# DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING Course outcomes- 2019 scheme

## SEMESTER - 1 & 2

Course code	Course Name		Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO 1	Solve systems of linear equations, diagonalize matrices and characterise quadratic forms	3	3	3	3	2	1			1	2		2
		CO 2	Compute the partial and total derivatives and maxima and minima of multivariable functions	3	3	3	3	2	1			1	2		2
MAT 101	LINEAR ALGEBRA AND CALCULUS	CO 3	Compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane lamina	3	3	3	3	2	1			1	2		2
		CO 4	Perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent	3	2	3	2	1	1			1	2		2
		CO 5	Determine the Taylor and Fourier series expansion of functions and learn their applications.	3	3	3	3	2	1			1	2		2
		CO 1	Compute the quantitative aspects of waves and oscillations in engineering systems.	3	2						1	2			1
		CO 2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.	3	2						1	2			1
PHT 1000	ENGINEERING PHYSICS A (FOR CIRCUIT BRANCHES)	CO 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.	3	2						1	2			1
		CO 4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems	3	2						1	2			1
		CO 5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system	3	1						1	2			1
		CO 1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.	1	2	1									
		CO 2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.	1	1		1	2							
CYT 100	ENGINEERING CHEMISTRY	CO 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.	1	1		1	2							

		CO 4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.	2	1								
		CO 5	Study various types of water treatment methods to develop skills for treating wastewater.	1		1			3				
		CO 1	Recall principles and theorems related to rigid body mechanics	2	2								
		CO 2	Identify and describe the components of system of forces acting on the rigid body	3	3								
EST 100	ENGINEERING MECHANICS	CO 3	Apply the conditions of equilibrium to various practical problems involving different force system	3	3								
		CO 4	Choose appropriate theorems, principles or formulae to solve problems of mechanics	3	3								
		CO 5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses	3	3								
		CO 1	Draw the projection of points and lines located in different quadrants	3									
		CO 2	Prepare multiview orthographic projections of objects by visualizing them in different positions	3									
F07.110	ENGINEERING	CO 3	Draw sectional views and develop surfaces of a given object	3	1								
EST 110	GRAPHICS	CO 4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.	3								1	
		CO 5	Convert 3D views to orthographic views	3								2	
		CO 6	Obtain multiview projections and solid models of objects using CAD tools	3			3					3	
		CO 1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.	3				3	2	2			
		CO 2	Explain different types of buildings, building components, building materials and building construction	3	2					3			
		CO 3	Describe the importance, objectives and principles of surveying.	3	2			2	3		2		

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		CO 4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps	3	2	1	3			2			
	BASICS OF CIVIL &	CO 5	Discuss the Materials, energy systems, water management and environment for green buildings.	3	2		3			2			
EST 120	MECHANICAL ENGINEERING	CO 6	Analyse thermodynamic cycles and calculate its efficiency	3	2		3						
		CO 7	Illustrate the working and features of IC Engines	3	1		3						
		CO 8	Explain the basic principles of Refrigeration and Air Conditioning	3	1								
		CO 9	Describe the working of hydraulic machines	3	2								
		CO 10	Explain the working of power transmission elements	3	1								
		CO 11	Describe the basic manufacturing, metal joining and machining processes	3									
		CO 1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits	3	1								2
		CO 2	Develop and solve models of magnetic circuits	3	1								2
EST	BASICS OF ELECTRICAL AND	CO 3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state	3	1								2
130	ELECTRONICS ENGINEERING	CO 4	Describe working of a voltage amplifier	2									
		CO 5	Outline the principle of an electronic instrumentation system	2									2
		CO 6	Explain the principle of radio and cellular communication	2									2
		CO 1	Define and Identify different life skills required in personal and professional life					2	1	2	2	1	3
		CO 2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.							3			2
		CO 2	stress.							,			

HUN 101	LIFE SKILLS	CO 3	Explain the basic mechanics of effective communication and demonstrate these through presentations.						1		1	3		
101		CO 4	Take part in group discussions									3		1
		CO 5	Use appropriate thinking and problem solving techniques to solve new problems		3		2	1						
		CO 6	Understand the basics of teamwork and leadership						1		3			
		CO 1	Compute the derivatives and line integrals of vector functions and learn their applications	3	3	3	3	2	1		1	2		2
	VECTOR CALCULUS,	CO 2	Evaluate surface and volume integrals and learn their inter-relations and applications	3	3	3	3	2	1		1	2		2
MAT 102	DIFFERENTIAL EQUATIONS AND TRANSFORMS	CO 3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients	3	3	3	3	2	1		1	2		2
	TRAINSFORMS	CO 4	Compute Laplace transform and apply them to solve ODEs arising in engineering	3	3	3	3	2	1		1	2		2
		CO 5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering	3	3	3	3	2	1		1	2		2
		CO 1	Develop vocabulary and language skills relevant to engineering as a profession									3		2
		CO 2	Analyze, interpret and effectively summarize a variety of textual content									1		3
HUN	PROFESSIONAL	CO 3	Create effective technical presentations						1		1	3		
102	COMMUNICATION	CO 4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus									3		1
		CO 5	Identify drawbacks in listening patterns and apply listening techniques for specific needs		1						2	3		
		CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions	1					1		1	3		
		CO 1	Analyze a computational problem and develop an algorithm/flowchart to find its solution	3	2	3	2		2			1	1	1

		CO 2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.	3	2	3	2	2				1		1
EST	DD C CD LAWY C DA C	CO 3	Write readable C programs with arrays, structure or union for storing the data to be processed	3	2	3	2	2				1		1
102	PROGRAMING IN C	CO 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	3	2	3	2	2				1	1	1
		CO 5	Write readable C programs which use pointers for array processing and parameter passing	3	2			2				1	1	1
		CO 6	Develop readable C programs with files for reading input and storing output	3	2			2				1	1	1
		CO 1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories	3				3		1	2			1
		CO 2	Understand the need for precise measurement practices for data recording	3				3		1	2			1
PHL 120	ENGINEERING PHYSICS LAB	CO 3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations	3				3		1	2			1
		CO 4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics	3				3		1	2			1
		CO 5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results	3				3		1	2			1
		CO 1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses	3				2						3
		CO 2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs	3				3						3
CYL	ENGINEERING CHEMISTRY	CO 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	3				3						3
120	LAB	CO 4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis	3				3						3
		CO 5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments	3				1						3
		CO 6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economical and environmental problems and why it is an integral part of curriculum	3				1						3

		CO 1	Name different devices and tools used for civil engineering measurements	1		1	1		2	2		
		CO 2	Explain the use of various tools and devices for various field measurements	1		1	1		2	2		
		CO 3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work	1		1	1	2	2	2	1	
ESL 120	CIVIL & MECHANICAL	CO 4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.	1		1	1	2	2	2	1	1
ESL 120	WORKSHOP	CO 5	Compare different techniques and devices used in civil engineering measurements	1		1	1		2	2		1
		CO 6	Identify Basic Mechanical workshop operations in accordance with the material and objects	1								
		CO 7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades	2								
		CO 8	Apply appropriate safety measures with respect to the mechanical workshop trades	2								
		CO 1	Demonstrate safety measures against electric shocks				3					1
		CO 2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols	2						1		
		CO 3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings	2	1		1	1	2	2		2
ESL 130	ELECTRICAL & ELECTRONICS WORKSHOP	CO 4	Identify and test various electronic components	3								2
		CO 5	Draw circuit schematics with EDA tools	3		2						2
		CO 6	Assemble and test electronic circuits on boards	3		2						1
		CO 7	Work in a team with good interpersonal skills						3	2		2

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		CO 1	Understand the concept and the solution of partial differential equation.	3	3	3	3	2	1				2		2
		CO 2	Analyse and solve one dimensional wave equation and heat equation.	3	3	3	3	2	1				2		2
MAT201	PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX	CO 3	Understand complex functions, its continuity differentiability with the use of CauchyRiemann equations.	3	3	3	3	2	1				2		2
	ANALYSIS	CO 4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function	3	3	3	3	2	1				2		2
		CO 5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals.	3	3	3	3	2	1				2		2
		CO 1	Apply Fermi-Dirac Distribution function and Compute carrier concentration at equilibrium and the parameters associated with generation, recombination and transport mechanism	3	3										
		CO 2	Explain drift and diffusion currents in extrinsic semiconductors and Compute current density due to these effects.	3	3										
ECT201	SOLID STATE DEVICES	CO 3	Define the current components and derive the current equation in a pn junction diode and bipolar junction transistor.	3	3										
		CO 4	Explain the basic MOS physics and derive the expressions for drain current in linear and saturation regions.	3	3										
		CO 5	Discuss scaling of MOSFETs and short channel effects	3											
		CO 1	Explain the elements of digital system abstractions such as digital representations of information, digital logic and Boolean algebra	3	3										
ECT 203	LOGIC CIRCUIT DESIGN	CO 2	Create an implementation of a combinational logic function described by a truth table using and/or/inv gates/ muxes	3	3	3									
ECT 203	LOGIC CIRCUIT DESIGN	CO 3	Compare different types of logic families with respect to performance and efficiency	3	3										
		CO 4	Design a sequential logic circuit using the basic building blocks like flip-flops	3	3	3									
		CO 5	Design and analyze combinational and sequential logic circuits through gate level Verilog models.	3	3	3		3							
		CO 1	Apply Mesh / Node analysis to obtain steady state response of the linear time invariant networks.	3	3	2		1							2
		CO 2	Apply Network Theorems to obtain steady state response of the linear time invariant networks.	3	3	2		1							2
ECT205	NETWORK THEORY	CO 3	Apply Laplace Transforms to determine the transient behaviour of RLC networks.	3	3	2		1							2
		CO 4	Apply Network functions and Network Parameters to analyse the single port networks.	3	3	2		1							2
		CO 5	Apply Network functions and Network Parameters to analyse the two port networks.	3	3	2		1							2
		CO 1	Explain the different concepts and principles involved in design engineering.	2	1					1			1		
EST 200	DESIGN AND ENGINEERING	CO 2	Apply design thinking while learning and practicing engineering.		2				1		1				2
		CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.			2			1	1		2	2		1

		CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction						2	3			2
	gyam a ny a ny E E van yeen ny a	CO 2	Explain the different types of environmental pollution problems and their sustainable solutions						2	3			2
MCN201	SUSTAINABLE ENGINEERING	CO 3	Discuss the environmental regulations and standards						2	3			2
		CO 4	Outline the concepts related to conventional and non-conventional energy						2	3			2
		CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles						2	3			2
		CO 1	Describe the needs and requirements of scienti c computing and to familiarize one programming language for scienti c computing and data visualization.	3	3	3	2						
		CO 2	Approximate an array/matrix with matrix decomposition	3	3	1	2						
ECL 201	SCIENTIFIC COMPUTING	CO 3	Implement numerical integration and di erentiation	3	3	1	1						
LCL 201	LABORATORY	CO 4	Solve ordinary di erential equations for engineering applications	3	3	1	1						
		CO 5	Compute with exported data from instruments	3	3	1	3						
		CO 6	Realize how periodic functions are constituted by sinusoids. Simulate random processes and understand their statistics.	3	3	2	2						
		CO 1	Design and demonstrate the functioning of various combinational and sequential circuits using Ics	3	3	3					3		3
ECL 203	LOGIC DESIGN LAB	CO 2	Apply an industry compatible hardware description language to implement digital circuits	3	1	1	3	3			3		3
		CO 3	Implement digital circuis on FPGA boards and connect external hardware to the boards	3	1	1	3	3			3	1	3
		CO 4	Function effectively as an individual and in a team to accomplish the given task	3	3	1		3			3		3

Course code	Course Name		Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO 1	Understand the concept, properties and important models of discrete random variables, and using them analyze suitable random phenomena	3	2	2	2	2					2		1
	PROBABILITY	CO 2	Understand the concept, properties and important models of continuous random variables, and using them analyze suitable random phenomena.	3	2	2	2	2					2		1
MAT 204	DISTRIBUTIONS, RANDOM PROCESS AND NUMERICAL	CO 3	Analyze random processes using autocorrelation, power spectrum and Poisson process model as appropriate	3	2	2	2	2					2		1
	METHODS	CO 4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques	3	2	2	2	2					2		1
		CO 5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations	3	2	2	2	2					2		1
		CO 1	Design analog signal processing circuits using diodes and first order RC circuit	3	3										2
ECT202	ANALOG CIRCUITS	CO 2	Analyse basic amplifiers using BJT and MOSFET	3	3										2
		CO 3	Apply the principle of oscillator and regulated power supply circuits.	3	3									1	2

COMPUTER   ARCHITECTURE AND MICROCONTROLLERS   CO   Stylain the functional units, I/O and memory management w.r.t a typical computer   3   0   0   0   0   0   0   0   0   3   3											_	1				$\overline{}$
CO 3   Describe orthogonality of signals and convolution integral.   CO 4   Apply transfer function to compute the LTI response to input signals.   3   2   0   0   0   0   0   0   0   0   0			CO 1	Apply properties of signals and systems to classify them	3	2										
CO   Apply transfer function to compute the LTI response to input signals.   3   3   2   2   3   3   3   3   3   3			CO 2	Represent signals with the help of series and transforms	3	2										
ECT 204   SIGNALS AND SYSTEMS   CO   Apply sampling theorem to discretize continuous time signals   3   2   2   0   0   0   0   0   0   0   0			CO 3	Describe orthogonality of signals and convolution integral.	3	2										
COMPUTER   COMPUTER   ARCHITECTURE AND MICROCONTROLLERS   CO   Explain the functional units, I/O and memory management w.r.t a typical computer   3			CO 4	Apply transfer function to compute the LTI response to input signals.	3	3	2									
COMPUTER   ARCHITECTURE AND   MICROCONTROLLERS   CO 2   Distinguish between microprocessor and microcontroller   3   3   3   3   3   3   3   3   3	ECT 204	SIGNALS AND SYSTEMS	CO 5		3	2	2									
ARCHITECTURE AND MICROCONTROLLERS   CO 2   Distinguist review in interface with peripheral devices using ALP/Embedded C   3   3   3   3   3   3   3   3   3		COMPANIED		architecture.	3											3
MICROCONTROLLERS   CO   Develop ALP/Embedded C   3   3   3   3   3   3   3   3   3	ECT 206			ě i												_
HUT 200   Professional Ethics   CO   Interface 8051 microcontroller with peripheral devices using ALP/Embedded C   3   3   3   3   3   3   3   3   3	ECT 206				3		3		3							3
HUT 200   Professional Ethics   CO		MICROCONTROLLERS			3	3	3		3							3
HUT 200   Professional Ethics   CO 2   Adopt a good character and follow an ethical life.   CO 3   Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.   CO 4   Solve moral and ethical problems through exploration and assessment by established experiments.   CO 5   Apply the knowledge of human values and social values to contemporary ethical values and global issues.   CO 5   Apply the knowledge of human values and social values to contemporary ethical values and global issues.   CO 1   Explain the background of the present constitution of India and features   CO 2   Utilize the fundamental rights and duties.   CO 3   Utilize the fundamental rights and duties.   CO 3   Understand the working of the union executive, parliament and judiciary.   CO 4   Understand the working of the union executive, parliament and judiciary.   CO 5   Utilize the special provisions and statutory institutions.   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 1   Design and demonstrate the functioning of basic analog circuits using discrete components.   CO 2   Design and simulate the functioning of basic analog circuits using simulation tools.   CO 3   Sunction effectively as an individual and in a team to accomplish the given task.   CO 1   CO 2   Design and samulate the functioning of pasic analog circuits using simulation tools.   CO 3   CO 3   CO 3   CO 4   CO 4   CO 4   CO 5			CO 5	Familiarize system software and Advanced RISC Machine Architecture.	3				3							3
HUT 200   Professional Ethics   CO 3   Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.   CO 4   Solve moral and ethical problems through exploration and assessment by established experiments.   CO 4   Solve moral and ethical problems through exploration and assessment by established experiments.   CO 5   Apply the knowledge of human values and social values to contemporary ethical values and global issues.   CO 5   Explain the background of the present constitution of India and features   CO 2   Utilize the fundamental rights and duties.   CO 3   Understand the working of the union executive, parliament and judiciary.   CO 4   Understand the working of the state executive, legislature and judiciary.   CO 5   Utilize the special provisions and statutory institutions.   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 7   Design and demonstrate the functioning of basic analog circuits using discrete components.   CO 8   CO 9   Design and simulate the functioning of basic analog circuits using simulation tools.   CO 9   Sinuction effectively as an individual and in a team to accomplish the given task.   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interface microcontroller with peripherals   CO 9   Develop ALP/Embedded C Programs to interf			CO 1	Understand the core values that shape the ethical behaviour of a professional.								3	2			2
HUT 200   Professional Ethics   CO 3   and legal ethics.   CO 4   Solve moral and ethical problems through exploration and assessment by established experiments.   CO 5   Solve moral and ethical problems through exploration and assessment by established experiments.   Apply the knowledge of human values and social values to contemporary ethical values and global issues.   CO 5   Suplain the background of the present constitution of India and features   CO 2   Utilize the fundamental rights and duties.   CO 3   Understand the working of the union executive, parliament and judiciary.   CO 4   Understand the working of the state executive, legislature and judiciary.   CO 5   Utilize the special provisions and statutory institutions.   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 7   Design and demonstrate the functioning of basic analog circuits using discrete components.   CO 8   Show national and patriotic spirit as responsible citizens of the country   CO 9   Design and simulate the functioning of basic analog circuits using discrete components.   CO 9   CO 9   Design and simulate the functioning of basic analog circuits using discrete components.   CO 9   CO 9   Design and simulate the functioning of basic analog circuits using discrete components.   CO 9   CO 9   Design and simulate the functioning of basic analog circuits using discrete components.   CO 9   CO 9   CO 9   Design and simulate the functioning of basic analog circuits using discrete components.   CO 9			CO 2	Adopt a good character and follow an ethical life.						2		3				2
CO 4   Solve moral and ethical problems through exploration and assessment by established experiments.   CO 5   Solve moral and ethical problems through exploration and assessment by established experiments.   CO 5   Apply the knowledge of human values and social values to contemporary ethical values and global issues.   CO 1   Explain the background of the present constitution of India and features   CO 2   Utilize the fundamental rights and duties.   CO 3   Understand the working of the union executive, parliament and judiciary.   CO 4   Understand the working of the state executive, legislature and judiciary.   CO 5   Utilize the special provisions and statutory institutions.   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 1   Design and demonstrate the functioning of basic analog circuits using discrete components.   CO 2   Design and simulate the functioning of basic analog circuits using discrete components.   CO 3   Show national and patriotic spirit as responsible citizens of the country   CO 2   Design and simulate the functioning of basic analog circuits using discrete components.   CO 3   Show national and patriotic spirit as responsible citizens of the country   CO 3   Show national and patriotic spirit as responsible citizens of the country   CO 4   CO 5   Show national and patriotic spirit as responsible citizens of the country   CO 6   Show national and patriotic spirit as responsible citizens of the country   CO 7   Show national and patriotic spirit as responsible citizens of the country   CO 7   Show national and patriotic spirit as responsible citizens of the country   CO 7   CO 7	111 TE 200	D 6 : 154:	CO 3							3	2		2			2
COS   global issues.   Society   COS   global issues.   Society   COS   Global issues.   Society   COS   Explain the background of the present constitution of India and features   Society   COS   Utilize the fundamental rights and duties.   Society   COS   Utilize the fundamental rights and duties.   Society   COS   Understand the working of the union executive, parliament and judiciary.   Society   COS   Utilize the special provisions and statutory institutions.   Society   COS   Utilize the special provisions and statutory institutions.   Society   COS   Utilize the special provisions and statutory institutions.   Society   COS   Show national and patriotic spirit as responsible citizens of the country   Society   COS   COS	HU1 200	Professional Etnics	CO 4									2	3			2
CO 2   Utilize the fundamental rights and duties.   3   3   3   3   3   3   3   3   3			CO 5							3	2	2	2			2
CONSTITUTION OF INDIA  CO 3 Understand the working of the union executive, parliament and judiciary.  CO 4 Understand the working of the state executive, legislature and judiciary.  CO 5 Utilize the special provisions and statutory institutions.  CO 6 Show national and patriotic spirit as responsible citizens of the country  ECL 202  ANALOG CIRCUITS AND SIMULATION LAB  CO 1 Design and demonstrate the functioning of basic analog circuits using discrete components.  CO 2 Design and simulate the functioning of basic analog circuits using simulation tools.  CO 3 Function effectively as an individual and in a team to accomplish the given task.  CO 1 Write an Assembly language program/Embedded C program for performing data manipulation.  CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals  3 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			CO 1	Explain the background of the present constitution of India and features						2	2	2		2		
CO 4 Understand the working of the state executive, legislature and judiciary.  CO 5 Utilize the special provisions and statutory institutions.  CO 6 Show national and patriotic spirit as responsible citizens of the country  CO 1 Design and demonstrate the functioning of basic analog circuits using discrete components.  CO 2 Design and simulate the functioning of basic analog circuits using simulation tools.  CO 3 Function effectively as an individual and in a team to accomplish the given task.  CO 1 Write an Assembly language program/Embedded C program for performing data manipulation.  MICROCONTROLLER LAB  CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals  3 2 3 3 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3										3	3	3		3		
ECL 202  ANALOG CIRCUITS AND SIMULATION LAB  CO 2 Design and demonstrate the functioning of basic analog circuits using discrete components.  CO 3 Function effectively as an individual and in a team to accomplish the given task.  CO 1 Write an Assembly language program/Embedded C program for performing data manipulation.  ANALOG CONTROLLER  LAB  CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals  3 2 3 3 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3	MCN202	CONSTITUTION OF INDIA								3	2	3		3		
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ANALOG CIRCUITS AND SIMULATION LAB  CO 1 Design and demonstrate the functioning of basic analog circuits using discrete components.  SIMULATION LAB  CO 2 Design and simulate the functioning of basic analog circuits using simulation tools.  CO 3 Function effectively as an individual and in a team to accomplish the given task.  CO 1 Write an Assembly language program/Embedded C program for performing data manipulation.  MICROCONTROLLER LAB  CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals  3 3 3 3 3 2 2 3 3 3 3 3 3 3 3 3 3 3 3				1 1						_		_		-		
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ECL 204 MICROCONTROLLER LAB CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	ECL 202	SIMULATION LAB			3	3	3		3				2			2
ECL 204 MICROCONTROLLER LAB CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			CO 3	Function effectively as an individual and in a team to accomplish the given task.	3	3	3						3			3
LAB CO 2 Develop ALP/Embedded C Programs to interface microcontroller with peripherals 3 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	EGY AS	MICROCONTROLLER	CO 1	Write an Assembly language program/Embedded C program for performing data manipulation.	3		3		3				3			3
CO 3 Perform programming/interfacing experiments with IDE for modern 3 3 2 3 3 3 3 3 3	ECL 204		CO 2	Develop ALP/Embedded C Programs to interface microcontroller with peripherals	3		3	2	3				3			3
			CO 3	Perform programming/interfacing experiments with IDE for modern	3		3	2	3	3			3		3	3

Course code	Course Name		Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO 1	Understand Op Amp fundamentals and differential amplifier configurations	3	3	1	2								1
ECT201	DIE I D DIEECO LEED CIDCUIE	CO 2	Design operational amplifier circuits for various applications	3	3	2	2	2							1

ECT301	INEAR INTEGRATED CIRCUIT	CO 3	Design Oscillators and active filters using opamps	3	3	2	2	2						1
		CO 4	Explain the working and applications of timer, VCO and PLL Ics	3	3	1	2	2						1
	-	CO 5	Outline the working of Voltage regulator IC's and Data converters	3	3	2	2	2						1
		CO 1	State and prove the fundamental properties and relations relevant to DFT and solve basic	3	3	2		2						2
		CO 2	Compute DFT and IDFT using DIT and DIF radix-2 FFT algorithms	3	3	3		3						2
	-	CO 3	Design linear phase FIR filters and IIR filters for a given specification	3	3	3		3						2
			Illustrate the various FIR and IIR filter structures for the realization of the given system											<u> </u>
ECT303	DIGITAL SIGNAL PROCESSING	CO 4	function	3	3	2		3						2
	TROCESSINO	CO 5	Explain the basic multi-rate DSP operations decimation and interpolation in both time and frequency domains using supported mathematical equations.	2	2	2		2						2
		CO 6	Explain the architecture of DSP processor (TMS320C67xx) and the finite word length effects	2	2									2
		CO 1	Explain the existent analog communication systems.	3	3									
		CO 2	Apply the concepts of random processes to LTI systems	3	3	2	3	3						
ECT305	ANALOG AND DIGITAL	CO 3	Apply waveform coding techniques in digital transmission.	3	3	2	3	3	2					2
EC1303	COMMUNICATION	CO 4	Apply GS procedure to develop digital receivers.	3	3	2	3	3	2					2
		CO 5	Apply equalizer design to counteract ISI.	3	3	2	3	3	2					2
		CO 6	Apply digital modulation techniques in signal transmission	3	3	2	3	3	2					2
		CO 1	Analyse electromechanical systems by mathematical modelling and derive their transfer functions	3	3	2		1						2
		CO 2	Determine Transient and Steady State behaviour of systems using standard test signals	3	3	2		1						2
ECT307	CONTROL SYSTEMS	CO 3	Determine absolute stability and relative stability of a system	3	3	3		1						2
		CO 4	Apply frequency domain techniques to assess the system performance and to design a control system with suitable compensation techniques	3	3	3		1						2
	<u> </u>	CO 5	Analyse system Controllability and Observability using state space representation	3	3	3		1						2
		CO 1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the	2									3	
		CO 2	Take appropriate decisions regarding volume of output and to evaluate the social cost	2	2			2	2	3			3	
HUT 300	Industrial Economics & Foreign	CO 3	Determine the functional requirement of a firm under various competitive conditions.	2	2	1				_			3	
	Trade	CO 4	Examine the overall performance of the economy, and the regulation of economic	2	2	1			1				3	
	<u> </u>	CO 5	Determine the impact of changes in global economic policies on the business	2	2	1							3	
		CO 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		2				2			2	-	2
		CO 2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment	2	3	2		2	2	3		3		2
		CO 3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk	2	3	2	2	2	2	3		3		2
MCN 301	DISASTER MANAGEMENT	CO 4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community	3	3	3		2	2	3				2
		CO 5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions	3	3			2	2	3				2
		CO 6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level	3					2	3	3			2

	ANALOG INTEGRATED	CO 1	Use data sheets of basic Analog Integrated Circuits and design and implement application circuits using Analog ICs.	3	3	3				2		2
ECL331	CIRCUITS AND SIMULATION LAB	CO 2	Design and simulate the application circuits with Analog Integrated Circuits using simulation tools.	3	3	3	2	3		2		2
		CO 3	Function effectively as an individual and in a team to accomplish the given task.	3	3	3		3		3	2	3
		CO 1	Simulate digital signals.	3	3	1	2	3		3		1
	DIGITAL SIGNAL	CO 2	verify the properties of DFT computationally	3	3	1	2	3		3		1
ECL333	PROCESSING LABORATORY	CO 3	Familiarize the DSP hardware and interface with computer.Implement LTI systems with linear convolution.	3	3	3	2	3		3	1	1
	LABORATORT	CO 4	Implement FFT and IFFT and use it on real time signals.Implement FIR low pass filter.Implement real time LTI systems with block convolution and FFT.	3	3	1	2	3		3		1

Course code	Course Name		Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO 1	To summarize the basic mathematical concepts related to electromagnetic	3	3	1	1								2
		CO 2	Analyse Maxwell's equation in different forms and apply them to diverse engineering problems.	3	3	1	1								2
ECT302	ELECTROMAGNETICS	CO 3	To analyse electromagnetic wave propagation and wave polarization	3	3	1	1								2
		CO 4	To analyse the characteristics of transmission lines and solve the transmission line	3	3	1	1								2
		CO 5	To analyse and evaluate the propagation of EM waves in Wave guides.	3	3	1	1								2
		CO 1	Explain the various methodologies in ASIC and FPGA design.	3		3									2
		CO 2	Design VLSI Logic circuits with various MOSFET logic families.	3	2	3									2
ECT304	VLSI CIRCUIT DESIGN	CO 3	Compare different types of memory elements	3	2	3									2
		CO 4	Design and analyse data path elements such as Adders and multipliers	3	2	3									2
		CO 5	Explain MOSFET fabrication techniques and layout design rules.	3		2									2
		CO 1	Explain measures of information – entropy, conditional entropy, mutual information	3	3										
		CO 2	Apply Shannon's source coding theorem for data compression.	3	3	2	3	3							
	INFORMATION THEORY	CO 3	Apply the concept of channel capacity for characterize limits of error-free transmission.	3	3	2	3	3	2						2
ECT306	AND CODING	CO 4	Apply linear block codes for error detection and correction	3	3	2	3	3	2						2
		CO5	Apply algebraic codes with reduced structural complexity for error correction	3	3	2	3	3	2						2
		CO 6	Understand encoding and decoding of covolutional and LDPC codes	3	3	2	3	3	2						2
		CO 1	Apply the knowledge of circuit theorems and solid state physics to solve the problems in electronic Circuits	3	3	1									2

	COMPREHENSIVE COURSE	CO 2	Design a logic circuit for a specific application	3	3	1									2
ECT308	WORK	CO 3	Design linear IC circuits for linear and non-linear circuit applications.	3	3	1									2
		CO 4	Explain basic signal processing operations and Filter designs	3	2										2
		CO 5	Explain existent analog and digital communication systems	3	2	1									2
		CO 1	Understand and gain the basic idea about the embedded system.	3	3	2		1			2				2
		CO 2	Able to gain architectural level knowledge about the system and hence to program an embedded system.	3	3	2		1			2				2
ECT342	EMBEDDED SYSTEMS	CO 3	Understand ARM architecture and pipeline processor organisation	3	3	3		3			2				2
		CO 4	Able to write ARM assembly language programming	3	3	3		3			2				2
		CO 5	Apply the knowledge for solving the real life problems with the help of an embedded system.	3	3	3		3			2	3			2
		CO 1	Explain the characteristics of management in the contemporary context	2				1	2	2	2		2	1	1
		CO 2	Describe the function of management	2				1	1		2	1	2	1	1
HUT 310	MANAGEMENT FOR	CO 3	Demonstrate ability in decision making process and productivity analysis	2	2	2	2	1							
1101310	ENGINEERS	CO4	Illustrate project management technique and develop a project schedule	2	2	2	2	1						2	1
		CO 5	Summerize the functional areas of management	2				1	1	1		1	2	1	
		CO 6	Comprehend the concept of entrepreneurship and create business plan		2	2	2	1	1	1	1	1	1	1	1
		CO 1	Setup simple prototype circuits for waveform coding and digial modulation techniques working in a team.	3	3	3	2	3				3	2		1
ECL332	COMMUNICATION LAB	CO 2	Simulate the error performance of a digital communication system using standard binary and M -ary modulation schemes.	3	3	3	2	3							1
		CO 3	Develop hands-on skills to emulate a communication system with software-designed-radio working in a team.	3	3	3	3	3				3	2		3
		CO 1	Be able to practice acquired knowledge within the selected area of technology for project development.	3	3	3	2		3						2
ECD334	MINIPROJECT	CO 2	Identify, discuss and justify the technical aspects and design aspects of the project with a systematic approach.	3	3	3	2		3					3	2
		CO 3	Reproduce, improve and refine technical aspects for engineering projects.	3	3	3	2		3					3	2
		CO 4	Work as a team in development of technical projects.								3		3	3	2
		CO 5	Communicate and report effectively project related activities and findings.								3	3	3		2

Course code	Course Name		Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO 1	Understand the basic concept of antennas and its parameters.	3	3		1								2
		CO 2	Analyze the far filed pattern of Short dipole and Half wave dipole antenna.	3	3	3	1	2						Ť	2

ECT401	MICROWAVES AND	CO 3	Design of various broad band antennas, arrays and its radiation patterns.	3	3	3	1	3							2
	ANTENNAS	CO 4	Illustratethe principle of operation of cavity resonators and various microwave sources.	3	3	2	1								2
		CO 5	Explain various microwave hybrid circuits and microwave semiconductor devices.	3	3	2	1								2
		CO 1	Describe the protocols used in web and email applications.	3		2									
		CO 2	Analyse problems pertaining to reliable data transfer, flow control and congestion over a TCP network.	3		1			1			3			2
ECT423	COMPUTER NETWORKS	CO 3	Apply Dijkstra's algorithm and distance-vector algorithm in the context of routing over computer networks.	3		2			2			1			
		CO 4	Analyze the performance of collision avoidance algorithms in random access protocols such as ALOHA.	3								1			2
		CO 5	Analyze the delay performance of an ARQ system using standard queueing models.	3					2						2
		CO 1	Describe the theories of accident causation and preventive measures of industrial accidents.	2	2				2	2	2				1
		CO 2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.	2	1	2		1	1	1	1				1
MCN401	INDUSTRIAL SAFETY	CO 3	Explain different issues in construction industries.	2	2	2		1	1	1	1	1	1		1
	ENGINEERING	CO 4	Describe various hazards associated with different machines and mechanical material handling.	2	2	2		1	1	1	1	1	1		1
		CO 5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards.	2	2	2	1	1	1	1	1	1	1		1
		CO 1	Choose the appropriate energy source depending on the available resources.	2					1	2					
	DENEWA DAE ENED CH	CO 2	Explain the concepts of solar thermal and solar electric systems.	3											
EET435	RENEWABLE ENERGY SYSTEMS	CO 3	Illustrate the operating principles of wind, and ocean energy conversion systems.	3					1	1					
	SISIEWS	CO 4	Outline the features of biomass and small hydro energy resources	3					1	1					
		CO 5	Describe the concepts of fuel cell and hydrogen energy technologies	3											
		CO 1	Identify academic documents from the literature which are related to her/his areas of interest	2	2	1	1		2	1					3
ECQ413	SEMINAR	CO 2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest	3	3	2	3		2	1					3
		CO 3	Prepare a presentation about an academic document	3	2			3			1		2		3
		CO 4	Give a presentation about an academic document	3				2			1		3		3
		CO 5	Prepare a technical report	3	3	3	3	2	2		2		3		3
	·	CO 1	Model and solve real world problems by applying knowledge across domains	2	2	2	1	2	2	2	1	1	1	1	2
		CO 2	Develop products, processes or technologies for sustainable and socially relevant applications	2	2	2		1	3	3	1	1		1	1
ECD415	PROJECT PHASE I	CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks									3	2	2	1
ECD413	FROJECT FRASET	CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms					2			3	2	2	3	2
		CO 5	Identify technology/research gaps and propose innovative/creative solutions	2	3	3	1	2							1
		CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms					2			2	2	3	1	1

		CO 1	Familiarize the basic Microwave components and to analyse few microwave measurements and its parameters.	3	3	3				3		3
ECL411	ELECTROMAGNETICS LAB	(())	Understand the principles of fiber-optic communications and the different kind of losses, signal distortion and other signal degradation factors.	3	3	3				3		3
		CO 3	Design and simulate basic antenna experiments with simulation tools.	3	3	3	2	3		3		3

Course code	Course Name		Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO 1	Summarize the basics of cellular system and cellular design fundamentals.	3	3	2		1			2				2
		CO 2	Describe the wireless channel models and discuss capacity of wireless channels	3	3	3		3							2
ECT402	WIRELESS	CO 3	Analyze the performance of the modulation techniques for flat-fading channels and multicarrier modulation.	3	3	3		3							
EC1402	COMMUNICATION	CO 4	Illustrate how receiver performance can be enhanced by various diversity techniques.	3	3	3		3							
		CO 5	Identify advantages of various equalization techniques and multiple-access techniques in wireless communication.	3	3	3		3							
		CO 6	Calculate system parameters such antenna height, range, maximum usable frequency in different modes of radio wave propagation.	3	3	3									2
		CO 1	Understand basic bioelectric potentials and its implications in diagnostics	3	2										
		CO 2	Understand the principles used for diagnosis of abnormalities in the cardiovascular system	3	2										
ECT414	BIOMEDICAL ENGINEERING	CO 3	Explain the techniques used for diagnosis and therapy in the neuromuscular system	3	3										,
	E. (OII VEEKII VO	CO 4	Understand the principle and working of different types of bio medical equipment/device	3	3										
		CO 5	Classify various diagnostic medical imaging techniques.	3	3										
		CO 1	Discuss the fundamental concepts of entrepreneurship										1	1	
		CO 2	Understand entrepreneurial motivation and motivation theories								2		1		
ECT474	ENTREPRENEURSHIP	CO 3	Analyze types of enterprises and ownership structure										1		
		CO 4	Applyproject evaluation methods	2		1		2					1	3	
		CO 5	Evaluate enterprise financial strength	2		1		2					1	3	
		CO 1	Summarize the functions and structure of general-purpose operating systems.		3										
		CO 2	Use different scheduling algorithms on processes and threads.	2	3										2
ECT426	REAL TIME OPERATING SYSTEMS		Interpret a real time operating system along with its synchronization, communication and interrupt handling tools.	2	3					2					2

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		CO 4	Illustrate task constraints and analyze the different scheduling algorithms on tasks.	2	3					2					2
		CO 5	Illustrate the applications of real time operating systems.	2	3	2				3				2	2
		CO 1	Understand the IoT fundamentals and architecture modelling	3	3	2		1			2				2
ECT458	INTERNET OF THINGS	CO 2	Understand the smart things in IoT and functional blocks	3	3	3		3			2				2
		CO 3	To understand the communication networks and protocols used in IoT.	3	3	3		3			2	3			2
		CO 4	To understand the cloud resources, data analysis and applications.	3	3	2		2			2				2
		CO 5	To apply the IoT processes in embedded applications.	3	3	2		2			2				2
		CO 1	The objective of this Course viva is to ensure the basic knowledge of each student in the most fundamental core courses in the curriculum.	2	2	2	1	2	2	2	1	1	1	1	2
ECT404	COMPREHENSIVE COURSE VIVA	CO 2	The viva voce shall be conducted based on the core subjects studied from third to eighth semester	2	2	2		1	3	3	1	1		1	1
		CO 3	helps the learner to become competent in placement tests and other competitive examinations.									3	2	2	1
		CO 1	Model and solve real world problems by applying knowledge across domains	2	2	2	1	2	2	2	1	1	1	1	2
		CO 2	Develop products, processes or technologies for sustainable and socially relevant applications	2	2	2		1	3	3	1	1		1	1
		CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks									3	2	2	1
ECD416	PROJECT PHASE II	CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms					2			3	2	2	3	2
		CO 5	Identify technology/research gaps and propose innovative/creative solutions	2	3	3	1	2							1
		CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms					2			2	2	3	1	1