Department of Information Technology

Course Outcome

Vision

To be the centre for excellence in the development of IT solutions with specific approach of industry interface, blended learning and project based learning leading to the development of globally competent graduates and life-long learners.

Mission

Committed to develop students as competent IT professionals for employment and self-employment by adapting to the innovative and interactive academic process to acquire domain specific technical knowledge, soft skills and social responsibilities.

Program Educational Objectives

- Graduates will analyze, design and implement modern computing problems by applying their knowledge of mathematics, information technology, and emerging technologies.

- Graduates will possess an attitude and aptitude for research, entrepreneurship and higher studies in the field of Information Technology.

- Graduates will be aware of their professional, ethical, legal, and social responsibilities and contributions towards the betterment of society through active engagement with professional societies and other community activities.

Program Specific Outcomes

- An ability to apply knowledge of mathematics, basic computing fundamental and problem-solving strategies to provide effective IT solutions.

- An ability to solve real-world problems using IoT, Cloud computing, Data science, computer network & security, Machine learning and different hardware & software tools.

- An ability to communicate and work effectively as an individual, member or leader in team to manage projects effectively to achieve the desired goal.

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 team work**: 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:

PSO1	An ability to apply knowledge of mathematics, basic computing fundamental and problem-solving strategies to provide effective IT solutions.
PSO2	An ability to solve real-world problems using IoT, Cloud computing, Data science, computer network & security, Machine learning and different hardware & software tools.
PSO3	An ability to communicate and work effectively as an individual, member or leader in team to manage projects effectively to achieve the desired goal

Course Outcome

Second Year (S.E.) Subjects Course Outcomes (2019 course)

Semester – I

CO	C201: Discrete Mathematics (214441)
C201.1	Apply formal proof techniques and solve the problems with logical reasoning
C201.2	Evaluate the combinatorial problems by using probability theory
C201.3	Design binary tree using tree traversal techniques
C201.4	Analyze types of relations and functions to provide solution to computational problems
C201.5	Evaluate techniques of number theory and its application
C201.6	Solve problems using fundamental algebraic structures

CO	C202: Logic Design and Computer Organization (214442)
C202.1	To perform basic binary arithmetic & simplify logic expressions.
C202.2	To grasp the operations of logic ICs and Implement combinational logic functions using ICs
C202.3	To comprehend the operations of basic memory cell types and Implement sequential logic functions using ICs
C202.4	To articulate the functions & organization of various blocks of CPU.
C202.5	To compare the processors by understanding the CPU instruction characteristics and enhancement features of CPU.
C202.6	To compare an assortment of memory types (with their characteristics) used in computer Systems and basic principle of interfacing input, output devices.

CO	C203: Data Structures & Algorithms (214443)
C203.1	Perform basic analysis of algorithms with respect to time and space complexity
C203.2	Determine appropriate searching and/or sorting techniques in the application development
C203.3	Implement abstract data type (ADT) and data structures for given application.
C203.4	Design algorithms based on techniques like brute -force, divide and conquer, greedy,etc.
C203.5	Apply implement learned algorithm design techniques and data structures to solve problems
C203.6	Design different hashing functions and use files organizations.

CO	C204: Object Oriented Programming (214444)
C204.1	Differentiate various programming paradigms and apply basic concepts of OOP.
C204.2	Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
C204.3	Identify relationships among objects using inheritance and polymorphism.
C204.4	Handle different types of exceptions and perform generic programming.
C204.5	Apply file handling for real world applications.
C204.6	Apply appropriate design patterns to provide object-oriented solutions.

CO	C205: Basics of Computer Network (214445)
C205.1	Understand and explain the concepts of communication theory and compare functions ofOSI and TCP/IP model.
C205.2	Analyze data link layer services, error detection and correction, linear block codes, cyclic Codes, framing and flow control protocols.
C205.3	Compare different access techniques, channelization and IEEE standards.
C205.4	Apply the skills of subnetting, supernetting and routing mechanisms.
C205.5	Analyze the routing protocol at the Network layer.
C205.6	Illustrate services and protocols used at the transport layer.

CO	C206: Logic Design Computer Organization Lab (214446)
C206.1	Use logic function representation for simplification with K-Maps and design Combinational logic circuits using SSI & MSI chips
C206.2	Design Sequential Logic circuits: MOD counters using synchronous counter.
C206.3	Understand the basics of simulator tool & stimulate basic blocks such as ALU & Memory

CO	C207: Data Structures & Algorithms Lab (214447)
C207.1	Analyze algorithms and to determine algorithm correctness and time efficiency class
C207.2	Implement abstract data type (ADT) and data structures for given application.
C207.3	Design algorithms based on techniques like brute -force, divide and conquer, greedy, etc.).
C207.4	Solve problems using algorithmic design techniques and data structures.
C207.5	Analyze algorithms with respect to time and space complexity.

CO	C208: Object Oriented programming Lab (214448)
C208.1	Implement basic concepts of OOP and apply object creation, initialization, and destruction to real world problems.
C208.2	develop solution to the problem various types of inheritance and polymorphism
C208.3	Implement interfaces for real world application
C208.4	Develop a solution to the problem using exception handling and generic programming.
C208.5	Apply file handling for real world applications.
C208.6	Apply appropriate design patterns to provide object-oriented solutions.

CO	C209: Soft Skill (214449)
C209.1	Introspect about individual's goals, aspirations by evaluating SWOC & think creatively.
C209.2	Develop effective communication skills Listening, Reading, and Writing & Speaking.
C209.3	Constructively participate in group discussion and prepare & deliver Presentations.
C209.4	Write precise briefs or reports and technical documents.
C209.5	Practice professional etiquette, present oneself confidently and successfully handle personal interviews.
C209.6	Function effectively in multi-disciplinary and heterogeneous teams.

CO	C210: Audit Course – III (214450)
C210.1	Understand the basic concepts of cyber security and its abilities
C210.2	Analyze and evaluate the cyber security needs of an organization.
C210.3	Understand the importance of cyber laws and its practices.
C210.4	Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation

Second Year (S.E.) Subjects Course Outcomes (2019 course)

Semester – II

CO	C211: Engineering Mathematics –III (207003)
C211.1	Solve Linear differential equations, essential in modeling and design of computer-based systems.
C211.2	Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
C211.3	Apply Statistical methods like correlation& regression analysis and probability theory for data analysis and predictions in machine learning.
C211.4	Solve Algebraic & Transcendental equations and System of linear equations using numerical techniques.
C211.5	Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.

CO	C212: Processor Architecture (214451)
C212.1	Use architectural details of PIC 18 microcontroller for problem solving
C212.2	Implement embedded C programming for PIC 18.
C212.3	Use concepts of timers and interrupts of PIC 18.
C212.4	Demonstrate real life applications using PIC 18
C212.5	Analyze architectural details of ARM processor

CO	C213: Database Management System (214452)
C213.1	Apply fundamental elements of database management systems
C213.2	Design ER-models to represent simple database application scenarios
C213.3	Design and develop SQL queries on data for relational databases
C213.4	Improve the database design by normalization & to incorporate query processing
C213.5	Apply ACID properties for transaction management and concurrency control
C213.6	Analyze various database architectures and technologies

CO	C214: Computer Graphics (214453)
C214.1	Apply mathematical and logical aspects for developing elementary graphics operation like scan conversion of points, lines, circle, and apply it for problem solving
C214.2	Apply techniques of geometrical transforms to produce, position and manipulate Objects in 2 dimensional and 3-dimensional space respectively.
C214.3	Describe mapping from a world coordinates to device coordinates, clipping, and projections in order to produce 3D images on 2D output device.
C214.4	Apply concepts of rendering, shading, animation, curves and fractals using computer graphics tools in design, development and testing of 2D, 3D modeling applications.
C214.5	Apply concepts of Curves, fractals and Animation
C214.6	Apply concepts of virtual reality

CO	C215: Software Engineering (214454)
C215.1	Classify various software application domains.
C215.2	Analyze software requirements by using various modeling techniques.
C215.3	Translate the requirement models into design models.
C215.4	Apply planning and estimation to any project.
C215.5	Use quality attributes and testing principles in software development life cycle.
C215.6	Articulate recent trends in Software engineering by using CASE and agile tools.

CO	C216: Programming Skill Development Lab (214455)
C216.1	Apply embedded C programming concepts to solve given problem
C216.2	Develop and Execute embedded C program to perform array addition, block transfer, sorting operations
C216.3	Perform interfacing of real-world input and output devices to PIC18 microcontroller
C216.4	Use platform like Raspberry-Pi /Arduino

CO	C217: Database Management System Lab (214456)
C217.1	To install and configure database systems
C217.2	To analyze and design a database schema using entity relationship models.
C217.3	To design and implement a database schema for a given problem-domain using SQL DDL commands.
C217.4	To populate and query a database using SQL DML / DCL commands.
C217.5	To design a backend database of any one organization.

CO	C218: Computer Graphics Lab (214457)
C218.1	Apply line& circle drawing algorithms to draw the objects.
C218.2	Apply polygon filling methods for the object.
C218.3	Apply polygon clipping algorithms for the object.
C218.4	Apply the 2D transformations on the object.
C218.5	Implement the curve generation algorithms.
C218.6	Demonstrate the animation of any object using animation principles.

CO	C219: Project Based Learning (214458)
C219.1	Develop critical thinking and engineering problem solving skills amongst the students.
C219.2	Explain the roles and responsibilities of IT engineers to the solution of engineering problems within the social, environmental and economic context.
C219.3	Equip the students with knowledge and skills require to develop solutions for the different problems
C219.4	Collaborate and engage in multi-disciplinary learning environments.

CO	C220: Audit Course- 4A(Water Supply and Management) (214459)
C220.1	Relate the relations between the environment and ecology, estimating water requirement for public water supply scheme.
C220.2	Assess the quality of water as per BIS and select the appropriate treatment method required for the water source.
C220.3	Analyze the suitable distribution system for a locality and know the appurtenances used.
C220.4	Summarize the arrangement of water supply and fittings in a building.
C220.5	Determine the need of conservation of water and rural water supply.
C220.6	Identify the sources of water pollution and suitable control measures.

CO	C301: Theory of Computation (314441)
C301.1	Write regular expressions and construct finite automata for the regular languages
C301.2	Illustrate context free grammar and design pushdown automata & post Machine for a given Languages
C301.3	Construct a Turing Machine for formal languages.
C301.4	Express understanding of computational complexity, decidability and undecidability problems

CO	C302: Operating System (314442)
C302.1	Articulate use of different System software and demonstrate shell programming
C302.2	Evaluate different process and thread scheduling techniques
C302.3	Illustrate the concept of concurrency control
C302.4	Analyze different memory, I/O and file management techniques

CO	C303: Machine Learning (314443)
C303.1	Apply basic concepts of machine learning and types of machine learning algorithms
C303.2	Apply supervised and un supervised machine learning algorithm for real world problem and evaluate their performance
C303.3	Apply fundamental concept of artificial neural network

CO	C304: Human-Computer Interaction (314444)
C304.1	Explain importance of HCI study and principles of user-centered design approach.
C304.2	Develop understanding of human factors in HCI design.
C304.3	Develop understanding of models, paradigms, and context of interactions.
C304.4	Design effective user-interfaces following a structured and organized UCD process.
C304.5	Evaluate usability of a user-interface design.
C304.6	Apply cognitive models for predicting human-computer-interactions.

CO	C305B: ELE- I 1) Advanced Database and Management System (314445)
C305B.1	Differentiate relational and object-oriented databases.
C305B.2	Illustrate parallel & distributed database architectures.
C305B.3	Apply concepts of NoSQL Databases.
C305B.4	Explain concepts of data warehouse and OLAP technologies.
C305B.5	Apply data mining algorithms and various software tools.
C305B.6	Comprehend emerging and enhanced data models for advanced applications.

CO	C306: Operating Systems Lab (314446)
C306.1	Articulate use of different System software and demonstrate shell programming
C306.2	Evaluate different process and thread scheduling techniques
C306.3	Illustrate the concept of concurrency control
C306.4	Analyze different memory, I/O and file management techniques

CO	C307: Human Computer Interaction- Lab (314447)
C307.1	Differentiate between good design and bad design.
C307.2	Analyze creative design in the surrounding.
C307.3	Assess design based on feedback and constraint.
C307.4	Design paper-based prototypes and use wire frame.
C307.5	Implement user-interface design using web technology.
C307.6	Evaluate user-interface design using HCI evaluation techniques.

CO	C308: Laboratory Practice-I (314448)
C308.1	Apply data preprocessing on dataset and Implement supervised and unsupervised machine learning models
C308.2	Evaluate performance of machine learning models for real-time problems
C308.3	Apply the dimensionality reduction for high dimensional dataset
C308.4	Apply advanced Database Programming Languages and configure database systems
C308.5	Apply advanced Database Programming Languages and configure database systems

CO	C309: Seminar (314449)
C309.1	To Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
C309.2	To define intended future work based on the technical review.
C309.3	To present the study using graphics and multimedia presentation.
C309.4	To write a technical report summarizing state-of-the-art on an identified topic.

CO	C310: Audit Course 5 (314450)
C310.1	Identify Startup opportunities
C310.2	Explain legal and other requirements for new ventures
C310.3	Analyze financial Issues of startups

Third Year (T.E.) Subjects Course Outcomes (2019 course)
Semester – II

CO	C311: Computer Networks& Security (314451)
C311.1	To Apply Responsibilities, services offered and protocol used at application layer of network
C311.2	To Apply concepts of wireless network and different wireless standards.
C311.3	To Analyze the Adhoc Network's MAC layer, routing protocol and Sensor network architecture.
C311.4	To Implement the principal concepts of network security and Understand network security threats, security services, and countermeasures
C311.5	To Apply basic cryptographic techniques in application development.
C311.6	To Gain a good comprehension of the landscape of cyber security Vulnerabilities & describe typical threats to modern digital systems.

CO	C312: Data Science and Big Data Analytics (314452)
C312.1	Learn Big Data primitives.
C312.2	Apply different mathematical models for Big Data.
C312.3	Demonstrate Big Data learning skills by developing industry or research applications.
C312.4	Analyze learning models comes from a different algorithmic approach.
C312.5	Analyze needs, challenges and techniques for big data visualization.
C312.6	Learn different programming platforms for big data analytics.

CO	C313: Web Application Development (314453)
C313.1	Design Dynamic website using HTML, CSS, Bootstrap and scripting languages
C313.2	Develop web applications with Front End & Back End Technologies.
C313.3	Develop mobile website using JQuery Mobile
C313.4	Deploy web application on cloud using AWS

CO	C314B ELE – II 1) Cyber Security (314454B)
C314B.1	Develop basic understanding of cyber security.
C314B.2	Differentiate among different types of cyber threats and cyber-crimes.
C314B.3	Illustrate cyber forensic techniques to identify the criminal activities.
C314B.4	Apply forensic analysis tools to recover important evidence for identifying computer crime
C314B.5	Distinguish and classify the forms of cybercriminal activity and the technological and social engineering methods used to undertake such crimes.
C314B.6	Evaluate the effectiveness of cyber-security, cyber-laws and other countermeasures against

CO	C314C: ELE – II 2) Cloud Computing (314454C)
C314C.1	Articulate the main concepts, key technologies and fundamentals of cloud computing.
C314C.2	Understand cloud enabling technologies and virtualization
C314C.3	Analyze various cloud programming models and apply them to solve problems on cloud.
C314C.4	Explain data storage and major security issues in the cloud.
C314C.5	Understand trends in ubiquitous cloud and internet of things.
C314C.6	Explore future trends of cloud computing.

CO	C315: Internship (314455)
C315.1	Develop professional competence through industry internship
C315.2	Apply academic knowledge in a personal and professional environment
C315.3	Apply professional and societal ethics in their day-to-day life
C315.4	Become a responsible professional having social, economic and administrative considerations

CO	C316: Computer Networks& Security-Lab (314456)
C316.1	Design and configure small size network and associated networking commands.
C316.2	Understand various client/server environments to use application layer protocols.
C316.3	Use basic cryptographic techniques in software and system design.
C316.4	Apply methods for authentication, access control, intrusion detection.

CO	C317: DS & BDA-Lab (314457)
C317.1	Apply Big data primitives and fundamentals for application development.
C317.2	Explore different Big data processing techniques with use cases.
C317.3	Apply the Analytical concept of Big data using Python.
C317.4	Visualize the Big Data using Tableau.
C317.5	Design algorithms and techniques for Big data analytics
C317.6	Design and develop Big data analytic applications for emerging trends.

CO	C318: Laboratory Practice-II (314458)
C318.1	Design Dynamic website using HTML, CSS, Bootstrap and scripting languages
C318.2	Develop web application with Front End & Back End Technologies.
C318.3	Develop mobile website using JQuery Mobile
C318.4	Design & Deploy web application on cloud using AWS
C318.5	To know the different guidelines for Packet Sniffing in networking and internetworking environment and will be able analyze the cyber-attacks.
C318.6	Apply the knowledge of IDS to secure network and performing analysis of IDS attack on network.

CO	C319: Audit Course 6 (314459)
319.1	Practice responsible decision-making and personal accountability.
319.2	Demonstrate an understanding of group dynamics and effective teamwork.
319.3	Develop a range of leadership skills and abilities such as effectively leading change, resolving conflict, and motivating others.
319.4	Develop multi-dimensional personality.

Final Year (B.E.) Subjects Course Outcomes (2019 course)

Semester – I

CO	C401: Information Retrieval (414441)
C401.1	Explore the concept of Information retrieval and to apply clustering in information retrieval.
C401.2	Use an indexing approach for retrieval of text and multimedia data.
C401.3	Evaluate performance of information retrieval systems.
C401.4	Apply the concepts of multimedia and distributed information retrieval.
C401.5	Use appropriate tools in analyzing the web information.
C401.6	Simulate the working of a search engine and recommender system.

CO	C402: Software Project Management (414442)
C402.1	Apply the practices and methods for successful Software Project Management.
C402.2	Create Design and Evaluate Project.
C402.3	Analyze Project Schedule and calculate Risk Management with help of tools.
C402.4	Demonstrate different tools used for Project Tracking, Monitoring & Control.
C402.5	Identify Staff Selection Process and the issues related to Staff Management.
C402.6	Discuss and use modern tools for Software Project Management.

CO	C403: Deep Learning (414443)
C403.1	Apply the fundamentals, algorithms and methodologies of deep learning
C403.2	Apply the concepts of Convolution Neural Networks and demonstrate the use of popular CNN architecture
C403.3	Illustrate the modeling of recurrent neural network using LSTM and compare feed forward neural network with RNN
C403.4	Elaborate the autoencoder as unsupervised deep learning algorithm
C403.5	Explore Representation Learning and Transfer Learning techniques using variants of CNN architecture
C403.6	Solve real world problems and evaluate the performance of deep learning algorithms

CO	C404A: Elective - III (Mobile Computing) (414444)
C404A.1	Understand the basic concepts of mobile computing, MAC and different multiplexing technics.
C404A.2	Understand Protocols, Connection Establishment, Frequency Allocation, Routing of mobile telecommunication system like GSM, GPRS, UMTS.
C404A.3	Understand the Generations of Mobile Communication Technologies
C404A.4	Learn mobile IP , Adhoc – Network, Reactive Routing protocols, Multicast Routing.
C404A.5	Obtaining knowledge of transport layer protocol TCP, File System, and different application layer protocols.
C404A.6	Gain knowledge about different mobile platforms, operating Systems, Software Development Kit, Security Issues.

CO	C405D: Elective -IV (Wireless Communication) (414445)
C405D.1	Articulate the fundamental concept of cellular system
C405D.2	Analyse the fundamentals of cellular systems.
C405D.3	Illustrate multiple access technique for effective utilization of spectrum.
C405D.4	Design and analyse the WAP Programming Model in networking environment.
C405D.5	Learn and understand security issues, challenges and tools in wireless communication.
C405D.6	Explore the emerging trends and applications in wireless communication.

CO	C406: Lab Practice – III (414446)
C406.1	Explore the concept of Information retrieval and to apply clustering in information retrieval.
C406.2	Use appropriate indexing approach for retrieval of text and multimedia data and Evaluate performance of information retrieval systems.
C406.3	Apply appropriate tools in analyzing the web information.
C406.4	Map the concepts of the subject on recent developments in the Information retrieval field.

CO	C407: Lab Practice – IV (414447)
C407.1	Learn and Use various Deep Learning tools and packages to build and train deep neural network models for various applications.
C407.2	Apply Deep Learning techniques CNN, RNN and Auto Encoders to solve real word problems.
C407.3	Evaluate the performance of the model developed using Deep Learning.

CO	C408: Project Stage – I (414448)
C408.1	To apply knowledge of mathematics, science, and engineering to formulate the Problem statement
C408.2	. To design and conduct experiments, as well as to analyze and interpret data.
C408.3	Understand the professional and ethical responsibility.
C408.4	To communicate effectively.
C408.5	Get broad education which is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
C408.6	Recognition of the need for, and an ability to engage in life-long learning.
C408.7	To use the techniques, skills, and modern engineering tools necessary for engineering practices.
C408.8	To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

CO	C409: Audit Course – VII (414449)
C409.1	Understand the reasons for Stress.
C409.2	Understand the role of Yoga.
C409.3	Develop a healthy mind in a healthy body.
C409.4	Develop overall efficiency.

Final Year (B.E.) Subjects Course Outcomes (2019 course)

Semester – II

CO	C410: Distributed Computing System (414450)
C410.1	Demonstrate the core concepts of distributed systems.
C410.2	Explore the concept of middleware of distributed systems.
C410.3	Illustrate the IPC methods and analyze different coordination algorithms.
C410.4	Comprehend the importance of replication to achieve fault tolerance in DS.
C410.5	Analyze the design and functioning of existing distributed file systems, distributed multimedia, and distributed web-based systems.
C410.6	Examine various Recent Trends in distributed systems.

CO	C411: Elective – V (Social Computing) (414451)
C411.1	Understand basics of Social Media Analytics.
C411.2	Correlate Network Measures for Social Media Data.
C411.3	Visualize mining in social media data.
C411.4	Discuss the Social Similarities.
C411.5	Interpret social media behavior.
C411.6	Apply Social Media Computations for Google+.

CO	C412: Elective – VI (Blockchain Technology) (414452)
C412.1	Apply cryptography in blockchain and decentralized systems.
C412.2	Apply acquired blockchain knowledge to address associated issues effectively.
C412.3	Develop blockchain applications using Ethereum knowledge.
C412.4	Apply Hyperledger knowledge to develop decentralized solutions, considering its features, architecture, benefits, and differences from Ethereum.
C412.5	Apply tokenization knowledge to develop blockchain-based solutions for enterprise systems, addressing challenges and considering consensus mechanisms.
C412.6	Develop blockchain solutions, considering platform selection, risks, regulations, and benefits.

CO	C413: Startup & Entrepreneurship (414453)
C413.1	To understand key concepts and framework of innovation and start-up ecosystem.
C413.2	To develop startup ecosystem, its key components and how to influence and manage dynamics between them and increase the productivity of ecosystem.
C413.3	To understand the role of different stakeholders in the ecosystem in building and supporting growth of start-ups.
C413.4	Global trend in start-up ecosystem and product development.
C413.5	Mapping different start-up ecosystems and developing performance indicators.

CO	C414: Lab Practice-V (414454)
C414.1	Demonstrate knowledge of the core concepts and techniques in distributed systems.
C414.2	Learn how to apply principles of state-of-the-Art Distributed systems in practical application.
C414.3	Design, build and test application programs on distributed systems.

CO	C415: Lab Practice-VI (414455)
C415.1	Setup crypto wallet and perform various operations on a crypto wallet.
C415.2	Deploy the smart contract on the Ethereum network.
C415.3	Implement Solidity data structures to represent and organize different types of data in a smart contract.

CO	C416: Project Stage- II (414456)
C416.1	To apply engineering and mathematical knowledge to investigate / select proper technology / Algorithm suitable to solve the problem in hand.
C416.2	To apply knowledge of statistics for analysis of results and express conclusion and justification for the same.
C416.3	To design and conduct experiments, as well as to analyze and interpret data or develop prototype model of the application.
C416.4	To communicate effectively.
C416.5	Get broad education which is necessary to understand the impact of engineering solutions in a global, economic, environmental, ethically and societal context.
C416.6	Recognition of the need for, and an ability to engage in life-long learning.

CO	C417: Audit course IX (414457)
C417.1	Understand the importance of IT Act.
C417.2	Understand the significance of cyber laws and its practices.
C417.3	Identify and Analyze software vulnerabilities and security solutions to reduce the risk of exploitation.
C417.4	To study various privacy and security concerns of Online social media.