Electronics & Telecommunication

Engineering Department

*Course Outcome_* AY 2021-2022

Department Vision

To recognize as excellent department offering competent technical education to create competent Electronics & Telecommunication Engineers for benefits of common masses.

Department Mission

Committed to serve the needs of society through innovative teaching – learning process, promoting Industry-Institute Interaction to provide competent and cultured Electronics and Telecommunication Engineers.

Program Educational Objectives

1. To impart state of art technical education in the Electronics & Telecommunication Engineering.

2. To promote society beneficial projects and activities.

3. To develop soft skill, teamwork, professional ethics and multidisciplinary approach for the carrier enhancement.

4. To bridge the gap between Industry-Institute through collaboration with Industries, Institutions and Universities.

5. To provide suitable infrastructure and facilities in tuned with advancing technological evaluation.

Program Outcomes

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PS01	Able to demonstrate design & test of electronics system that perform analog and digital functions.
PS02	Ability to use of technique, skill & engineering tools necessary for engineering practices.
PS03	Ability to apply fundamental knowledge of electronics and communication subjects in real world.

SECOND YEAR COURSE OUTCOMES

AY 2021-2022_SEMESTER – I

207005 - C201	ENGINEERING MATHEMATICS
C201.1	Solve higher order linear differential equation and illustrate mathematical model on simple electrical circuit and control system
C201.2	Solve basic problems involving Fourier transform, Z-Transform and illustrate their applications
C201.3	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.
C201.4	Perform vector differentiation and analyze the vector fields
C201.5	Perform vector integration, analyze the vector fields and apply to electro- magnetic fields& wave theory.
C201.6	Analyze conformal mappings, transformations and perform contour integration of complex functions

204181-C202	ELECTRONICS CIRCUITS
C202.1	Analyze the physics, characteristics, and parameters of MOSFET towards its application as an amplifier.
C202.2	Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given Specifications.
C202.3	Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
C202.4	Draw internal schematic of Op-Amp and analyze its performance parameters.
C202.5	Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
C202.6	Compare the principles of various data conversion techniques and PLL with their applications.

204182-C203	DIGITAL CIRCUITS
C203.1	Identify and prevent various hazards and timing problems in a digital design
C203.2	Use the basic logic gates and various reduction techniques to design digital logic circuit.
C203.3	Design and implement combinational logic circuits
C203.4	Analyze, design and implement sequential circuits
C203.5	Design sequential logic circuit using Finite State Machine and Algorithmic State Machine.
C203.6	Design combinational circuit using PLD's & classify and characterise various semiconductor memories

204183-C204	ELECTRICAL CIRCUITS
C204.1	Analyze the simple DC and AC circuit with circuit simplification techniques.
C204.2	Formulate and analyze driven and source free RL and RC circuits.
C204.3	Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
C204.4	Explain construction, working and applications of DC Generator, DC Motor and Permanent Magnet DC Motor.
C204.5	Explain construction, working and applications of Single phase & Three phase AC Motors.
C204.6	Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.

204184-C205	DATA STRUCTURE
C205.1	Apply fundamentals of C for array, pointers, file handling
C205.2	Implement sorting and searching algorithms and calculate their complexity.
C205.3	Develop applications of stack and applicability of queue using array
C205.4	Demonstrate applicability of Linked List to develop stack and queue using link list
C205.5	Demonstrate applicability of nonlinear data structures and evaluate string using Tree
C205.6	Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm

204185-C206	ELECTRONICS CIRCUIT LAB
C206.1	Design & implement single stage MOSFET amplifier and analyze it's DC operating points, Av, Ri, Ro & bandwidth
C206.2	Implement current series feedback amplifier and analyze it's Rif, Rof, Avf & bandwidth
C206.3	Design & implement an adjustable voltage regulator using three terminal voltage regulator IC and analyze it's percentage load and line regulation.
C206.4	Implement and compare using datasheet for OPAMP 741 and LF351 for their Input bias current, Input offset current, Input offset voltage, Slew rate & CMRR
C206.5	Design and implement to analyze OPAMP as Integrator, DAC, Square and triangular waveform generator.
C206.6	Design and implement to analyze OPAMP as Schmitt trigger & Instrumentation Amplifier

204186-C207	DIGITAL CIRCUIT LAB
C207.1	Verify truth table of IC-74LS153, IC-74LS138 and implement for 3 and 4 bit variable functions.
C207.2	Design and implement 1 Digit BCD adder , 4-bit binary subtractor using 74LS83 implement 4 & 8 bit comparator using 74LS 85 .
C207.3	Verify voltage and current parameter for TTL and CMOS ICs.
C207.4	Design and implement Synchronous and asynchronous counter using JK flipflop 74LS90, IC74HC191
C207.5	Verify truth table of IC-74LS153, IC-74LS138 and implement for 3- and 4-bit variable functions.
C207.6	Design and implement 1 Digit BCD adder , 4-bit binary subtractor using 74LS83 implement 4 & 8 bit comparator using 74LS 85 .

204187-C208	ELECTRICAL CIRCUIT LAB
C208.1	Analyze the simple DC circuits using Network Theorems.
C208.2	Carry out the transient analysis and determine the voltage, current expressions for RL, RC and RLC Network.
C208.3	Determine "Network Parameters" for given network and analyze using Laplace Transform to find the network transfer function.
C208.4	Analyzing characteristics of DC Shunt motor.
C208.5	Analyzing parameters and characteristics of three phase AC Motors
C208.6	Make a report on construction, working and applications of special purpose motors

204188-C209	DATA STRUCTURE LAB
C209.1	Conceptual Implementation of String, files, structure using array and pointers
C209.2	Implement sorting algorithm and analyses time complexity
C209.3	To implement stack and queue using array and link list
C209.4	Create Link list and perform operation like insert, delete, search, sort, traversing.
C209.5	Implement Binary search tree with operations
C209.6	Implement graph with different traversal techniques

204189-C210	ELECTRONICS SKILL DEVELOPMENT
C210.1	Identify and analyze the appropriate electronic principle for the task.
C210.2	Build an electronic circuit as per required specifications.
C210.3	Design a Printed Circuit Board layout using PROTEOUS programme.
C210.4	Assemble components and Printed Circuit Board
C210.5	Measure the parameters of electronic circuit and test it.
C210.6	Conduct circuit simulation using suitable software

204190-C211	Audit Course - I
C211.1	Demonstrate an integrative approach to environmental issues with a focus on sustainability
C211.2.	Understand and evaluate the global scale of environmental problems.

SECOND YEAR COURSE OUTCOMES

AY 2021-2022_SEMESTER - II

204191-C212	SIGNALS & SYSTEMS
C212.1	Classify different signals and systems and perform operations on signals.
C212.2	Analyze the LTI systems in time domain and determine the convolution between two signals.
C212.3	Analyze and resolve the signals in frequency domain using Fourier series.
C212.4	Analyze and resolve the signals in frequency domain using Fourier Transform.
C212.5	Apply and Analyze LTI systems using Laplace transform.
C212.6	Apply the concept of probability to compute statistical parameters, CDF and PDF.

204192-C213	CONTROL SYSTEMS
C213.1	Apply the Knowledge of model of physical system to analyze and check the stability of the control system
C213.2	Apply the knowledge of time domain analysis to check the stability of a closed-loop control system
C213.3	Apply and analyze the time domain technique to check the stability of system.
C213.4	To Analyze the performance characteristics of system using frequency response method
C213.5	Apply knowledge of state variable form for system equation.
C213.6	Compare various digital controllers and understand the role of the controllers in Industrial automation.

204193-C214	PRINCIPLES OF COMMUNICATION SYSTEMS
C214.1	To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes
C214.2	Apply amplitude modulation concepts for measurement of modulation index & compare different generation techniques
C214.3	Analyze the mathematical techniques of generation, transmission of FM & PM signals
C214.4	Compare various pulse modulation techniques& analyze sampling effects.
C214.5	Compare various modulation techniques in a digital communication system.
C214.6	Illustrate waveform coding, digital multiplexing and synchronization techniques and their importance in baseband digital transmission.

204194-C215	OBJECT ORIENTED PROGRAMMING
C215.1	Apply the principles of object-oriented programming and basic of C++ to write simple programming.
C215.2	Apply the concepts of OOP such as classes & objects, data encapsulation in C++ to create application.
C215.3	Create application by using the concept of polymorphism (operator overloading) and friend function in C++.
C215.4	Create application by using the concepts of classes, methods inheritance and polymorphism to write programs C++.
C215.5	Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
C215.6	Create application by using concept of file in Cpp programming.

204195-C216	SIGNALS & CONTROL SYSTEMS LAB
C216.1	Simulate the signals and systems using MATLAB
C216.2	Analyze the signals with the help of Fourier analysis
C216.3	Design the simulation platform for spectral analysis of real time signals
C216.4	Check the time response analysis for first and second order systems for step input using MATLAB SOFTWARE
C216.5	Check the stability of the system in time domain and the frequency response analysis in Bode , Nyquist and Polar plot using MATLAB.
C216.6	Observe the effect of P, PI, PD, and PID controller on step response of a feedback control system using MATLAB SOFTWARE.

204196-C217	PRINCIPLES OF COMMUNICATION SYSTEM LAB
C217.1	Evaluate analog modulated waveform in time /frequency domain and also find modulation index
C217.2	Analyze transmission & reception of Phase modulation
C217.3	To illustrate the effect of sampling theorem.
C217.4	Analyze the pulse modulation nature in communication
C217.5	Able to use sampling techniques in MATLAB Simulink
C217.6	Able to use the pulse modulation techniques in MATLAB Simulink

204197-C218	OBJECT ORIENTED PROGRAMMING LAB
C218.1	Apply the basic of C++ to write simple programming
C218.2	Create an application by using concept of classes, objects, Constructor and Destructor in C++ programming.
C218.3	Develop an application by using concept of operator overloading.
C218.4	By using principle of OOP – inheritance, polymorphism; develop an application in C++.
C218.5	Create application in cpp by using Concept of namespaces , template ,exception handling.
C218.6	Create an application in CPP , to retrieve , write data in file.

204198-C219	DATA ANALYTICS LAB
C219.1	Install Python Jupyter and write programs using NumPy, Pandas, Matplotlib and Scikit-learn
C219.2	Write programs related to 1D and 2D arrays also use data series data frame.
C219.3	Write programs to visualize output using various graphs and plots
C219.4	Write programs for Data Wrangling Operation.
C219.5	Write programs for Exploratory Data Analysis.
C219.6	Complete an end-to-end project related to data analytics.

204199-C220	EMPLOYABILITY SKILL DEVELOPMENT LAB
C220.1	Apply SWOC assessment to develop personal and career goals using introspective skills. Outline and evaluate short-term and long-term goals.
C220.2	Develop effective communication skills listening, reading, writing, and speaking
C220.3	Develop self- management attributes, problem solving abilities and team working & building capabilities
C220.4	Work in multi-cultural professional environment, leadership qualities and work effectively by enhancing inter-personal relationships, conflict management and leadership skills.
C220.5	Apply professional ethics, etiquettes & morals to enhance the opportunities of employability and excel in the professional environment.
C220.6	Develop practically deployable skill set like critical thinking, Quantitative Ability & Logical Reasoning to enhance the opportunities of employability and excel in the professional environment.

204200-C221	PROJECT BASED LEARNING
C220.1	Identify the real-world problem through a literature survey and/or field visits.
C220.2	Identity project & learning objectives as a part of a team.
C220.3	Design system by selecting appropriate technology, components & cost effective measures.
C220.4	Contribute to society through proposed solution by following professional ethics and safety measures.
C220.5	To derive inferences, communicate effectively & identify the extension of the project.
C220.6	Lead individuals and teams using effective communication skills.

204201-C222	MANDATORY AUDIT COURSE 4 – ENHANCING SOFT SKILLS AND PERSONALITY
C222.1	To develop effective communication & Presentation skills
C222.2	To develop interpersonal & management skills
C223.3	To facilitate an all-round development of personality

THIRD YEAR COURSE OUTCOME
AY 2021-2022 _SEMESTER – I

304181-C301	DIGITAL COMMUNICATION
C301.1	Apply the knowledge of probability and statistical calculations on random signal analysis.
C301.2	Measure the performance of digital communication receiver systems in terms of probability of error in presence of noise
C301.3	Find the probability of error of different pass band transmission techniques.
C301.4	Analyze Performance of spread spectrum communication system and classify it to improve the performance under fading channels for various applications.
C301.5	Apply the concept of average information content,entropy and mutual information to design efficient encoding schemes for communication system
C301.6	Design a data compression scheme using suitable sourse coding technique to maximize the data rate

304182-C302	ELECTROMAGNETIC FIELD THEORY
C302.1	Apply the basic electromagnetic principles to E & H field for different source.
C302.2	Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either sides.
C302.3	Apply Maxwell's equations in both the forms for various sources and Calculate the time average power density using Power Poynting Theorem, retarded vector magnetic potential.
C302.4	Analyze the incident/reflected/transmitted waves at normal incidence.
C302.5	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.
C302.6	Carry out a detailed study, interpret the relevance and applications of Electromagnetics.

304183-C303	DATABASE MANAGEMENT
C303.1	Ability to implement the underlying concepts of a database system.
C303.2	Design and implement a database schema for a given problem-domain using data model.
C303.3	Formulate, using SQL/DML/DDL commands, solutions to a wide range of query and update problems
C303.4	Implement transactions, concurrency control, and be able to do Database recovery.
C303.5	Able to Compare various Parallel Database Architectures and Identify for various applications
C303.6	Able to understand various Distributed Databases Evaluate it for various applications

304184-C304	MICROCONTROLLER
C304.1	Understand the fundamentals of microcontroller and write a Sample programs in C language.
C304.2	Interface various electronic components with microcontrollers.
C304.3	Analyze the features of PIC 18F XXXX.
C304.4	Describe the programming details in peripheral support.
C304.5	Develop interfacing models according to applications.
C304.6	Evaluate the serial communication details and interfaces.

304185-C305A	ELECTIVE - I FUNDAMENTALS OF JAVA PROGRAMMING
C305.1	Demonstrate the use of basic principles of Java programming language for problem solving.
C305.2	Apply the concepts of classes and objects to write programs in Java
C305.3	Demonstrate the concepts of methods & Inheritance
C305.4	Use the concepts of interfaces & packages for program implementation.
C305.5	Demonstrate the use of multithreading and Exception handling in Java to develop programs
C305.6	Apply knowledge of Graphics class, AWT packages and input and output files to write program in Java

304185-C305A	Elective - I COMPUTER NETWORK
C305.1	Design LAN using appropriate networking architecture, topologies , transmission media and networking devices
C305.2	Analyze data link services, error detection and correction for flawless data communication using data link layer protocols
C305.3	Apply switching techniques and internet protocol addressing for network layer
C305.4	Analyze, classify and compare interior and exterior, unicast and multicasting protocols of network layer
C305.5	Apply and Analyze data flow using TCP/UDP protocols, congestion control techniques for QoS
C305.6	Analyze and compare protocols suitable at application layer

304186-C306	DIGITAL COMMUNICATION LAB
C306.1	Able to analyze digital modulation techniques using hardware setup kit.
C306.2	Describe and analyze the digital communication system with spread spectrum modulation
C306.3	Able to analyze digital modulation techniques by using MATLAB tools (M-ary PSK & QAM)
C306.4	Able to analyze digital modulation techniques by using MATLAB tools (BPSK Receiver)
C306.5	Able to identify and describe different techniques in modern digital communications, in particular in source coding using MAT Lab tools.
C306.6	Apply the knowledge of digital electronics and describe the error control codes like block code, cyclic code

304187-C307	DATABASE MANAGEMENT LAB
C307.1	Develop open source relational database using MySQL.
C307.2	Design and Develop appropriate DDL query of relational database
C307.3	Design and Develop appropriate DML query of relational database
C307.4	Write a PL/ SQL block for control structure & Cursor
C307.5	Write a PL/ SQL block for stored Procedure, Function & Trigger.
C307.6	Develop interfacing of Database with Java/ Python & with Database Relational Design

304188-C308	MICROCONTROLLER LAB
C308.1	To write assembly and embedded c programming of 8051 microcontroller
C308.2	To write embedded c programming of pic18xx microcontroller
C308.3	To interface of real world peripheral devices with 8051 microcontroller.
C308.4	To interface of real world peripheral devices with pic18xx microcontroller.
C308.5	To select various hardware and software tools for developing applications using 8051 microcontrollers.
C308.6	To select various hardware and software tools for developing applications usin pic18xx microcontroller.

304189-C309A	ELECTIVE- I -LAB-CORE JAVA
C309.1	Apply basic principles of Java programming language to write program to learn concept like Constants, Variables, and Data Types, Operators and Expressions, Decision making statements in Java.
C309.2	Apply the concepts of classes, objects and constructor and destructor to write simple java programs
C309.3	Apply the concepts of inheritance, interfaces & packages to implement simple programs.
C309.4	Demonstrate the use of Exception handling in Java to develop programs
C309.5	Apply concept of Graphics class, AWT packages to write simple programs of applet.
C309.6	Apply the concept of files in java to implement simple programs

304189-C309B	ELECTIVE - I _LAB – COMPUTER NETWORK
C309.1	Create LAN for computers using network simulator
C309.2	Apply various command prompts to various Networks (LAN, WAN) using relevant network devices on Simulator.
C309.3	Configure router using RIP.
C309.4	Implement leaky bucket/ token bucket using simulator.
C309.5	Implement Telnet, DHCP Server using simulator.
C309.6	Analyze the performance of various communication protocols and Configure HTTP / FTP and using packet analysis tools.

304190-C310	SKILL DEVELOPMENT
C310.1	Identify and analyze the appropriate electronic principle for the task.
C310.2	Build an electronic circuit as per required specifications.
C310.3	Design a Printed Circuit Board layout using PROTEOUS programme.
C310.4	Assemble components and Printed Circuit Board
C310.5	Measure the parameters of electronic circuit and test it.

304191A- C311	MANDATORY AUDIT COURSE 5 : DEVELOPING SOFT SKILLS AND PERSONALITY
C311.1	Develop effective communication skills (spoken and written).
C311.2	Develop effective presentation skills.
C311.3	Become self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills

THIRD YEAR COURSE OUTCOME

AY 2021- 2022_SEMESTER - II

304192-C312	CELLULAR NETWORK
C312.1	Apply the fundamental knowledge of wireless communication
C312.2	Analyze the performance of OFDM & MIMO system
C312.3	Design cellular radio system & compare handover mechanism.
C312.4	Analysis of link budget & tele traffic system models.
C312.5	Compare wireless mobile technologies, wireless network using simulation.
C312.6	Summarize different issues in performance analysis.

304193-C313	PROJECT MANAGEMENT
C313.1	Apply the fundamental knowledge of project management for effectively handling the projects.
C313.2	Identify and select the appropriate project based on feasibility study and undertake its effective planning.
C313.3	Assimilate effectively within the organizational structure of project and handle project management related issues in an efficient manner.
C313.4	Apply the project scheduling techniques to create a Project Schedule Plan and accordingly utilize the resources to meet the project deadline.
C313.5	Identify and assess the project risks and manage finances in line with Project Financial Management Process.
C313.6	Apply the fundamental knowledge of project management for effectively handling the projects.

304194-C314	POWER DEVICES & CIRCUITS
C314.1	Based on the characteristic parameters among SCR, GTO, MOSFET & IGBT, analyze and identify suitability of the power device for certain applications and understand the significance of device ratings.
C314.2	To design triggering / driver circuit for various power devices.
C3141.3	To evaluate and analyze various performance parameters of the different converters and its topologies.
C314.4	Design of various protections circuits for power devices
C314.5	To evaluate the performance of uninterruptible power supplies, switch mode power supplies and battery.
C314.6	Analyze case studies of electric vehicles & solar systems by using power electronics

304195-C315	ELECTIVE-II-NETWORK SECURITY
C315.1	Analyze attacks on computers and computer security
C315.2	Analyze knowledge of cryptography techniques
C315.3	Apply and analyze various symmetric asymmetric keys for ciphers
C315.4	Evaluate different message authentication algorithms and hash functions
C315.5	Analyze various aspects of E-Mail Security
C315.6	Analyze various aspects of Web Security

304195-C315	ELECTIVE – II- ADVANCED JAVA PROGRAMMING
C315.1	Design and Investigate GUI applications using Applets and JApplet - swing component
C315.2	Design and Investigate GUI application using relevant AWT/ swing components to handle the event like key event, window event, mouse event.
C315.3	Design and Investigate GUI applications using Abstract Windowing Toolkit (AWT), Swing and collection frameworks.
C315.4	Design application to access database through java program
C315.5	Design & investigate an application using remote method & invocations(RMI)
C315.6	Develop program for client /server communication using Java Networking classes.

304196-C316	CELLULAR NETWORKS LAB
C316.1	Compute and compare the median loss by employing Hata model for various distance.
C316.2	Simulate BER Performance over a Wireline AWGN channel with BPSK transmission for SNR:0 to 50 dB.
C316.3	Compute the RMS delay spread for a given power profile and plot the graph of power Vs delay.
C316.4	Perform a Link-Budget analysis for a wireless communication system.
C316.5	Estimate channel coefficient vector Multi-Antenna Systems.
C316.6	Program to implement OFDM and Evaluate frame error rate against SNR.

304197-C317	POWER DEVICES & CIRCUITS LAB
C317.1	Analyze V-I Characteristics of SCR, MOSFET & IGBT
C317.2	Analyze single phase semi and full converters with R & R-L loads
C317.3	Analyze single phase PWM Power MOSFET based bridge inverter as well as DC chopper for R & R-L loads
C317.4	Analyze Switched Mode Power Supply
C317.5	Analyze single phase AC voltage controller using SCRs
C317.6	Design and implement a solar cell operated emergency lighting system as well as battery testing, safety and maintenance of batteries

304198-C318	ELECTIVE- II – ADVANCE JAVA LAB
C318.1	Developing GUI application using applet and handling key event.
C318.2	Developing GUI application by using relevant AWT/Swing components to handle the mouse event
C318.3	Develop application to insert and retrieve data from database through Java programs, using Java Database Connectivity
C318.4	Develop application to Invoke the remote methods using Remote Method Invocation (RMI) to accept simple datatypes.
C318.5	Develop application for client /server communication using Java Networking classes
C318.6	Develop application to create simple JSP pages using concept of servlets.

304198-C318	ELECTIVE – II- NETWORK SECURITY
C318.1	Analyze attacks on computers and computer security
C318.2	Analyze knowledge of cryptography techniques
C318.3	Apply and Analyze various symmetric asymmetric keys for ciphers
C318.4	Evaluate different message authentication algorithms and hash functions
C318.5	Analyze various aspects of E-Mail Security
C318.6	Analyze various aspects of Web Security

304199-C319	ELECTIVE – II- INTERNSHIP
C319.1	To develop professional competence through internship.
C319.2	To apply academic knowledge in a personal and professional environment.
C319.3	To build the professional network and expose students to future employees.
C319.4	Apply professional and societal ethics in their day to day life.
C319.5	To become a responsible professional having social , economic and administrative
C319.6	

304200-C320	MINI PROJECT
C320.1	Understand, plan and execute a Mini Project with team
C320.2	Implement electronic hardware by learning PCB artwork design
C320.3	Implement electronic hardware by learning soldering techniques
C320.4	Implement electronic hardware by learning testing and troubleshooting
C320.5	Prepare a technical report based on the Mini project
C320.6	Deliver technical seminar based on the Mini Project work carried out.

304196-C321	Audit Course-VI- Patent Law for Engineers and Scientists
C316.1	Identify weather Innovation is Patentable or not
C316.2	Draft Specification of the Patent

FINAL YEAR COURSE OUTCOME

AY 2021-2022 _SEMESTER - I

404181- C401	VLSI DESIGN & TECHNOLOGY
C401.1	Develop, Analyze digital circuits using HDL
C401.2	Apply knowledge of HDL to design Sequential circuit
C401.3	Model digital circuit with HDL, simulate, synthesis in FPGA
C401.4	Design CMOS circuits for specified applications
C401.5	Apply various issues and constraints in design of an ASIC , simulate CMOS circuit
C401.6	Apply knowledge of testability in design and build self test circuit

404182- C402	COMPUTER NETWORKS & SECURITY
C402.1	Apply fundamental underlying principles of computer networking by Drawing TCP/IP, Analysis of Media Access Control & its Comparison & Classify Ethernet as well as Wireless LAN & its application.
C402.2	Apply Analyze & Classify network layer protocol & Determine suitable IP addresses
C402.3	Analyze the requirements for a given organizational structure, Compare and select/Draw the most appropriate networking architecture and technologies;
C402.4	Analyze, Classify and Compare various protocols used at Transport layer & able to Draw architecture of various protocols.
C402.5	Analyze & Compare various Protocols suitable at applications Layer.
C402.6	Apply & Analyze cryptography technique for network security

404182 - C403	RADIATION & MICROWAVE TECHNIQUES
C403.1	To apply fundamental theory to analyse radiating element
C403.2	Analyze array radiating elements
C403.3	Formulate the wave equation for analysis of waveguide
C403.4	Scattering Analyze of passive of microwave components
C403.5	To analyze the active components of microwave systems
C403.6	To perform the various microwave measurement techniques

404184C- 404A	ELECTIVE-I EMBEDDED SYSTEMS & RTOS
C404A.1	Evaluate the requirements of programming Embedded Systems, related software and hardware architectures and tool chain for Embedded Systems.
C404A.2	To apply concept of real time system and scheduling algorithms in building embedded systems and analyze various real time operating systems
C404A.3	To demonstrate micro os2 Services
C404A.4	To apply the concept of Advanced embedded architectures to interface with various modules.
C404A.5	To develop applications for Linux Operating systems by using its concept.
C404A.6	Develop skills to design and implement using open platform for embedded system

404184D-404B	ELECTIVE-I INTERNET OF THINGS
C404B.1	Get insight of Internet of Things and apply to real time applications
C404B.2	Apply principles of RFID in application, Understand the concept of sensors/actuators and wireless sensor networks
C404B.3	Classify and compare WPAN technologies for IoT
C404B.4	Classify and compare IP based protocols for IoT
C404B.5	Analyze the data of IoT by understanding the concept of Big data and Hadoop
C404B.6	Apply the concept of IoT in real world applications

404185B-405A	ELECTRONICS PRODUCT DESIGN ELECTIVE -II
C405A.1	Analyze the different stages and evaluate different parameters involved in product design and development.
C405A.2	Compare various stages &testing methods for hardware design.
C405A.3	Compare various stages & testing methods for software design.
C405A.4	Analysis of various stages of PCB Design.
C405A.5	Analyze, Debug & Test different electronic products with safety measures.
C405A.6	Present documentation for development of electronic product.

404185D-405B	ARTIFICIAL INTELLIGENCE – ELECTIVE -II
C405B.1	Design and implement key components of intelligent agents and expert systems
C405B.2	Design smart system using different informed search/uninformed search or heuristic approaches
C405B.3	Apply knowledge representation techniques to represent common AI applications
C405B.4	Apply and classify the problem into a suitable form of learning and solve it
C405B.5	Design and integrate various pattern recognition and ai techniques in designing intelligent expert systems
C405B.6	Apply concepts of natural language processing to solve AI applications

404185D-405C	ELECTRONICS IN AGRICULTURE -ELECTIVE-II
C405C.1	Analyze computer system & virtual instrumentation.
C405C.2	Able to Provide communication solution for interpreting environmental parameters with Electronics systems
C405C.3	Choose suitable Instruments for different parameter measurement in agriculture sector.
C405C.4	Apply knowledge of Electronics in Agriculture
C405C.5	Suggest suitable instruments and systems for Greenhouse Technology
C405C.6	Apply Electronics Governance

404186-C406	LAB PRACTICE -I COMPUTER NETWORKS & SECURITY PR
C406.1	To Apply knowledge of networking for implementation & testing of LAN
C406.2	To Apply to Installation and configuration of server for different applications
C406.3	To Analyze computer networking using different tools/ software
C406.4	Design & analyze radiating elements.
C406.5	To Analyze Passive Microwave Components.
C406.6	Analyze active components by Microwave measurement.

404187-C407	LAB PRACTICE II (VLSI + ELECTIVE I)
C407.1	To study different IOT boards and its applications
C407.2	To understand interfacing of sensors and actuators with IOT boards
C407.3	To apply ucos 2 and rt-linux operating features (semaphore, mutex, multitasking, mailbox).
C407.4	To write application for modern architecture and open platform for embedded system
C407.5	To design CMOS circuit.
C407.6	To simulate, synthesis circuit with PLD Devices.

404188-C408	PROJECT PHASE -I
C408.1	Ability to identify community and its need, engage in study to research literature & consolidate to formulate the problem statement.
C408.2	Ability to engage in study to identify the mathematical, science and engineering concepts necessary to solve the identified engineering problem
C408.3	Ability to select the engineering tools/components for solving the identified engineering problem.

C416	Audit Course – V- HUMAN BEHAVIOR
C416.1	Society will observe change in awareness levels, knowledge and understanding of students.
C416.2	Society will observe change in attitudes / behavior of students with regards to their improved teamwork, institutional leadership and other life skills.
C416.3	Society will observe improvement in social health and attitude of students.

FINAL YEAR COURSE OUTCOME

AY 2021-2022_SEMESTER - II

404189 - C409	MOBILE COMMUNICATION
C409.1	Apply the concepts of switching technique and to Design multistage networks, Compare different switching techniques for Data communication.
C409.2	Determine the telecommunication traffic, derive loss system, Analyze Queuing system, and compare various signaling systems
C409.3	Analyze & Solve radio channel and cellular capacity, Compare Handoff strategies, Propagation Mechanism& model, Derive & Determine Small Scale Fading and Multipath
C409.4	Analyze the architecture of GSM system& its characteristics, classify different services & Design GSM system using Radio transmission parameters for different applications.
C409.5	Classify different Traffic and Logical Channels in GSM& its burst structure, demonstrate call set up procedure, Handover mechanism & its security and concepts of different GSM Services& Compare Multiple Access techniques
C409.6	Differentiate thoroughly the generations of mobile technologies

404190-C410	BROADBAND COMMUNICATION SYSTEMS
C410.1	Select the basic components, Compare different optical sources and detector for fiber optic communication system.
C410.2	Carry out Link power budget and Rise Time Budget analysis by proper selection of components and check its viability.
C410.3	Analyze different WDM components, apply diffraction grating and compare optical amplifiers for multichannel systems.
C410.4	Apply the orbital mechanics, compare different launchers, launch vehicles and interpret orbital effects in satellite communication systems.
C410.5	Analyze satellite subsystems, determine equipment reliability and space qualification for satellite communication systems.
C410.6	Carry out Satellite Link design for Up Link and Down Link.

404191- 411A	PLC AND AUTOMATION - ELECTIVE III
C411.1	To use concept of automation
C411.2	To use transmitters and design signal conditioning circuits.
C411.3	To select proper controller, input and output devices.
C411.4	To develop PLC ladder programs for simple industrial applications
C411.5	To design Automation systems for industrial applications using PLC approach.
C411.6	To demonstrate CNC Machine and use industrial communication protocols.

404191- 411A	MACHINE LEARNING - ELECTIVE III
C412.1	Understand and apply fundamentals of Machine Learning, types of Machine Learning and determine the need of feature selection for dimensionality reduction.
C412.2	Apply various techniques of linear regression and classification, analyze data and build Vector machines for classification.
C412.3	Apply various dimensionality reduction techniques and build K-means clustering and Gaussian Mixture model.
C412.4	Analyze activation functions, learning mechanisms and build artificial neural networks with the help of McCulloch-Pits Neuron Model.
C412.5	Apply artificial neural network algorithms for the solution of real-world problems.
C412.6	Implement convolution neural networks in recognition applications.

404192-C412	Elective IV Wireless Sensor Network
C413.1	Analyze various concepts and terminologies used in WSN for various application.
C413.2	Differentiate modulation techniques for radio wave. Analyze medium access protocols for different topology
C413.3	Differentiate wireless standards and protocols
C413.4	Analyze Localization Schemes and Routing ALGORITHMS
C413.5	Analyze techniques of data aggregation and importance of security in WSN
C413.6	Examine the issues involved in design and deployment of WSN

404193-C413	LAB PRACTICE-III (MC+BCS)
C413.1	Apply AT commands for voice and data operation, VoIP call routing process, Measure various voltages at PSTN switch
C413.2	Analyze Lost call system/delay system of voice/data traffic, bit error rate in presence of AWGN, GMSK/QPSK/QAM Modulation
C413.3	Measure bit error rate in presence of Hata/ Multipath propagation model for Link budget, Multiple access techniques such as TDMA/CDMA/OFDMA. Visit to Mobile Telephone Switching Office (MTSO).
C413.4	Measure Numerical aperture of optical fiber & characteristics of various sources and detectors.
C413.5	Analyze optical fiber attenuation, Power and time budget, direct communication link between Uplink Transmitter and Downlink Receiver
C413.6	Create AUDIO-VIDEO satellite link between Transmitter and Receiver

404194-C414	LAB PRACTICE IV (ELECTIVE III)
C414.1	Use the tools like Logix Pro of PLC for simple logics
C414.2	Interface the system components to PLC for electrical/mechanical automation applications.
C414.3	Execute the Automation system using SCADA / HMI/ Interactive simulation
C414.4	Design simulation of 3-cylinder piston pump, traffic controller, batch simulator and door simulator using PLC.
C414.5	Apply HMI to control AC Motor speed.
C414.6	Interface PLC to VFD over profibus and exchange the data.

404195-C415	PROJECT PHASE -II
C415.1	Ability to identify community and its need, engage in study to research literature & consolidate to formulate the problem statement.
C415.2	Ability to engage in study to identify the mathematical, science and engineering concepts necessary to solve the identified engineering problem
C415.3	Ability to select the engineering tools/components for solving the identified engineering problem.
C415.4	Ability to demonstrate compliance to the prescribed standards/safety norms through implementation of the identified engineering problem
C415.5	Ability to perform the budget analysis of the project through the utilization of resources (finance, power, area, bandwidth, weight, size, any other)
C415.6	Ability to analyze and interpret results of experiments conducted on the designed solution(s) to arrive at valid conclusions

C417	AUDIT COURSE-VI- TEAM BUILDING, LEADERSHIP AND FITNESS
C417.1	Society will observe change in awareness levels, knowledge and understanding of today's youth.
C417.2	Society will observe change in attitudes / behavior of students with regards to their improved teamwork, institutional leadership and other life skills.
C417.3	Society will observe improvement in student’s body’s fitness levels, social health, attitude and reduced health problem.