Department of Electronics and Telecommunication

SE – 2019 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – III			
207005	**Engineering Mathematics III**	CO1	Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems
		CO2	Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems
		CO3	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
		CO4	Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory.
		CO5	Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
204181	**Electronic Circuits**	CO1	Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier.
		CO2	Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
		CO3	Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
		CO4	Explain internal schematic of Op-Amp and define its performance parameters
		CO5	Explain internal schematic of Op-Amp and define its performance parameters.
		CO6	Understand and compare the principles of various data conversion techniques and PLL with their applications.
204182	**Digital Circuits**	CO1	Identify and prevent various hazards and timing problems in a digital design.
		CO2	Use the basic logic gates and various reduction techniques

			of digital logic circuit.
		CO3	Analyze, design and implement combinational logic circuits.
		CO4	Analyze, design and implement sequential circuits.
		CO5	Differentiate between Mealy and Moore machines.
		CO6	Analyze digital system design using PLD.
204183	**Electrical Circuits**	CO1	Analyze the simple DC and AC circuit with circuit simplification techniques.
		CO2	Formulate and analyze driven and source free RL and RC circuits.
		CO3	Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
		CO4	Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
		CO5	Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
		CO6	Analyze and select a suitable motor for different applications.
204184	**Data structures**	CO1	Solve mathematical problems using C programming language.
		CO2	Implement sorting and searching algorithms and calculate their complexity.
		CO3	Develop applications of stack and queue using array.
		CO4	Demonstrate applicability of Linked List.
		CO5	Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity.
		CO6	Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.
SE – 2019 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – IV			
204191	**Signals & Systems**	CO1	Identify, classify basic signals and perform operations on

			signals.
		CO2	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.
		CO3	Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform.
		CO4	Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
		CO5	Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF.
		CO6	Compute the mean, mean square, variance and standard deviation for given random variables using PDF.
204192	**Control Systems**	CO1	Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
		CO2	Determine the (absolute) stability of a closed-loop control system
		CO3	Perform time domain analysis of control systems required for stability analysis
		CO4	Perform frequency domain analysis of control systems required for stability analysis
		CO5	Apply root-locus, Frequency Plots technique to analyze control systems
		CO6	Express and solve system equations in state variable form.
		CO7	Differentiate between various digital controllers and understand the role of the controllers in Industrial automation
204193	**Principles of Communication Systems**	CO1	To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
		CO2	Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
		CO3	Explain generation and detection of FM systems and

			compare with AM systems.
		CO4	Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
		CO5	Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
		CO6	Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.
204194	**Object Oriented Programming**	CO1	Describe the principles of object oriented programming.
		CO2	Apply the concepts of data encapsulation, inheritance in C++.
		CO3	Understand Operator overloading and friend functions in C++.
		CO4	Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
		CO5	Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
		CO6	Describe and use of File handling in C++.
204199	**Employability Skill Development**	CO1	Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
		CO2	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
		CO3	Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills
		CO4	Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career
		CO5	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.
204200	**Project Based Learning η**	CO1	Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
		CO2	Contribute to society through proposed solution by strictly following professional ethics and safety measures.

		CO3	Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
		CO4	Analyze the results and arrive at valid conclusion.
		CO5	Use of technology in proposed work and demonstrate learning in oral and written form.
		CO6	Develop ability to work as an individual and as a team member.

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TE – 2019 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester –V			
304181	Digital Communication	CO1	Apply the statistical theory for describing various signals in a communication system.
		CO2	Understand and explain various digital modulation techniques used in digital communication systems and analyze their performance in presence of AWGN noise.
		CO3	Describe and analyze the digital communication system with spread spectrum modulation.
		CO4	Analyze a communication system using information theoretic approach.
		CO5	Use error control coding techniques to improve performance of a digital communication system.
304182	Electromagnetic Field Theory	CO1	Apply the basic electromagnetic principles and determine the fields (E & H) due to the given source.
		CO2	Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either sides.
		CO3	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
		CO4	Formulate, Interpret and solve simple uniform plane wave (Helmholtz Equations) equations, and analyze the incident/reflected/transmitted waves at normal incidence.
		CO5	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
		CO6	Carry out a detailed study, interpret the relevance and applications of Electromagnetics.

304183	Database Management	CO1	Ability to implement the underlying concepts of a database system.
		CO2	Design and implement a database schema for a given problem-domain using data model
		CO3	Formulate, using SQL/DML/DDL commands, solutions to a wide range of query and update problems.
		CO4	Implement transactions, concurrency control, and be able to do Database recovery.
		CO5	Able to understand various Parallel Database Architectures and its applications.
		CO6	Able to understand various Distributed Databases and its applications.
304184	Microcontrollers	CO1	Understand the fundamentals of microcontroller and programming.
		CO2	Interface various electronic components with microcontrollers.
		CO3	Analyze the features of PIC 18F XXXX.
		CO4	Describe the programming details in peripheral support.
		CO5	Develop interfacing models according to applications
		CO6	Evaluate the serial communication details and interfaces.
304185	Digital Signal Processing	CO1	Interpret and process discrete/ digital signals and represent DSP system
		CO2	Analyze the digital systems using the Z-transform techniques.
		CO3	Implement efficient transform and its application to analyze DT signals.
		CO4	Design and implement IIR filters.
		CO5	Design and implement FIR filters.
		CO6	Apply DSP techniques for speech/ biomedical/ image signal processing.
304190	Skill Development	CO1	Student should recognize the need to engage in independent and life-long learning in required skill sets
		CO2	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.

		CO3	Student has to make use of the modern electronic and IT Engineering Tools and Technologies for solving electronic engineering problems
		CO4	Student would be able to communicate effectively at different technical and administrative levels.
		CO5	Student will exhibit leadership skills both as an individual and as a member in a team in multidisciplinary environment.
TE – 2019Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – VI			
304192	Cellular Networks	CO1	Understand fundamentals of wireless communications.
		CO2	Discuss and study OFDM and MIMO concepts.
		CO3	Elaborate fundamentals mobile communication.
		CO4	Describes aspects of wireless system planning.
		CO5	Understand of modern and futuristic wireless networks architecture.
		CO6	Summarize different issues in performance analysis
304193	Project Management	CO1	Apply the fundamental knowledge of project management for effectively handling the projects.
		CO2	Identify and select the appropriate project based on feasibility study and undertake its effective planning.
		CO3	Assimilate effectively within the organizational structure of project and handle project management related issues in an efficient manner.
		CO4	Apply the project scheduling techniques to create a Project Schedule Plan and accordingly utilize the resources to meet the project deadline.
		CO5	Identify and assess the project risks and manage finances in line with Project Financial Management Process.
		CO6	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.
304194	Power Devices &	CO1	To differentiate based on the characteristic parameters

	Circuits		among SCR, GTO, MOSFET & IGBT and identify suitability of the power device for certain applications and understand the significance of device ratings.
		CO2	To design triggering / driver circuits for various power devices.
		CO3	To evaluate and analyze various performance parameters of the different converters and its topologies.
		CO4	To understand significance and design of various protections circuits for power devices.
		CO5	To evaluate the performance of uninterruptible power supplies, switch mode power supplies and battery.
		CO6	To understand case studies of power electronics in applications like electric vehicles, solar systems etc.
304195	Embedded Processors	CO1	Understand basics of Embedded C Programming and usage of Embedded C and study different software tools for programming microcontrollers.
		CO2	Get acquainted with various Embedded Processor architectures related to industrial application.
		CO3	Know about the programming of ARM 7 based microcontroller with on chip peripherals and external peripherals.
		CO4	Understand the architectures of ARM Cortex M4 Microcontrollers and its advantages over ARM 7 Microcontrollers.
		CO5	Implement the real world programming of ARM 7 based microcontroller with on chip peripherals and external peripherals.
		CO6	Recognize the interfacing of real world sensors and standard buses. Will also able to design different case studies.
304199	Internship	CO1	To develop professional competence through internship.
		CO2	To apply academic knowledge in a personal and professional environment
		CO3	To build the professional network and expose students to future employees.
		CO4	Apply professional and societal ethics in their day to day life.
		CO5	To become a responsible professional having social, economic and administrative considerations.

		CO6	To make own career goals and personal aspirations.
304200	Mini Project	CO1	Understand, plan and execute a Mini Project with team.
		CO2	Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
		CO3	Prepare a technical report based on the Mini project.
		CO4	Deliver technical seminar based on the Mini Project work carried out.

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BE – 2019 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester –VII			
404181	**Radiation & Microwave Theory**	CO1	Apply the fundamentals of electromagnetic to derive free space propagation equation and distinguish various performance parameters of antenna.
		CO2	Identify various modes in the waveguide. Compare: coaxial line, rectangular waveguides & striplines and identify applications of the same.
		CO3	Explore construction and working of principles passive microwave devices/components.
		CO4	Explore construction and working of principles active microwave devices/component
		CO5	Analyze the structure, characteristics, operation, equivalent circuits and applications of various microwave solid state active devices
		CO6	Know the various microwave systems, device set ups of microwave measurement devices and Identify the effect of radiations on environmental sustainability
404182	**VLSI Design and Technology**	CO1	Develop effective HDL codes for digital design.
		CO2	Apply knowledge of real time issues in digital design
		CO3	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs
		CO4	Design CMOS circuits for specified applications.
		CO5	Analyze various issues and constraints in design of an ASIC.
		CO6	Apply knowledge of testability in design and Build In Self Test (BIST) circuit
404183	**Cloud Computing**	CO1	Understand the basic concepts of Cloud Computing
		CO2	Describe the underlying principles of different Cloud Service Models.
		CO3	Classify the types of Virtualization.

		CO4	Examine the Cloud Architecture and understand the importance of Cloud Security
		CO5	: Develop applications on Cloud Platforms.
		CO6	Evaluate distributed computing and the Internet of Things.
404184	**Elective - 3 Embedded & RTOS**	CO1	Apply design metrics of Embedded systems to design real time applications to match recent trends in technology
		CO2	Apply Real time systems concepts
		CO3	Evaluate µCOS operating system and its services
		CO4	Apply Embedded Linux Development Environment and testing tools
		CO5	Analyze Linux operating system and device drivers
		CO6	Analyze the hardware – software co design issues for testing of real time Embedded system
404185 E	**Elective - 4 Electronic Product Development**	CO1	Understand and explain design flow of design of electronics product.
		CO2	Associate with various circuit design issues and testing.
		CO3	Inferring different software designing aspects and the Importance of product test & test specifications.
		CO4	Summarizing printed circuit boards and different parameters.
		CO5	Estimating assorted product design aspects.
		CO6	Exemplifying special design considerations and importance of documentation.
404188	**Project Phase – I**	CO1	Demonstrate a sound technical knowledge in field of E&TC in the form of project.
		CO2	Undertake real life problem identification, formulation and solution.
		CO3	Design engineering solutions to complex problems utilizing a systematic approach.
		CO4	Demonstrate the knowledge, effective communication skills and attitudes as professional engineer.

BE – 2019 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – VIII			
404190	**Fiber Optic Communication**	CO1	Explain the working of components and measurement equipments in optical fiber networks.
		CO2	Calculate the important parameters associated with optical components used in fiber optic telecommunication systems.
		CO3	Compare and contrast the performance of major components in optical links.
		CO4	Evaluate the performance viability of optical links using the power and rise time budget analysis.
		CO5	Design digital optical link by proper selection of components and check its viability using simulation tools.
		CO6	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.
404191	**Elective - 5 4. Embedded System Design**	CO1	Apply the design aspects of Embedded system
		CO2	Create and debug a firmware for the Embedded System using ARM Cortex M4.
		CO3	Develop a specific software code for the functionality of the Embedded System.
		CO4	Utilize an open source RTOS for embedded system design
		CO5	Design an advanced embedded system
		CO6	Explore Embedded Android system.
404193	**Innovation & Entrepreneurship**	CO1	Understand Innovation, Entrepreneurship and characteristics of an entrepreneur
		CO2	Develop a strong understanding of the Design Process and its application in variety of business settings.

		CO3	Generate sustainable ideas
		CO4	Explore various processes required to be an entrepreneur.
		CO5	Understand patents and its process of filing.
		CO6	Choose and use appropriate social media for marketing.
404194	**Digital Business Management**	CO1	Identify drivers of digital business
		CO2	Illustrate various approaches and techniques for E-business and management
		CO3	Prepare E-business plan
404188	**Project Phase-II**	CO1	Students will be able to Learn teamwork
		CO2	Students will be able to Be well aware about Implementation phase
		CO3	Students will be able to Get exposure of various types of testing methods and tools
		CO4	Students will be able to Understand the importance of documentation