CHAITANYA BHARATHI
INSTITUTE OF TECHNOLOGY
An Autonomous Institute I Affiliated to Osmania University
Kokapet Village, Gandipet Mandal, Hyderabad, Telangana-500075, www.cbit.ac.in

Approved by | Recognized Research Centers | Programs Accredited by | Grade A++ In | All India Ranking 151-200 Band | ISO Certifications
Quality Audit 9001 : 2015
Green Audit 14001 : 2015
Energy Audit 50001 : 2018

COMMITTED TO RESEARCH, INNOVATION AND EDUCATION
45 years

B.E (CSE – IoT & CSBT) Program

B.E. Program Outcomes (PO's)

Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for the solution of complex engineering problems.

Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

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 public health and safety, and cultural, societal, and environmental considerations.

Conduct investigations of complex problem: Use research-based knowledge and research methods including design of experiments, analysis and interpretations of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate technique, resources and modern engineering and IT tools, including prediction and modelling to complex engineering activities, with an understanding of the limitations.

The engineering 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.

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.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
Reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, member and leader in a team, to manage projects and in multidisciplinary environments.

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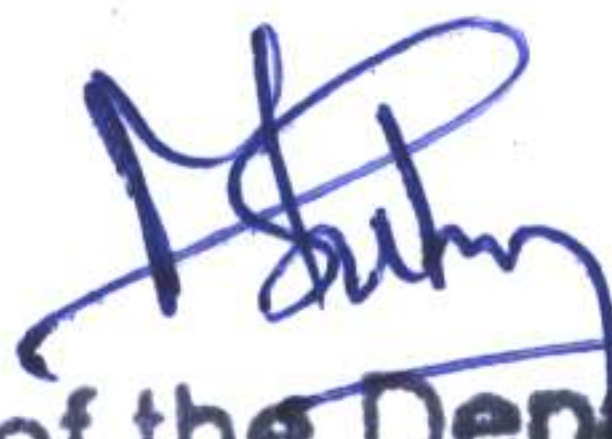CBIT (A), Gandipet, Hyderabad-500 075.

Life-long learning: Recognise 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 EDUCATION OBJECTIVES (PEO's): After the completion of the program, our:

1. Graduate will apply their knowledge and skills to succeed in their careers and / or obtain advanced degrees, provide solutions as entrepreneurs.

2. Graduates will creatively solve problem, communicate effectively, and successfully function in multi-disciplinary teams with superior work ethics and values.

3. Graduates will apply principles and practices of Computer Science, mathematics and Science to successfully complete hardware and/or software-related engineering projects to meet customer.

4. Graduates will have the ability to adapt, contribute innovate modern technologies and systems in the domain of cyber security, IoT or productivity engage in research.

Program Specific Outcomes (PSO's)

1. Able to acquire the practical competency through emerging technologies and open-source platforms related to the areas of Cuber Security, IoT and Blockchain.

2. Able to assess the hardware and software aspects necessary for the development of solutions to secure critical IT infrastructure and prepare collaborative plans for any incidence response.

3. Able to provide diversified solutions in product development by adhering to ethical values for the benefit of society.

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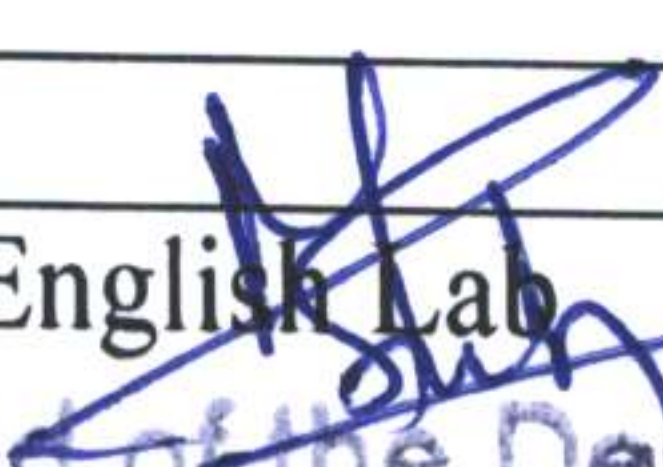
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Department of Computer Engineering and Technology

Course Outcomes Statements for BE (CSE – IOT& CSBT) R-20
Academic Year : 2023-24

I SEMESTER

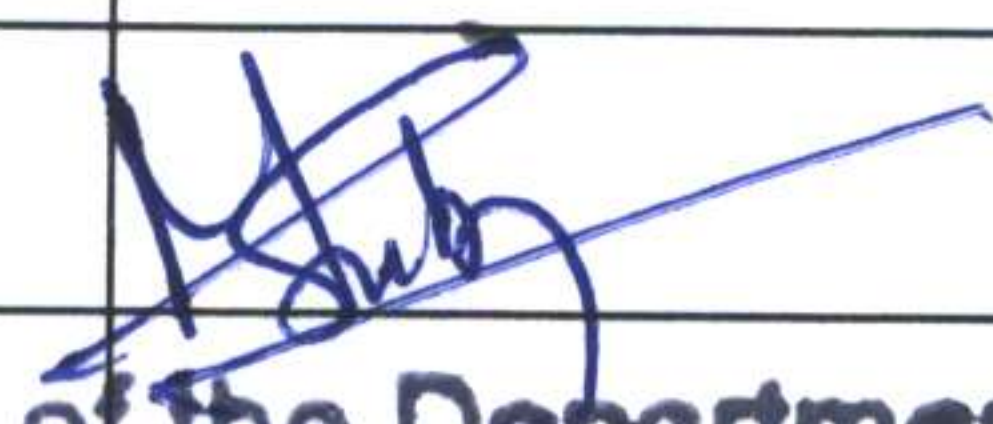| SNO	COURSE	Course Name	Course Outcomes Statements
1	22MTC01	Linear Algebra and Calculus	1. Determine the extreme values of functions of two variables.
			2. Apply the vector differential operator to scalar and vector functions.
			3. Solve line, surface, and volume integrals by Green's, Gauss's, and Stokes's theorems.
			4. Determine the basis and dimension of a vector space, compute linear transformation.
			5. Apply the Matrix Methods to solve the system of linear equations.
2	22PYC01	Optics and Semiconductor Physics	1. Demonstrate the physical properties of light.
			2. Explain characteristic properties of lasers and fiber optics.
			3. Find the applications of quantum mechanics.
			4. Classify the solids depending upon electrical conductivity.
			5. Identify different types of semiconductors.
3	22CSC01	Problem Solving and Programming	1. Understand real world problems and develop computer solutions for those problems.
			2. Understand the basics of Python.
			3. Apply Python for solving basic programming solutions.
			4. Create algorithms/flowcharts for solving real-time problems.
			5. Build and manage dictionaries to manage data.
			6. Handle data using files.
4	22EGC01	English	1. Illustrate the nature, process and types of communication and communicate effectively without barriers.
			2. Construct and compose coherent paragraphs, emails and adhering to appropriate mobile etiquette.
			3. Apply techniques of precision to write a précis and formal letters by using acceptable grammar and appropriate vocabulary.
			4. Distinguish formal from informal reports and demonstrate advanced writing skills by drafting formal reports.
			5. Critique passages by applying effective reading techniques.
5	22PYC03	Optics and Semiconductor Physics Lab	1. Interpret the errors in the results of an experiment.
			2. Demonstrate physical properties of light experimentally.
			3. Make use of lasers and optical fibers for engineering applications.
			4. Explain the V-I characteristics of some optoelectronic and semiconductor devices.
			5. Find the applications of thermistors.
6	22EGC02	English Lab	1. Define the speech sounds in English and understand the nuances of pronunciation in English.
			2. Apply stress correctly and speak with the proper tone,

			intonation, and rhythm.
			3. Analyze listening comprehension texts to enhance their listening skills.
			4. Determine the context and speak appropriately in various situations.
			5. Design and present effective posters while working in teams, and discuss and participate in group discussions.
7	22CSC02	Problem Solving and Programming Lab	1. Understand various Python program development environments.
			2. Demonstrate the concepts of Python.
			3. Implement algorithms/flowcharts using Python to solve real-world problems.
			4. Build and manage dictionaries to manage data.
			5. Write Python functions to facilitate code reuse.
			6. Use Python to handle files and memory.
8	22MEC01	CAD and Drafting	1. Become conversant with appropriate use of CAD software for drafting.
			2. Recognize BIS, ISO Standards and conventions in Engineering Drafting.
			3. Construct the projections of points, lines, planes, solids.
			4. Analyze the internal details of solids through sectional views.
			5. Create isometric projections and views.
9	22MEC38	Digital Fabrication Lab	1. Understand safety measures to be followed in workshop to avoid accidents.
			2. Identify various tools used in fitting, carpentry, tin smithy, house wiring, welding, casting, and machining processes.
			3. Make a given model by using workshop trades including fitting, carpentry, tinsmithy and house wiring.
			4. Perform various operations in welding, machining and casting processes.
			5. Conceptualize and produce simple device/mechanism of their choice.

II SEMESTER:

SNO	COURSE	Course Name	Course Outcomes Statements
1	22MTC04	Differential Equations and Numerical Methods	1. Calculate the solutions of first order linear differential equations.
			2. Calculate the solutions of higher order linear differential equations.
			3. Solve the algebraic, transcendental, and system of equations.
			4. Apply interpolation and numerical differentiation techniques for given data.
			5. Test the convergence and divergence of Infinite series.
2	22CYC01	Chemistry	1. Identify the microscopic chemistry in terms of molecular orbitals, intermolecular forces, and rate of chemical reactions.
			2. Discuss the properties and processes using thermodynamic functions, electrochemical cells, and their role in batteries and fuel cells.
			3. Illustrate the major chemical reactions that are used in the synthesis of organic molecules.
			4. Classify the various methods used in treatment of water for domestic and industrial use.
			5. Outline the synthesis of various Engineering materials & Drugs.
3	22EEC01	Basic Electrical	1. Understand the concepts of Kirchhoff's laws and their application

		Engineering	to various theorems to get solution of simple DC circuits.
			2. Predict the steady state response of RLC circuits with AC single phase/three phase supply.
			3. Infer the basics of single phase transformer.
			4. Describe the construction, working principle of DC machine and 3-phase Induction motor.
			5. Acquire the knowledge of electrical wires, cables, earthing, electrical safety precautions to be followed in electrical installations and electric shock and its safety and energy calculations.
4	22CSC03	Object Oriented Programming	1. Understand the concepts of Object-Oriented features.
			2. Apply OOPs concepts and different libraries to solve programming problems.
			3. Understand the advanced concepts of Python.
			4. Develop programs to access databases and web data.
			5. Understand APIs and third-party libraries to be used with Python.
5	22CYC02	Chemistry Lab	1. Identify the basic chemical methods to analyse the substances quantitatively & qualitatively.
			2. Estimate the amount of chemical substances by volumetric analysis.
			3. Determine the rate constants of reactions from concentration of reactants/ products as a function of time.
			4. Calculate the concentration and amount of various substances using instrumental techniques.
			5. Develop the basic drug molecules and polymeric compounds.
6	22MBC02	Community Engagement	1. Gain an understanding of Rural life, Culture and Social realities.
			2. Develop a sense of empathy and bonds of mutuality with Local Communities.
			3. Appreciate significant contributions of Local communities to Indian Society and Economy.
			4. Exhibit the knowledge of Rural Institutions and contributing to Community's Socio-Economic improvements.
			5. Utilize the opportunities provided by Rural Development Programmes.
7	22CSC04	Object Oriented Programming Lab	1. Demonstrate the features of Object-Oriented Programming.
			2. Understand APIs and third-party libraries to be used with Python.
			3. Use Python libraries to solve real-world problems.
			4. Write scripts to solve data science/machine learning problems using NumPy and Pandas.
			5. Develop applications by accessing web data and databases.
			Laboratory / Practical:
			1. Write a NumPy program to compute the cross product of two given vectors.
			2. Write NumPy program to calculate the QR decomposition of a given matrix.
			3. Write a Pandas program to convert a Panda Module Series to Python list and its type.
			4. Write a Pandas program to convert a NumPy array to a Pandas series.
			5. Create a Python project to get the citation from Google scholar using title and year of publication and volume and pages of journal.
			6. Create a Python project to get total COVID-19 cases, total deaths due to COVID-19, total COVID-19 patients recovered in the world.
8	22MEC37	Robotics and Drones Lab	1. Demonstrate knowledge of the relationship between mechanical structures of robotics and their operational workspace characteristics.

			2. Understand mechanical components, motors, sensors, and electronic circuits of robots and build robots.
			3. Demonstrate knowledge of robot controllers.
			4. Use Linux environment for robotic programming.
			5. Write Python scripts to control robots using Python and Open CV.
9	22EEC02	Basic Electrical Engineering Lab	1. Comprehend the circuit analysis techniques using various circuital laws and theorems.
			2. Analyse the parameters of the given coil and measurement of power and energy in AC circuits.
			3. Determine the turns ratio/performance parameters of single-phase transformer.
			4. Infer the characteristics of DC shunt motor through different tests.
			5. Illustrate different parts and their functions of electrical components, equipment, and machines.

III Semester:

SNO	COURSE	Course Name	Course Outcomes Statements
1.	20CIC01	Fundamentals of Cyber security and Tools	1. Discuss different types of cybercrimes and analyze legal frameworks to deal with these cybercrimes.
			2. Describe the usage of Tools in cybercrimes.
			3. Recognize the importance of digital evidence in prosecution.
			4. Analyze and resolve cyber security issues in various domains.
			5. Analyze the commercial activities in the event of significant information security incidents in the Organization.
			6. Understand the importance of Cyber Laws and their Legal perspective.
2.	20CSC09	Discrete Mathematics	1. Describe rules of inference for Propositional and Predicate logic.
			2. Demonstrate use of Set Theory, Venn Diagrams, relations, and functions in Real-world scenarios.
			3. Model solutions using Generating Functions and Recurrence Relations.
			4. Determine the properties of graphs and trees to solve problems arising in computer science applications.
			5. Distinguish between groups, semi groups and monoids in algebraic systems.
			6. Formulate solutions to a variety of real world problems.
3.	20CSC11	Data Structures Lab	1. Implement the abstract data type.
			2. Implement linear data structures such as stacks, queues using array and linked list.
			3. Implement non-linear data structures such as trees, graphs.
			4. Analyze various sorting techniques.
			5. Analyze various algorithms of linear and nonlinear data structures.
			6. Design and develop real world problem using suitable data structures.
4.	20CSC08	Data Structures	1. Understand the basic concepts of data structures and sorting techniques.

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				2.Analyze the performance of algorithms.
				3. Distinguish between linear and non-linear data structures.
				4. Apply linear and non-linear data structures.
				5. Identify the significance of balanced search trees, graphs and hashing.
				6. Establish a suitable data structure for real world applications.
5.	20CSC17	Data Base Management Systems Lab		1. Outline the built-in functions of SQL and apply these functions to write simple and complex queries using SQL operators.
				2. Demonstrate Queries to Retrieve and Change Data using Select, Insert, Delete and Update. Construct Queries using Group By, Order By and Having Clauses.
				3. Demonstrate Commit, Rollback, Save point commands, SQL Plus Reports and formulate the Queries for Creating, Dropping and Altering Tables, Views, constraints.
				4. Develop queries using Joins, Sub-Queries and Working with Index, Sequence, Synonym, Controlling Access and Locking Rows for Update, Creating Password and Security features.
				5. Demonstrate the usage of data types, Bind and Substitution Variables, Anchored, Declarations, Assignment Operation and PL/SQL code using Control Structures
				6. Develop PL/SQL code using Cursors, Exception, Composite Data Types and Procedures, Functions and Packages.
6.	22CSC11	DATABASE MANAGEMENT SYSTEMS		1. Design database schema for an application using RDBMS concepts.
				2. Write SQL queries for tasks of various complexities.
				3. Build applications using database system as backend.
				4. Understand internal working of a DBMS including data storage, indexing, query processing, transaction processing, concurrency control and recovery mechanisms.
				5. Analyze non-relational and parallel/distributed data management systems with a focus on scalability.
7.	22CSC20	COMPUTER NETWORKS		1. Learn the communication protocol suites like ISO-OSI and TCP/IP.
				2. Illustrate and explain Data Communications System and its components.
				3. Identify and analyze various congestion control algorithms.
				4. Distinguish the internet protocols and understand transport layer protocols like IP, ARP, ICMP, TCP, UDP, RTCP.
				5. Identify various application layer protocols like HTTP, WWW, DNS, Email Protocols, FTP and the underlying protocols.
8.	22ITC01	DIGITAL LOGIC AND COMPUTER ARCHITECTURE		1. Apply Boolean algebra for simplification and learn representation of data using numbers.
				2. Understand fundamentals of combinational & sequential logic gates, registers and counters.
				3. Infer the architecture and functionality of the central processing unit.
				4. Explore the techniques that computers use to communicate with I/O devices for data transfer.
				5. Comprehend memory hierarchy, cache memory and virtual memory.

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9.	22CSC37	NETWORKS LAB	1. Identify the different types of wiring equipment used in the network lab.
			2. Understand the various network devices like repeater, hub, switch, and routers.
			3. Practice the basic network configuration commands like ifconfig, ping, traceroute, nslookup, dig, arp, netstat, nmap.
			4. Design the network topologies using GNS3 and examine the packet transfer.
			5. Design the network using various routing protocols.
10.	22CIC02	FUNDAMENTALS OF CYBER SECURITY AND TOOLS LAB	1. Use Foot Printing Tools for Information Gathering.
			2. Scan and scrutinize the information gathered.
			3. Understand the usage of Sniffer Tools.
			4. Become familiar with Attack Launching Tools.
			5. Configure the proactive Defense system.

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IV SEMESTER:

SNO	COURSE	Course Name	Course Outcomes Statements
1	22MTC13	Mathematical Foundation for Data Science and Security	1. Analyze the coefficient of skewness and fitting of the data by various methods.
			2. Apply properties of Mathematical Expectations and analyze the various distributions.
			3. Evaluate areas of curves by using various distributions.
			4. Apply various tests for testing the significance of sample data.
			5. Apply RSA – PKC for solving security issues.
	22CSC14	DESIGN AND ANALYSIS OF ALGORITHMS	1. Analyzing performance of algorithms using asymptotic notations.
			2. Demonstrate familiarity with major algorithms and importance of algorithm design techniques.
			3. Apply algorithm design techniques on different problems.
			4. Analyze the efficiency of the algorithms.
			5. Understanding limits of efficient computation with the help of complexity classes.
3	22ECC36	Basic Electronics and Sensors	1. Identify various types of semiconductor devices for building electronic circuits.
			2. Describe the operation of various sensors, data converters, and actuators.
			3. Acquire the data from various sensors.
			4. Analyze usage of sensors/actuators for the development of real-time applications.
			5. Apply theoretical learning to implement practical real-time problems for automation.
4	22ITC17	Web Technologies	1. Create web pages with good aesthetic sense of design using HTML, CSS3, Bootstrap, and popular themes.
			2. Use JS in validations and DOM manipulation.
			3. Design Schema and perform CRUD operations from UI components.
			4. Become an agile practitioner with the ability to quickly complete projects using ReactJS.
			5. Build an end-to-end application from scratch using React JS, NODE JS, Express JS, and MongoDB.
5	22CIC03	AI Tools, Techniques and Applications	1. Understand fundamental concepts of AI and its importance.
			2. Identify various Machine Learning algorithms and their limitations.
			3. Develop Chatbots based on requirements.
			4. Analyze complex problems involving image processing, Computer Vision, and HCI.
			5. Understand smart solutions for various domains.
6	22MBC01	Engineering Economics and Accountancy	1. Apply fundamental knowledge of Managerial Economics concepts and tools.
			2. Analyze various aspects of Demand Analysis, Supply, and Demand Forecasting.

			3. Understand Production and Cost relationships to make the best use of resources available.
			4. Apply Accountancy Concepts and Conventions and preparation of Final Accounts.
			5. Evaluate Capital and Capital Budgeting decisions based on any technique.
7	22CIC04	AI Tools, Techniques and Applications Lab	1. Demonstrate the capabilities of AI.
			2. Build models for various real-time problems using AI/ML Tools.
			3. Develop Chatbots, programs for simple applications.
			4. Analyze and interpret the experimentation results.
			5. Develop skills to communicate the experimentation results.
8	22CSC34	Design and Analysis of Algorithms Lab	1. Implement greedy, dynamic programming, backtracking, and branch-and-bound techniques.
			2. Demonstrate various algorithmic design techniques.
			3. Analyze the performance of various algorithms.
			4. Compare various design strategies.
			5. Formulate solutions to solve real-world problems using acquired knowledge.
9	22ITC19	Internet Technologies Lab	1. Build interactive and user-friendly static frontend UI applications using HTML, CSS, and JavaScript.
			2. Develop a web page based on Bootstrap.
			3. Use MongoDB concepts in Web Application Development using React JS.
			4. Create Single Page and multi-page Applications using React, Node JS, Express JS, and MongoDB.
			5. Implement MVC and responsive design to scale well across PC, tablet, and Mobile Phone.
10	22ECC37	Basic Electronics and Sensors Lab	1. Familiarize with basic electronic components, devices, and systems.
			2. Formulate the research problems associated with Transistor or Op-amp circuits.
			3. Examine the Interfacing of myRIO with various sensors/transducers, Motors.
			4. Examine and Measure the problems encountered in Robots or sensor-related systems.
			5. Justify the solutions related to transistorized circuits for real-time applications.

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V SEMESTER:

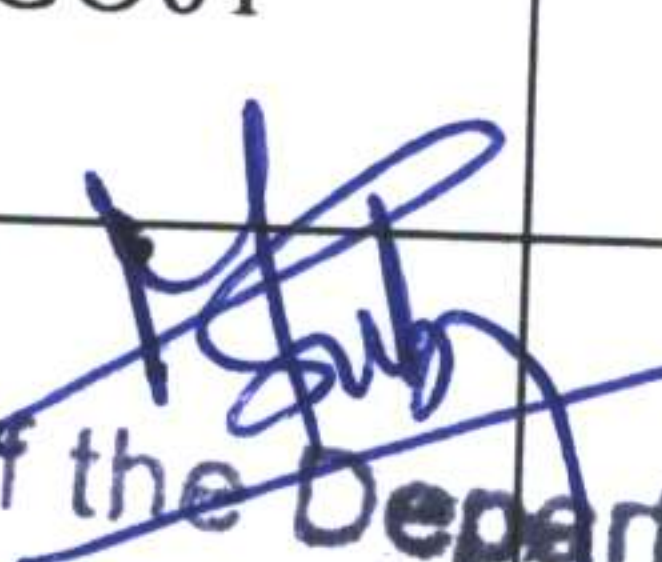| SNO	COURSE	Course Name	Course Outcomes Statements
1	20CSC12	DESIGN AND ANALYSIS OF ALGORITHMS	1. Identify and apply asymptotic notations to measure the performance of algorithms.
			2. Describe the algorithmic design techniques of divide and conquer, greedy, dynamic programming, backtracking and branch and bound to solve problems.
			3. Apply suitable algorithmic design techniques to solve problems to get optimal solution.
			4. Analyze the performance of algorithmic design techniques.
			5. Evaluate the efficiency of alternative solutions derived for a problem by applying various algorithmic design techniques.
			6. Understand P, NP, NP-Hard, NP-Completeness and Reducibility.
2	20CSC20	OPERATING SYSTEMS	1. Identify the basics of an operating systems and its major components.
			2. Understand the concepts related to process synchronization and deadlocks.
			3. Distinguish various memory management techniques.
			4. Interpret various threats and defense mechanisms used to protect the system.
			5. Evaluate various file allocation methods.
			6. Apply security as well as recovery features in the design of algorithms.
3	20CIC03	IOT DEVELOPMENT, APPLICATIONS AND PRACTICE	1. Understand Internet of Things, its hardware and software components.
			2. Illustrate working of I/O devices, sensors & communication module.
			3. Compare communication protocols in IoT.
			4. Explore fundamentals of IoT Data Analytics and Supporting Services.
			5. Organize and Analyze IoT data.
			6. Develop real time IoT based projects.
4	20CIC04	COMPUTER NETWORKS	1. Understand the communication protocol suites like ISO-OSI and TCP/IP.
			2. Illustrate Data Communications System and its components.
			3. Analyze various routing protocol, congestion control algorithms.
			4. Distinguish the internet protocols like IP, ICMP, IGMP, BGP, OSPF, and DHCP.
			5. Understand the transport layer protocols like TCP, UDP and SCTP.
			6. Identify the functions of application layer protocols like HTTP, WWW, DNS, Email protocols and SFTP.
5	20CIE01	LINUX KERNEL INTERNALS AND PROGRAMMING	1. Understand fundamental concepts of Linux kernel.

			2. Apply system programming concepts and its library functions.
			3. Analyze memory management and system administration.
			4. Create multithreaded programs using POSIX threads.
			5. Work with file management and system management.
6	20CIE03	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (Professional Elective – I)	1. Understand the significance of AI and Tools.
			2. Apply regression and classification concepts to real-world problems.
			3. Perform clustering operations using appropriate algorithms.
			4. Implement AI concepts using Python.
			5. Perform predictive analysis using ML algorithms.
			6. Understand the fundamentals of Deep Learning and Neural Networks.
7	20MEO09	ORGANIZATIONAL BEHAVIOUR (Open Elective – I)	1. Understand Organizational Behavioral principles and practices.
			2. Compare various organizational designs and cultures enabling organizational development.
			3. Apply motivational theories and leadership styles in resolving employee's problems and decision-making processes.
			4. Understand the group dynamics, communication network, and skills needed to resolve organizational conflicts.
			5. Analyze the behavior, perception, and personality of individuals and groups in organizations in terms of the key factors that influence organizational behavior.
8	20MTO03	QUANTUM COMPUTING (Open Elective – I)	1. Compute basic mathematical operations on Quantum bits.
			2. Execute Quantum operations of Quantum computing.
			3. Build quantum programs.
			4. Develop quantum logical gates and circuits.
			5. Develop the quantum algorithm.
9	20CSC23	Operating System Lab	1. Understand Linux/Unix environment.
			2. Identify and interpret various system programs.
			3. Understand and implement shell programming.
			4. Simulate memory management and file allocation techniques.
			5. Analyze process and file management system calls by creating and/or modifying concurrent programs.
			6. Build network-oriented applications using system calls.
10	20CIC05	IOT Development, Application and	1. Use of various hardware and software

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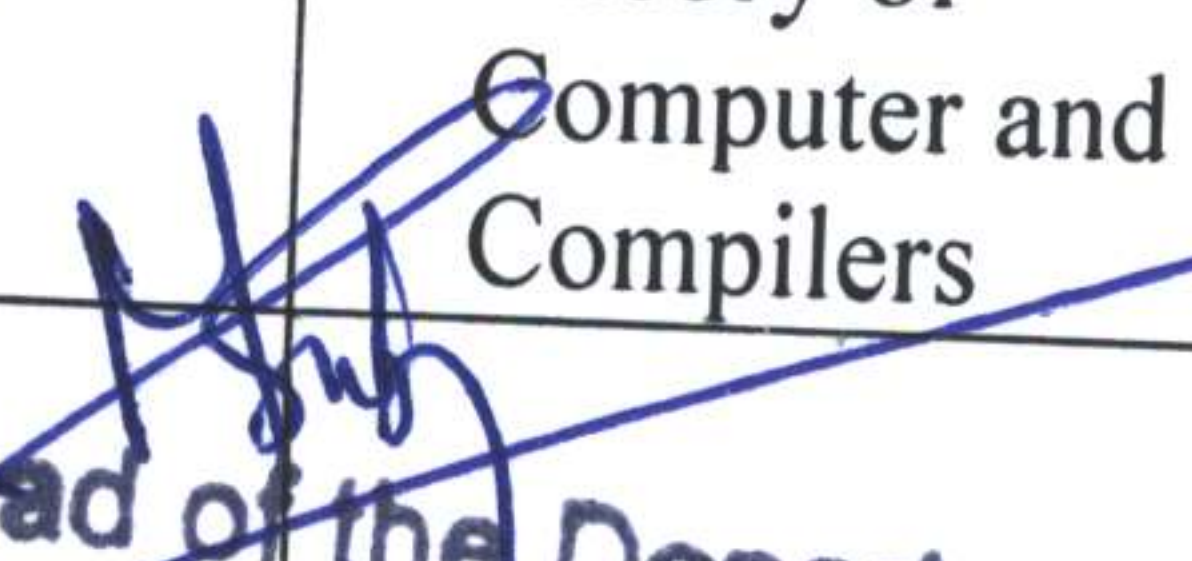|		Practical Lab	components related to Internet of Things.
			2. Interface I/O devices, sensors to Raspberry Pi/Arduino.
			3. Implement various communication protocols in IoT.
			4. Monitoring remote system using IoT.
			5. Hypothesizing Real time IoT based projects.
			6. Develop real life IoT based projects.
11	20CIC06	Computer Networks Lab	1. Identify the different types of connecting Medias and equipment"s used in the networks Lab.
			2. Differentiate various network devices like repeater, hub and switch.
			3. Practice the basic network commands like ifconfig, ping, traceroute, nslookup, dig, arp, netstat, nmap
			4. Design and demonstrate network topologies using GNS3
			5. Examine the packet transfer using tcpdump.
			6. Analyze the network performance using Wire shark or any tool.

VI SEMESTER:

SNO	COURSE	Course Name	Course Outcomes Statements
1.	20CSE15	Soft Computing Lab	Implement McCulloh-Pitts model for Boolean operations.
			Apply perceptron learning algorithm for a given problem.
			Design and analyze various Neural Networks Architectures.
			Apply concepts of fuzzy sets on real-time applications.
			Implement Genetic Algorithms with its operators.
			Apply soft computing strategies for various real time applications.
2.	20CSE06	Soft Computing	Understand various soft computing concepts and techniques.
			Analyze and design various learning models.
			Apply the Neural Network Architecture for various Real time applications.
			Examine and approximate reasoning using fuzzy logic
			Design Genetic algorithms in different applications.
			Develop soft computing techniques to solve different applications.
3.	20EGO01	Technical Writing Skills	Communicate effectively, without barriers and understand aspects of technical communication.
			Differentiate between general writing and technical writing and write error free sentences usingtechnology specific words.
			Apply techniques of writing in business correspondence and in writing articles.

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			Draft technical reports and technical proposals.
4.	20MTO01	Financial Mathematics	Prepare agenda and minutes of a meeting and demonstrate effective technical presentation skills.
			Calculate the internal rate of return, annuity and amortization.
			Apply the portfolio theory.
			Examine the binomial model of pricing.
			Analyze the stochastic differential equations.
			Solve the BSM partial differential equations.
5.	20CIE05	Vulnerability Analysis and Penetration Testing	Explain the basic principles and techniques of how attackers can enter computer systems.
			Describe and distinguish key phases of ethical hacking: reconnaissance, scanning, gaining access, maintaining access, and covering the tracks.
			Put acquired knowledge into practice by performing ethical penetration tests and hide the intrusion.
			Experience on various tools & techniques of vulnerability assessment & penetration testing used inLinux.
			Identify flaws and vulnerabilities in applications, websites, networks, systems, protocols andconfigurations using both manual techniques and assistive tools.
6.	20CIE07	Vulnerability Analysis and Penetration Testing Lab	Evaluate the strengths and weaknesses of various information technology solutions in terms of datasecurity.
			Install and exploit tools for network protection.
			Exploit and analyse vulnerabilities in LAN, wireless devices and identify the same using penetrationtesting.
			Perform vulnerability scanning and penetration testing using appropriate tools and techniques.
			Perform a wireless pen testing, packet analysis and log analysis.
			Perform static and dynamic analysis on application.
7.	20EGMO3	Universal Human Values-II	Students are expected to become more aware of themselves and their surroundings (family, society,nature).
			They would become more responsible in life, and in handling problems with sustainable solutions,while keeping human relationships and human nature in mind.
			They would have better critical ability.
			They would also become sensitive to their commitment towards what they have understood (humanvalues, human relationship and human society).
			It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
8.	20CIC09	Blockchain Platforms and Application Lab	Understand the fundamental design and architectural primitives of Blockchain and consensusProtocols.
			Deploy various blockchain platforms and identify the significance of smart contracts.
			Implement the working of Ethereum and decentralized applications.

				Implement the blockchain applications with Hyperledger Fabric and Composer.
				Apply blockchain in different application domains such as financial and supply chain sectors.
				Analyze the Implications of blockchain for privacy and security.
9.	20CIC08	Blockchain Platform and Applications		Understand the fundamental design and architectural primitives of Blockchain and consensusprotocols.
				Explore various blockchain platforms and identify the significance of smart contracts.
				Identify the working of Ethereum and decentralized applications.
				Implement the blockchain applications with Hyperledger Fabric and Composer.
				Apply blockchain in different application domains such as financial and supply chain sectors.
				Analyze the Implications of blockchain for privacy and security.
10.	20CSC22	Software Engineering		State the software process and explain perspective process model, evolutionary process models.
				Understand the agile Software process models and demonstrate the skills necessary to specify therequirements of software product so as to prepare SRS document.
				Recall the modeling concepts and estimate the cost of software using empirical models.
				Enlist the design principles and construct a product using coding principles and standards.
				Develop test cases and apply software testing methods in conventional and O-O approaches andestimates software quality of SW.
11.	20EGCO3	Employability Skills		Become effective communicators, participate in group discussions with confidence and be able to makepresentations in a professional context.
				Write resumes, prepare and face interviews confidently.
				Be assertive and set short term and long term goals, learn to manage time effectively and deal withstress.
				Make the transition smoothly from campus to work, use media with etiquette and understand theacademic ethics.
				Enrich their vocabulary, frame accurate sentences and comprehend passages confidently.
12.	20CSC25	Case Studies Using UML Lab		Identify the problem scope and constraints in the problem.
				Prepare software requirements specifications (SRS) for the system according to standards.
				Apply the design notations of structured approach to develop ER and Data Flow Diagrams.
				Apply/Use the design notations of OO approach to develop UML diagrams using rational tools.
				Implement, analyze and prepare the documentation for the proposed system.
13.	20CIC07	Theory of Computer and Compilers		Understand formal language basics and the power of automata to recognize the languages.
				Analyze the concept compilation Process and data structures of a compiler.

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			Attains the knowledge of context free grammars and able to implement parsers.
			Design Syntax directed translation scheme for a given Context free grammar and generation of intermediate code.
			Apply Optimization to intermediate code and machine code.
			Illustrate various object forms, error recovery and tools of a compiler.

VII SEMESTER

SNO	COURSE	Course Name	Course Outcomes Statements
1	20CSC30	CRYPTOGRAPHY AND NETWORK SECURITY	1. Analyze and design classical encryption techniques and block ciphers.
			2. Analyze and design hash and MAC algorithms, and digital signatures.
			3. Design network application security schemes like PGP, S/MIME, IPSec, SSL, TLS, HTTPS, SSH, etc.
			4. Evaluate the authentication and hash algorithms.
			5. Create and configure simple firewall architectures.
			6. Understand digital sign in emails and files.
2	20EGM01	INDIAN CONSTITUTION AND FUNDAMENTAL PRINCIPLES	1. Understand the making of the Indian Constitution and its features.
			2. Identify the difference among Right To Equality, Right To Freedom, and Right to Liberty.
			3. Analyze the structuring of the Indian Union and differentiate the powers between Union and States.
			4. Distinguish between the functioning of Lok Sabha and Rajya Sabha while appreciating the importance of Judiciary.
			5. Differentiate between the functions underlying Municipalities, Panchayats, and Co-operative Societies.
3	20EGM02	INDIAN TRADITIONAL KNOWLEDGE	1. Understand the philosophy of Indian culture.
			2. Distinguish the Indian languages and literature.
			3. Learn the philosophy of ancient, medieval, and modern India.
			4. Acquire information about the fine arts in India.
			5. Know the contribution of scientists of different eras.
4	20CIE10	CRYPTO CURRENCIES	1. Understand the core functionality and utility of Blockchain and Cryptocurrency technologies.
			2. Familiarize with working of different cryptocurrencies.
			3. Explain the positive and negative implications of cryptocurrencies.

			4. Differentiate the modern currencies and its market usage.
			5. Understand the Regulations of different cryptocurrencies.
5	20CIE09	SOCIAL ENGINEERING	1. Apply up-to-date social engineering techniques and ethical consideration.
			2. Extract intelligence from publicly available sources to support intelligent needs and to discover vulnerabilities in IT systems.
			3. Explore different types of social engineering attacks.
			4. Identify the attacks and victims.
			5. Acquire knowledge on tactics and strategies on how to protect the network against attacks.
6	20CSE08	ENTERPRISE APPLICATION DEVELOPMENT	1. Understand the database connectivity and application servers.
			2. Explore the type of forms with validations using ReactJS.
			3. Utilize Express framework to develop responsive web applications.
			4. Demonstrate the architecture and file system of NodeJs.
			5. Identify the significance of component intercommunication with Angular2.
			6. Adapt MEAN or MERN stack to implement a real-time web application.
7	20CSE34	CLOUD COMPUTING	1. Understand the need of cloud technology and terminology.
			2. Identify and understand the cloud infrastructure.
			3. Write scripts for the automation of infrastructure and software deployment.
			4. Design solutions for the automation and migration of manual data centers.
			5. Develop scripts for the automation of cloud services.
8	20MEO04	ENTREPRENEURSHIP	1. Understand the concept and essence of entrepreneurship.
			2. Identify business opportunities and nature of enterprise.
			3. Analyze the feasibility of new business plans.
			4. Apply project management techniques like PERT and CPM for effective planning and execution of projects.
			5. Use behavioral, leadership, and time management aspects in the entrepreneurial journey.
9	20CSC31	CRYPTOGRAPHY AND NETWORK SECURITY LAB	1. Identify basic security attacks and services.
			2. Design symmetric and asymmetric key algorithms for cryptography.
			3. Create and use authentication functions.
			4. Identify and investigate network security

			threats.
			5. Analyze and design network security protocols.
10	20CIC10	TECHNICAL SEMINAR	1. Study and review research papers of new field/areas and summarize them.
			2. Identify promising new directions of various cutting-edge technologies in Computer Science and Engineering.
			3. Impart skills to prepare detailed reports describing the selected topic/area.
			4. Acquire skills to write technical papers/articles for publication.
			5. Effectively communicate by making an oral presentation before the evaluating committee.
11	20CIC11	PROJECT PART - 1	1. Review the literature related to the problem area / selected topic.
			2. Undertake problem identification, formulation, and solution.
			3. Prepare a synopsis of the selected topic.
			4. Gather the required data and set up the environment for the implementation.
			5. Conduct preliminary analysis/modelling/simulation experiments.
			6. Communicate the work effectively in both oral and written forms.
12	20CSE17	ENTERPRISE APPLICATION DEVELOPMENT LAB	1. Prepare database connections with application servers.
			2. Design user interfaces using ReactJS.
			3. Construct strong expertise on Express framework to develop responsive web applications.
			4. Create server-side applications using Node.js.
			5. Develop SPA using Angular 2.
			6. Invent next culture-shifting web applications.
13	20CSE38	CLOUD COMPUTING LAB	1. Configure various virtualization tools such as VirtualBox/VMware Workstation.
			2. Manage resources in virtual machines.
			3. Design, implement and deploy applications in PaaS environment.
			4. Demonstrate Unix and Hadoop commands in VM.
			5. Explore the features of Hadoop.
			6. Install Hadoop single-node cluster and run simple applications like WordCount.

VIII SEMESTER

SNO	COURSE	Course Name	Course Outcomes Statements
1	20CSE04	FREE AND OPEN SOURCE TECHNOLOGIES	1. Identify various FOSS tools, platforms, licensing procedures and development models, ethics.
			2. Describe various FOSS projects, development

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			models and project management.
			3. Adapt to the usage of FOSS tools and technologies.
			4. Distinguish between Proprietary and Open Source tools, development methods.
			5. Practice Open Source principles, ethics, and models and to evaluate various Open Source projects like Linux, Apache, GIT, etc.
2	20EGMO4	GENDER SENSITIZATION	1. Understand the difference between "Sex" and "Gender" and be able to explain socially constructed theories of identity.
			2. Recognize shifting definitions of "Man" and "Women" in relation to evolving notions of "Masculinity" and "Femininity".
			3. Appreciate women's contributions to society historically, culturally and politically.
			4. Analyze the contemporary system of privilege and oppressions, with special attention to the ways gender intersects with race, class, sexuality, ethnicity, ability, religion, and nationality.
			5. Demonstrate an understanding of personal life, the workplace, the community and active civic engagement through classroom learning.
3	20CEM01	ENVIRONMENTAL SCIENCE	1. Identify the natural resources and realise the importance of water, food, forest, mineral, energy, land resources and affects of over utilization.
			2. Understand the concept of ecosystems and realise the importance of interlinking of food chains.
			3. Contribute for the conservation of bio-diversity.
			4. Suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.
			5. Follow the environmental ethics and contribute to the mitigation and management of environmental disasters.
4	20CIC12	PROJECT PART – 2	1. Demonstrate a sound technical knowledge of their selected topic.
			2. Design engineering solutions to complex problems utilizing a systematic approach.
			3. Conduct investigations by using research-based knowledge and methods to provide valid conclusions.
			4. Create/select/use modern tools for the modelling, prediction and understanding the limitation of complex engineering solutions.
			5. Communicate with engineers and the community at large in written and oral forms.
			6. Demonstrate the knowledge, skills and attitudes of a professional engineer.

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