KALYANI CHARITABLE TRUST'S

LATE G. N. SAPKAL COLLEGE OF ENGINEERING

Kalyani Hills, Anjaneri-Vadholi, Trimbakeshwar Road, Dist: Nashik – 422 212 (India)
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SAPKAL KNOWLEDGE HUB

Department of Electronics & Telecommunication Engineering

Course Outcomes

Year	Name of course	Course Outcome No.	Course Outcomes
FE	Basic Electronics Engineering	CO 104010.1	Explain the working of P-N junction diode and its circuits.
		CO 104010.2	Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
		CO 104010.3	Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
		CO 104010.4	Use different electronics measuring instruments to measure various electrical parameters.
		CO 104010.5	Select sensors for specific applications.
		CO 104010.6	Describe basic principles of communication systems.
SE	Engineering Mathematics -III	CO 207005.1	Solve higher order linear differential equation using appropriate techniques for modeling, analyzing electrical circuits and control systems.
		CO 207005.2	Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		CO 207005.3	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
		CO 207005.4	Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory
		CO 207005.5	Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing
SE	Electronic Circuits	CO 204181.1	Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier.
		CO 204181.2	Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
		CO 204181.3	Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
		CO 204181.4	Explain internal schematic of Op-Amp and define its performance parameters.
		CO 204181.5	Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
		CO 204181.6	Understand and compare the principles of various data conversion techniques and PLL with their applications.
SE	Digital Circuits	CO 204182.1	Identify and prevent various hazards and timing problems in a digital design.
		CO 204182.2	Use the basic logic gates and various reduction techniques of digital

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			logic circuit.
		CO 204182.3	Analyze, design and implement combinational logic circuits.
		CO 204182.4	Analyze, design and implement sequential circuits.
		CO 204182.5	Differentiate between Mealy and Moore machines.
		CO 204182.6	Analyze digital system design using PLD.
SE	Electrical Circuits	CO 204183.1	Analyze the simple DC and AC circuit with circuit simplification techniques.
		CO 204183.2	Formulate and analyze driven and source free RL and RC circuits.
		CO 204183.3	Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
		CO 204183.4	Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
		CO 204183.5	Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
		CO 204183.6	Analyze and select a suitable motor for different applications.
SE	Data Structures	CO 204184.1	Solve mathematical problems using C programming language.
		CO 204184.2	Implement sorting and searching algorithms and calculate their complexity.
		CO 204184.3	Develop applications of stack and queue using array.
		CO 204184.4	Demonstrate applicability of Linked List.
		CO 204184.5	Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity.
		CO 204184.6	Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.
SE	Signals & Systems	CO 204191.1	Identify, classify basic signals and perform operations on signals.
		CO 204191.2	Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals.
		CO 204191.3	Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform.
		CO 204191.4	Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
		CO 204191.5	Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF.
		CO 204191.6	Compute the mean, mean square, variance and standard deviation for given random variables using PDF.
SE	ControlSystems	CO 204192.1	Determine and use models of physical systems in forms suitable for use

Course Outcomes

			in the analysis and design of control systems.
		CO 204192.2	Determine the (absolute) stability of a closed-loop control system.
		CO 204192.3	Perform time domain analysis of control systems required for stability analysis.
		CO 204192.4	Perform frequency domain analysis of control systems required for stability analysis.
		CO 204192.5	Apply root-locus, Frequency Plots technique to analyze control systems.
		CO 204192.6	Express and solve system equations in state variable form.
		CO 204192.7	Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.
SE	Principles of Communication Systems	CO 204193.1	To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
		CO 204193.2	Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
		CO 204193.3	Explain generation and detection of FM systems and compare with AM systems.
		CO 204193.4	Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
		CO 204193.5	Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
		CO 204193.6	Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
SE	Object Oriented Programming	CO 204194.1	Describe the principles of object oriented programming.
		CO 204194.2	Apply the concepts of data encapsulation, inheritance in C++.
		CO 204194.3	Understand Operator overloading and friend functions in C++.
		CO 204194.4	Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
		CO 204194.5	Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
		CO 204194.6	Describe and use of File handling in C++.
SE	Employability Skill Development	CO204199.1	Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
		CO204199.2	Develop effective communication skills (listening, reading, writing, and speaking), self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.
		CO204199.3	Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills.

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Department of Electronics & Telecommunication Engineering

Course Outcomes

		CO204199.4	Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career.
		CO204199.5	Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment.
TE	Digital Communication	CO 304181.1	Apply the statistical theory for describing various signals in a communication system
		CO 304181.2	Understand and explain various digital modulation techniques used in digital communication systems and analyze their performance in presence of AWGN noise.
		CO 304181.3	Describe and analyze the digital communication system with spread spectrum modulation
		CO 304181.4	Analyze a communication system using information theoretic approach.
		CO 304181.5	Use error control coding techniques to improve performance of a digital communication system.
TE	Electromagnetic Field Theory	CO 304182.1	Apply the basic electromagnetic principles and determine the fields (E & H) due to the given source.
		CO 304182.2	Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either sides.
		CO 304182.3	State, Identify and Apply Maxwell's equations (integral and differential forms) in both the forms (Static, time-varying or Time-harmonic field) for various sources, Calculate the time average power density using Poynting Theorem, Retarded magnetic vector potential.
		CO 304182.4	Formulate, Interpret and solve simple uniform plane wave (Helmholtz Equations) equations, and analyze the incident/reflected/transmitted waves at normal incidence.
		CO 304182.5	Interpret and Apply the transmission line equation to transmission line problems with load impedance to determine input and output voltage/current at any point on the Transmission line, Find input/load impedance, input/load admittance, reflection coefficient, SWR, Vmax/Vmin, length of transmission line using Smith Chart.
		CO 304182.6	Carry out a detailed study, interpret the relevance and applications of Electromagnetics
TE	Database Management	CO 304183.1	Ability to implement the underlying concepts of a database system.
		CO 304183.2	Design and implement a database schema for a given problem-domain using data model
		CO 304183.3	Formulate, using SQL/DML/DDL commands, solutions to a wide range of query and update problems.
		CO 304183.4	Implement transactions, concurrency control, and be able to do Database recovery.
		CO 304183.5	Able to understand various Parallel Database Architectures and its applications.
		CO 304183.6	Able to understand various Distributed Databases and its applications.
TE	Microcontroller	CO 304184.1	Understand the fundamentals of microcontroller and programming.

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		CO 304184.2	Interface various electronic components with microcontrollers.
		CO 304184.3	Analyze the features of PIC 18F XXXX.
		CO 304184.4	Describe the programming details in peripheral support.
		CO 304184.5	Develop interfacing models according to applications.
		CO 304184.6	Evaluate the serial communication details and interfaces.
TE	Digital Signal Processing	CO 304185A.1	Interpret and process discrete/ digital signals and represent DSP system.
		CO 304185A.2	Analyze the digital systems using the Z-transform techniques.
		CO 304185A.3	Implement efficient transform and its application to analyze DT signals.
		CO 304185A.4	Design and implement IIR filters.
		CO 304185A.5	Design and implement FIR filters.
		CO 304185A.6	Apply DSP techniques for speech/ biomedical/ image signal processing.
TE	Electronic Measurements	CO 304185B.1	Understand the metrics for the measurement system
		CO 304185B.2	Select and use the instruments for measurement & analysis of basic electronic parameters
		CO 304185B.3	Identify and use the different signal generators for specific applications
		CO 304185B.4	Understand the principles of different Oscilloscopes for specific applications
		CO 304185B.5	Identify the use of other display devices, recorders and timer/counter in measurement systems
		CO 304185B.6	Use the advanced measurement systems for electronics parameter measurement
TE	Fundamentals of JAVA Programming	CO 304185C.1	Understand the basic principles of Java programming language
		CO 304185C.2	Apply the concepts of classes and objects to write programs in Java
		CO 304185C.3	Demonstrate the concepts of methods & Inheritance
		CO 304185C.4	Use the concepts of interfaces & packages for program implementation
		CO 304185C.5	Understand multithreading and Exception handling in Java to develop robust programs
		CO 304185C.6	Use Graphics class, AWT packages and manage input and output files in Java
TE	Computer Networks	CO 304185D.1	Design LAN using appropriate networking architecture, topologies, transmission media, and networking devices
		CO 304185D.2	Understand the working of controlling techniques for flawless data communication using data link layer protocols.
		CO 304185D.3	Learn the functions of network layer, various switching techniques and internet protocol addressing
		CO 304185D.4	Explore various interior and exterior, unicasting and multicasting protocols.
		CO 304185D.5	Analyze data flow using TCP/UDP Protocols, congestion control techniques for QoS
		CO 304185D.6	Illustrate the use of protocols at application layer
TE	Skill	CO 304190.1	Student should recognize the need to engage in independent and life-

Course Outcomes

	Development		long learning in required skill sets
		CO 304190.2	Student needs to experience the impact of industries on society by visiting different industries and understand the importance of industrial products for analog and digital circuits and systems.
		CO 304190.3	Student has to make use of the modern electronic and IT Engineering Tools and Technologies for solving electronic engineering problems.
		CO 304190.4	Student would be able to communicate effectively at different technical and administrative levels.
		CO 304190.5	Student will exhibit leadership skills both as an individual and as a member in a team in multidisciplinary environment.
TE	Cellular Networks	CO 304192.1	Understand fundamentals of wireless communications
		CO 304192.2	Discuss and study OFDM and MIMO concepts.
		CO 304192.3	Elaborate fundamentals mobile communication.
		CO 304192.4	Describes aspects of wireless system planning.
		CO 304192.5	Understand of modern and futuristic wireless networks architecture
		CO 304192.6	Summarize different issues in performance analysis
TE	Project Management	CO 304193.1	Apply the fundamental knowledge of project management for effectively handling the projects
		CO 304193.2	Identify and select the appropriate project based on feasibility study and undertake its effective planning
		CO 304193.3	Assimilate effectively within the organizational structure of project and handle project management related issues in an efficient manner.
		CO 304193.4	Apply the project scheduling techniques to create a Project Schedule Plan and accordingly utilize the resources to meet the project deadline
		CO 304193.5	Identify and assess the project risks and manage finances in line with Project Financial Management Process.
		CO 304193.6	Develop new products assessing their commercial viability and develop skillsets for becoming successful entrepreneurs while being fully aware of the legal issues related to Product development and Entrepreneurship.
TE	Power Devices & Circuits	CO 304194.1	To differentiate based on the characteristic parameters among SCR, GTO, MOSFET & IGBT and identify suitability of the power device for certain applications and understand the significance of device ratings.
		CO 304194.2	To design triggering / driver circuits for various power devices.
		CO 304194.3	To evaluate and analyze various performance parameters of the different converters and its topologies.
		CO 304194.4	To understand significance and design of various protections circuits for power devices.
		CO 304194.5	To evaluate the performance of uninterruptible power supplies, switch

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Course Outcomes

			mode power supplies and battery.
		CO 304194.6	To understand case studies of power electronics in applications like electric vehicles, solar systems etc.
TE	Digital Image Processing	CO 304195A.1	Apply knowledge of mathematics for image understanding and analysis.
		CO 304195A.2	Implement spatial domain image operations.
		CO 304195A.3	Design and realize various algorithms for image segmentation
		CO 304195A.4	Design and realize various algorithms for image Compression.
		CO 304195A.5	Apply restoration to remove noise in the image.
		CO 304195A.6	Describe the object recognition system.
TE	Sensors in Automation	CO 304195B.1	Understand the Concepts of Sensors/Transducers, classify and evaluate static and Dynamic Characteristics of Measurement Systems.
		CO 304195B.2	Choose the proper sensor comparing different standards and guidelines for measurements of Temperature and Humidity.
		CO 304195B.3	Choose the proper sensor comparing different standards and guidelines for measurements of Force, Pressure, Stress and Flow
		CO 304195B.4	Choose the proper sensor comparing different standards and guidelines for measurements of Displacement, Vibration, Acceleration and Level
		CO 304195B.5	Explore sensors to profound areas like environmental, Agricultural and bio-medical equipment and sustainability
		CO 304195B.6	Explore IoT based applications of Sensors and Transducers
TE	Advanced JAVA Programming	CO 304195C.1	Design and develop GUI applications using Applets.
		CO 304195C.2	Apply relevant AWT/ swing components to handle the given event.
		CO 304195C.3	Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
		CO 304195C.4	Learn to access database through Java programs, using Java Database Connectivity (JDBC)
		CO 304195C.5	Invoke the remote methods in an application using Remote Method Invocation (RMI)
		CO 304195C.6	Develop program for client /server communication using Java Networking classes.
TE	Embedded Processors	CO 304195D.1	Understand basics of Embedded C Programming and usage of Embedded C and study different software tools for programming microcontrollers.
		CO 304195D.2	Get acquainted with various Embedded Processor architectures related to industrial application.
		CO 304195D.3	Know about the programming of ARM 7 based microcontroller with on chip peripherals and external peripherals.
		CO 304195D.4	Understand the architectures of ARM Cortex M4 Microcontrollers and its advantages over ARM 7 Microcontrollers.
		CO 304195D.5	Implement the real world programming of ARM 7 based microcontroller with on chip peripherals and external peripherals.
		CO 304195D.6	Recognize the interfacing of real world sensors and standard buses. Will also able to design different case studies

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TE	Network Security	CO 304195E.1	Analyze attacks on computers and computer security.
		CO 304195E.2	Demonstrate knowledge of cryptography techniques.
		CO 304195E.3	Illustrate various Symmetric and Asymmetric keys for Ciphers
		CO 304195E.4	Evaluate different Message Authentication Algorithms and Hash Functions
		CO 304195E.5	Get acquainted with various aspects of E-Mail Security
		CO 304195E.6	Assimilate various aspects of Web Security
TE	Internship	CO 304199.1	To develop professional competence through internship.
		CO 304199.2	To apply academic knowledge in a personal and professional environment.
		CO 304199.3	To build the professional network and expose students to future employees
		CO 304199.4	Apply professional and societal ethics in their day to day life.
		CO 304199.5	To become a responsible professional having social, economic and administrative considerations.
		CO 304199.6	To make own career goals and personal aspirations.
TE	Mini Project	CO 304200.1	Understand, plan and execute a Mini Project with team.
		CO 304200.2	Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
		CO 304200.3	Prepare a technical report based on the Mini project.
		CO 304200.4	Deliver technical seminar based on the Mini Project work carried out.
BE	Radiation and Microwave Theory	CO 404181.1	Apply the fundamentals of electromagnetic to derive free space propagation equation and distinguish various performance parameters of antenna.
		CO 404181.2	Identify various modes in the waveguide. Compare: coaxial line, rectangular waveguides & striplines and identify applications of the same.
		CO 404181.3	Explore construction and working of principles passive microwave devices/components.
		CO 404181.4	Explore construction and working of principles active microwave devices/components
		CO 404181.5	Analyze the structure, characteristics, operation, equivalent circuits and applications of various microwave solid state active devices.
		CO 404181.6	Know the various microwave systems, device set ups of microwave measurement devices and Identify the effect of radiations on environmental sustainability.
BE	VLSI Design & Technology	CO 404182.1	Develop effective HDL codes for digital design
		CO 404182.2	Apply knowledge of real time issues in digital design.
		CO 404182.3	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
		CO 404182.4	Design CMOS circuits for specified applications.
		CO 404182.5	Analyze various issues and constraints in design of an ASIC
		CO 404182.6	Apply knowledge of testability in design and Build In Self Test (BIST) circuit.
BE	Cloud Computing	CO 404183.1	Understand the basic concepts of Cloud Computing.
		CO 404183.2	Describe the underlying principles of different Cloud Service Models.
		CO 404183.3	Classify the types of Virtualization.

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		CO 404183.4	Examine the Cloud Architecture and understand the importance of Cloud Security
		CO 404183.5	Develop applications on Cloud Platforms.
		CO 404183.6	Evaluate distributed computing and the Internet of Things.
BE	Speech Processing	CO 404184C.1	Understand basics of Human speech production mechanism.
		CO 404184A.2	Classify speech sounds based on acoustic and articulatory phonetics
		CO 404184A.3	Analyse speech signal to extract the characteristic of vocal tract (formants) and vocal cords (pitch).
		CO 404184A.4	Evaluate speech signal for extracting LPC and MFCC Parameters of speech signal.
		CO 404184A.5	Implement algorithms for processing of speech and audio signals considering the properties of acoustic signals.
		CO 404184A.6	Design speech recognition application for speech signal analysis.
BE	PLC SCADA and Automation	CO 404184B.1	Understand and Recognize Industrial Control Problems.
		CO 404184B.2	Analyze & explain different hardware functions of PLC.
		CO 404184B.3	Develop Ladder Programming in PLC and PLC Interface in real time applications.
		CO 404184B.4	Explore and interpret functionality of SCADA.
		CO 404184B.5	Identify and interpret the functionality of DCS.
		CO 404184B.6	Define and explain CNC machines and Applications of Industrial Protocols.
BE	Java Script	CO 404184C.1	Use basic features of java script
		CO 404184C.2	Use relevant data types for developing application in java script.
		CO 404184C.3	Use the function and objects as self-contained, with data passing in and out through well-defined interfaces in development of small systems.
		CO 404184C.4	Apply the regular expression for Text matching and manipulation
		CO 404184C.5	Explore use of the various aspects of JavaScript object models that are fundamental to the proper use of the language.
		CO 404184C.6	Develop the application using windows controlling and form handling
BE	Embedded System & RTOS	CO 404184D.1	Apply design metrics of Embedded systems to design real time applications to match recent trends in technology.
		CO 404184D.2	Apply Real time systems concepts
		CO 404184D.3	Evaluate µCOS operating system and its services
		CO 404184D.4	Apply Embedded Linux Development Environment and testing tools.
		CO 404184D.5	Analyze Linux operating system and device drivers
		CO 404184D.6	Analyze the hardware – software co design issues for testing of real time Embedded system.
BE	Modernized IoT	CO 404184E.1	Comprehend and analyze concepts of sensors, actuators, IoT and IoE.
		CO 404184E.2	Interpret IoT Architecture Design Aspects.
		CO 404184E.3	Comprehend the operation of IoT protocols
		CO 404184E.4	Describe various IoT boards, interfacing, and programming for IoT.
		CO 404184E.5	Illustrate the technologies, Catalysts, and precursors of IIoT using suitable use

Course Outcomes

			cases.
		CO 404184E.6	Provide suitable solution for domain specific applications of IoT.
BE	Data Mining	CO 404185A.1	Understand the process of data mining and performance issues in data mining
		CO 404185A.2	Apply data preprocessing techniques to the historical data collected in data warehouse
		CO 404185A.3	Analyze various types of Frequent pattern analysis methods and advanced Pattern mining techniques
		CO 404185A.4	Evaluate various data mining algorithms for developing effective data mining models
		CO 404185A.5	Analyze different clustering and outlier detection methods
		CO 404185A.6	Design data mining models in different mining application areas
BE	Electronics Product Design	CO 404185B.1	Understand and explain design flow of design of electronics product
		CO 404185B.2	Associate with various circuit design issues and testing
		CO 404185B.3	Inferring different software designing aspects and the Importance of product test & test specifications.
		CO 404185B.4	Summarizing printed circuit boards and different parameters
		CO 404185B.5	Estimating assorted product design aspects.
		CO 404185B.6	Exemplifying special design considerations and importance of documentation
BE	Deep Learning	CO 404185C.1	Classify machine learning algorithms and its types.
		CO 404185C.2	Discuss the concepts of deep learning and its Frameworks
		CO 404185C.3	Identify the deep learning architectures with respect to the applications.
		CO 404185C.4	Demonstrate different architectures of Convolutional neural networks.
		CO 404185C.5	Discuss natural language processing architectures.
		CO 404185C.6	Make use of various case studies and deep learning applications.
BE	Low Power CMOS	CO 404185D.1	Explain the sources of power dissipation in CMOS
		CO 404185D.2	Classify the special techniques to mitigate the power consumption in CMOS circuits
		CO 404185D.3	Summarize the power optimization and trade off techniques in digital circuits.
		CO 404185D.4	Illustrate the power estimation at logic and circuit level.
		CO 404185D.5	Explain the software design for low power in various levels.
		CO 404185D.6	Use the CAD tools for low power synthesis
BE	Smart Antennas	CO 404185E.1	Compare various linear wire antenna and uniform array in terms of antenna parameters and analyze them based on the current distribution and identify an appropriate wire antenna for given application.
		CO 404185E.2	Classify Microstrip & re-configurable antenna and techniques.
		CO 404185E.3	Describe smart antenna systems and discuss the beam steering and mutual coupling effects.
		CO 404185E.4	Explain DOA estimation methods and classify.

Course Outcomes

		CO 404185E.5	Classify the beam forming methods.
		CO 404185E.6	Describe and Compare MIMO systems.
BE	Project Phase – I	CO 404188.1	Demonstrate a sound technical knowledge in field of E&TC in the form of project.
		CO 404188.2	Undertake real life problem identification, formulation and solution.
		CO 404188.3	Design engineering solutions to complex problems utilizing a systematic approach.
		CO 404188.4	Demonstrate the knowledge, effective communication skills and attitudes as professional engineer.
BE	Fiber Optic Communication	CO 404190.1	Explain the working of components and measurement equipments in optical fiber networks
		CO 404190.2	Calculate the important parameters associated with optical components used in fiber optic telecommunication systems.
		CO 404190.3	Compare and contrast the performance of major components in optical links.
		CO 404190.4	Evaluate the performance viability of optical links using the power and rise time budget analysis.
		CO 404190.5	Design digital optical link by proper selection of components and check its viability using simulation tools.
		CO 404190.6	Compile technical information related to state of art components, standards, simulation tools and current technological trends by accessing the online resources to update their domain knowledge
BE	Biomedical Signal Processing	CO 404191A.1	Describe the origin of various biomedical signals and Interpret the meaning of various parameters associated with biomedical signals
		CO 404191A.2	Analyze ECG Signals with extraction of meaningful information
		CO 404191A.3	Explain Processing of EEG signals for Diseases of Central Nervous System
		CO 404191A.4	Analyze EMG signals for understanding Neuromuscular Diseases
		CO 404191A.5	Analyze various Biomedical Signals
		CO 404191A.6	Process the biomedical signals to remove adaptive interference and noise
BE	Industrial Drives & Control	CO 404191B.1	Understand significance and design of various components of electrical drives.
		CO 404191B.2	Develop, evaluate and analyze the performance of DC motor drives
		CO 404191B.3	Design, estimate and examine the performance of chopper controlled DC drives.
		CO 404191B.4	Adapt, choose and categorize performance of PWM inverter drives for Induction motors
		CO 404191B.5	Elaborate, interpret and analyze the performance of Synchronous motor drive.
		CO 404191B.6	Develop, explain and examine performance of stepper motor control.
BE	Android Development	CO 404191C.1	Describe the process of developing mobile applications.
		CO 404191C.2	Create mobile applications on the different android platform.
		CO 404191C.3	Design and implement mobile applications involving data storage in databases.
BE	Embedded	CO 404191D.1	Apply the design aspects of Embedded system

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LATE G. N. SAPKAL COLLEGE OF ENGINEERING

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Department of Electronics & Telecommunication Engineering

Course Outcomes

	System Design	CO 404191D.2	Create and debug a firmware for the Embedded System using ARM Cortex M4.
		CO 404191D.3	Develop a specific software code for the functionality of the Embedded System.
		CO 404191D.4	Utilize an open source RTOS for embedded system design.
		CO 404191D.5	Design an advanced embedded system.
		CO 404191D.6	Explore Embedded Android system.
BE	Mobile Computing	CO 404191E.1	Understand concepts of Mobile Communication
		CO 404191E.2	Analyse next generation Mobile Communication System.
		CO 404191E.3	Understand network layers of Mobile Communication
		CO 404191E.4	Understand IP and Transport layers of Mobile Communication.
		CO 404191E.5	Study of different mathematical models.
		CO 404191E.6	Understand different mobile applications
BE	System on Chip	CO 404192A.1	Understand the basic concepts and architecture of SOC.
		CO 404192A.2	Understand the basic terminology of Verilog HDL programming.
		CO 404192A.3	Apply the various Verilog modeling styles in writing the design and testbench codes.
		CO 404192A.4	Understand the basic steps used in the VLSI Physical Design.
		CO 404192A.5	Understand the basic architecture of various processors used in SOC.
		CO 404192A.6	Understand the working principle of various Buses and memory used in SOC.
BE	Nanoelectronics	CO 404192B.1	Understand the fundamental knowledge behind nanotechnology.
		CO 404192B.2	Understand to Nano-CMOS technology.
		CO 404192B.3	Explore various Nanoelectronics material.
		CO 404192B.4	Understand the importance of carbon nanotubes.
		CO 404192B.5	Understand Nanomaterial and Nanodevice fabrication
		CO 404192B.6	Understand various applications of Nanotechnology in Electronics
BE	Remote Sensing	CO 404192C.1	Describe the concepts of remote sensing and electromagnetic radiation interaction.
		CO 404192C.2	Explain the sensors characteristics and analyze its resolution
		CO 404192C.3	Classify different types of satellite data products and design various color composites.
		CO 404192C.4	Describe the fundamentals of microwave remote sensing.
		CO 404192C.5	Analyze GNSS signal structure and augmentation systems.
		CO 404192C.6	Demonstrate and describe real life applications of remote sensing.
BE	Digital Marketing	CO 404192D.1	Design websites using free tools like Wordpress and explore it for digital marketing.
		CO 404192D.2	Apply various keywords for a website & to perform SEO.
		CO 404192D.3	Understand the various SEM Tools and implement the Digital Marketing Tools.
		CO 404192D.4	Illustrate the use of Facebook, Instagram and Youtube for Digital Marketing in real life.

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Course Outcomes

		CO 404192D.5	Use Linked in platform for various campaigning.
		CO 404192D.6	Understand the importance of recent trends in digital marketing
BE	Innovation and Entrepreneurship	CO 404193.1	Understand Innovation, Entrepreneurship and characteristics of an entrepreneur.
		CO 404193.2	Develop a strong understanding of the Design Process and its application in variety of business settings.
		CO 404193.3	Generate sustainable ideas.
		CO 404193.4	Explore various processes required to be an entrepreneur
		CO 404193.5	Understand patents and its process of filing.
		CO 404193.6	Choose and use appropriate social media for marketing.
BE	Digital Business Management	CO 404194.1	Identify drivers of digital business
		CO 404194.2	Illustrate various approaches and techniques for E-business and management.
		CO 404194.3	Prepare E-business plan.