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 knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 to develop to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development (WK1 to WK4).
PO3	**Design/development of solutions**: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5).
PO4	**Conduct investigations of complex problems**: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions (WK8).
PO5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).
PO6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5 and WK7).
PO7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9).
PO8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
PO10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	**Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) Independent and life-long learning, ii) Adaptability to new and emerging technologies and iii) Critical thinking in the broadest context of technological change. (WK8).

Knowledge and Attitude Profile (WK)

WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2	Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8	Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9	Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

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 B.Tech Information Technology (2024 Pattern)

Semester – I

CO	C201: Data Structures (161301)
C201.1	Select appropriate searching and sorting techniques in the application development.
C201.2	Solve problems using stack and queue data structure.
C201.3	Apply linked list data structure for solving problems.
C201.4	Solve problems based on tree and graph data structure.
C201.5	Apply hashing techniques for implementing data structures.

CO	C202: Digital Logic and Computer Organization (161302)
C202.1	Apply Boolean algebra and logic minimization techniques to simplify combinational logic expressions.
C202.2	Apply design techniques to develop Sequential Circuits.
C202.3	Study various concepts of Computer architectures and organization.
C202.4	Illustrate advanced features of 80386 Microprocessor.
C202.5	Apply knowledge of the 80386 instruction set to write and analyze assembly-level programs.

CO	C203: Discrete Mathematics (161303)
C203.1	Solve problems by applying set theory, propositional logic, and formal proof techniques.
C203.2	CO2: Illustrate problems logically by using function and relation models.
C203.3	CO3: Analyze the number of possible outcomes using permutations and combinations.
C203.4	CO4: Solve computing problems using appropriate graph and tree algorithms.
C203.5	CO5: Evaluate algebraic structures and coding theory.

CO	C204: MDM-I Artificial Intelligence (170404A)
C204.1	Explain the basic principles and scope of Artificial Intelligence and its relevance to different engineering disciplines.
C204.2	Apply search algorithms for solving simple engineering problems.
C204.3	Understand and differentiate between types of machine learning and data representations.
C204.4	Identify and analyze AI applications in domains such as predictive maintenance, smart cities, automation, and control systems.
C204.5	Recognize ethical, social, and professional issues in deploying AI solutions in engineering contexts.

CO	C205A: OEC-1 Intellectual Property Rights and Ethics (171305A)
C205A.1	Understand the basics of intellectual property rights.
C205A.2	Learn the patent filing process.
C205A.3	Understand the copyright/trademark/industrial design and filing process.
C205A.4	Understand the importance of ethics in their personal and professional life.
C205A.5	Learn the workplace responsibilities and rights as an engineer in the industry.

CO	C205B: OEC-1 Renewable Energy (171305B)
C205B.1	Describe the basics of renewable energy.
C205B.2	Explain the constructional details and working of hydro-electric power plant.
C205B.3	Describe the fundamentals and technology to harness solar energy.
C205B.4	Explain the wind energy conversion system.
C205B.5	Discuss the bio-energy conversion pathways.

CO	C205C: OEC-1 Health, Care and Management Systems (171305C)
C205C.1	Understand the structure and function of key human body systems relevant to healthcare and diagnosis.
C205C.2	Identify common health issues and explain their causes, symptoms.
C205C.3	Describe the working principles and applications of basic biomedical instruments used in diagnosis and monitoring
C205C.4	Analyze the role of advanced medical devices and imaging systems in clinical decision making and treatment.
C205C.5	Explain the components of hospital management system and significance of digital health technologies like Electronic Health Records (EHR), telemedicine and emergency tracking.

CO	C205D: OEC-1 Smart City and Infrastructure (171305D)
C205D.1	Describe concept, features and components of smart cities with relevant examples.
C205D.2	Demonstrate the structure and regulatory mechanisms of smart city development in context of Indian and international benchmarks.
C205D.3	Apply GIS and remote sensing techniques for spatial analysis and infrastructure planning in smart cities.
C205D.4	Relate smart transportation technologies and their role in improving urban mobility and sustainability.
C205D.5	Suggest smart solutions for urban water, air and waste management using IoT technologies.

CO	C206: EEM Business Economics (172406)
C206.1	CO1: Understand the role of economics in business decision-making and analyze real-world economic scenarios.
C206.2	CO2: Apply demand and supply principles to determine market equilibrium and pricing Strategies.
C206.3	CO3: Analyze cost structures, profitability and break-even points in business operations.
C206.4	CO4: Evaluate the impact of business cycles, inflation, and government economic policies on industries.
C206.5	CO5: Develop pricing strategies based on competitive analysis and consumer demand.

CO	C207: VEC Environmental Studies (173407)
C207.1	Describe the importance of environmental studies and the sustainable use of natural resources.
C207.2	Explain the structure and function of ecosystems and the significance of biodiversity.
C207.3	Identify various types of environmental pollution and their control measures.
C207.4	Discuss key environmental issues, policies and their impact on society.
C207.5	Observe and report environmental conditions and features through field activities.

CO	C208: CEP/FP Community Engagement / Field Projects (214449)
C208.1	Explore relevance between theory and practice through community-based problem Learning.
C208.2	Identify real-life socio-technical problems and develop the solution.
C208.3	Implement wisdom of empathy and social responsibility to meet complex global challenges.
C208.4	Develop innovative ideas in collaboration with society through community-based research methods.
C208.5	Analyze the need of research projects and develop a plan for betterment of public service values through active citizenship.

Second Year B.Tech Information Technology (2024 Pattern)

Semester – II

CO	C209: Operating Systems (161401)
C209.1	Analyze the role and functions of an Operating System in resource management.
C209.2	Apply process/thread scheduling algorithms in operating systems.
C209.3	Implement process synchronization techniques.
C209.4	Evaluate memory management techniques for optimization.
C209.5	Compare I/O management, disk scheduling, and file system techniques.

CO	C210: Database Management System (161402)
C210.1	Design E-R Model for given requirements and convert the same into database tables.
C210.2	Use SQL to write queries for given requirements.
C210.3	Implement normalization techniques, to construct optimized relational database designs.
C210.4	Analyze and implement transaction management strategies.
C210.5	Apply principles of NoSQL and MongoDB databases to perform the operations on databases.

CO	C211: Computer Graphics (161403)
C211.1	Understand the fundamentals of graphics systems and apply mathematics to perform elementary computer graphics operations.
C211.2	Apply the core concepts of transformation in two and three dimensions.
C211.3	Understand basics of hidden surface detection and apply clipping algorithm to clip lines outside the window.
C211.4	Describe methods and techniques for shading and apply mathematics to generate fractals.
C211.5	Understand the basics of animation, gaming and image processing.

CO	C212: MDM-2 Engineering Mathematics-III (170304A)
C212.1	Solve higher order linear differential equations using appropriate techniques.
C212.2	Apply Laplace transform and Z-Transform to solve differential equations, difference equations.
C212.3	Apply vector calculus concepts to analyze problems and solve system of linear equations by using numerical methods.
C212.4	Analyze discrete and continuous random variables using Binomial, Poisson and Normal distributions.
C212.5	Analyze data through hypothesis tests like Chi-square and t-tests.

CO	C213: OEC-2 Cyber Security and Laws (171405A)
C213.1	Understand the basics of cyber security.
C213.2	Study ethical hacking techniques and hacker methodologies.
C213.3	Identify and classify various types of cyber crimes and related cyber laws.
C213.4	Apply methods for cyber forensics.
C213.5	Use of AI in cyber security.

CO	C214: AEC Foreign Languages (174408)
C214.1	Learn the basic phonetics, alphabets and sounds of the selected foreign language.
C214.2	Interpret and use everyday vocabulary to manage simple social interaction.
C214.3	Form simple sentences using basic grammatical structures and sentence patterns.
C214.4	Participate in simple conversations and everyday communication situations relevant to academic, social and professional contexts.
C214.5	Demonstrate cultural awareness and appropriate language behaviour to facilitate global and cross-cultural interactions.

CO	C215: VSEC Java Programming (161409)
C215.1	Use various data types, conditional and looping constructs in Java.
C215.2	Demonstrate Java classes, various overloading and overriding methods in Java.
C215.3	Design and implement Java programs using OOP principles.
C215.4	Apply knowledge in handling files and implementing multithreading in Java applications.
C215.5	Justify real-time applications on the Java Platform.

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

Semester – I

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.