



COLLEGE OF ENGINEERING VADAKARA
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
COURSE OUTCOMES (2019 Scheme)

Sem & Subject	CO#	Course Outcomes
MAT101-LINEAR ALGEBRA AND CALCULUS (S1)	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.
PHT100-ENGINEERING PHYSICS (S1)	CO1	Determine 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	Interpret 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	Distinguish the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems.
	CO5	Interpret the principles behind various superconducting applications, explain the working of solid-state lighting devices and fibre optic communication system.
EST120-BASICS OF CIVIL AND MECHANICAL ENGINEERING (S1)	CO1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering and Explain different types of buildings, building components, building materials and building construction.
	CO2	Describe the importance, objectives and principles of surveying and summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps.
	CO3	Discuss the Materials, energy systems, water management and environment for green buildings.
	CO4	Analyse thermodynamic cycles and calculate its efficiency and illustrate the working and features of IC Engines.
	CO5	Explain the basic principles of Refrigeration and Air Conditioning and Describe the working of hydraulic machines.

	CO6	Explain the working of power transmission elements and Describe the basic manufacturing, metal joining and machining processes.
EST100-ENGINEERING MECHANICS (S1)	CO1	To recall principles and theorems related to rigid body mechanics.
	CO2	To identify and describe components of system of forces acting on the rigid body.
	CO3	To apply the conditions of equilibrium to various practical problem involving different force system.
	CO4	To choose appropriate theorems, principle or formulae to solve problems of mechanics.
	CO5	To solve problems involving rigid bodies, applying the properties of distributed areas and masses.
HUN101- LIFE SKILLS (S1)	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.
PHL120-ENGINEERING PHYSICS LAB (S1)	CO1	Develop analytical/experimental skills & impart prerequisite hands-on experience for engineering laboratories.
	CO2	Comprehend the need for precise measurement practices for data recording.
	CO3	Comprehend the principle, concept, working & applications of relevant technologies & comparison of results with theoretical calculations.
	CO4	Develop basic communication skills through working in groups in performing the laboratory experiments & by interpreting the results
ESL120-CIVIL & MECHANICAL WORKSHOP (S1)	CO1	Choose devices, tools, materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
	CO2	Identify and compare various tools, techniques and devices used for civil engineering measurements.
	CO3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
	CO4	Identify Basic Mechanical workshop operations in accordance with the material and objects.

	CO5	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades.
	CO6	Apply appropriate safety measures with respect to the mechanical workshop trades.
MAT 102-VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS (S2)	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.
CYT100-ENGINEERING CHEMISTRY (S2)	CO1	Implement the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
	CO2	Recognise various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
	CO3	Implement the knowledge of analytical method for characterizing a chemical mixture or a compound. Comprehend the basic concept of SEM for surface characterisation of nanomaterials.
	CO4	To study about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
	CO5	To learn about various types of water treatment methods to develop skills for treating wastewater.
EST110-ENGINEERING GRAPHICS (S2)	CO1	Draw the projection of points and lines located in different quadrants.
	CO2	Prepare multiview orthographic projections of objects by visualizing them in
	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 and vice versa.
	CO6	Obtain multiview projections and solid models of objects using CAD Tool.
EST130-BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (S2)	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
	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.
EST102-C PROGRAMMING (S2)	CO1	Analyse a computational problem and develop an algorithm/flowchart to find its solution.
	CO2	Develop readable* C programs with branching and looping statements, which uses
	CO3	Write readable C programs with arrays, structure or union for storing the data to
	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.
HUN102 PROFESSIONAL COMMUNICATION (S2)	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
ESL 130-ELECTRICAL AND ELECTRONICS WORKSHOP (S2)	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, work in a team with good interpersonal skills
UTILIZU- ENGINEERING CHEMISTRY LAB (S2)	CO1	Understand the different techniques of qualitative chemical analysis to generate experimental skills.
	CO2	Learn to design and carry out scientific experiments as well as accurately record and analyse the results of such experiments.
	CO3	Comprehend the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations.

	CO4	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social and environmental problems and why is an integral part of curriculum.
MAT201-PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS (S3)	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 CauchyRiemann 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.
ECT201-SOLID STATE DEVICES (S3)	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.
ECT203-LOGIC CIRCUIT DESIGN (S3)	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.
ECT205-NETWORK THEORY (S3)	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.
ESS IO NA L	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.
MCN201- SUSTAINABLEENGINEERING (S3)	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.
ECL201-SCIENTIFIC COMPUTING LAB (S3)	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,differentiation and solve ordinary differential equations for engineering applications.
	CO4	Compute with exported data from instruments.
	CO5	Realize how periodic functions are constituted by sinusoids.
	CO6	Simulate random processes and understand their statistics.
ECL203-LOGIC DESIGN LAB (S3)	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.
PROBABILITY, RANDOM PROCESS AND NUMERICAL METHODS	CO1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena.
	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.
ECT202- ANALOG CIRCUITS (S4)	CO1	Design analog signal processing circuits using diodes and first order RC circuits.
	CO2	Analyse basic amplifiers using BJT and MOSFET.
	CO3	Apply the principle of oscillator and regulated power supply circuits.
ECT204-SIGNALS AND SYSTEMS (S4)	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
ECT206-COMPUTER ARCHITECTURE AND MICROCONTROLLERS (S4)	CO1	Explain the functional units, I/O and memory management w.r.t a typical computer architecture.
	CO2	Describe the architecture, internal organization, instruction set, and addressing modes of the 8051 microcontroller.
	CO3	Develop assembly language and Embedded C programs to interface the 8051
	CO4	Apply timers, counters, serial communication, system software tools, and ARM architectural concepts in embedded system applications.
	CO5	Analyze memory hierarchy, cache organization, virtual memory, and input/output mechanisms in computer systems.
EST200-DESIGN ENGINEERING (S4)	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.
MCN202-CONSTITUTION OF INDIA (S4)	CO1	Understand the background and features of constitution of India and enlist the clauses in Part I & II of Indian Constitution.
	CO2	Utilize the fundamental rights and duties and enlist Directive Principles of State Policy.
	CO3	Understand the working of the union executive, parliament and judiciary.
	CO4	Understand the working of the state executive, legislature and judiciary.
	CO5	Understand the special provisions and statutory institutions.

	CO6	Show national and patriotic spirit as responsible citizens of the country.
ECL202-ANALOG CIRCUITS AND SIMULATION LAB (S4)	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.
ECL204- MICROCONTRO LLER LAB (S4)	CO1	Write an Assembly language program/Embedded C program for performing data manipulation.
	CO2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals.
	CO3	Perform programming/interfacing experiments with IDE for modern
ECT301-LINEAR INTEGRATED CIRCUITS (S5)	CO1	Understand Op-Amp fundamentals and differential amplifier configurations.
	CO2	Design operational amplifier circuits for various applications.
	CO3	Design Oscillators and active filters using op-amps.
	CO4	Explain the working and applications of timer, VCO and PLL ICs.
	CO5	Outline the working of Voltage regulator IC's and Data converters.
ECT303-DIGITAL SIGNAL PROCESSING (S5)	CO1	State and prove the fundamental properties and relations relevant to DFT and solve basic problems involving DFT based filtering.
	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.
ANALOG AND DIGITAL COMMUNICATI ON	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.
ECT307-CONTROL SYSTEMS (S5)	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.
HUT300-INDUSTRIAL ECONOMICS AND FOREIGN TRADE (S5)	CO1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
	CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
	CO3	Determine the functional requirement of a firm under various competitive conditions.
	CO4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
	CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm.
MCN301-DISASTER MANAGEMENT (S5)	CO1	Discuss the system of earth and define various terminologies used in disaster management.
	CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment.
	CO3	Explain the core elements, phases and measures of Disaster Risk Management.
	CO4	Identify factors that determine the nature of various disaster response and disaster response actions.
	CO5	Explain stakeholder participation and crisis counselling in disaster management.
	CO6	Explain various legislations and best practices for disaster management.
ECL331-ANALOG CIRCUITS AND SIMULATION LAB (S5)	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.
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 and block convolution and FFT.
	CO5	Implement FFT and IFFT and use it on real time signals.
	CO6	Implement FIR low pass filter.
ECT302-ELECTROMAGNETICS (S6)	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.
ECT304-VLSI CIRCUIT DESIGN (S6)	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.
ECT306-INFORMATION THEORY AND CODING (S6)	CO1	Explain measures of information – entropy, conditional entropy, mutual information.
	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.
ECT308-COMPREHENSIVE COURSE WORK (S6)	CO1	Apply the knowledge of circuit theorems and solid-state physics to solve the problems in electronic Circuit.
	CO2	Design a logic circuit for a specific application.
	CO3	Design linear IC circuits for linear and non-linear circuit applications.
	CO4	Explain basic signal processing operations and Filter designs.
	CO5	Explain existent analog and digital communication systems.
ECT332- DIGITAL IMAGE PROCESSING (S6)	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.
	CO1	Explain the characteristics of management in the contemporary context (Cognitive Knowledge level: Understand).

HUT310-MANAGEMENT FOR ENGINEERS (S6)	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).
HUT300-INDUSTRIAL ECONOMICS & FOREIGN TRADE (S6)	CO1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
	CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
	CO3	Determine the functional requirement of a firm under various competitive conditions.
	CO4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
	CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm.
ECL332-COMMUNICATION LAB (S6)	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.
ECD334-MINIPROJECT (S6)	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.
ECT401-MICROWAVE & ANTENNAS (S7)	CO1	Understand the basic concept of antennas and its parameters.
	CO2	Analyze the far field pattern of short dipole and Half wave dipole antenna.
	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.
	CO1	Understand the basics of machine learning and different types.

ECT463-MACHINE LEARNING (S7)	CO2	Differentiate regression and classification, apply Bayes' decision theory in classification
	CO3	Apply linear algebra and statistical methods in discriminant-based algorithms
	CO4	Understand the basics of unsupervised learning and non-metric methods
	CO5	Understand ensemble methods, dimensionality reduction, evaluation, model selection.
	CO6	Understand the basics of machine learning and different types.
MCN401-INDUSTRIAL SAFETY ENGINEERING (S7)	CO1	Describe the theories of accident causation and preventive measures of industrial accidents.
	CO2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.
	CO3	Explain different issues in construction industries
	CO4	Describe various hazards associated with different machines and mechanical material handling.
	CO5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards.
ECL411-ELECTROMAGNETICS LAB (S7)	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.
ECQ413 -SEMINAR (S7)	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 knowledgelevel: 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).
ECD415-PROJECT DESIGN (S7)	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.
	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).
EET4335-RENEWABLE ENERGY SYSTEMS (S7)	CO1	Choose the appropriate energy source depending on the available resources.
	CO2	Explain the concepts of solar thermal and solar electric systems.
	CO3	Illustrate the operating principles of wind, and ocean energy conversion systems.
	CO4	Outline the features of biomass and small hydro energy resources.
	CO5	Describe the concepts of fuel cell and hydrogen energy technologies.
CET415-ENVIRONMENTAL IMPACT ASSESSMENT (S7)	CO1	Explain the need for minimizing the environmental impacts of developmental activities.
	CO2	Outline environmental legislation & clearance procedure in the country.
	CO3	Apply various methodologies for assessing the environmental impacts of any developmental activity.
	CO4	Prepare an environmental impact assessment report.
	CO5	Conduct an environmental audit.
ITT415-WEB DESIGNING (S7)	CO1	Interpret the fundamental concept of web designing(Cognitive knowledge level: Understand).
	CO2	Summarize the basic elements of HTML(Cognitive knowledge level: Understand).
	CO3	Develop suitable web graphics for the web pages (Cognitive knowledge level: Apply).
	CO4	Apply cascading style sheet to add presentation style to web pages (Cognitive knowledge level: Apply).
	CO5	Employ javascript to add functionality to web pages(Cognitive knowledge level: Apply).
ECT402- WIRELESS COMMUNICATION (S8)	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.
ECT414-BIOMEDICAL ENGINEERING (S8)	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.
ECT476-ROBOTICS (S8)	CO1	Attain a thorough understanding of different types of Robots and their applications
	CO2	Select appropriate sensors and actuators based on the robotic applications.
	CO3	Perform kinematic and dynamic analyses for robots.
	CO4	Carry out the design and control of a simple robot.
	CO5	Integrate mechanical and electrical hardware for making a robotic device.
	CO6	Attain a thorough understanding of different types of Robots and their applications.
ECT418-RMECHATRONICS (S8)	CO1	Understand the working principles of various sensors and actuators in Mechatronics systems and be able to choose the suitable one for the real-world application.
	CO2	Formulate and simulate models of mechatronics systems.
	CO3	Explain the implementation of PLC in mechatronics applications.
	CO4	Explain the standard fabrication techniques and principle of operation of MEMS devices.
	CO5	Design and Analysis of commonly encountered mechatronics systems for real time applications.
ECD416-PROJECT (S8)	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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