Course Outcomes (COs) For 2018 Scheme

CO Statement's tables are created with respect to each course, and it describe what students are expected to know and can do at the end of each course.

Course Number is used to specify a course base on following guideline.

Note: Course Outcome Number: C -Study Year -Semester Number -Subject Code Number
Example: C234 – (2-second Year; 3-3rd Semester; 4-Subject code number)

COURSE CODE	**:**	**C231**
COURSE NAME	**:**	**TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIUES**

CO	COURSE OUTCOME	BTL
C231.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.	L2
C231.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.	L2
C231.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals, and systems.	L2
C231.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.	L2
C231.5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.	L2

COURSE CODE	**:**	**C232**
COURSE NAME	**:**	**NETWORK THEORY**

CO	COURSE OUTCOME	BTL
C232.1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting.	L4
C232.2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin's/ Norton's/ Maximum Power Transfer/ Millman's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions.	L4
C232.3	Calculate current and voltages for the given circuit under transient conditions and Apply Laplace transform to solve the given network.	L3
C232.4	Solve the given network using specified two port network parameter like Z or Y or T or h.	L4
C232.5	Understand the concept of resonance and determine the parameters that characterize series/parallel circuits	L4

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C233
COURSE NAME	:	ELECTRONIC DEVICES

CO	COURSE OUTCOME	BTL
C233.1	Interpret the principles of semiconductor physics.	L2
C233.2	Annotate the construction and working principles of P-N junctions and Optoelectronic devices like Solar Cells, Photo detectors and Light Emitting Diodes.	L2
C233.3	Interpret the mathematical models of BJTs along with the Constructional details.	L2
C233.4	Infer the mathematical models of semiconductor junctions and MOS transistors for electronic circuits and systems.	L2
C233.5	Interpret the fabrication process of semiconductor devices and CMOS Process integration.	L2

COURSE CODE	:	C234
COURSE NAME	:	DIGITAL SYSTEM DESIGN

CO	COURSE OUTCOME	BTL
C234.1	Determining the concept of combinational logic circuits.	L3
C234.2	Analyze & Design the combinational logic circuits.	L3
C234.3	Examine flip-flops characteristics and designing applications inculcating flip-flops.	L3
C234.4	Design the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines	L3
C234.5	Design applications of Combinational & Sequential Circuits.	L3

COURSE CODE	:	C235
COURSE NAME	:	COMPUTER ORGANIZATION & ARCHITECTURE

CO	COURSE OUTCOME	BTL
C235.1	Recognize the basic organization of a computer system and demonstrate the machine instruction operations	L3
C235.2	Illustrating the addressing modes, instruction formats and program control statements	L3
C235.3	Demonstrate the different ways of accessing an input / output device including interrupts.	L3
C235.4	Illustrate the organization of different types of semiconductor and other secondary storage memories.	L3
C235.5	Illustrate simple processor organization based on hardwired control and micro programmed control.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C236
COURSE NAME	:	POWER ELECTRONICS AND INSTRUMENTATION

CO	COURSE OUTCOME	BTL
C236.1	Build and test circuits using power electronic devices.	L2
C236.2	Analyse and design-controlled rectifier, DC to DC converters, DC to AC inverters and SMPS.	L3
C236.3	Analyse the instruments characteristics and errors.	L3
C236.4	Interpreting the principles of operation and to develop circuits for multi-range ammeters, voltmeters and bridges to measure passive component values and frequency.	L2
C236.5	Explain the principle, design, and analyse the transducers for measuring physical parameters.	L3

COURSE CODE	:	C237
COURSE NAME	:	ELECTRONIC DEVICES & INSTRUMENTATION LAB

CO	COURSE OUTCOME	BTL
C237.1	Recognize and demonstrate functioning of semiconductor power devices	L2
C237.2	Evaluate the characteristics, switching, power conversion and control by semiconductor power devices.	L3
C237.3	Analyse the response and plot the characteristics of transducers such as LDR, Photo diode, etc.	L3
C237.4	Design and test simple electronic circuits for measurement of temperature and resistance	L3
C237.5	Use circuit simulation software for the implementation and characterization of electronic circuits and devices.	L3

COURSE CODE	:	C238
COURSE NAME	:	DIGITAL SYSTEM DESIGN LAB

CO	COURSE OUTCOME	BTL
C238.1	Design, realize and verify De Morgan's Theorem, SOP, POS forms	L3
C238.2	Demonstrate the Truth Table of various expression and combinational circuits using logic gates	L3
C238.3	Design various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers	L3
C238.4	Design and construct counters, and shift registers inculcating flipflops	L3
C238.5	Simulate serial adder and binary multiplier	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C239
COURSE NAME	:	CONSTITUTION OF INDIA, PROFESSIONAL ETHICS AND CYBER LAW

CO	COURSE OUTCOME	BTL
C239.1	Analyse and describe the role and salient feature of the Indian Constitution	L3
C239.2	Recognise the structure and powers of the union and state executives	L2
C239.3	Relate to the procedures and provisions in the electoral process	L2
C239.4	Develop Engineering and Professional ethics and adopt the responsibilities expected of an engineer	L3
C239.5	Identify the cybercrimes and describe the cyber laws for cyber safety measures	L2

COURSE CODE	:	C241
COURSE NAME	:	COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS

CO	COURSE OUTCOME	BTL
C241.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory	L3
C241.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flowvisualization and image processing.	L3
C241.3	Apply discrete and continuous probability distributions in analyzing the probability modelsarising in engineering field.	L3
C241.4	Use correlation and regression analysis to fit a suitable mathematical model forthe statistical data	L3
C241.5	Construct joint probability distributions and demonstrate the validity of testing thehypothesis.	L3

COURSE CODE	:	C242
COURSE NAME	:	ANALOG CIRCUITS

CO	COURSE OUTCOME	BTL
C242.1	Apply the knowledge gained on the characteristics of Bipolar Junction Transistor and Field Effect Transistor in the design.	L3
C242.2	Design and analyze MOSFET amplifier circuits and Oscillators.	L3
C242.3	Design and analyze sinusoidal and non-sinusoidal oscillators.	L3
C242.4	Apply the functioning principle of linear ICs in design of higher level circuits.	L3
C242.5	Design of Linear IC based circuits.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C243
COURSE NAME	:	CONTROL SYSTEMS

CO	COURSE OUTCOME	BTL
C243.1	Develop the mathematical model of mechanical and electrical systems.	L3
C243.2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.	L3
C243.3	Determine the time domain specifications for first and second order systems.	L3
C243.4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.	L3
C243.5	Determine the stability of a system in the frequency domain using Nyquist and Bode plots.	L3

COURSE CODE	:	C244
COURSE NAME	:	ENGINEERING STATISTICS & LINEAR ALGEBRA

CO	COURSE OUTCOME	BTL
C244.1	Analyze and evaluate single and multiple random variables	L3
C244.2	Identify and associate Random Variables and Random Processes in Communication events	L3
C244.3	Analyze and model the Random events in typical communication events to extract quantitative statistical parameters.	L3
C244.4	Analyze and model typical signal sets in terms of a basis function set of Amplitude, phase and frequency.	L3
C244.5	Demonstrate by way of simulation or emulation the ease of analysis employing basis functions, statistical representation, and Eigen values.	L3

COURSE CODE	:	C245
COURSE NAME	:	SIGNALS AND SYSTEMS

CO	COURSE OUTCOME	BTL
C245.1	Analyze the different types of signals and systems.	L3
C245.2	Determine the linearity, causality, time-invariance, and stability properties of continuous and discrete time systems.	L3
C245.3	Evaluate the convolution sum and integral	L3
C245.4	Illustrate continuous and discrete systems in time and frequency domain using different transforms; test whether the system is stable.	L3
C245.5	Analyze discrete time signals and systems using Z-transforms.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C246
COURSE NAME	:	MICROCONTROLLER

CO	COURSE OUTCOME	BTL
C246.1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.	L2
C246.2	Write 8051 Assembly level programs using 8051 instructions set.	L2
C246.3	Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch.	L3
C246.4	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial ports.	L3
C246.5	Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.	L3

COURSE CODE	:	C247
COURSE NAME	:	MICROCONTROLLER LAB

CO	COURSE OUTCOME	BTL
C247.1	Enhance programming skills using Assembly language and C	L2
C247.2	Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.	L3
C247.3	Interface different input and output devices to 8051 and control them using Assembly language programs.	L3
C247.4	Interface the serial devices to 8051 and do the serial transfer using C programming.	L3
C247.5	Develop application based on microcontroller 8051	L3

COURSE CODE	:	C248
COURSE NAME	:	ANALOG CIRCUITS LAB

CO	COURSE OUTCOME	BTL
C248.1	Analyze frequency response of JFET/MOSFET amplifier.	L3
C248.2	Design BJT/FETs amplifier with and without feedback and evaluate their performance characteristics	L3
C248.3	Apply the knowledge gained in the design of BJT/FET circuits in oscillators	L3
C248.4	Design analog circuits using OPAMPS for different applications	L3
C248.5	Simulate and analyse analog circuits that uses IC's for different electronic applications	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C351
COURSE NAME	:	TECHNOLOGICAL INNOVATION MANAGEMENT AND ENTREPRENEURSHIP

CO	COURSE OUTCOME	BTL
C351.1	Understand the role of a manager and fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business.	L2
C351.2	Identify the various organizations architecture, staffing and directing, controlling.	L2
C351.3	Describe the Entrepreneurs, and their social responsibilities	L2
C351.4	Understand the components in developing a business plan	L2
C351.5	Recognise the business model and various sources of funding and institutions supporting entrepreneurs.	L3

COURSE CODE	:	C352
COURSE NAME	:	DIGITAL SIGNAL PROCESSING

CO	COURSE OUTCOME	BTL
C352.1	Determine response of LTI systems using time domain and DFT techniques.	L3
C352.2	Computation of DFT using FFT algorithms and linear filtering approach.	L3
C352.3	Design and realize FIR digital filters	L3
C352.4	Design and realize IIR digital filters	L3
C352.5	Understand the DSP processor architecture.	L3

COURSE CODE	:	C353
COURSE NAME	:	PRINCIPLES OF COMMUNICATION SYSTEMS

CO	COURSE OUTCOME	BTL
C353.1	Describe principle generation, detection of AM, SSB, VSB Modulation	L3
C353.2	Describe principle generation, detection and applications of angle modulation	L3
C353.3	Illustrate random process of analog signal in Time domain and types of noise in channel also analyse the performance of communication system in presence of noise	L3
C353.4	Represent analog signal in digital format using sampling and quantization	L3
C353.5	Describe different digital modulation techniques such as PCM, Delta modulation, MPEG and Vo-coders.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C354
COURSE NAME	:	INFORMATION THEORY AND CODING

CO	COURSE OUTCOME	BTL
C354.1	Illustrate the concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source	L3
C354.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms	L3
C354.3	Model the continuous and discrete communication channels using input, output and joint probabilities	L3
C354.4	Determine a codeword comprising of the check bits computed using Linear Block codes, binary cyclic codes	L3
C354.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.	L3

COURSE CODE	:	C355
COURSE NAME	:	ELECTROMAGNETIC WAVES

CO	COURSE OUTCOME	BTL
C355.1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.	L3
C355.2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distributions by using Divergence Theorem.	L3
C355.3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations	L3
C355.4	Calculate magnetic force, potential energy, and Magnetization with respect to magnetic materials and voltage induced in electric circuits.	L3
C355.5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem	L3

COURSE CODE	:	C356
COURSE NAME	:	VERILOG HDL

CO	COURSE OUTCOME	BTL
C356.1	Acquire knowledge on evolution of Verilog, hierarchical modeling concepts of Verilog HDL	L2
C356.2	Analyze the structure of a Verilog Module Demonstrate the use of data types, compiler directives and system tasks to interpret digital circuits in HDL	L3
C356.3	Design and verify the functionality of digital circuits at gate level or data flow modeling and perform timing and delay simulation with suitable test bench.	L3
C356.4	Design and verify the functionality of digital circuits using behavioural modeling more effectively using Verilog tasks, functions, directives and verify with suitable test bench	L3
C356.5	Programming with useful modeling technique and interpret the various constructs in logic synthesis.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	**:**	**C357**
COURSE NAME	**:**	**DSP LAB**

CO	COURSE OUTCOME	BTL
C357.1	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.	L2
C357.2	Modeling of discrete time signals and systems and verify its properties and results.	L3
C357.3	Implementation of discrete computations using DSP processor and verify the results.	L3
C357.4	Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.	L3
C357.5	write programs using matlab/scilab/octave to illustrate DSP concepts	L3

COURSE CODE	**:**	**C358**
COURSE NAME	**:**	**HDL LAB**

CO	COURSE OUTCOME	BTL
C358.1	Design combinational circuits using the Verilog programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.	L3
C358.2	Design sequential circuits like flip flops and counters using verilog in Behavioral description and obtain simulation waveforms.	L3
C358.3	Use FPGA/CPLD kits for downloading Verilog codes and check output	L3
C358.4	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.	L3
C358.5	Interface the hardware to the programmable chips and obtain the required output	L3

COURSE CODE	**:**	**C359**
COURSE NAME	**:**	**ENVIRONMENTAL STUDIES**

CO	COURSE OUTCOME	BTL
C359.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.	L2
C359.2	Develop critical thinking and/or observation skills and apply them to the analysis of a problem or questions related to the environment.	L2
C359.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.	L2
C359.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.	L2
C359.5	Relate to the latest developments in environmental pollution mitigation tools	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C361
COURSE NAME	:	DIGITAL COMMUNICATION

CO	COURSE OUTCOME	BTL
C361.1	Associate and apply the concepts of band pass sampling to well specified signals and channels.	L3
C361.2	Analyze the geometric representation of signals and formulate parameters over AWGN channel	L3
C361.3	Understand the concepts digital modulation techniques like BPSK, QPSK and FSK etc and analyze the probability of error.	L3
C361.4	Analyse the transmission and reconstruction of band pass signals subjected to errors in a band limited channel and demonstrate by simulation and emulation process.	L3
C361.5	Understand the principles of spread spectrum considerations	L3

COURSE CODE	:	C362
COURSE NAME	:	EMBEDDED SYSTEMS

CO	COURSE OUTCOME	BTL
C362.1	Describe the architectural features and instructions of 32-bit microcontroller ARM cortex M3	L2
C362.2	Apply the knowledge gained for programming ARM Cortex M3 for different applications	L3
C362.3	Recognize the basic hardware components and their selection method based on the characteristics and attributes of an embedded system	L2
C362.4	Develop the hardware software co-design and firmware design approaches	L2
C362.5	illustrate the need of real time operating system for embedded system applications	L3

COURSE CODE	:	C363
COURSE NAME	:	MICROWAVE AND ANTENNAS

CO	COURSE OUTCOME	BTL
C363.1	Describe the use and advantages of microwave transmission	L2
C363.2	Describe various parameters related to microwave transmission lines and Identify microwave devices for several applications	L2
C363.3	Distinguish Different types of Planar Transmission Lines and Analyze various antenna parameters necessary for building a RF system	L3
C363.4	Examine Antenna arrays, Radiation Resistance of Short Dipole, Half wave Dipole, Principle of Pattern application.	L4
C363.5	Illustrate various antenna configurations according to the applications	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C364
COURSE NAME	:	OPERATING SYSTEM

CO	COURSE OUTCOME	BTL
C364.1	Illustrate the goals, structure, operation, and types of operating systems.	L2
C364.2	Apply scheduling techniques to find performance factors.	L3
C364.3	Apply suitable techniques for contiguous and non-contagious memory allocation.	L3
C364.4	Explain organization of file systems and IOCS	L2
C364.5	Describe message passing, deadlock detection and prevention methods.	L2

COURSE CODE	:	C365
COURSE NAME	:	RENEWABLE ENERGY RESOURCES

CO	COURSE OUTCOME	BTL
C365.1	Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy & Outline energy from sun, energy reaching the Earth's surface and solar thermal energy applications.	L2
C365.2	Discuss types of solar collectors, their configurations, solar cell system, its characteristics, and their applications.	L2
C365.3	Explain generation of energy from hydrogen, wind, geothermal system, solid waste, and agriculture refuse.	L2
C365.4	Discuss production of energy from biomass, biogas.	L2
C365.5	Summarize tidal energy resources, sea wave energy and ocean thermal energy.	L2

COURSE CODE	:	C366
COURSE NAME	:	EMBEDDED SYSTEMS LAB

CO	COURSE OUTCOME	BTL
C366.1	Understand the instruction set of 32-bit microcontroller ARM Cortex M3 and the software tool required for programming in Assembly and C language	L2
C366.2	Develop assembly language programs using ARM Cortex M3 for different applications	L3
C366.3	Interface external device and I/O with ARM Cortex M3	L3
C366.4	Develop C Language programs and library functions for Embedded system applications	L3
C366.5	Analyze the functions of various peripherals, peripheral registers, and power saving modes of ARM Cortex M3	L4

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C367
COURSE NAME	:	COMMUNICATION LAB

CO	COURSE OUTCOME	BTL
C367.1	Design and test circuits for analog modulation and demodulation schemes viz. AM, FM, etc	L3
C367.2	Determine the characteristics and response of microwave waveguide	L3
C367.3	Determine characteristics of microstrip antennas and devices & compute the parameters associated with it	L3
C367.4	Design and test the digital and analog modulation circuits and display the waveforms	L3
C367.5	Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes	L3

COURSE CODE	:	C368
COURSE NAME	:	MINI-PROJECT

CO	COURSE OUTCOME	BTL
C368.1	Demonstrate an ability to formulate a sustainable solution to an identified problem for the betterment of society.	L3
C368.2	Apply relevant modern tools to solve the identified technical problem.	L3
C368.3	Analyze and evaluate the experimental results and propose suitable modifications to improve performance.	L3
C368.4	Effectively present the work with professional ethics as an individual or working as a team.	L3
C368.5	Communicate technical content effectively through written reports and oral presentations.	L3

COURSE CODE	:	C369
COURSE NAME	:	ARTIFICIAL NEURAL NETWORK

CO	COURSE OUTCOME	BTL
C369.1	Understand the role of neural networks in engineering, artificial intelligence and cognitive modelling	L2
C369.2	Illustrate the concepts and techniques of neural networks through the study of important neural network models.	L3
C369.3	Evaluate whether neural networks are appropriate to a particular application.	L3
C369.4	Apply neural networks to particular application.	L3
C369.5	Analyse the steps needed to improve performance of the selected neural network.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C3610
COURSE NAME	:	DATA STRUCTURE USING C++

CO	COURSE OUTCOME	BTL
C3610.1	Discuss the basics of C++ and its features.	L2
C3610.2	Discuss arrays, dynamic memory allocation using pointers and linear / non-linear structures.	L2
C3610.3	Analyse the operations of linear data structures : stack and linked list and their applications	L3
C3610.4	Analyse the operations of linear data structures : queues, linked list along with their applications and hash table representations	L3
C3610.5	Design appropriate data structures for solving computing problems	L3

COURSE CODE	:	C3611
COURSE NAME	:	DIGITAL SYSTEM DESIGN USING VERILOG

CO	COURSE OUTCOME	BTL
C3611.1	Discuss basics of number systems and design to verify the basic combinational and sequential circuits.	L3
C3611.2	Design a semiconductor memory for specific chip design.	L3
C3611.3	Implementation of PLD's along with its interconnection and signal integrity.	L3
C3611.4	Design Embedded systems to perform serial and parallel IO interfacing.	L3
C3611.5	Examine design flow, optimization, DFT and non-technical issues	L3

COURSE CODE	:	C3612
COURSE NAME	:	NANOELECTRONICS

CO	COURSE OUTCOME	BTL
C3612.1	Understand the principle behind Nano science engineering and Nano electronics	L2
C3612.2	Know the effect of particles size on mechanical, thermal, optical and electrical properties of nanomaterials.	L2
C3612.3	Know the properties of carbon and carbon nanotubes and its applications used for sensing and the use of smart dust sensors	L2
C3612.4	Apply the knowledge to prepare and characterize nanomaterial.	L2
C3612.5	Analyse the process flow required to fabricate state-of-the-art transistor technology	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C3613
COURSE NAME	:	PYTHON APPLICATION PROGRAMMING

CO	COURSE OUTCOME	BTL
C3613.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.	L3
C3613.2	Demonstrate proficiency in handling Strings and File Systems.	L3
C3613.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions	L3
C3613.4	Interpret the concepts of Object-Oriented Programming as used in Python	L3
C3613.5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.	L3

COURSE CODE	:	C3614
COURSE NAME	:	INDUSTRIAL SERVO CONTROL SYSTEMS

CO	COURSE OUTCOME	BTL
C3614.1	Explain the evolution and classification of servos, with descriptions of servo drive actuators, amplifiers, feedback transducers, performance and troubleshooting techniques.	L2
C3614.2	Discuss system analogs, vectors and transfer functions of differential equations for electrical servo motors, both DC and brushless DC servo motors.	L3
C3614.3	Represent servo drive components by their transfer function, to combine the servo drive building blocks into system block diagrams along with the frequency response techniques for proper servo compensations.	L3
C3614.4	Illustrate the performance criteria and the servo plant compensation techniques	L3
C3614.5	Explain perform indices and performance criteria for servo systems and discuss the mechanical considerations of servo systems	L2

COURSE CODE	:	C3615
COURSE NAME	:	PLC AND SCADA

CO	COURSE OUTCOME	BTL
C3615.1	Discuss history of PLC and describe the hardware components of PLC: I/O modules, CPU, memory devices, other support devices, operating modes and PLC programming	L3
C3615.2	Describe field devices Relays, Contactors, Motor Starters, Switches, Sensors, Output Control Devices, Seal-In Circuits, and Latching Relays commonly used with I/O module and programming timers	L3
C3615.3	Analyze PLC timer and counter ladder logic programs and describe the operation of different program control instructions	L3
C3615.4	Discuss the execution of data transfer instructions, data compare instructions and the basic operation of PLC closed-loop control system.	L3
C3615.5	Describe the operation of mechanical sequencers, bit and word shift registers, processes and structure of control systems and communication between the processes.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C3616
COURSE NAME	:	INTRODUCTION TO DATA ANALYTICS

CO	COURSE OUTCOME	BTL
C3616.1	Define data, big data along with its architecture, methods of descriptive analytics of data and examples of data use.	L2
C3616.2	Explain methods for multivariate analysis, data preparation and data transformation and reducing.	L2
C3616.3	Explain techniques for clustering the data and pattern mining	L2
C3616.4	Explain the methods of predictive analytics, performance measures for regression and algorithms for regression.	L2
C3616.5	Explain performance measures for classification of data and methods of prediction.	L2

COURSE CODE	:	C3617
COURSE NAME	:	MOBILE APPLICATION DEVELOPMENT

CO	COURSE OUTCOME	BTL
C3617.1	Create, test and debug Android application by setting up Android development environment	L3
C3617.2	Implement adaptive, responsive user interfaces that work across a wide range of devices	L3
C3617.3	Infer long running tasks and background work in Android applications	L3
C3617.4	Demonstrate methods in storing, sharing and retrieving data in Android applications	L3
C3617.5	Analyze performance of android applications and understand the role of permissions and security also describe the steps involved in publishing Android application to share with the world	L3

COURSE CODE	:	C3618
COURSE NAME	:	INTRODUCTION TO DATA STRUCTURES AND ALGORITHMS

CO	COURSE OUTCOME	BTL
C3618.1	Understand the logic, develop the algorithm and write the flow chart and pseudo-code for the given problem	L2
C3618.2	Understand the concept of array, structures and pointers to organize and access data and apply static and dynamic methods for allocating memory to store data	L3
C3618.3	Implement stack and queues using static and dynamic arrays	L3
C3618.4	Able to implement and traverse queues and trees.	L3
C3618.5	Able to understand the concepts of graphs and implement different sorting techniques on arrays	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C3619
COURSE NAME	:	PROGRAMMING IN JAVA

CO	COURSE OUTCOME	BTL
C3619.1	Describe object – oriented programming and different data types , variables and arrays in Java programming	L2
C3619.2	Develop simple java programs using operators and control statements	L3
C3619.3	Introduce the concepts of classes and inheritance in java programs to solve real world problems	L3
C3619.4	Demonstrate the creation and use of packages, the concept of exception handling in java	L3
C3619.5	Demonstrate the concept of I/O , enumeration , type wrapper , applet and string handling in java	L3

COURSE CODE	:	C3620
COURSE NAME	:	INTRODUCTION TO OPERATING SYSTEM

CO	COURSE OUTCOME	BTL
C3620.1	Demonstrate the use of operating system and different system structures.	L3
C3620.2	Illustrate the scheduling process along with multithread programming.	L3
C3620.3	Compare the common algorithms used for scheduling various tasks in operating systems and formulate solutions for critical section problem	L3
C3620.4	Understand the various methods of handling deadlocks and various memory management strategies	L3
C3620.5	Understand the concept of virtual memory and various file implementation techniques.	L3

COURSE CODE	:	C3621
COURSE NAME	:	NON- CONVENTIONAL ENERGY SOURCES

CO	COURSE OUTCOME	BTL
C3621.1	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations	L2
C3621.2	Know the need of renewable energy resources, historical and latest developments.	L2
C3621.3	Describe the use of solar energy and the various components used in the energy production with respect to applications like-heating, cooling, desalination, power generation, drying, cooking etc	L2
C3621.4	Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications	L2
C3621.5	Understand the concept of Biomass energy resources and their classification, types of biogas Plants-applications	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C3622
COURSE NAME	:	WORLD CLASS MANUFACTURING

CO	COURSE OUTCOME	BTL
C3622.1	Understand recent trends in manufacturing.	L2
C3622.2	Demonstrate the relevance and basics of World Class Manufacturing	L3
C3622.3	Understand customization of product for manufacturing	L2
C3622.4	Understand the implementation of new technologies	L2
C3622.5	Compare the existing industries with WCM industries	L2

COURSE CODE	:	C3623
COURSE NAME	:	SUPPLY CHAIN MANAGEMENT

CO	COURSE OUTCOME	BTL
C3622.1	Understand and explain the supply chain importance, key decisions and business strategies to improve performance and reduce cost.	L2
C3622.2	Interpret theoretical logic for make versus buy decisions to select supplier by identifying core processes to create a world class supply base.	L3
C3622.3	Plan warehouse management system by controlling material handling, transportation and traffic management. Also, design an effective distribution network with a model facility location and capacity allocations.	L3
C3622.4	Make use of network optimization model, decision trees to reduce the impact of uncertainty on network design	L2
C3622.5	Explain the integration of information technology with supply chain for the effective forecasting and reduced uncertainty for agile supply chain management.	L2

COURSE CODE	:	C3624
COURSE NAME	:	ADVANCED MATERIALS TECHNOLOGY

CO	COURSE OUTCOME	BTL
C3624.1	Explain the concepts and principles of advanced materials and manufacturing processes	L2
C3624.2	Understand the applications of all kinds of Industrial materials	L2
C3624.3	Apply the material selection concepts to select a material for a given application.	L3
C3624.4	Define Nanotechnology, Describe nano material characterization	L2
C3624.5	Understand the behaviour and applications of smart materials, ceramics, glasses and non-metallic materials.	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C471
COURSE NAME	:	COMPUTER NETWORKS

CO	COURSE OUTCOME	BTL
C471.1	Explain basic concepts of Data Communication, Reference models like OSI –TCP/IP model, services and role of each layer.	L2
C471.2	Illustrate the media access control, channel allocation, framing, error and flow control techniques and internetworking protocols.	L3
C471.3	Apply the concepts of Logical addressing, sub-netting mechanism in IP Addressing and Construct routing tables using various routing protocols.	L3
C471.4	Apply the congestion control mechanism in TCP and illustrate the Connection Management, Error control and Flow control mechanism	L3
C471.5	Explain the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and DNS.	L2

COURSE CODE	:	C472
COURSE NAME	:	VLSI DESIGN

CO	COURSE OUTCOME	BTL
C472.1	Demonstrate understanding of MOS transistor theory.	L2
C472.2	Sketch the basic gates using the stick and layout diagrams with the knowledge of physical design aspects and Demonstrate CMOS fabrication flow and technology scaling.	L3
C472.3	Demonstrate ability to design Combinational circuits as per the requirements and estimate the delay associated with the circuit.	L3
C472.4	Demonstrate ability to design Sequential circuits and dynamic logic circuits as per the requirements	L3
C472.5	Interpret Memory elements along with timing considerations and interpret testing and testability issues in VLSI Design	L2

COURSE CODE	:	C473
COURSE NAME	:	DIGITAL IMAGE PROCESSING

CO	COURSE OUTCOME	BTL
C473.1	Comprehend the fundamentals, applications, visual perception and image acquisition in image processing system using real time examples.	L2
C473.2	Illustrate Image enhancement techniques in spatial domain by various tools and apply the image enhancement techniques in spatial domain.	L2
C473.3	Demonstrate the various frequency domain transformation techniques for improving the image quality.	L2
C473.4	Identify the noise models for image restoration, filtering and estimating the degradation.	L2
C473.5	Describe the colour image processing fundamentals using colour models.	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C474
COURSE NAME	:	MULTIMEDIA COMMUNICATION

CO	COURSE OUTCOME	BTL
C474.1	Understand basics of different multimedia networks and applications	L2
C474.2	Recognize various representations of information.	L2
C474.3	Illustrate the compression principles, techniques used for text and images also analyse Distributed multimedia systems	L2
C474.4	Illustrate the compression principles and techniques used for audio and video	L2
C474.5	Describe multimedia information communications across networks	L2

COURSE CODE	:	C475
COURSE NAME	:	INTRODUCTION TO AI

CO	COURSE OUTCOME	BTL
C475.1	Identify the AI based problems	L2
C475.2	Classify Predicate Logic and recall basic rules for solving problems	L2
C475.3	Categorize the various reasoning Techniques to Solve the AI problems	L2
C475.4	Discuss the strategies for game playing and natural language processing	L2
C475.5	Summarize the learning techniques and Interpret Expert systems.	L2

COURSE CODE	:	C476
COURSE NAME	:	COMPUTER NETWORKS LAB

CO	COURSE OUTCOME	BTL
C476.1	Choose suitable tools to model a network	L2
C476.2	Use the network simulator for learning and practice of networking algorithms	L3
C476.3	Illustrate the operations of network protocols and algorithms using C Programming	L3
C476.4	Simulate the network with different configurations to measure the performance parameters	L3
C476.5	Implement the data link and routing protocols using C Programming	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C477
COURSE NAME	:	VLSI LAB

CO	COURSE OUTCOME	BTL
C477.1	Design and simulate combinational and sequential digital circuits using Verilog HDL	L3
C477.2	Understand the synthesis process of digital circuits using EDA tool	L3
C477.3	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list	L3
C477.4	Design and simulate basic CMOS circuits like invertor, common source amplifier and differential amplifiers	L3
C477.5	Perform RTL GDSH flow and understand the stages in ASIC design	L3

COURSE CODE	:	C478
COURSE NAME	:	PROJECT WORK PHASE–I

CO	COURSE OUTCOME	BTL
C478.1	Demonstrate an ability to apply engineering specialization to identify a problem.	L2
C478.2	Formulate a hypothesis for a given problem using research literature then identify applicable tools and components to solve the identified technical problems.	L2
C478.3	Design, Analyze and evaluate the sub blocks of the identified project to obtain experimental results and propose suitable modifications to improve performance.	L3
C478.4	Effectively present the work with professional ethics as an individual or working as a team.	L2
C478.5	Communicate technical content effectively through written reports and oral presentations.	L2

COURSE CODE	:	C479
COURSE NAME	:	REAL TIME SYSTEMS

CO	COURSE OUTCOME	BTL
C479.1	Explain the fundamentals of Real time systems and its classifications.	L2
C479.2	Understand the concepts of computer control and the suitable computer hardware requirements for real-time applications	L2
C479.3	Describe the operating system concepts and techniques required for real time systems.	L2
C479.4	Develop the software algorithms using suitable languages to meet Real time applications.	L3
C479.5	Apply suitable methodologies to design and develop Real-Time Systems	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C4710
COURSE NAME	:	SATELLITE COMMUNICATION

CO	COURSE OUTCOME	BTL
C4710.1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.	L2
C4710.2	Describe the electronic hardware systems associated with the satellite subsystem and earth station.	L2
C4710.3	Describe the communication satellites with the focus on national satellite system.	L3
C4710.4	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.	L2
C4710.5	Describe the satellites used for applications in remote sensing, weather forecasting and navigation.	L3

COURSE CODE	:	C4711
COURSE NAME	:	DSP ALGORITHMS & ARCHITECTURE

CO	COURSE OUTCOME	BTL
C4711.1	Comprehend the knowledge and concepts of digital signal processing techniques.	L2
C4711.2	Apply the knowledge of DSP computational building blocks to achieve speed in DSP architecture or processor	L3
C4711.3	Apply knowledge of various types of addressing modes, interrupts, peripherals and pipelining structure of TMS320C54xx processor	L3
C4711.4	Develop basic DSP algorithms using DSP processors.	L3
C4711.5	Discuss about synchronous serial interface and multichannel buffered serial port (McBSP) of DSP device and Demonstrate the programming of CODEC interfacing	L3

COURSE CODE	:	C4712
COURSE NAME	:	IOT & WIRELESS SENSOR NETWORK

CO	COURSE OUTCOME	BTL
C4712.1	Understand choice and application of IoT & M2M communication protocols.	L2
C4712.2	Describe Cloud computing and design principles of IoT	L2
C4712.3	Relate to MQTT clients, MQTT server and its programming.	L3
C4712.4	Describe the architectures and its communication protocols of WSNs	L3
C4712.5	Identify the uplink and downlink communication protocols associated with specific application of IOT /WSNs	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C4713
COURSE NAME	:	AUTOMOTIVE ELECTRONICS

CO	COURSE OUTCOME	BTL
C4713.1	Describe the basics of automobile dynamics and design electronics	L2
C4713.2	Acquire an overview of automotive components, subsystems, and basics of Electronic Engine Control in today's automotive industry	L2
C4713.3	Use available automotive sensors and actuators while interfacing with microcontrollers/ microprocessors during automotive system design.	L2
C4713.4	Understand the networking of various modules in automotive systems, communication protocols and diagnostics of the sub systems	L2
C4713.5	Design and implement the electronics that attribute the reliability, safety, and smartness to the automobiles, providing add-on comforts and get fair idea on future Automotive Electronic Systems	L3

COURSE CODE	:	C4714
COURSE NAME	:	CRYPTOGRAPHY

CO	COURSE OUTCOME	BTL
C4714.1	Explain basic cryptographic algorithms to encrypt and decrypt the data	L2
C4714.2	Discuss symmetric and asymmetric cryptography algorithms to encrypt and decrypt the information	L2
C4714.3	Describe the mathematics associated with cryptography	L2
C4714.4	Apply concepts of modern algebra in cryptography algorithms.	L3
C4714.5	Apply pseudo random sequence in stream cipher algorithms	L3

COURSE CODE	:	C4715
COURSE NAME	:	MACHINE LEARNING WITH PYTHON

CO	COURSE OUTCOME	BTL
C4715.1	Evaluate the problems in machine learning	L5
C4715.2	Use supervised, unsupervised or reinforcement learning for problem solving	L3
C4715.3	Examine the theory of probability and statistics in machine learning	L3
C4715.4	Apply concept learning, ANN, Bayes classifier, k nearest neighbour	L4
C4715.5	Perform statistical analysis of machine learning techniques.	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C4716
COURSE NAME	:	CARBON CAPTURE AND STORAGE

CO	COURSE OUTCOME	BTL
C4716.1	Discuss the impacts of climate change and the measures that can be taken to reduce emissions	L3
C4716.2	Discuss carbon capture and carbon storage.	L3
C4716.3	Explain the fundamentals of power generation.	L2
C4716.4	Explain methods of carbon capture from power generation and industrial processes.	L2
C4716.5	Explain different carbon storage methods: storage in coal seams, depleted gas reservoirs and saline formation and Carbon dioxide compression and pipeline transport.	L2

COURSE CODE	:	C4717
COURSE NAME	:	ELECTRIC VEHICLES

CO	COURSE OUTCOME	BTL
C4717.1	Explain the roadway fundamentals, laws of motion, vehicle mechanics and propulsion system design	L2
C4717.2	Explain the working of electric vehicles and hybrid electric vehicles in recent trends	L2
C4717.3	Model batteries, Fuel cells, PEMFC and super capacitors	L3
C4717.4	Analyze DC and AC drive topologies used for electric vehicle application	L3
C4717.5	Develop the electric propulsion unit and its control for application of electric vehicles	L3

COURSE CODE	:	C4718
COURSE NAME	:	DISASTERS MANAGEMENT

CO	COURSE OUTCOME	BTL
C4718.1	Discuss disaster management plan, cyclones, and their hazard potential	L2
C4718.2	Understand the role of IMD and cyclone prediction and cyclone warning systems in India	L2
C4718.3	Understand the role of different institutions' defence and other services in natural disaster management	L2
C4718.4	Understand the role of the Central Water Commission in river water sharing, Draught, its assessment and draught management plan	L2
C4718.5	Understand occurrence of earth quake, tsunamis and thunderstorms	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C4719
COURSE NAME	:	ELECTRICAL ENERGY CONSERVATION AND AUDITING

CO	COURSE OUTCOME	BTL
C4719.1	Analyse about energy scenario nationwide and worldwide , also outline Energy Conservation Act and its features	L2
C4719.2	Discuss load management techniques and energy efficiency	L2
C4719.3	Understand the need of energy audit and energy audit methodology	L2
C4719.4	Understand various pillars of electricity market design.	L2
C4719.5	Conduct energy audit of electrical systems and buildings to show an understanding for the demand side management and energy conservation.	L2

COURSE CODE	:	C4720
COURSE NAME	:	INTRODUCTION TO BIG DATA ANALYTICS

CO	COURSE OUTCOME	BTL
C4720.1	Explain the importance of data and data analysis	L2
C4720.2	Interpret the probabilistic models for data	L3
C4720.3	Define hypothesis, uncertainty principle	L2
C4720.4	Evaluate regression analysis	L4

COURSE CODE	:	C4721
COURSE NAME	:	PYTHON APPLICATION PROGRAMMING

CO	COURSE OUTCOME	BTL
C4721.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.	L2
C4721.2	Demonstrate proficiency in handling Strings and File Systems	L3
C4721.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.	L4
C4721.4	Interpret the concepts of Object-Oriented Programming as used in Python.	L3
C4721.5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python	L4

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C4723
COURSE NAME	:	INTRODUCTION TO DOT NET FRAMEWORK FOR APPLICATION DEVELOPMENT

CO	COURSE OUTCOME	BTL
C4723.1	Implement applications on Visual Studio .NET platform by understanding the syntax and semantics of C#	L3
C4723.2	Demonstrate Object Oriented Programming concepts in C# programming language	L3
C4723.3	Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications	L3
C4723.4	Illustrate the use of generics and collections in C#	L3
C4723.5	Illustrate queries to query in-memory data and define own operator behaviour.	L3

COURSE CODE	:	C4724
COURSE NAME	:	ENERGY AND ENVIRONMENT

CO	COURSE OUTCOME	BTL
C4724.1	Understand energy scenario, energy sources and their utilization	L2
C4724.2	Understand various methods of energy storage, energy management and economic analysis	L2
C4724.3	Analyse the awareness about environment and eco system	L3
C4724.4	Understand the environment pollution along with waste management	L2
C4724.5	Understand social issues with respect to the environmental changes and pollution control.	L2

COURSE CODE	:	C4725
COURSE NAME	:	AUTOMOTIVE ENGINEERING

CO	COURSE OUTCOME	BTL
C4725.1	Identify the different parts of an automobile and it's working	L2
C4725.2	Understand the working of transmission and braking systems	L2
C4725.3	Understand the working of steering and suspension systems and their applications	L2
C4725.4	Identify applications of various types of fuels and injection systems.	L2
C4725.5	Analyse the cause of automobile emissions, its effects on environment and methods to reduce the emissions	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C4726
COURSE NAME	:	INDUSTRIAL SAFETY

CO	COURSE OUTCOME	BTL
C4726.1	Identify the basic safety terms, international standards, hazards and risk analysis around the work environment in industries.	L2
C4726.2	Recognise the types of fires extinguishers and to demonstrate the portable extinguishers used for different classes of fires also able to recognize the sign boards and its application.	L2
C4726.3	Use the safe measures while performing work in and around the work area of the available laboratories.	L2
C4726.4	Report the case studies by sharing experience of the employees working in housekeeping, laboratories like workshops, electrical labs, machine shops, electronics and computer laboratories	L2
C4726.5	Recognise the chemical and electrical hazards for its prevention and control	L2

COURSE CODE	:	C4727
COURSE NAME	:	OPTIMIZATION TECHNIQUES

CO	COURSE OUTCOME	BTL
C4727.1	Define and use optimization terminology, concepts, and understand how to classify an optimization problem	L1
C4727.2	Understand how to classify an optimization problem	L2
C4727.3	Apply the mathematical concepts formulate the problem of the systems	L3
C4727.4	Analyse the problems for optimal solution using the algorithms	L3
C4727.5	Interpret the optimum solution	L3

COURSE CODE	:	C481
COURSE NAME	:	WIRELESS & CELLULAR COMMUNICATION

CO	COURSE OUTCOME	BTL
C481.1	Interpret the concepts of propagation mechanisms like Reflection, Diffraction and Scattering in Wireless Channels.	L2
C481.2	Develop a scheme for idle mode, call setup, call progress handling, and call tear down in a GSM cellular network.	L3
C481.3	Develop a scheme for idle mode, call setup, call progress handling, and call tear down in a CDMA cellular network.	L3
C481.4	Understanding the basic operation and Architecture of Air Interface in an LTE 4G System	L3
C481.5	Analyze multi-carrier modulation and functional standards of LTE using OFDMA and SC-FDMA principles	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C482
COURSE NAME	:	NETWORK SECURITY

CO	COURSE OUTCOME	BTL
C482.1	Explain network security services and mechanisms and Identify Computer attacks.	L2
C482.2	Demonstrate the concept of Transport Level Security, Identify the threats in web and the counter measures available to enhance the security of web applications.	L2
C482.3	Explain Security concerns in Internet Protocol and its modes, SÁ, AH, ESP, Combining security Associations Internet key exchange.	L2
C482.4	Illustrate the intrusion detection principles, virus related threats and their Counter measures.	L2
C482.5	Specify the necessity for Firewall, the characteristics of firewall, its types and Configuration.	L2

COURSE CODE	:	C483
COURSE NAME	:	PROJECT WORK PHASE -2

CO	COURSE OUTCOME	BTL
C483.1	Ability to Interconnect different design block.	L3
C483.2	Apply relevant modern tools to solve the identified technical problem.	L3
C483.3	Analyze and evaluate the experimental results and propose suitable modifications to improve performance.	L4
C483.4	Effectively present the work with professional ethics as an individual or working as a team.	L2
C483.5	Communicate technical content effectively through written reports and oral presentations.	L2

COURSE CODE	:	C484
COURSE NAME	:	TECHNICAL SEMINAR

CO	COURSE OUTCOME	BTL
C484.1	Identify and review research literature and comprehend solutions that exist to ECE problems.	L2
C484.2	Understand the techniques, skills and use applicable tools necessary for presenting the authorized work.	L2
C484.3	Communicate effectively on contemporary areas/trends/developments in Engineering fields and develop technical reports.	L2
C484.4	Effectively present the work with professional ethics as an individual.	L2
C484.5	Understand the impact of authorized work in societal and environmental context.	L2

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C485
COURSE NAME	:	INTERNSHIP

CO	COURSE OUTCOME	BTL
C485.1	Enhance the existing engineering knowledge and gain practical experience.	L2
C485.2	Understand through an intensive experience, the nature of workplaces and their associated values, routines, and cultures.	L2
C485.3	Integrate and demonstrate existing and new technical knowledge for industrial applications.	L3
C485.4	Effectively present and write technical reports with professional ethics as an individual /Team on contemporary areas/trends/developments in Engineering fields.	L2
C485.5	Recognize the need for lifelong learning processes with Management skills through critical reflection of internship experiences.	L2

COURSE CODE	:	C486
COURSE NAME	:	MICROELECTROMECHANICAL SYSTEMS

CO	COURSE OUTCOME	BTL
C486.1	Appreciate the technologies related to Micro Electro Mechanical Systems	L2
C486.2	Understand design and fabrication processes involved with MEMS De- vices	L2
C486.3	Analyse the MEMS devices and develop suitable mathematical models	L2
C486.4	Know various application areas for MEMS device	L2
C486.5	Describe the Micro manufacturing	L2

COURSE CODE	:	C487
COURSE NAME	:	RADAR ENGINEERING

CO	COURSE OUTCOME	BTL
C487.1	Describe the radar fundamentals	L2
C487.2	Analyse the radar signals	L3
C487.3	Explain the working principle of pulse Doppler radars, their applications and limitations	L2
C487.4	Describe the working of various radar transmitters and receivers	L2
C487.5	Analyze the range parameters of pulse radar system which affect the sys tem performance	L3

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE CODE	:	C488
COURSE NAME	:	OPTICAL COMMUNICATION ENGINEERING

CO	COURSE OUTCOME	BTL
C488.1	Classify and describe working of optical fiber with different modes of signal propagation	L2
C488.2	Describe the transmission characteristics and losses in optical fiber communication	L2
C488.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers	L2
C488.4	Describe the constructional features and the characteristics of optical Sources and detectors	L2
C488.5	Illustrate the networking aspects of optical fiber and describe various standards associated with it.	L3

COURSE CODE	:	C489
COURSE NAME	:	BIOMEDICAL SIGNAL PROCESSING

CO	COURSE OUTCOME	BTL
C489.1	Integrating the basic mathematical, scientific and computational skills necessary to analyse ECG and EEG signals	L3
C489.2	Apply classical and modern filtering and compression techniques for ECG and EEG signals	L3
C489.3	Develop a thorough understanding on basics of ECG and EEG feature extraction	L3
C489.4	Evaluate various event detection techniques for the analysis of the EEG and ECG	L4
C489.5	Develop algorithms to process and analyse biomedical signals for better diagnosis	L3