that are clear and adhering to all the necessary conventions.
2	EST102: PROGRAMMING IN C	CO1	Analyze a computational problem and develop an algorithm/flowchart to find its solution.
		CO2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
		CO3	Write readable C programs with arrays, structure or union for storing the data to be processed.
		CO4	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.
		CO5	Write readable C programs which use pointers for array processing and parameter passing.
		CO6	Develop readable C programs with files for reading input and storing output.

2	CYL120: ENGINEERING CHEMISTRY LAB	CO1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses.
		CO2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs.
		CO3	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.
		CO4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis.
		CO5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
		CO6	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.
2	ESL130: ELECTRICAL AND ELECTRONICS WORKSHOP	CO1	Demonstrate safety measures against electric shocks.
		CO2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols.
		CO3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings.
		CO4	Identify and test various electronic components.
		CO5	Draw circuit schematics with EDA tools.

		CO6	Assemble and test electronic circuits on boards.
		CO7	Work in a team with good interpersonal skills.
3	MAT201: PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS	CO1	Understand the concept and the solution of partial differential equation.
		CO2	Analyse and solve one dimensional wave equation and heat equation.
		CO3	Understand complex functions, its continuity differentiability with the use of Cauchy-Riemann equations.
		CO4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function.
		CO5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.
3	ECT201: SOLID STATE DEVICES	CO1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism.
		CO2	Explain drift and diffusion currents in extrinsic semiconductors and compute current density due to these effects.
		CO3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor.
		CO4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions.
		CO5	Discuss scaling of MOSFETs and short channel effects.

3	ECT203: LOGIC CIRCUIT DESIGN	CO1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra.
		CO2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes
		CO3	Compare different types of logic families with respect to performance and efficiency.
		CO4	Design a sequential logic circuit using the basic building blocks like flip-flops.
		CO5	Design and analyze combinational and sequential logic circuits through gate level Verilog models.
3	ECT205: NETWORK THEORY	CO1	Apply Mesh / Node analysis or Network Theorems to obtain steady state response of the linear time invariant networks.
		CO2	Apply Laplace Transforms to determine the transient behaviour of RLC networks.
		CO3	Apply Network functions and Network Parameters to analyse the single port and two port networks.
3	EST200: DESIGN AND ENGINEERING	CO1	Explain the different concepts and principles involved in design engineering.
		CO2	Apply design thinking while learning and practicing engineering.
		CO3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.
3	MCN201: SUSTAINABLE ENGINEERING	CO1	Understand the relevance and the concept of sustainability and the global initiatives in this direction.
		CO2	Explain the different types of environmental pollution problems and their sustainable solutions.

		CO3	Discuss the environmental regulations and standards.
		CO4	Outline the concepts related to conventional and non-conventional energy .
		CO5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles.
3	ECL201: SCIENTIFIC COMPUTING LAB	CO1	Describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization.
		CO2	Approximate an array/matrix with matrix decomposition.
		CO3	Implement numerical integration and differentiation.
		CO4	Solve ordinary differential equations for engineering applications.
		CO5	Compute with exported data from instruments.
		CO6	Realize how periodic functions are constituted by sinusoids.
		CO7	Simulate random processes and understand their statistics.
3	ECL203: LOGIC DESIGN LAB	CO1	Design and demonstrate the functioning of various combinational and sequential circuits using ICs.
		CO2	Apply an industry compatible hardware description language to implement digital circuits.
		CO3	Implement digital circuits on FPGA boards and connect external hardware to the boards.
		CO4	Function effectively as an individual and in a team to accomplish the given task.
4		CO1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena.

	MAT204: PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS	CO2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena.
		CO3	Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate.
		CO4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques.
		CO5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations.
4	ECT202: ANALOG CIRCUITS	CO1	Design analog signal processing circuits using diodes and first order RC circuit.
		CO2	Analyse basic amplifiers using BJT and MOSFET.
		CO3	Apply the principle of oscillator and regulated power supply circuits.
4	ECT204: SIGNALS AND SYSTEMS	CO1	Apply properties of signals and systems to classify them.
		CO2	Represent signals with the help of series and transforms.
		CO3	Describe orthogonality of signals and convolution integral.
		CO4	Apply transfer function to compute the LTI response to input signals.
		CO5	Apply sampling theorem to discretize continuous time signals.
4	ECT206: COMPUTER ARCHITECTURE AND MICROCONTROLLERS	CO1	Explain the functional units, I/O and memory management w.r.t a typical computer architecture.
		CO2	Distinguish between microprocessor and microcontroller.
		CO3	Develop simple programs using assembly language programming.
		CO4	Interface 8051 microcontroller with peripheral devices using ALP/Embedded C.

		CO5	Familiarize system software and Advanced RISC Machine Architecture.
4	HUT200: PROFESSIONAL ETHICS	CO1	Understand the core values that shape the ethical behaviour of a professional.
		CO2	Adopt a good character and follow an ethical life.
		CO3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
		CO4	Solve moral and ethical problems through exploration and assessment by established experiments.
		CO5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.
4	MCN202: CONSTITUTION OF INDIA	CO1	Explain the background of the present constitution of India and features.
		CO2	Utilize the fundamental rights and duties.
		CO3	Understand the working of the union executive, parliament and judiciary.
		CO4	Understand the working of the state executive, legislature and judiciary.
		CO5	Utilize the special provisions and statutory institutions.
		CO6	Show national and patriotic spirit as responsible citizens of the country.
4	ECL202: ANALOG CIRCUITS AND SIMULATION LAB	CO1	Design and demonstrate the functioning of basic analog circuits using discrete components.
		CO2	Design and simulate the functioning of basic analog circuits using simulation tools.
		CO3	Function effectively as an individual and in a team to accomplish the given task.
4		CO1	Write an Assembly language program/Embedded C program for performing data manipulation.

	ECL204: MICROCONTROLLER LAB	CO2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals.
		CO3	Perform programming/interfacing experiments with IDE for modern microcontrollers.
5	ECT301: LINEAR INTEGRATED CIRCUITS	CO1	Understand Op Amp fundamentals and differential amplifier configurations.
		CO2	Design operational amplifier circuits for various applications.
		CO3	Design Oscillators and active filters using opamps.
		CO4	Explain the working and applications of timer, VCO and PLL ICs.
		CO5	Outline the working of Voltage regulator IC's and Data converters.
5	ECT303: DIGITAL SIGNAL PROCESSING	CO1	State and prove the fundamental properties and relations relevant to DFT and solve basic problems involving DFT based filtering methods.
		CO2	Compute DFT and IDFT using DIT and DIF radix-2 FFT algorithms.
		CO3	Design linear phase FIR filters and IIR filters for a given specification.
		CO4	Illustrate the various FIR and IIR filter structures for the realization of the given system function.
		CO5	Explain the basic multi-rate DSP operations decimation and interpolation in both time and frequency domains using supported mathematical equations.
		CO6	Explain the architecture of DSP processor (TMS320C67xx) and the finite word length effects.
5	ECT305: ANALOG AND DIGITAL COMMUNICATION	CO1	Explain the existent analog communication systems.
		CO2	Apply the concepts of random processes to LTI systems.
		CO3	Apply waveform coding techniques in digital transmission.

		CO4	Apply GS procedure to develop digital receivers.
		CO5	Apply equalizer design to counteract ISI.
		CO6	Apply digital modulation techniques in signal transmission.
5	ECT307: CONTROL SYSTEMS	CO1	Analyse electromechanical systems by mathematical modelling and derive their transfer functions.
		CO2	Determine Transient and Steady State behaviour of systems using standard test signals
		CO3	Determine absolute stability and relative stability of a system.
		CO4	Apply frequency domain techniques to assess the system performance and to design a control system with suitable compensation techniques.
		CO5	Analyse system Controllability and Observability using state space representation.
5	HUT300: INDUSTRIAL ECONOMICS AND FOREIGN TRADE	CO1	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)
		CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
		CO3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
		CO4	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)

		CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)
5	MCN301: DISASTER MANAGEMENT	CO1	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).
		CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
		CO3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
		CO4	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)
		CO5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
		CO6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).
5	ECL331: ANALOG INTEGRATED CIRCUITS AND SUMULATION LAB	CO1	Use data sheets of basic Analog Integrated Circuits and design and implement application circuits using Analog ICs.
		CO2	Design and simulate the application circuits with Analog Integrated Circuits using simulation tools.

		CO3	Function effectively as an individual and in a team to accomplish the given task.
5	ECL333: DIGITAL SIGNAL PROCESSING LAB	CO1	Simulate digital signals.
		CO2	Verify the properties of DFT computationally.
		CO3	Familiarize the DSP hardware and interface with computer.
		CO4	Implement LTI systems with linear convolution.
		CO5	Implement FFT and IFFT and use it on real time signals.
		CO6	Implement FIR low pass filter.
		CO7	Implement real time LTI systems with block convolution and FFT.
6	ECT302: ELECTROMAGNETICS	CO1	To summarize the basic mathematical concepts related to electromagnetic vector fields.
		CO2	Analyse Maxwell's equation in different forms and apply them to diverse engineering problems.
		CO3	To analyse electromagnetic wave propagation and wave polarization.
		CO4	To analyse the characteristics of transmission lines and solve the transmission line problems using Smith chart.
		CO5	To analyse and evaluate the propagation of EM waves in Wave guides.
6	ECT304: VLSI CIRCUIT DESIGN	CO1	Explain the various methodologies in ASIC and FPGA design.
		CO2	Design VLSI Logic circuits with various MOSFET logic families.
		CO3	Compare different types of memory elements.
		CO4	Design and analyse data path elements such as Adders and multipliers.
		CO5	Explain MOSFET fabrication techniques and layout design rules.
6		CO1	Explain measures of information – entropy, conditional entropy, mutual information

	ECT306: INFORMATION THEORY AND CODING	CO2	Apply Shannon's source coding theorem for data compression.
		CO3	Apply the concept of channel capacity for characterize limits of error-free transmission.
		CO4	Apply linear block codes for error detection and correction.
		CO5	Apply algebraic codes with reduced structural complexity for error correction.
		CO6	Understand encoding and decoding of convolutional and LDPC codes.
6	ECT352: DIGITAL IMAGE PROCESSING	CO1	Distinguish / Analyse the various concepts and mathematical transforms necessary for image processing.
		CO2	Differentiate and interpret the various image enhancement techniques.
		CO3	Illustrate image segmentation algorithm.
		CO4	Understand the basic image compression techniques.
6	ECT342: EMBEDDED SYSTEMS	CO1	Understand and gain the basic idea about the embedded system.
		CO2	Able to gain architectural level knowledge about the system and hence to program an embedded system.
		CO3	Apply the knowledge for solving the real life problems with the help of an embedded system.
6	HUT310: MANAGEMENT FOR ENGINEERS	CO1	Explain the characteristics of management in the contemporary context (Cognitive Knowledge level: Understand).
		CO2	Describe the functions of management (Cognitive Knowledge level: Understand).
		CO3	Demonstrate ability in decision making process and productivity analysis (Cognitive Knowledge level: Understand).

		CO4	Illustrate project management technique and develop a project schedule (Cognitive Knowledge level: Apply).
		CO5	Summarize the functional areas of management (Cognitive Knowledge level: Understand).
		CO6	Comprehend the concept of entrepreneurship and create business plans (Cognitive Knowledge level: Understand).
6	ECL332: COMMUNICATION LAB	CO1	Setup simple prototype circuits for waveform coding and digital modulation techniques working in a team.
		CO2	Simulate the error performance of a digital communication system using standard binary and M -ary modulation schemes.
		CO3	Develop hands-on skills to emulate a communication system with software-designed-radio working in a team.
6	ECD334: MINI PROJECT	CO1	Be able to practice acquired knowledge within the selected area of technology for project development.
		CO2	Identify, discuss and justify the technical aspects and design aspects of the project with a systematic approach.
		CO3	Reproduce, improve and refine technical aspects for engineering projects.
		CO4	Work as a team in development of technical projects.
		CO5	Communicate and report effectively project related activities and findings.
7		CO1	Understand the basic concept of antennas and its parameters.
		CO2	Analyze the far field pattern of Short dipole and Half wave dipole antenna.

	ECT401: MICROWAVES AND ANTENNAS	CO3	Design of various broad band antennas, arrays and its radiation patterns.
		CO4	Illustrate the principle of operation of cavity resonators and various microwave sources.
		CO5	Explain various microwave hybrid circuits and microwave semiconductor devices.
7	ECT423: COMPUTER NETWORKS	CO1	Describe the protocols used in web and email applications.
		CO2	Analyse problems pertaining to reliable data transfer, flow control and congestion over a TCP network.
		CO3	Apply Dijkstra's algorithm and distance-vector algorithm in the context of routing over computer networks.
		CO4	Analyze the performance of collision avoidance algorithms in random access protocols such as ALOHA.
		CO5	Analyze the delay performance of an ARQ system using standard queueing models.
7	MCN401: INDUSTRIAL SAFETY AND ENGINEERING	CO1	Describe the theories of accident causation and preventive measures of industrial accidents. (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 mechanical material handling. (Cognitive Knowledge level: Understand)
		CO5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level:

			Apply)
7	ECL411: ELECTROMAGNETICS LAB	CO1	Familiarize the basic Microwave components and to analyse few microwave measurements 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.
7	ECQ413: SEMINAR	CO1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
		CO2	Read and apprehend an academic document from the literature which is related to her/his areas of interest (Cognitive knowledge level: Analyze).
		CO3	Prepare a presentation about an academic document (Cognitive knowledge level: Create).
		CO4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
		CO5	Prepare a technical report (Cognitive knowledge level: Create).
7	ECD415: PROJECT PHASE I	CO1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
		CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
		CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).

		CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
		CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
		CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).
8	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.
8	ECT414: BIOMEDICAL ENGINEERING	CO1	Understand basic bioelectric potentials and its implications in diagnostics.
		CO2	Understand the principles used for diagnosis of abnormalities in the cardiovascular system.
		CO3	Explain the techniques used for diagnosis and therapy in the neuromuscular system.
		CO4	Understand the principle and working of different types of bio medical equipment/device.
		CO5	Classify various diagnostic medical imaging techniques.

8	ECT416: MODERN COMMUNICATION SYSTEMS	CO1	Explain OFDM, OFDMA and SC-FDMA techniques used in cellular communication.
		CO2	Discuss the different wireless communication standards for short range communication.
		CO3	Explain the IoT architecture and various connectivity technologies used in IoT Systems.
		CO4	Understand the various communication standards for connected autonomous vehicles.
		CO5	Explain the significance and architecture of software defined radio and cognitive radio.
8	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.
8	ECD416: PROJECT PHASE II	CO1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
		CO2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
		CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
		CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
		CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).

		CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).
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