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Department of Electronics & Computer Engineering

Program: B.Tech - Electronics & Computer Science

Academic Year:2022-2023

COURSE CODE	COURSE NAME	CO NO	Description of the Course Outcome
22UC1101	Integrated Professional English	CO1	Understanding the language Mechanics in Basic Grammar & Interactive Listening & Speaking
		CO2	Applying Integrated Reading skills &Techniques of Writing
		CO3	Understand various strategies of reading and use them in interpreting the text.
		CO4	Apply the concepts of writing to draft corporate letters, emails and memos, reports, etc.
22UC1202	English Proficiency	CO1	Understanding Language Mechanics in advanced Grammar and advanced Communicative Listening & Speaking
		CO2	Applying the advanced Reading techniques and Advanced Techniques of Writing
		CO3	Classifying social media and corporate communication skills
		CO4	Applying analytical thinking skills
22UC2103	Essential Skills for Employability	CO1	Developing basic grammar Identify and organize sentence structures based on grammar and applying writing skills
		CO2	Develop effective interpersonal skills, cultivate a positive attitude, applypositive self-talk techniques, and use SWOC analysis to enhance employability.
		CO3	Develop drafting skills through the Cloze Test, Passage completion, E-mail writing, Paragraph writing, Essay writing
		CO4	Develop effective communication skills through JAM and extempore, describingproducts and processes through JAM and extempore, demonstrating proper email and phone etiquette, and improving listening skills to enhance personal andprofessional relationships.
22UC2204	Corporate Readiness Skills	CO1	Extend word power for developing effective speaking and writing skills
		CO2	Evaluate the coexistence of the "I" with the body.
		CO3	Identify and associate the holistic perception of harmony at all levels of existence.

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Code	Course	CO	Description
		CO4	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.
22UC0010	Universal Human Values & Professional Ethics	CO1	Understand and analyse the essentials of human values and skills, self-exploration, happiness, and prosperity.
		CO2	Envisage the roadmap to fulfil the basic aspiration of human beings.
		CO3	Analyze the profession and its role in this existence
		CO4	Understand the profession and his role in this existence
22UC0011	GENDER & SOCIAL EQUALITY	CO1	Students will have developed a better understanding of important issues related to gender in contemporary India
		CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological, and legal aspects of gender. This will be achieved through group discussions.
		CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
		CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
22UC0019	ESSENCE OF INDIAN KNOWLEDGE TRADITION	CO1	understand the concepts of Indian traditional knowledge
		CO2	develop the outstanding knowledge on Indian administration
		CO3	understand the importance of traditional culture and knowledge
		CO4	know the impact of western culture on Indian society
22UC0008	Indian Constitution	CO1	To acquire knowledge of the historical developments that culminated in the drafting of the Indian Constitution.
		CO2	To understand the basic features of the Indian Constitution.
		CO3	To understand the structure of the Federal government as defined by the Indian Constitution.
		CO4	To understand the Indian Judicial system and election commission of India
22UC0009	Ecology & Environment	CO1	Define to articulate a basic understanding of the importance of Environmental education and conservation of natural resources. conservation of natural resources and Energy resources.
		CO2	Understand concepts of ecosystems and learn methods for conservation of habitats and biodiversity.
		CO3	Identify critically the individual roles in the prevention of pollution. Environmental Studies will be enabled to do independent research on human interactions with the environment
		CO4	Recognize the knowledge of environmental legislation, disaster management and EIA process.
22UC0020T	ANCIENT INDIAN COMPUTING: A HISTORI	CO1	Summarize the contributions of ancient Indian mathematics, linguistics, logic, and philosophy to computational thinking.
		CO2	Apply the philosophical implications of ancient Indian computing
		CO3	Implement ethical ancient Indian computing and its relevance in contemporary society.

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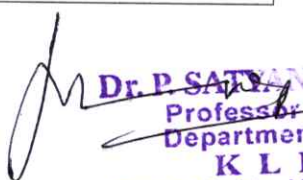
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	CAL AND CULTURAL PERSPECTIVE	CO4	Analyze the historical and cultural context of ancient Indian computing systems
22UC1203	DESIGN THINKING AND INNOVATION	CO1	Understand the importance of a Design thinking mindset for identifying contextualized problems
		CO2	Analyze the problem statement by empathizing with a user
		CO3	Develop ideation and test the prototypes made
		CO4	Explore the fundamentals of entrepreneurship skills for transforming the challenge into an opportunity
22UC0012	INNOVATION MANAGEMENT	CO1	Develop a value proposition for the problem identified
		CO2	Build MVP for the solution developed
		CO3	Devise to market strategy
		CO4	Create a Pitch-deck with a funding strategy
22MT1101	Mathematics for Computing	CO1	Model a system of equations for real-world applications in engineering, physical and biological sciences, computer science, finance, and economics and solve them through matrix algebra
		CO2	Model basic and computational techniques on discrete structures like relations, orders, functions & FSM, Lattices, and propositional &predicate logic
		CO3	Model real-world structures and their related applications using advanced discrete structures like graphs and trees.
		CO4	Model the given Statistical data for real-world applications in Engineering science, Economics and Management.
		CO5	Demonstrate the Aptitude and Reasoning skills (Tests in skilling hours)
22MT2102	Mathematics for Engineers	CO1	Apply differential and integral calculus to find maxima & minima of functions, evaluate the integrals and solve the differential equations.
		CO2	Demonstrate the Fourier series and Laplace transforms.
		CO3	Describe probability, Random Variables
		CO4	Explain complex variables, analytic functions and introduction to stochastic process and Algebraic structures.
22MT2005	PROBABILITY, STATISTICS & QUEUEING THEORY	CO1	understand the importance of probabilistic concepts in a wide spectrum of problems arising in engineering applied science
		CO2	Identify the relationship between variables using correlation and regression techniques
		CO3	Explain the role of Statistical tests of significance in solving real world engineering problems
		CO4	To formulate Stochastic process in terms of Markov chains and solve problems in queueing systems, and networks
22MT2004	MATHEMATICAL PROGRA	CO1	Apply various methods for finding the optimal solution of Linear Programming Problem
		CO2	Apply Integer and Fractional programming approaches for solving optimization problems

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	MMING	CO3	To express a practical problem, such as an engineering analysis or design problem and to optimize a multivariate quadratic function subject to linear constraints on the variables.
		CO4	To apply the search and optimization methodologies applicable to the resolution of multi-disciplinary decision problems, under a decision support framework.
22PH1211	Science Elective 1(Semiconductor Physics)	CO1	Understand semiconductor in terms of its electrical and optical properties
		CO2	Understand junction properties of semiconductor device.
		CO3	Understand the characteristics of devices like BJT, FET
		CO4	Understand the applications of photonic devices.
22CY1001	Science Elective 2(Engineering Chemistry)	CO1	Apply the operation of electrochemical systems to produce electric energy and storage devices.
		CO2	Use the fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena.
		CO3	Examine water quality and apply appropriate purification technique for intended problem.
		CO4	Employ the fundamental principles and general properties of materials in various engineering applications.
		CO5	Analyse the data, develop skills in chemical analysis and their application in engineering.
22UC3108	PROBLEM SOLVING AND REASONING SKILLS-1	CO1	Apply the concepts of mathematical principles besides logic and identifying certain basic mathematical formulae to solve these kinds of problems
		CO2	Apply the concepts of Co-primes, Divisibility rules, LCM &HCF concepts to solve problems in Numbers, Apply the concepts of Algebra to solve the problems based on Sets, Relations, Functions and Graphs, Surds & Indices, Logarithms, Quadratic Equations, Inequalities & Progressions.
		CO3	Apply Venn diagrams and other applicable diagrams to solve questions in Syllogism, Logical Venn Diagrams, Cubes & Dice. Understand the principles used in forming Number& letter series, Number, letter & word Analogy, Odd man out, Coding & Decoding.
		CO4	Understand the underlying assumptions in the arguments presented in the topics: Statements & conclusions, statements & Arguments (Critical Reasoning), statements & Assumptions, logical connectives, Binary logic.
22UC3209	PROBLEM SOLVING AND REASONING	CO1	Apply the concepts of Unitary method in solving problems in Time & Work, Chain Rule, Pipes & Cisterns. Apply the concept of Average speed and Relative speed to solve the problems related to Time, Speed &Distance, Trains, Boats & Streams, Races & games. Apply the concept of counting principles to solve the problems related to Permutations & Combinations and Probability.

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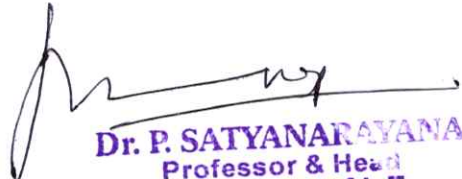(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

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	SKILL-2	CO2	Apply the concepts of Perimeter, Area, Surface Area & Volume to solve the problems in 2D & 3D Geometry. Apply the concepts of Trigonometry to solve problems related to Heights & Distances. Apply the concepts of Lines, Angles, Triangles, Quadrilaterals & Polygons to solve the problems related to Geometry, Analyzing the data given in the Table, Bar Graph, Pie Chart and Line Graph to solve the problems in Data Interpretation. Data Sufficiency, Statistics, Crypt arithmetic.
		CO3	Apply the fundamental relationships and principles in solving questions in Blood Relations, Directions, Clocks, Calendars, Alphabet Test, Number, ranking & Time sequence test, Seating Arrangements, Mathematical Operations, Data Sufficiency, Nonverbal - series, analogy, classification.
		CO4	Apply the conditions mentioned in the question statement to solve questions in Input & Output, Assertion and Reason, dot situation. embedded figures, figure matrix, mirror and water images, paper cutting, paper folding pattern completion, rule detection, flowcharts, Puzzles, Sudoku puzzles
22SC1101	Computational Thinking for Structured Design	CO1	Design Basic and Complex Building Blocks for real world problems using structured programming paradigm
		CO2	Translate computational thinking into Logic Design for Solving real world
		CO3	Apply and Analyse CRUD operations on Basic Data Structures using Asymptotic Notations
		CO4	Apply and Analyse CRUD operations on Linear Data Structures using Asymptotic Notations.
		CO5	Apply the structured programming paradigm with logic building skills on Basic and Linear Data Structures for solving real world problems
		CO6	Skill the students in such a way that students will be able to develop logic that help them to create programs as well as applications in C
221EC1101	Digital Logic & Processors	CO 1	Understand numerical and character representations in digital logic, number system, data codes and the corresponding 8design of arithmetic circuitry. Understanding Logic gates, Logic theorems, Boolean algebra and SOP/POS'S expressions.
		CO 2	Combinational systems design using standard gates and minimization methods
		CO 3	Sequential systems: Design of counters using flip flops.
		CO 4	Understanding PLA's, PAL's, FPGA's, and processors
		CO5	Analysing and realization of Boolean functions, half adder, encoders, decoders, flip flops, and counters.
22ME1103	Design Tools Workshop	CO 1	Practice design thinking by developing artistic skills, Visualize and complete his/her innovative design by final drafting using 3D modelling
		CO 2	Understand the concept of web page, web browser, web server, and able to create Static webpages
		CO 3	Understand the concept of report writing using a markup language Latex
		CO 4	Understand the concept of data visualization and creating data visualization dashboards, Understand the basic concept of VR/AR
22SC1209	IOT Workshop	CO1	To make the students to understand about the programming fundamentals of Arduino Software and Tinker cad

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		CO2	To demonstrate the Interfacing of Arduino UNO and ESP32 with LCD, LED, buzzer, and Push Button
		CO3	To design and configure the sensors with Arduino UNO and ESP32 Boards
		CO4	To design and configure the actuators with Arduino UNO and ESP32 Boards and build Arduino and ESP32 based application
22SC1210	Data Structures	CO1	Understand various sorting algorithms and analyze the efficiency of the algorithms
		CO2	Implement Linear Data Structures and Demonstrate their applications.
		CO3	Understand hashing techniques and Implement tree data structures.
		CO4	Understand graph data structures and apply graphs to solve problems
		COS	Develop and evaluate common practical applications for linear and nonlinear data structures.
22EC1202	Computer Organization & Architecture	CO1	Understand the functionality of CPU functional units control unit, registers, the arithmetic and logic unit, instruction execution unit
		CO2	Understand the concepts of CPU and the operation of main, cache and virtual memory organizations
		CO3	Understand the concepts of the different types of I/O modules and I/O transfer techniques in computer modules
		CO4	Apply the concept of pipelining in instruction execution and design issues of RISC, CISC and parallel computing architectures
22CS1201	OBJECT ORIENTED PROGRAMMING	CO1	Apply the concepts of Basic Data types, Operators, Decision and Looping Control Statements, Strings
		CO2	Apply the concepts of Lists, Tuples, Dictionaries. Functions, Modules, Class, Object, OOPS principles.
		CO3	Apply Concepts of OOP principles, classes and objects, Call by value vs. Call by reference, recursion, and Nested classes
		CO4	Apply Concepts of Files, Interfaces, Packages, Threads
		CO5	Design, implement, and evaluate Python programs using basic data types, variables, expressions, conditional statements, loops, functions, built-in data structures, object-oriented programming concepts, Python libraries and modules, debugging techniques, and file I/O to solve programming problems.
22EC1203	Design of Basic Electronic Circuits	CO1	Understand the basic electronic components.
		CO2	Understand the basic circuit analysis techniques
		CO3	Understand the active circuit elements and working.
		CO4	Analyse the applications of semiconductor devices
22EC2106	PROCESSORS AND CONTROLLERS	CO1	Apply the architectural features of CISC type of General-purpose processor Intel 8086.
		CO2	Apply the architectural features of CISC type of microcontroller Intel 8051 Microcontroller
		CO3	Analyze the Interfacing of Peripherals to the 8051 Microcontroller through programming using MCU8051 IDE.
		CO4	Apply the basic architecture concepts of ARM - CORTEX STM-32 Microcontroller

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		CO5	Analyze the programming & interfacing of 8051 and 8086 using the hardware/software tool.
		CO6	Analyze the programming & interfacing of 8051 using the proteus and keil tool.
22EC2105 R	SIGNALS & COMMUNICATION SYSTEMS	CO1	Understand the basic Continuous Time Signals and Systems
		CO2	Solve the frequency domain challenges and applications to systems.
		CO3	Interpret the principles of linear and angle modulation and demodulation techniques.
		CO4	Analyze the analog transmitters and receivers in the presence of noise
22CS2104 R	OPERATING SYSTEMS	CO1	Understanding the basic algorithms for process and CPU scheduling, Operating Systems Basics, Functionalities, Types of Operating Systems
		CO2	Understands Virtualization overview, paging, Segmentation and Translation Look Aside Buffer.
		CO3	Understands Concurrency and threads code, Thread API, Locks, Locked Data Structures, Condition Variables, Mutex, Semaphores, Monitors, Deadlock
		CO4	Classify I/O Devices, Hard Disk Drives, Redundant Disk Arrays (RAID), Files
		CO5	Apply Unix System Calls. Use C Programming Language to implement Operating System Concepts
22EC2104	ANALOG ELECTRONIC CIRCUIT DESIGN	CO1	Apply the knowledge of Semiconductor physics and discuss BJT configurations and its applications
		CO2	Apply the limitations of BJT and discuss the characteristics and applications of Field Effect Transistors
		CO3	Apply the linear and nonlinear circuits approaches and realise the characteristics of operational Amplifiers
		CO4	Apply the concept of feedback system and realise the working principles of Oscillators and multivibrators
		CO5	Design and analyse analog circuits for real time applications using Passive and Active Components.
22AD2102R	DATABASE MANAGEMENT SYSTEMS	CO1	Choose the functional components of DBMS and Design an ER Model for a database.
		CO2	Utilize a relational model for a database & Implement SQL concepts and relational algebra.
		CO3	Examine the PL/SQL programs, normalization techniques, indexing to construct and access database
		CO4	List the importance of transaction Processing, concurrency control and recovery techniques.
		CO5	Categorize a database and implement SQL queries and PL/SQL programs to do various operations on data.
22CI3004	ENTERPRISE	CO1	Apply the concepts of XML, XSLT and JDBC
		CO2	Develop Enterprise Application using Servlet and JSP

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	PROGRA MMING	CO3	Create Enterprise Application using JSF and build Business Logic using EJB, JNDI and Session Beans	
		CO4	Implement the concept of JPA, JAX-RS and JMS to build Web -Services.	
		CO5	Implement the concepts of XML, XSLT, Servlets, JSP, EJB, JPA, JAX-RS and JMS t o build large scale and distributable applications	
		CO6	To experiment the concept ofEnterprise Programming with real world problems	
22CI2001	ADAPTI VE SOFTWA RE ENGINE ERING	CO1	Understand the fundamental concept of software and software engineering, as well as the nature of the process, including numerous software models with reverse engineering.	
		CO2	Apply the demands of users and which methodology will be best suited to meet those needs. They can employ extreme software models to elicit and validate the user's needs. They can also use agile methodologies to design and develop project-based software's	
		CO3	Apply various software methodologies of Scrum, Kanban and SAFe Methodology for developing user-friendly software and also, they can be able to analyse various software projects by using project Monitoring Tools such as JIRA, Design Patterns - Architectural Patterns - Model Driven Architecture.	
		CO4	Analyze numerous testing methodologies for testing diverse software, as well as risk management, project planning, and estimating to design and analyse any software project.	
22AD200 1	DATA DRIVEN ARTIFICI AL INTELLI GENCE SYSTEM S	CO1	Understand and apply the concepts of intelligent agents and various search algorithms, to solve real-world problems.	
		CO2	Analyse satisfaction problems, discover knowledge using logic, and analyse reasoning techniques to make informed decisions in uncertain environments.	
		CO3	Apply and analyse various Machine Learning algorithms, Examine CNN, and Deep Learning techniques	
		CO4	Apply various Data Visualization Techniques, Analyse Data analytics techniques, Discover the insights from complex datasets.	
		CO5	Examine AI for Data science lab in the python environment.	
22AD220 3	MACHIN E LEARNI NG	CO1	Understand the basic concepts of machine learning	
		CO2	Build SVM Algorithm for solving Classification and Prediction problems	
		CO3	Apply Ensemble methods to solve classification problem	
		CO4	Analyse different categories of clustering algorithms	
		CO5	Implement Machine Learning Techniques using Python Language	
		CO6	Develop machine learning applications using Python Language	
22EC2210 R	NETWOR K PROTOC OLS AND SECURIT Y	CO1	Apply the knowledge of communication to understand and analyse the physical and data link layer in networks	
		CO2	Analyse different Network layer protocols and Routing algorithms	
		CO3	Analyse different Transport layer, Session Layer, Presentation Layer and Application Layer Protocols	
		CO4	Analyse different cryptography algorithms	

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		CO5	Analysis of different protocols with different topologies in networks
22AD3105R	DEEP LEARNING	CO1	Apply optimization algorithms to solve neural networks
		CO2	Apply CNN model and its variants to real time data
		CO3	Able to apply Sequence models -RNN& LSTM
		CO4	Construct the attention networks and Generative Neural models
		CO5	Implement basic Neural Networks, optimization algorithms, various types of auto encoders, batch normalization, convolutional neural networks, RNN and LSTM
		CO6	Implement Deep learning case studies using keras and pytorch
22SDEC01	ELECTRONICS SYSTEM DESIGN	CO1	Apply the concept of Discrete Semiconductors and other basic components for different applications
		CO2	Apply different Sensors, power supply designs and Special Integrated Circuits for various applications
		CO3	Apply the PCB Design, Development boards, software, and driver tools for system design and to post and fetch data from cloud database
22SDEC03	ELECTRONICS SYSTEM DESIGN AUTOMATION	CO1	Apply best practices and adhere to industry standards while using design automation tools for electronic system design.
		CO2	Analyze the electronic system circuits with EDA Tools
		CO3	Design of specific electronic systems, such as digital circuits, analog circuits, and mixed-signal circuits and Analyze its performance characteristics
22SDCI01	PYTHON FULL STACK DEVELOPMENT	CO1	To apply suitable design techniques to implement given real-world problems by problem-solving, logic building, and building web applications
		CO2	Apply end-to-end web applications using Flask as the primary web framework, covering topics such as routing and deployment.
		CO3	Apply Python and Django framework to develop web applications using model, views, templates, URLs, forms, and databases.
22TBEC01	EDA Tools for PCB	CO1	Design and analyse the concepts of different Sensors and Special Integrated Circuits using EasyEDA Tool
		CO2	Design and analyse the concepts of PCB Design to create the single layer Artwork using EasyEDA Tool
		CO3	Design and analyse the concepts of PCB Design to create the multi-layer Artwork using EasyEDA Tool
22TBCS02	CLOUD FOUNDATIONS-AWS	CO6	Skill based -Build a real world and scalable full stack application using Serverless technologies

Academic Professor I/C
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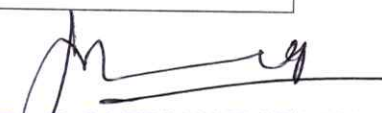
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		CO3	Able to understand various MAC protocols for sensor networks
		CO4	Able to understand and analyse various routing techniques of WSN and ad hoc networks
19EM52D1	Video and Audio Streaming	CO 1	Understand fundamental concepts related to streaming
		CO 2	Understand the process related to video encoding
		CO 3	Understand the process related to Audio encoding
		CO 4	Understand the processes and mechanisms involved in streaming video and audio.
19EM52D2	Cloud Computing and Big Data Analytics	CO1	Under the process involved in sensing and moving data across the network to be stored in the clouds and extract the same for conducting the analytics
		CO2	Understand the fundamentals related to cloud computing especially relating to data storage into cloud and retrieval of the same from the clouds.
		CO3	Ability to develop application for storing the sensed data on to the clouds
		CO4	Ability to conduct Analytics using the data stored in the clouds
19EM52D3	Data analytics for IoT	CO1	Under the process involved in sensing and moving data across the network to be stored in the clouds and extract the same for conducting the analytics
		CO2	Understand the fundamentals related to cloud computing especially relating to data storage into cloud and retrieval of the same from the clouds.
		CO3	Ability to develop application for storing the sensed data on to the clouds
		CO4	Ability to conduct Analytics using the data stored in the clouds
19EM52D4	Sensor network programming	CO1	Able to understand fundamentals of TinyOS and nesC in WSN environment.
		CO2	Able to understand real world programming of wireless sensor network in different scenarios.
		CO3	Able to understand the performance analysis of power-aware algorithms
		CO4	Able to understand and develop energy efficient algorithms for wireless sensor networks thru simulation or real time experiments
19IE6050	Dissertation	CO1	Must be able install and operate a development platform
		CO2	Should be able to draft requirements for a chosen application
		CO3	Should be able to analyze and design the application using formal methods learnt in the curriculum
		CO4	Should be able to develop, test, install and demonstrate the running system

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