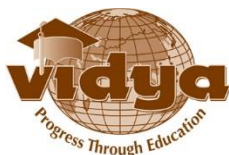| COURSE OUTCOMES				
Branch: DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING				
2019 SCHEME				
After the completion of the course the students will be able to				
Sl. No..	SEM	Subject	CO	CO statement
1	S1	MAT101 LINEAR ALGEBRA AND CALCULUS	MAT101.1	solve systems of linear equations, diagonalize matrices and characterise quadratic forms
			MAT101.2	compute the partial and total derivatives and maxima and minima of multivariable functions
			MAT101.3	compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
			MAT101.4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
			MAT101.5	determine the Taylor and Fourier series expansion of functions and learn their applications.
2	S1	CYT 100 ENGINEERING CHEMISTRY)	CYT100.1	apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
			CYT100.2	understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
			CYT100.3	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.
			CYT100.4	learn about the basics of stereochemistry and its application. Apply the knowledge

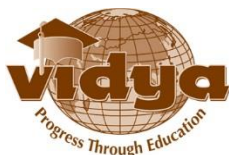|				
				of conducting polymers and advanced polymers in engineering.
			CYT100.5	study various types of water treatment methods to develop skills for treating wastewater.
3	S1	EST 110 ENGG.GRAPHICS	EST110.1	draw the projection of points and lines located in different quadrants
			EST110.2	prepare multiview orthographic projections of objects by visualizing them in different positions
			EST110.3	draw sectional views and develop surfaces of a given object
			EST110.4	prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
			EST110.5	convert 3D views to orthographic views and vice versa using CAD tools
4	S1	HUN 101 LIFE SKILLS	HUN101.1	define and Identify different life skills required in personal and professional life
			HUN101.2	develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
			HUN101.3	explain the basic mechanics of effective communication and demonstrate these through presentations.
			HUN101.4	take part in group discussions
			HUN101.5	understand the basics of teamwork and leadership
5	S1	EST 130 BASIC ELECTRONICS/ELECTRICAL	EST130.1	apply fundamental concepts and circuit laws to solve simple DC electric circuits.
			EST130.2	develop and solve models of magnetic circuits.
			EST130.3	apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state.

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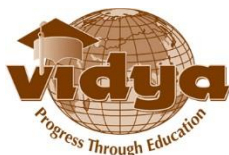|			EST130.4	describe the working of a voltage amplifier and to outline the principle of an electronic instrumentation system.
			EST130.5	explain the principle of radio and cellular communication.
6	S1	CYL 120 ENGINEERING CHEMISTRY LAB	CYL120.1	understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
			CYL120.2	develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
			CYL120.3	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
			CYL120.4	acquire the ability to understand, explain and use instrumental techniques for chemical analysis
			CYL120.5	learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
7	S1	ESL 130 ELECTRICAL & ELECTRONICS WORKSHOP	ESL130.1	demonstrate safety measures against electric shocks.
			ESL130.2	identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols.
			ESL130.3	develop the connection diagram, identify the suitable accessories and

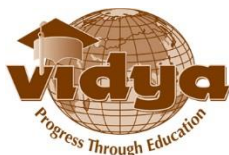|				
				materials necessary for wiring simple lighting circuits for domestic buildings
			ESL130.4	identify and test various electronic components
			ESL130.5	make use of BIS/IEEE symbols to draw circuit schematics and experiment with and test electronic circuits on board
8	S2	MAT 102 VECTOR CALCULUS, DIFFERENTIAL EQUATIONS & TRANSFORMS	MAT102.1	compute the derivatives and line integrals of vector functions and learn their applications
			MAT102.2	evaluate surface and volume integrals and learn their inter-relations and applications.
			MAT102.3	solve homogeneous and non-homogeneous linear differential equation with constant coefficients
			MAT102.4	compute Laplace transform and apply them to solve ODEs arising in engineering
			MAT102.5	determine the Fourier transforms of functions and apply them to solve problems arising in engineering
9	S2	PHT 110 ENGINEERING PHYSICS	PHT110.1	compute the quantitative aspects of waves and oscillations in engineering systems.
			PHT110.2	apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
			PHT110.3	analyze the behaviour of matter in the atomic and subatomic level through the principles of

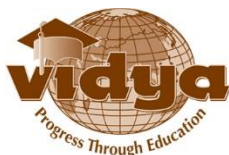|				
				quantum mechanics to perceive the microscopic processes in electronic devices.
			PHT110.4	classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problem
			PHT110.5	analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system
10	S2	EST 100 ENGINEERING MECHANICS	EST100.1	recall principles and theorems related to rigid body mechanics
			EST100.2	identify and describe the components of system of forces acting on the rigid body
			EST100.3	apply the conditions of equilibrium to various practical problems involving different force system.
			EST100.4	choose appropriate theorems, principles or formulae to solve problems of mechanics.
			EST100.5	solve problems involving rigid bodies, applying the properties of distributed areas and masses
11	S2	EST 102 BASICS OF COMPUTER PROGRAMMING	EST102.1	analyze a computational problem and develop an algorithm/flowchart to find its solution.
			EST102.2	develop readable C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.

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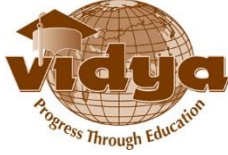|				
			EST102.3	write readable C programs with arrays,structure or union for storing the data to be processed.
			EST102.4	divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem.
			EST102.5	write readable C programs which use pointers for array processing and parameter passing. Develop readable C programs with files for reading input and storing output.
12	S2	EST 120 BASICS OF CIVIL AND MECHANICAL ENGINEERING	EST120.1	recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering with special focus on Building construction and basics of Surveying
			EST120.2	summarize the basic infrastructure services MEP, HVAC, elevators, escalators and ramps and discuss the Materials, energy systems, water management and environment for green buildings.
			EST120.3	analyse thermodynamic cycles and their efficiency for illustrating working of IC Engines.
			EST120.4	explain the basic principles of refrigeration, air conditioning, hydraulic turbines and power transmission elements.
			EST120.5	describe the basic manufacturing, metal joining and machining processes.
13	S2		HUN102.1	develop vocabulary and language skills relevant to engineering as a profession.

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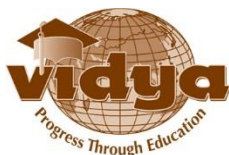|				
		HUN 102 PROFESSIONAL COMMUNICATION	HUN102.2	get the capability to analyze, interpret and effectively summarize a variety of textual content.
			HUN102.3	create effective technical presentations.
			HUN102.4	discuss a topic in a group setting and arrive at generalizations/ conclusions.
			HUN102.5	create professional and technical documents with required relevance and clarity.
14	S2	PHL 120 ENGINEERING PHYSICS LAB	PHL120.1	develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
			PHL120.2	understand the need for precise measurement practices for data recording
			PHL120.3	understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
			PHL120.4	analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
			PHL120.5	develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
15	S2	ESL 120 CIVIL & MECHANICAL WORKSHOP	ESL120.1	name different devices and tools used for civil engineering measurements and Explain the use of various tools and devices for various field measurements
			ESL120.2	demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land,

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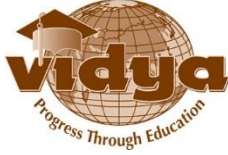|				
				plumbing and undertaking simple construction work.
			ESL120.3	choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing and Compare different techniques and devices used in civil engineering measurements
			ESL120.4	identify Basic Mechanical workshop operations with appropriate Tools and Instruments with respect to the mechanical workshop trades in accordance with the material and Objects.
			ESL120.5	apply appropriate safety measures with respect to the mechanical workshop trades.
16	S3	MAT201 PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS	MAT201.1	understand the concept and the solution of partial differential equation.
			MAT201.2	analyse and solve one dimensional wave equation and heat equation.
			MAT201.3	understand complex functions, its continuity differentiability with the use of Cauchy-Riemann equations
			MAT201.4	evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
			MAT201.5	understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.
17	S3		ECT201.1	define and understand the concepts in semiconductor physics and to describe and

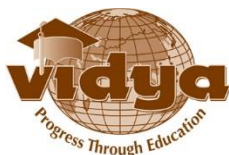|				
				apply the generation and recombination processes in semiconductors.
		ECT201 SOLID STATE DEVICES	ECT201.2	explain drift and diffusion currents in extrinsic semiconductors and compute current density due to these effects.
			ECT201.3	solve the differential equations & find the current components in a PN junction diode and bipolar junction transistor.
			ECT201.4	analyze energy band diagrams of metal semiconductor junctions and MOS capacitors and derive the expressions for drain current in linear and saturation regions.
			ECT201.5	discuss scaling of MOSFETs and short channel effects.
18	S3	ECT203 LOGIC CIRCUIT DESIGN	ECT203.1	explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra
			ECT203.2	create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes
			ECT203.3	compare different types of logic families with respect to performance and efficiency
			ECT203.4	design a sequential logic circuit using the basic building blocks like flip-flops
			ECT203.5	design and analyze combinational and sequential logic circuits through gate level Verilog models.
19	S3	ECT205 NETWORK THEORY	ECT205.1	recall Mesh / Node analysis to obtain steady state response of the linear time invariant networks.
			ECT205.2	apply Network Theorems to obtain steady state response of the linear time invariant networks.

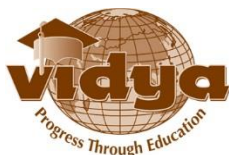|			ECT205.3	apply Laplace Transforms to determine the transient behavior of RLC networks.
			ECT205.4	apply Network functions and Network Parameters to analyse the single port networks using Laplace transform
			ECT205.5	apply Network functions and Network Parameters to analyse two port networks.
20	S3	EST200 DESIGN AND ENGINEERING	EST200.1	students are able to Explain different concepts and principles involved in design engineering.
			EST200.2	students are able to discuss and demonstrate the workability of solutions for design problems and Apply design thinking while learning and practicing engineering.
			EST200.3	students are able to compare designs covering function, cost, environmental sensitivity, safety factors along with engineering analysis.
			EST200.4	students are able to Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.
			EST200.5	students can judge the optimal solution from the available choice.
21	S3	MCN201 SUSTAINABLE ENGINEERING	MCN201.1	understand the relevance and the concept of sustainability and the global initiatives in this direction
			MCN201.2	explain the different types of environmental pollution problems and their sustainable solutions
			MCN201.3	discuss the environmental regulations and standards
			MCN201.4	outline the concepts related to conventional and non-conventional energy
			MCN201.5	demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

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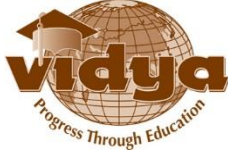|				
22	S3	ECL201 SCIENTIFIC COMPUTING LAB	ECL201.1	describe the needs and requirements of scientific computing and to familiarize one programming language for scientific computing and data visualization.
			ECL201.2	approximate an array/matrix with matrix decomposition.
			ECL201.3	implement numerical integration and differentiation for solving ordinary differential equations for engineering applications.
			ECL201.4	realize how periodic functions are constituted by sinusoids
			ECL201.5	simulate random processes and understand their statistics.
23	S3	ECL203 LOGIC DESIGN LAB	ECL203.1	design and demonstrate the functioning of various combinational circuits using ICs
			ECL203.2	design and demonstrate the functioning of various sequential circuits using ICs
			ECL203.3	apply an industry compatible hardware description language to implement digital circuits
			ECL203.4	implement digital circuits on FPGA boards and connect external hardware to the boards
			ECL203.5	function effectively as an individual and in a team to accomplish the given task
24	S4	MAT204 PROBABILITY, RANDOM PROCESSES & NUMERICAL METHODS	MAT204.1	understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena.
			MAT204.2	understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena.
			MAT204.3	analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate

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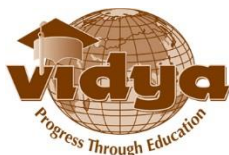|				
			MAT204.4	compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
			MAT204.5	apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations
25	S4	ECT202 ANALOG CIRUITS	ECT202.1	design analog signal processing circuits using diodes and first order RC circuits
			ECT202.2	design basic amplifiers using BJT and its small signal analysis
			ECT202.3	analyse the working of amplifiers using MOSFET
			ECT202.4	analyse and design different feedback amplifiers & Oscillators
			ECT202.5	apply the principles of power amplifiers and voltage regulators
26	S4	ECT204 SIGNALS & SYSTEMS	EC T204.1	apply properties of signals and systems to classify them
			EC T204.2	represent signals with the help of series and transforms
			EC T204.3	describe orthogonality of signals and convolution integral.
			EC T204.4	apply transfer function to compute the LTI response to input signals.
			EC T204.5	apply sampling theorem to discretize continuous time signals
27	S4	ECT206 COMPUTER ARCHITECTURE & MICROCONTROLLERS	ECT206.1	explain the functional units, I/O and memory management w.r.t a typical computer architecture.
			ECT206.2	distinguish between microprocessor and microcontroller
			ECT206.3	develop simple programs using assembly language programming
			ECT206.4	interface 8051 microcontroller with peripheral devices using ALP/Embedded C

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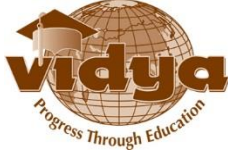|			ECT206.5	familiarize system software and Advanced RISC Machine Architecture.
28	S4	HUT200 PROFESSIONAL ETHICS	HUT200.1	understand the core values that shape the ethical behavior of a professional.
			HUT200.2	adopt a good character and follow an ethical life.
			HUT200.3	explain the role and responsibility in technical development by keeping personal ethics and legal ethics.
			HUT200.4	solve moral and ethical problems through exploration and assessment by established experiments.
			HUT200.5	apply the knowledge of human values and social values to contemporary ethical dilemmas and global issues.
29	S4	MCN202 CONSTITUTION OF INDIA	MCN202.1	explain the background of the present constitution of India and features.
			MCN202.2	utilize the fundamental rights and duties.
			MCN202.3	understand the working of the union executive, parliament and judiciary.
			MCN202.4	understand the working of the state executive, legislature and judiciary.
			MCN202.5	utilize the special provisions and statutory institutions and Show national and patriotic spirit as responsible citizens of the country
30	S4	ECL202 ANALOG CIRCUITS & SIMULATION LAB	ECL202.1	understand the working of analog circuits like clippers, clampers ,RC circuits etc.
			ECL202.2	design and demonstrate the functioning of MOSFET amplifier, Cascade and Cascode Amplifier
			ECL202.3	design and demonstrate the functioning of regulators, oscillators and power amplifiers.
			ECL202.4	design and simulate the functioning of basic analog circuits using simulation tools.

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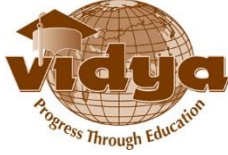|			ECL202.5	function effectively as an individual and in a team to accomplish the given task.
31	S4	ECL204 MICROCONTROLLER LAB	ECL204.1	write an Assembly language program for performing data manipulation.
			ECL204.2	students will be able to realize Assembly language program for performing data manipulation on 8051 trainer kit
			ECL204.3	develop ALP/Embedded C Programs to interface microcontroller with peripherals
			ECL204.4	perform programming/interfacing experiments with IDE for modern microcontrollers
			ECL204.5	troubleshoot interactions between software and hardware.
32	S5	ECT 301 LINAR INTEGRATED CIRCUITS	ECT301.1	understand Op Amp fundamentals and differential amplifier configurations
			ECT301.2	design operational amplifier circuits for various applications
			ECT301.3	design Oscillators and active filters using op amps
			ECT301.4	explain the working and applications of timer, VCO and PLL ICs
			ECT301.5	outline the working of Voltage regulator IC's and Data converters
33	S5	ECT 303 DIGITAL SIGNAL PROCESSING	ECT303.1	state and prove the fundamental properties and relations relevant to DFT and solve basic problems involving DFT based filtering methods
			ECT303.2	compute DFT and IDFT using DIT and DIF radix-2 FFT algorithms
			ECT303.3	design linear phase FIR filters and IIR filters for a given specification
			ECT303.4	illustrate the various FIR and IIR filter structures for the realization of the given system function
			ECT303.5	explain the basic multi-rate DSP operations decimation and interpolation in both time and frequency domains using

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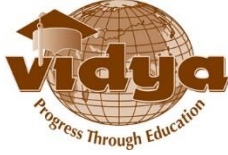|				
				supported mathematical equations. Explain the architecture of DSP processor (TMS320C67xx) and the finite word length effects
34	S5	ECT 305 ANALOG AND DIITAL COMMUNICATION	ECT305.1	explain the existent analog communication systems.
			ECT305.2	apply the concepts of random processes to LTI systems
			ECT305.3	apply waveform coding techniques in digital transmission.
			ECT305.4	apply GS procedure to develop digital receivers and equalizer design to counteract ISI.
			ECT305.5	apply digital modulation techniques in signal transmission.
35	S5	ECT 307 CONTROL SYSTEMS	ECT307.1	represent systems mathematically and derive the transfer function of the system
			ECT307.2	employ time domain analysis to predict and diagnose transient and steady state performance parameters of the system for standard input functions.
			ECT307.3	determine the stability of a system
			ECT307.4	identify the needs of different types of controllers and compensators to ascertain the required dynamic response from the system.
			ECT307.5	perform state variable analysis of control system and analyze a digital control system.
36	S5	MCN301 DISADTER MANAGEMENT	MCN301.1	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)
			MCN301.2	deistinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand)

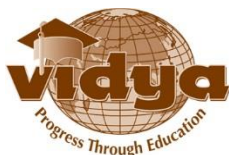|				
			MCN301.3	identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
			MCN301.4	explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)
			MCN301.5	identify factors that determine the nature of disaster response and discuss the various disaster response actions along with the best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).
37	S5	HUT 300 INDUSTRIAL ECONOMICS AND FOREIGN TRADE	HUT300.1	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)
			HUT300.2	take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
			HUT300.3	determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
			HUT300.4	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)
			HUT300.5	determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

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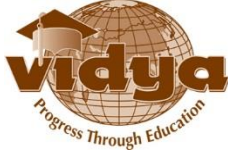|				
38	S5	ECL331 ANALOG INTEGRATED CIRCUITS AND SIMULATION LAB	ECL331.1	use data sheets of basic Analog Integrated Circuits and design and implement application circuits using Analog ICs.
			ECL331.2	design and simulate the application circuits with Analog Integrated Circuits using simulation tools.
			ECL331.3	function effectively as an individual and in a team to accomplish the given task.
			ECL331.4	work as team to design op-amp application circuits using 555 timer IC
			ECL331.5	able to design and implement basic D/A and A/D converter circuits.
39	S5	ECL333 DIGITAL SIGNAL PROCESSING LAB	ECL333.1	simulate digital signals and verify the properties of DFT computationally
			ECL333.2	familiarize the DSP hardware and interface with the computer.
			ECL333.3	implement real time LTI systems with linear convolution and block convolution and FFT.
			ECL333.4	implement FFT and IFFT and use it on real time signals.
			ECL333.5	implement FIR low pass filter.
40	S6	ECT302 ELECTROMAGNETICS	ECT302.1	to summarize the basic mathematical concepts related to electromagnetic vector fields.
			ECT302.2	analyse Maxwell's equation in different forms and apply them to diverse engineering problems.
			ECT302.3	to analyse electromagnetic wave propagation and wave polarization
			ECT302.4	to analyse the characteristics of transmission lines and solve the transmission line problems using Smith chart.
			ECT302.5	to analyse and evaluate the propagation of EM waves in Wave guides.

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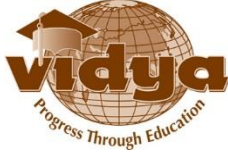| 41	S6	ECT304 VLSI CIRCUIT DESIGN	ECT304.1	explain the various methodologies in ASIC and FPGA design..
			ECT304.2	design VLSI Logic circuits with various MOSFET logic families.
			ECT304.3	compare different types of memory elements.
			ECT304.4	design and analyse data path elements such as Adders and multipliers.
			ECT304.5	explain MOSFET fabrication techniques and layout design rules.
42	S6	ECT306 INFORMATION THEORY AND CODING	ECT306.1	students will be able to understand the concept of information and entropy
			ECT306.2	students will be able to design a lossless transmission system on the basis of channel capacity and source coding theorem
			ECT306.3	students will be able understand the basics of Gaussian Channel & Shannon's Limit
			ECT306.4	students will be able to analyze error correction and detection using linear block codes.
			ECT306.5	students will be able to analyze error correction and detection using cyclic codes and convolutional code encoding and decoding
43	S6	HUT310 MANAGEMENT FOR ENGINEERS	HUT310.1	students would be able to critically analyse and evaluate a variety of management practices in the contemporary context
			HUT310.2	students would be able to understand and apply a variety of management and organisational theories in practice
			HUT310.3	students would be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace
			HUT310.4	students would be able to critically reflect on ethical theories and social responsibility

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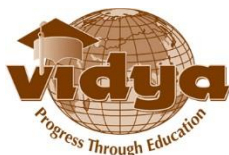|				
				ideologies to create sustainable organizations
			HUT310.5	know about the role of managers in an organisation
44	S6	ECT362 INTRODUCTION TO MEMS	ECT362.1	describe the working principles of micro sensors and actuators
			ECT362.2	identify commonly used mechanical structures in MEMS.
			ECT362.3	explain the application of scaling laws in the design of micro systems.
			ECT362.4	identify the typical materials used for fabrication of micro systems
			ECT362.5	describe the challenges in the design and fabrication of Micro systems
45	S6	ECT342 EMBEDDED SYSTEMS	ECT342.1	ability to understand basics of embedded system fundamentals and system design.
			ECT342.2	ability to understand the different standards and protocols used for communication with I/O devices and their interfacing with the processor.
			ECT342.3	ability to gain ARM Processor architectural level and pipeline processor organization knowledge.
			ECT342.4	ability to write programs in assembly and high level languages for ARM Processor.
			ECT342.5	ability to understand real time operating systems and their use in embedded systems.
46	S6	ECL332 COMMUNICATION LAB	ECL332.1	apply the knowledge of circuit theorems and solid state physics to solve the problems in electronic Circuits
			ECL332.2	design a logic circuit for a specific application

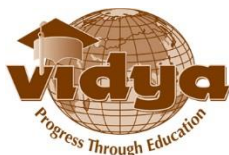|			ECL332.3	design linear IC circuits for linear and non-linear circuit applications.
			ECL332.4	explain basic signal processing operations and Filter designs
			ECL332.5	explain existent analog and digital communication systems
47	S6	ECT308 COMPREHENSIVE COURSE WORK	ECT308.1	setup simple prototype circuits for waveform coding working in a team.
			ECT308.2	setup simple prototype circuits for digital modulation techniques.
			ECT308.3	simulate the error performance of a digital communication system using standard binary.
			ECT308.4	simulate the error performance of M-ary modulation schemes.
			ECT308.5	develop hands-on skills to emulate a communication system with software-designed-radio working in a team.
48	S6	ECD334 MINI PROJECT	ECD334.1	students will be able to practice acquired knowledge within the selected area of technology for project development.
			ECD334.2	students will be able to Identify, discuss and justify the technical aspects and design aspects of the project with a systematic approach.
			ECD334.3	students will be able to Reproduce, improve and refine technical aspects for engineeringprojects.
			ECD334.4	work as a team in development of technical projects.
			ECD334.5	communicate and report effectively project related activities andfindings.
48	S7	ECT 401 MICROWAVES AND ANTENNAS	ECD401.1	understand the basic concept of antennas and its parameters
			ECD401.2	analyze the far filed pattern of Short dipole and Half wave dipole antenna.

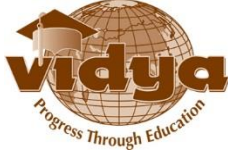|			ECD401.3	design of various broad band antennas, arrays and its radiation patterns.
			ECD401.4	illustrate the principle of operation of cavity resonators and various microwave sources
			ECD401.5	explain various microwave hybrid circuits and microwave semiconductor devices.
49	S7	MCN401 INDUSTRIAL SAFETY E4NGINEERING	MCN401.1	describe the theories of accident causation and preventive measures of industrial accidents. (Cognitive Knowledge level: Understand)
			MCN401.2	explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
			MCN401.3	explain different issues in construction industries. (Cognitive Knowledge level: Understand)
			MCN401.4	describe various hazards associated with different machines and mechanical material handling. (Cognitive Knowledge level: Understand)
			MCN401.5	dtilize different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)
49	S7		ECT423.1	describe the protocols used in web and email applications.

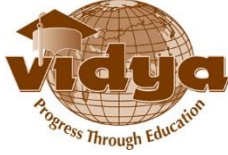|					
		ECT423 COMPUTER NETWORKS	ECT423.2	analyse problems pertaining to reliable data transfer, flow control and congestion over a TCP network.
			ECT423.3	apply Dijkstra's algorithm and distance-vector algorithm in the context of routing over computer networks.
			ECT423.4	analyze the performance of collision avoidance algorithms in random access protocols such as ALOHA.
			ECT423.5	analyze the delay performance of an ARQ system using standard queueing models.
50	S7	ECQ413 SEMINAR	ECQ413.1	identify academic documents from the literature which are related to her/his areas of interest
			ECQ413.2	read and apprehend an academic document from the literature which is related to her/his areas of interest
			ECQ413.3	prepare a presentation about an academic document
			ECQ413.4	give a presentation about an academic document
			ECQ413.5	prepare a technical report
50	S7	ECT413 OPTICAL FIBER COMMUNICATION	ECT413.1	understand the working and classification of optical fibers in terms of propagation modes
			ECT413.2	solve problems of transmission characteristics and losses in optical fiber
			ECT413.3	explain the constructional features and the characteristics of optical sources and detectors
			ECT413.4	describe the operations of optical amplifiers
			ECT413.5	understand the concept of WDM, FSO and LiFi
51	S7		ECD415.1	model and solve real world problems by applying knowledge across domains

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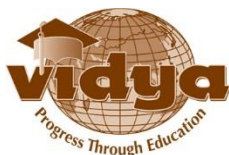|				
		ECD415 PROJECT PHASE I	ECD415.2	develop products, processes or technologies for sustainable and socially relevant applications
			ECD415.3	function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
			ECD415.4	plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
			ECD415.5	identify technology/research gaps and propose innovative/creative solutions
51	S7	ECL411 ELECTROMAGNETICS LAB	ECL411.1	organize and communicate technical and scientific findings effectively in written and oral forms
			ECL411.2	familiarize the basic Microwave components and to analyse few microwave measurements and its parameters.
			ECL411.3	understand the principles of fiber-optic communications and the different kind of losses, signal distortion and other signal degradation factors.
			ECL411.4	design and simulate basic antenna experiments with simulation tools
			ECL411.5	summarize the wireless mobile technologies, basics of cellular system and cellular design fundamentals.
52	S8	ECT 402 WIRELESS COM MUNICATION	ECT402.1	describe the wireless channel models and discuss capacity of wireless channels.
			ECT402.2	analyze the performance of the modulation techniques for flat-fading channels and multicarrier modulation.
			ECT402.3	identify the various diversity techniques, equalization techniques and multiple-

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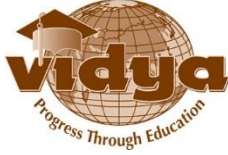|				
				access techniques in wireless communication.
			ECT402.4	calculate system parameters such antenna height, range, maximum usable frequency in different modes of radio wave propagation.
			ECT402.5	explain OFDM, OFDMA and SC-FDMA techniques used in cellular communication
52	S8	ECT416 MODERN COMMUNIACTION SYSTEMS	ECT416.1	discuss the different wireless communication standards for short range communication
			ECT416.2	explain the IoT architecture and various connectivity technologies used in IoT Systems
			ECT416.3	understand the various communication standards for connected autonomous vehicles
			ECT416.4	explain the significance and architecture of software defined radio and cognitive radio
			ECT416.5	understand the need, importance and scope of various Non-Conventional sources of energy
53	S8	ECT468 RENEWABLE ENRGY SYSTEMS	ECT468.1	outline the concepts and technologies related to renewable energy systems using wind and Solar-PV
			ECT468.2	understand the integration of smart grid with renewable energy systems
			ECT468.3	explain the concept of distribution management system.
			ECT468.4	describe the fundamentals of Smart metering
			ECT468.5	to understand the IoT fundamentals and architecture modelling

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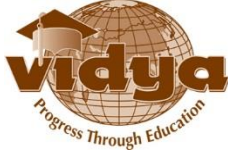|				
53	S8	ECT 458￼ INTERNET OF THINGS	ECT458.1	to describe the smart things in IoT and functional blocks.
			ECT458.2	to describe the communication networks and protocols used in IoT.
			ECT458.3	to apply the cloud resources, data analysis and applications.
			ECT458.4	to apply the IoT processes in embedded applications.
			ECT458.5	summarize the functions and structure of general-purpose operating systems.
54	S8	ECT426￼ RTOS	ECT426.1	use different scheduling algorithms on processes and threads.
			ECT426.2	interpret a real time operating system along with its synchronization, communication and interrupt handling tools.
			ECT426.3	illustrate task constraints and analyze the different scheduling algorithms on tasks
			ECT426.4	illustrate the applications of real time operating systems.
			ECT426.5	explain network security services and mechanisms and the types of attacks they are designed for
54	S8	ECT 434￼ SECURE COMMUNICATION	ECT434.1	apply the concepts of group, ring, field,modular arithmetic, Euclidean algorithm,Finite fields and polynomial arithmetic
			ECT434.2	analyze various symmetric encryption methods and their complexity levels
			ECT434.3	outline the concepts of public key cryptography, RSA algorithm, key distribution and management for public key systems
			ECT434.4	explain the requirements for authentication and the types of functions used to produce an authenticator
			ECT434.5	model and solve real world problems by applying knowledge across domains

55		ECD416 PROJECT PHASE II	ECD416.1	develop products, processes or technologies for sustainable and socially relevant applications
			ECD416.2	function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
			ECD416.3	plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
			ECD416.4	identify technology/research gaps and propose innovative/creative solutions
			ECD416.5	organize and communicate technical and scientific findings effectively in written and oral forms

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