3.1.1 Course Outcomes (COs) For 2021 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	solve ordinary differential equations using Laplace transform.		L3
C231.2	Apply the Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.		L3
C231.3	use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations		L3
C231.4	solve mathematical models represented by initial or boundary value problems involving partial differential equations		L3
C231.5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.		L3

COURSE CODE	:	C232	
COURSE NAME	:	DIGITAL SYSEM DESIGN USING VERILOG	
CO	COURSE OUTCOME		BTL
C232.1	Solve Boolean functions using K-map and Quine-McCluskey minimization technique.		L3
C232.2	Analyze and design for combinational logic circuits.		L3
C232.3	Analyze the concepts of Flip Flops (SR, D, T and JK) and to design the synchronous sequential circuits using Flip Flops.		L3
C232.4	Illustrate structure of Verilog module and use data flow description to model combinational circuits.		L3
C232.5	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using Verilog descriptions.		L3

COURSE CODE	:	C233	
COURSE NAME	:	BASIC SIGNAL PROCESSING	
CO		COURSE OUTCOME	BTL
C233.1		Apply the basics of Linear Algebra.	L3
C233.2		Examine the different types of signals and systems	L3
C233.3		Determining the properties of discrete-time signals & systems	L3
C233.4		Implementing the concept of LTI Systems	L3
C233.1		Integrating discrete time signals & systems using Z transforms	L3

COURSE CODE	:	C234	
COURSE NAME	:	ANALOG ELCTRONIC CIRCUITS	
CO		COURSE OUTCOME	BTL
C234.1		Identify the characteristics of BJTs and FETs for switching and amplifier circuits	L3
C234.2		Design and analyze FET amplifiers and oscillators with different circuit configurations and biasing conditions.	L3
C234.3		Understand the feedback topologies and approximations in the design of amplifiers and oscillators	L3
C234.4		Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters, and timers.	L3
C234.5		Use power electronic device components and analyse functions for basic power electronic circuits.	L3

COURSE CODE	:	C235	
COURSE NAME	:	ANALOG AND DIGITAL ELECTRONICS LAB	
CO		COURSE OUTCOME	BTL
C235.1		Design and analyze the BJT/FET amplifier and oscillator circuits.	L3
C235.2		Design and test Opamp circuits to realize the mathematical computations, DAC and precision rectifiers	L3
C235.3		Design and test the combinational logic circuits for the given specifications	L3
C235.4		Design and test the sequential logic circuits for the given functionality	L3
C235.5		model the basic electronic circuit experiments using SCR and 555 timers.	L3

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COURSE CODE	:	C236	
COURSE NAME	:	Social Connect and Responsibility	
CO		COURSE OUTCOME	BTL
C236.1		Understand social responsibility	l2
C236.2		Practice sustainability and creativity	L2
C236.3		Showcase planning and organizational skills	L2

COURSE CODE	:	C237	
COURSE NAME	:	CONSTITUTION OF INDIA & PROFESSIONAL ETHICS	
CO		COURSE OUTCOME	BTL
C237.1		Analyse the basic structure of Indian Constitution	
C237.2		Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution	
C237.3		know about our Union Government, political structure & codes, procedures	
C237.4		Understand our State Executive & Elections system of India	
C237.5		Remember the Amendments and Emergency Provisions, other important provisions given by the constitution	

COURSE CODE	:	C238	
COURSE NAME	:	LABVIEW PROGRAMMING BASICS	
CO		COURSE OUTCOME	BTL
C238.1		Use Lab VIEW to create data acquisition, analysis, and display operations	L3
C238.2		Create user interfaces with charts, graph, and buttons	L3
C238.3		Use the programming structures and data types that exist in Lab VIEW	L3
C238.4		Use various editing and debugging techniques	L3

COURSE CODE	:	C239	
COURSE NAME	:	LD (LOGIC DESIGN) LAB USING PSPICE / MULTISIM	
CO		COURSE OUTCOME	BTL
C239.1		Demonstrate the truth table of various expressions and combinational circuits using logic gates.	L2
C239.2		Design various combinational circuits such as adders, subtractors, comparators, multiplexers and code converters.	L3
C239.3		Construct flips-flops, counters, and shift registers.	L3
C239.4		Design and implement synchronous counters.	L3

COURSE CODE	:	C2310	
COURSE NAME	:	LIC (LINEAR INTEGRATED CIRCUITS) LAB USING PSPICE / MULTISIM	
CO		COURSE OUTCOME	BTL
C2310.1		Sketch/draw circuit schematics, construct circuits, analyze and troubleshoot circuits containing, op-amps, resistors, diodes, capacitors, and independent sources.	L2
C2310.2		Relate to the manufacturer's data sheets of IC 555 timer and IC μa741 op-amp.	L3
C2310.3		Realize and verify the operation of analog integrated circuits like Amplifiers, Precision Rectifiers, Comparators and Waveform generators.	L3
C2310.4		Design and implement analog integrated circuits like Oscillators, Active filters, Timer circuits, Data converters and compare the experimental results with theoretical values.	L3

COURSE CODE	:	C2311	
COURSE NAME	:	AEC (ANALOG ELECTRONIC CIRCUITS) LAB	
CO		COURSE OUTCOME	BTL
C2311.1		Understand the circuit schematic and its working.	L2
C2311.2		Demonstrate the characteristics of different electronic devices.	L3
C2311.3		Design and test simple electronic circuits as per the specifications using discrete electronic. components.	L3
C2311.4		Model the characteristics of active devices to compute the parameters.	L3
C2311.5		Familiarize with EDA software which can be used for electronic circuit simulation.	L3

COURSE CODE	:	C241	
COURSE NAME	:	COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS	
CO		COURSE OUTCOME	BTL
C241.1		Use the basic laws and definitions (with mathematical representations) in Electric and Magnetic fields.	L3
C241.2		Apply the basic laws of Electric and Magnetic fields to arrive at Divergence Theorem, Current continuity Equation, Curl, Stokes' theorem.	L3
C241.3		Apply Electric and Magnetic field concepts to arrive at Maxwell's equations, Electromagnetic wave equations and Poynting's theorem (Important concepts related to Communication link).	L3
C241.4		Recall the definitions related to Random variables and Random Processes.	L2
C241.5		Model the Random events in the Communication set-up and determine useful statistical parameters.	L3

COURSE CODE	:	C242	
COURSE NAME	:	DIGITAL SIGNAL PROCESSING	
CO		**COURSE OUTCOME**	**BTL**
C242.1		Compute DFT of real and complex discrete time signals	**L3**
C242.2		Determine the response of LTI systems using time domain and DFT techniques and computation of DFT using FFT.	**L3**
C242.3		Design and realize of FIR digital filters	**L3**
C242.4		Design and realize of IIR digital filters.	**L3**
C242.5		Design of Digital filters using DSP Processor.	**L3**

COURSE CODE	:	C243	
COURSE NAME	:	CIRCUITS & CONTROLS	
CO		**COURSE OUTCOME**	**BTL**
C243.1		Analyze and solve Electric circuit, by applying, loop analysis, Nodal analysis and by applying network Theorems.	**L3**
C243.2		Evaluate two port parameters of a network and Apply Laplace transforms to solve electric networks.	**L3**
C243.3		Deduce transfer function of a given physical system, from differential equation representation or Block Diagram representation and SFG representation.	**L3**
C243.4		Calculate time response specifications and analyse the stability of the system.	**L3**
C243.5		Draw and analyse the effect of gain on system behaviour using root loci and Perform frequency response Analysis and find the stability of the system. Represent State model of the system and find the time response of the system.	**L3**

COURSE CODE	:	C244	
COURSE NAME	:	COMMUNICATION THEORY	
CO		**COURSE OUTCOME**	**BTL**
C244.1		Compare amplitude modulation techniques and the various schemes involved to perform time and frequency domain transformations.	**L3**
C244.2		Identify the schemes for amplitude and frequency modulation and demodulation of analog signals and compare the performance.	**L3**
C244.3		Interpret the influence of channel noise on analog modulated signals.	**L3**
C244.4		Analyze the characteristics of PAM, PPM and TDM System	**L3**
C244.5		Illustration of digital formatting representations used for Multiplexers, Vocoders and Video transmission.	**L3**

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COURSE CODE	:	C245	
COURSE NAME	:	BIOLOGY FOR ENGINEERS	
CO		COURSE OUTCOME	BTL
C245.1		Elucidate the basic biological concepts via relevant industrial applications and case studies.	L2
C245.2		Evaluate the principles of design and development, for exploring novel bioengineering projects	L2
C245.3		Corroborate the concepts of biomimetics for specific requirements	L2
C245.4		Think critically towards exploring innovative bio-based solutions for socially relevant problems	L2
C245.5		Have a complete knowledge of the impotence trends in bio-engineering applications	L2

COURSE CODE	:	C246	
COURSE NAME	:	COMMUNICATION LABORATORY I	
CO		COURSE OUTCOME	BTL
C246.1		Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequency domain	L2
C246.2		Design and test the sampling, Multiplexing and PAM with relevant circuits	L3
C246.3		Model the basic circuitry and operations used in AM and FM receivers	L3
C246.4		Illustrate the operation of PCM and delta modulations for different input conditions	L3

COURSE CODE	:	C247	
COURSE NAME	:	EMBEDDED C BASICS	
CO		COURSE OUTCOME	BTL
C247.1		Develop C programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051 C.	L3
C247.2		Develop testing and experimental procedures on 8051 Microcontroller, analyze their operation under different cases	L3
C247.3		Develop programs for 8051 Microcontroller to implement real world problems	L3
C247.4		Design and Develop Mini projects	L3

COURSE CODE	:	C248	
COURSE NAME	:	UNIVERSAL HUMAN VALUES	
CO		**COURSE OUTCOME**	**BTL**
C248.1		By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.	**L2**
C248.2		They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).	**L2**
C248.3		It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.	**L2**
C248.4		Holistic vision of life, socially responsible behaviour, environmentally responsible work	**L2**
C248.5		Ethical human conduct, Having Competence and Capabilities for Maintaining Health and Hygiene Appreciation and aspiration for excellence (merit) and gratitude for all	**L2**

COURSE CODE	:	C249	
COURSE NAME	:	DAQ USING LABVIEW	
CO		**COURSE OUTCOME**	**BTL**
C249.1		Build temperature indicating instruments using LabVIEW (NI DAQ)	**L3**
C249.2		Interface peripheral devices/instruments to LabVIEW	**L3**
C249.3		Build LabVIEW modules to sense and process audio inputs	**L3**
C249.4		Apply programming structures, data types, and the analysis and signal processing algorithms in LabVIEW	**L3**
C249.5		Debug and troubleshoot applications	**L3**

COURSE CODE	:	C2410	
COURSE NAME	:	C++ BASICS	
CO		**COURSE OUTCOME**	**BTL**
C2410.1		Develop C++ program to solve simple and complex problems	L3
C2410.2		Apply and implement major object-oriented concepts like message passing, function overloading, operator overloading and inheritance to solve real-world problems.	L3
C2410.3		Use major C++ features such as Templates for data type independent designs and File I/O to deal with large data set.	L3
C2410.4		Analyse, design and develop solutions to real-world problems applying OOP concepts of C++	L3

COURSE CODE	:	C2411	
COURSE NAME	:	OCTAVE / SCILAB FOR SIGNALS	
CO		COURSE OUTCOME	BTL
C2411.1		Demonstrate the DSP concepts on signal generation and sampling using Scilab/Octave	L2
C2411.2		Design and verify the computation of discrete signals using Scilab/Octave.	L3
C2411.3		Demonstrate and verify the application of FFT/DFT algorithm for a given signal using Scilab/Octave.	L3
C2411.4		Design and demonstrate programs to evaluate different types of low and high pass FIR filters using Scilab/Octave.	L3
C2411.5		Design, demonstrate and visualize different real-world signals using Scilab/Octave programs.	L3

COURSE CODE	:	C351	
COURSE NAME	:	DIGITAL COMMUNICATION	
CO		COURSE OUTCOME	BTL
C351.1		Analyze different digital modulation techniques and choose the appropriate modulation technique for the given specifications.	L3
C351.2		Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted band limited channels.	L3
C351.3		Classify various spread spectrum schemes and compute the performance parameters of communication system.	L3
C351.4		Apply the fundamentals of information theory and perform source coding for given message	L3
C351.5		Apply different encoding and decoding techniques with error Detection and Correction.	L3

COURSE CODE	:	C352	
COURSE NAME	:	COMPUTER ORGANIZATION & ARM MICROCONTROLLERS	
CO		COURSE OUTCOME	BTL
C352.1		Explain the basic organization of a computer system.	L2
C352.2		Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.	L2
C352.3		Explain the architectural features and instructions of 32-bit microcontroller ARM Cortex M3	L2
C352.4		Apply the knowledge gained for Programming ARM Cortex M3 for different applications.	L2
C352.5		Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.	L2

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COURSE CODE	:	C353	
COURSE NAME	:	COMPUTER COMMUNICATION NETWORKS	
CO		**COURSE OUTCOME**	**BTL**
C353.1		illustrate the concepts of networking thoroughly.	L2
C353.2		Identify the protocols and services of different layers.	L3
C353.3		Classify the basic network configurations and standards associated with each network.	L2
C353.4		analyze the various applications that can be implemented on networks.	L3

COURSE CODE	:	C354	
COURSE NAME	:	ELECTROMAGNETIC WAVES	
CO		**COURSE OUTCOME**	**BTL**
C354.1		Solve problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.	L3
C354.2		Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distributions by using Divergence Theorem.	L3
C354.3		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
C354.4		Solve magnetic force, potential energy, and Magnetization with respect to magnetic materials and voltage induced in electric circuits.	L3
C354.5		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	:	C355	
COURSE NAME	:	COMMUNICATION LAB II	
CO		**COURSE OUTCOME**	**BTL**
C355.1		Design and test the digital modulation circuits and display the waveforms	L3
C355.2		Develop the source coding algorithm using C/C++/ MATLAB code.	L3
C355.3		Develop the Error Control coding algorithms using C/C++/ MATLAB code.	L3
C355.4		Illustrate the operations of networking concepts and protocols using C programming and network simulators.	L2

COURSE CODE	:	C356	
COURSE NAME	:	IOT (INTERNET OF THINGS) LAB	
CO		**COURSE OUTCOME**	**BTL**
C356.1		Explain internet of Things and its hardware and software components	**L2**
C356.2		Develop a module to Interface I/O devices, sensors & communication modules	**L3**
C356.3		Develop a Remotely monitor data and control devices	**L3**
C356.4		Develop real life IoT based projects	**L3**

COURSE CODE	:	C357	
COURSE NAME	:	RESEARCH METHODOLOGY & INTELLECTUAL PROPERTY RIGHTS	
CO		**COURSE OUTCOME**	**BTL**
C357.1		Explain traditional cryptographic algorithms of encryption and decryption process.	**L2**
C357.2		Use symmetric and asymmetric cryptography algorithms to encrypt and decrypt the data.	**L3**
C357.3		Apply concepts of modern algebra in cryptography algorithms	**L3**
C357.4		Design pseudo random sequence generation algorithms for stream cipher systems.	**L3**

COURSE CODE	:	C359	
COURSE NAME	:	ENVIRONMENTAL STUDIES	
CO		**COURSE OUTCOME**	**BTL**
C359.1		Demonstrate the characteristics of microwave sources.	**L2**
C359.2		Demonstrate the characteristics of directional coupler.	**L2**
C359.3		Explain microwave measurement procedure	**L2**
C359.4		Apply MATLAB toolbox for study of microwaves phenomena	**L3**

COURSE CODE	:	C3510	
COURSE NAME	:	Communication Simulink Toolbox	
CO	COURSE OUTCOME		BTL
C3510.1	Model sampling, aliasing, filtering, and quadrature modulation through simulation.		L3
C3510.2	Construct signal space representation of digital modulation techniques.		L3
C3510.3	Design and implement a pulse shape and matched filter to avoid inter-symbol interference and maximize receiver SNR.		L3
C3510.4	Demonstrate advanced wireless communication techniques like Multipath fading, CCI etc. and model the same using MATLAB / Simulink.		L3