

COURSE OUTCOMES

2019 Pattern Courses

- **Note: Patterns referred to create this document are:**
- A. For FE Artificial Intelligence & Data Science Engineering (Semester- I, II): 2019 Pattern
- B. For SE Artificial Intelligence & Data Science Engineering (Semester- III, IV): 2019 Pattern
- C. For TE Artificial Intelligence & Data Science Engineering (Semester- V, VI): 2019 Pattern
- D. For BE Artificial Intelligence & Data Science Engineering (Semester- VII, VIII): 2019 Pattern

Class- FE	Course Name : Programming and Problem Solving (110005)	Sem- I	Pattern: 2019
COs	Course Outcomes		
110005.1	Inculcate and apply various skills in problem solving.		
110005.2	Choose most appropriate programming constructs and features to solve the problems in diversified domains.		
110005.3	Exhibit the programming skills for the problems those require the writing of well-documented programs including use of the logical constructs of language, Python.		
110005.4	Demonstrate significant experience with the Python program development environment.		

Class- FE	Course Name : Project Based Learning (110013)	Sem- II	Pattern: 2019
COs	Course Outcomes		
110013.1	Project based learning will increase their capacity and learning through shared cognition.		
110013.2	Students able to draw on lessons from several disciplines and apply them in practical way.		
110013.3	Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.		

Class- SE	Course Name : Discrete Mathematics (210241)	Sem- III	Pattern: 2019
COs	Course Outcomes		
210241.1	Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.		
210241.2	Apply appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.		
210241.3	Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction		
210241.4	Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems.		
210241.5	Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.		
210241.6	Model and solve computing problem using tree and graph and solve problems using appropriate algorithms.		

Class- SE	Course Name : Fundamentals of Data Structures (210242)	Sem- III	Pattern: 2019
COs	Course Outcomes		
210242.1	Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity		
210242.2	Discriminate the usage of various structures, Design/Program/Implement the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution.		
210242.3	Demonstrate use of sequential data structures- Array and Linked lists to store and process data.		
210242.4	Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application		
210242.5	Compare and contrast different implementations of data structures (dynamic and static).		
210242.6	Understand, Implement and apply principles of data structures-stack and queue to solve computational problems		

Class- SE	Course Name : Object Oriented Programming (210243)	Sem- III	Pattern: 2019
COs	Course Outcomes		
210243.1	Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.		
210243.2	Design object-oriented solutions for small systems involving multiple objects.		
210243.3	Use virtual and pure virtual function and complex programming situations.		
210243.4	Apply object-oriented software principles in problem solving.		
210243.5	Analyze the strengths of object-oriented programming.		
210243.6	Develop the application using object oriented programming language (C++).		

Class- SE	Course Name : Computer Graphics (210244)	Sem- III	Pattern: 2019
COs	Course Outcomes		
210244.1	Identify the basic terminologies of computer graphics and interpret the mathematical foundation of the concepts of Computer Graphics.		
210244.2	Apply mathematics to develop Computer programs for elementary graphic operations.		
210244.3	Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons.		
210244.4	Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.		
210244.5	Understand the concepts of color models, lighting, shading models and hidden surface elimination.		
210244.6	210244.6 Create effective programs using concepts of curves, fractals, animation and gaming.		

Class- SE	Course Name : Operating Systems (217521)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217521.1	Enlist functions of OS and types of system calls		
217521.2	Apply process scheduling algorithms to solve a given problem		
217521.3	Illustrate deadlock prevention, avoidance and recovery		
217521.4	Explain memory management technique		
217521.5	Illustrate I/O and file management policies		
217521.6	Describe Linux process management		

Class- SE	Course Name : Data Structures Laboratory (217522)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217522.1	Use algorithms on various linear data structure using sequential organization to solve real life problems		
217522.2	Analyze problems to apply suitable searching and sorting algorithm to various applications		
217522.3	Analyze problems to use variants of linked list and solve various real life problems.		
217522.4	Designing and implement data structures and algorithms for solving different kinds of problems.		
217522.5	Design and apply algorithms to simulate the applications of Stack Data Structures.		
217522.6	Design and apply algorithms to simulate the applications of Queue Data Structures.		

Class- SE	Course Name : OOP and CG Laboratory (217523)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217523.1	Understand and apply the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes		
217523.2	Analyze the concept of file and apply it while storing and retrieving the data from secondary storages.		
217523.3	Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts		
217523.4	Understand the concept of windowing and clipping and apply various algorithms to fill and clip polygons		
217523.5	Apply logic to implement curves, fractals, and animation and gaming programs.		
217523.6	Design and develop interactive graphical applications by integrating object-oriented programming concepts, file handling techniques, and computer graphics algorithms.		

Class- SE	Course Name : Operating Systems Laboratory (217524)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217524.1	Choose the best CPU scheduling algorithm for a given problem instance		
217524.2	Demonstrate interprocess communication		
217524.3	Apply deadlock avoidance algorithm		
217524.4	Compare performance of page replacement algorithms		
217524.5	Demonstrate the fundamental UNIX commands & system calls		
217524.6	Implement and analyze file system management, I/O management techniques, and advanced synchronization mechanisms.		

Class- SE	Course Name :Business Communication Skills (217525)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217525.1	Express effectively through verbal/oral communication and improve listening skills		
217525.2	Write precise briefs or reports and technical documents.		
217525.3	Prepare for group discussion / meetings / interviews and presentations.		
217525.4	Explore goal/target setting, self-motivation and practicing creative thinking		
217525.5	Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Interpersonal relationships, and conflict management and leadership qualities.		
217525.6	Understand the concept of stress management.		

Class- SE	Course Name :Humanity and Social Science (217526)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217526.1	Aware of the various issues concerning humans and society.		
217526.2	Aware about their responsibilities towards society.		
217526.3	Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.		
217526.4	Able to understand the nature of the individual and the relationship between self and the community.		
217526.5	Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.		
217526.6	Encourage the students to use their knowledge and abilities to solve social problems and help their communities and the world at large.		

Class- SE	Course Name :Audit Course I Green Construction and Design (217527)	Sem- III	Pattern: 2019
COs	Course Outcomes		
217527.1	Understand the importance of environment friendly society.		
217527.2	Apply primary measures to reduce carbon emissions from their surroundings.		
217527.3	Learn role of IT solutions in design of green buildings.		
217527.4	Understand the use of software systems to complete statutory compliances involved in the design of a new home or office building through green construction.		

Class- SE	Course Name :Statistics (217528)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
217528 .1	Identify the use of appropriate statistical terms to describe data		
217528.2	Use appropriate statistical methods to collect, organize, display, and analyze relevant data.		
217528.3	Use distribution functions for random variables		
217528.4	Distinguish between correlation coefficient and regression		
217528.5	Understand tests for hypothesis and its significance		
217528.6	Apply and Analyze parametric and non-parametric test for sample cases.		

Class- SE	Course Name: Internet Of things (217529)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
217528.1	Have a thorough understanding of the structure, function and characteristics of computer systems and Understand the structure of various number systems and its application in digital design.		
217528.2	Develop the skill set to build IoT systems and sensor interfacing.		
217528.3	Explain the concept of Internet of Things and identify the technologies that make up the internet of things		
217528.4	Analyze trade-offs in interconnected wireless embedded device networks. Select Appropriate Protocols for IoT Solutions		
217528.5	Design a simple IoT system comprising sensors by analyzing the requirements of IoT Application		
217528.6	Identify the Application of IoT in automation of Commercial and Real World examples		

Class- SE	Course Name: Software Engineering (210253)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
210253.1	Analyze software requirements and formulate design solutions for a software.		
210253.2	Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.		
210253.3	Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.		
210253.4	Model and design User interface and component-level.		
210253.5	Identify and handle risk management and software configuration management.		
210253.6	Apply knowledge of software testing, verification, and validation to construct high-quality software solutions that are reliable, maintainable, understandable, robust, and cost-effective.		

Class- SE	Course Name : Data Structures and Algorithms (210252)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
210254.1	Identify and Articulate the complexity goals and benefits of a good hashing scheme for real-world applications.		
210254.2	Apply non-linear data structures for solving problems of various domains.		
210242.3	Design and specify the operations of a nonlinear based abstract data type and implement them in a high-level programming		
210254.4	Analyze the algorithmic solutions for resource requirements and optimization.		
210254.5	Use efficient indexing methods and multiway search techniques to store and maintain data.		
210254.6	Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.		

Class- SE	Course Name : Internet Of Things Laboratory (217531)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
217531.1	Understand IOT Application Development using Raspberry Pi/ Beagle board/ Arduino board		
217531.2	Develop and modify the code for various sensor based applications using wireless sensor modules and working with a variety of modules like environmental modules		
217531.3	Make use of Cloud platform to upload and analyse any sensor data		
217531.4	Implement digital logic concepts and basic electronics principles for IoT applications.		
217531.5	Design and develop embedded systems that interact with real-world data through sensor-actuator mechanisms.		
217531.6	Apply IoT technologies to solve real-world problems by integrating hardware, software, and cloud-based analytics		

Class- SE	Course Name :Data Structures and Algorithms Laboratory (210257)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
210257.1	Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem		
210257.2	Choose the most appropriate data structures and apply algorithms for graphical solutions of the problems.		
210257.3	Apply and analyze non linear data structures to solve real world complex problems.		
210257.4	Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression		
210257.5	Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations.		
210257.6	Design, develop, and evaluate real-world software solutions by integratingsuitable data structures and algorithmic techniques to enhance performance,maintainability, and modularity of applications.		

Class- SE	Course Name :Project Based Learning (217533)	Sem- IV	Pattern: 2019
COs	Course Outcomes		
217533.1	Identify the real life problem from societal need point of view		
217533.2	Choose and compare alternative approaches to select the most feasibleone .		
217533.3	Analyze and synthesize the identified problem from technological perspective		
217533.4	Design the reliable and scalable solution to meet challenges		
217533.5	Evaluate the solution based on the criteria specified		
217533.6	Inculcate long life learning attitude towards the societal problems		

Class- TE	Course Name : Database Management Systems (310241)	Sem- V	Pattern: 2019
COs	Course Outcomes		
310241.1	Analyze and design Database Management System using ER model		
310241.2	Implement database queries using database languages		
310241.3	Normalize the database design using normal forms		
310241.4	Apply Transaction Management concepts in real-time situations		
310241.5	Use NoSQL databases for processing unstructured data		
310241.6	Differentiate between Complex Data Types and analyze the use of appropriate data types		

Class- TE	Course Name : Computer Networks (317521)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317521.1	Summarize fundamental concepts of Computer Networks, architectures, protocols and technologies		
317521.2	Analyze the working of physical layer protocols.		
317521.3	Analyze the working of different routing protocols and mechanisms		
317521.4	Implement client-server applications using sockets		
317521.5	Illustrate role of application layer with its protocols, client-server architectures		
317521.6	Summarize concepts of MAC and ethernet.		

Class- TE	Course Name : Web Technology (310252)	Sem- V	Pattern: 2019
COs	Course Outcomes		
310252.1	Implement and analyze behavior of web pages using HTML and CSS		
310252.2	Apply the client side technologies for web development		
310252.3	Analyze the concepts of Servlet and JSP		
310252.4	Analyze the Web services and frameworks		
310252.5	Apply the server side technologies for web development		
310252.6	Create the effective web applications for business functionalities using latest web development platforms		

Class- TE	Course Name : Artificial Intelligence (310253)	Sem- V	Pattern: 2019
COs	Course Outcomes		
310253.1	Identify and apply suitable Intelligent agents for various AI applications		
310253.2	Build smart system using different informed search / uninformed search or heuristic approaches		
310253.3	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem		
310253.4	Apply the suitable algorithms to solve AI problems		
310253.5	Implement ideas underlying modern logical inference systems		
310253.6	Represent complex problems with expressive yet carefully constrained language of representation		

Class- TE	Course Name: Elective-I Human Computer Interface (310245B)	Sem- V	Pattern: 2019
COs	Course Outcomes		
310245B.1	Design effective Human-Computer-Interfaces for all kinds of users		
310245B.2	Apply and analyze the user-interface with respect to golden rules of interface		
310245B.3	Analyze and evaluate the effectiveness of a user-interface design		
310245B.4	Implement the interactive designs for feasible data search and retrieval		
310245B.5	Analyze the scope of HCI in various paradigms like ubiquitous computing, virtual reality, multi-media, World wide web related environments		
310245B.6	Analyze and identify user models, user support, and stakeholder requirements of HCI systems		

Class- TE	Course Name: Elective-I Pattern Recognition (317522B)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317522B.1	Distinguish variety of pattern recognition, classification and combination techniques.		
317522B.2	Apply statistical pattern recognition approaches in variety of problems.		
317522B.3	Elaborate different approaches of syntactic pattern recognition.		
317522B.4	Differentiate graphical approach and grammatical inferences in syntactic pattern recognition.		
317522B.5	Illustrate the artificial neural network-based pattern recognition		
317522B.6	Apply unsupervised learning in pattern recognition.		

Class- TE	Course Name: Software Laboratory I (317523)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317523.1	Implement SQL queries for given requirements, using different SQL concepts		
317523.2	Implement NoSQL queries using MongoDB		
317523.3	Design and develop application using database considering specific requirements		
317523.4	Design a system using different informed search / uninformed search or heuristic approaches		
317523.5	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.		
317523.6	Design and develop an interactive AI application.		

Class- TE	Course Name: CN Laboratory (317524)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317524.1	Analyze the requirements of network types, topology and transmission media		
317524.2	Demonstrate error control, flow control techniques and protocols and analyze them		
317524.3	Demonstrate the subnet formation with IP allocation mechanism and apply various routing algorithms		
317524.4	Develop Client-Server architectures and prototypes		
317524.5	Implement web applications and services using application layer protocols		
317524.6	Use network services and mechanisms		

Class- TE	Course Name: Elective I (HCI) Laboratory (317525)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317525.1	To design effective Human-Computer-Interfaces for all kinds of users		
317525.2	To apply and analyze the user-interface with respect to golden rules of interface		
317525.3	To implement the interactive designs for feasible data search and retrieval		
317525.4	Evaluate existing user interfaces based on established guidelines and user study observations to propose and justify design		
317525.5	Develop interactive web applications utilizing HTML, CSS, and JavaScript to implement dynamic user interface components		
317525.6	Apply 3D modeling techniques to create user interface elements or interactive objects using Blender/Retrieval		

Class- TE	Course Name: Elective I (PR) Laboratory (317525)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317525.1	Apply statistical pattern recognition approaches.		
317525.2	Implement Bayesian classifiers with appropriate parameter estimation techniques.		
317525.3	Implement syntactic pattern recognition techniques using grammars.		
317525.4	Implement parsing algorithms for syntactic pattern recognition.		
317525.5	Generate patterns using syntactical approaches for structured problem solving.		
317525.6	Develop artificial neural network-based pattern recognition systems.		

Class- TE	Course Name: Seminar and Technical Communication (317526)	Sem- V	Pattern: 2019
COs	Course Outcomes		
317526.1	Analysis specialized topic of interest from core area		
317526.2	Enhance Technical writing skills		
317526.3	Targeting specific problem and identify working solution to resolve it.		
317526.4	Developing professional communication skill		
317526.5	Engage in active listening and effective questioning techniques to enhance communication clarity.		
317526.6	Apply modern digital tools and software for enhancing technical communication.		

Class- TE	Course Name: Audit Course5 AC5-A: Emotional Intelligence (317528(A))	Sem- V	Pattern: 2019
317528(A).1	Expand their knowledge of emotional patterns in themselves and others		
317528(A).2	Discover how to manage their emotions, and positively influence themselves and others		
317528(A).3	Build more effective relationships with people at work and home		
317528(A).4	Positively influence and motivate colleagues, team members and managers		
317528(A).5	Increase their leadership effectiveness by creating an atmosphere that engages others		

Class- TE	Course Name: Data Science (317529)	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317529.1	Analyze needs and challenges for Data Science		
317529.2	Apply statistics for Data Analytics		
317529.3	Apply the lifecycle of Data analytics to real world problems		
317529.4	Implement Data Analytics using Python programming		
317529.5	Implement data visualization using visualization tools in Python programming		
317529.6	Design and implement Big Databases using the Hadoop ecosystem		

Class- TE	Course Name: Cyber Security (317530)	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317530.1	Gauge the security protections and limitations provided by today's technology.		
317530.2	Identify cyber security threats.		
317530.3	Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.		
317530.4	Build appropriate security solutions against cyber-attacks		
317530.5	Understand Trusted Systems and Access Control Mechanisms		
317530.6	Understand the Importance of cyber hygiene and evaluate emerging trends in cyber security.		

Class- TE	Course Name: Artificial Neural Network (317531)	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317531.1	Understand the basic features of neural systems and the difference between biological neuron & artificial neuron.		
317531.2	Perform the training of neural networks using various learning rules.		
317531.3	Grasping the use of Associative learning Neural Network		
317531.4	Describe the concept of Competitive Neural Networks		
317531.5	Implement the concept of Convolutional Neural Networks and its models		
317531.6	Use a new tool /tools to solve a wide variety of real-world problems		

Class- TE	Course Name: Elective-II Cloud Computing (317532(B))	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317532B.1	Understand the different Cloud Computing environment		
317532B.2	Use appropriate data storage technique on Cloud, based on Cloud application		
317532B.3	Analyze virtualization technology and install virtualization software		
317532B.4	Develop and deploy applications on Cloud		
317532B.5	Apply security in cloud applications		
317532B.6	Use advance techniques in Cloud Computing		

Class- TE	Course Name:Software Laboratory II (317533)	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317533.1	Model artificial Neural Network, and to analyze ANN learning, and its applications		
317533.2	Perform Pattern Recognition, Linear classification.		
317533.3	Develop different single layer/multiple layer Perception learning algorithms		
317533.4	Design and develop applications using neural networks		
317533.5	Perform artificial Neural Network using Forward Propagation and Back Propagation.		
317533.6	Implement CNN object detection algorithm for evaluating the performance.		

Class- TE	Course Name: Software Laboratory III (317532(B))	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317534 .1	Apply principles of Data Science for the analysis of real time problems		
317534 .2	Implement data representation using statistical methods		
317534 .3	Implement and evaluate data analytics algorithms		
317534 .4	Perform text preprocessing		
317534 .5	Implement data visualization technique		
317534 .6	Use cutting edge tools and technologies to analyze Data		

Class- TE	Course Name: Mini Project (317536)	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317536.1	Identify basic security attacks and services		
317536.2	Analyze the vulnerabilities and design a security solution.		
317536.3	Implement symmetric and asymmetric key algorithms		
317536.4	Demonstrate network security applications, Firewall, IDS.		
317536.5	Understand the AWS environment and its core service/Understand recent trends in NLP and Implement different pre-processing techniques.		
317536.6	Explore and utilize AWS services such as Amazon RDS and AWS Lightsail/Design and develop various application using NLP.		

Class- TE	Course Name: Internship (317532(B))	Sem- VI	Pattern: 2019
COs	Course Outcomes		
317535.1	To demonstrate professional competence through industry internship.		
317535.2	To apply knowledge gained through academics to a professional environment during internship.		
317535.3	To select appropriate technology and tools to solve a given real time problem.		
317535.4	To demonstrate abilities of a responsible professional and use ethical practices in day today life.		
317535.5	To create professional and social network and develop relationships with industry people and get exposure to future employers.		
317535.6	To explore various career opportunities in different domains and decide career goals.		

Class- BE	Course Name :Machine Learning (417521)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417521.1	Describe and compare different models of machine learning		
417521.2	Design ML models to make predictions by using linear, non-linear and logistic regression techniques		
417521.3	Implement classification models for two class problems and multiclass problems		
417521.4	Implement clustering models for unlabeled data		
417521.5	Integrate multiple machine learning algorithms in the form of ensemble learning		
417521.6	Apply reinforcement learning and its algorithms for different applications		

Class- BE	Course Name : Data Modeling and Visualization (417522)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417522.1	Summarize data analysis and visualization in the field of exploratory data science		
417522.2	Analyze the characteristics and requirements of data and select an appropriate data model		
417522.3	Describe to load, clean, transform, merge and reshape data		
417522.4	Design a probabilistic data modeling, interpretation, and analysis		
417522.5	Evaluate time series data		
417522.6	Integrate real world data analysis problems.		

Class- BE	Course Name : Quantum Artificial Intelligence (417523(A))	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417523(A).1	Understand quantum requirements and formulate design solutions using quantum circuits.		
417523(A).2	Illustrate applicable solutions in one or more application domains using a quantum architecture that integrates ethical, social,		
417523(A).3	Apply the Advanced Quantum Algorithms on real time problem		
417523(A).4	Analyze the quantum machine learning algorithms and their relevant application		
417523(A).5	Analyze quantum information processing & its relevant algorithms		
417523(A).6	Evaluate suitable algorithms for AI problems		

Class- BE	Course Name : Industrial Internet of Things (417523(B))	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417523B.1	Understand the basic knowledge of Industrial IOT, its challenges, benefits and significance in industrial applications		
417523B.2	Illustrate the use of sensors, actuators and communication protocols used in implementation of IIOT		
417523B.3	Elaborate the IIOT components required for IIOT architecture		
417523B.4	Analyze the role of cloud computing in IIOT including data storage, processing and data analytics and Digital Twin		
417523B.5	Recognize the importance of security in IIOT and solutions to mitigate security risks		
417523B.6	Categorize the various cases of IIoT implemented in various industries		

Class- BE	Course Name : Information Retrieval 417524(B)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417524B.1	Understand the concept of Information Retrieval		
417524B.2	Use an indexing approach for retrieval of documents		
417524B.3	Evaluate and analyze the retrieved information		
417524B.4	Apply appropriate method of Text Classification and Clustering		
417524B.5	Design and implement innovative features in search engines		
417524B.6	Analyze different real-life application of Information Retrieval		

Class- BE	Course Name: Computer Laboratory I (417525)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417525.1	Implement regression, classification and clustering models		
417525.2	Integrate multiple machine learning algorithms in the form of ensemble learning		
417525.3	Apply reinforcement learning and its algorithms for real world applications		
417525.4	Analyze the characteristics, requirements of data and select an appropriate data model		
417525.5	Apply data analysis and visualization techniques in the field of exploratory data science		
417525.6	Evaluate time series data		

Class- BE	Course Name: Project Stage - I (410248)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
410248.1	Solve real life problems by applying knowledge		
410248.2	Analyze alternative approaches, apply and use most appropriate one for feasible solution		
410248.3	Write precise reports and technical documents in a nutshell		
410248.4	Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work		
410248.5	Inter-personal relationships, conflict management and leadership quality		
410248.6	Apply ethical principles in engineering practice.		

Class- BE	Course Name : Computer Laboratory II (417526)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417526.1	Apply various tools and techniques for information retrieval and web mining		
417526.2	Evaluate and analyze retrieved information		
417526.3	Develop real applications using various information retrieval tools		
417526.4	Evaluate and apply core knowledge of Quantum AI to various real-world problems./Understand IIoT technologies,		
417526.5	Illustrate and demonstrate Quantum AI tools for different dynamic applications. /Build IIOT systems that include hardware and software and be exposed to modern and exciting hardware prototyping platforms		
417526.6	Build industry-compliant Quantum AI applications/Develop real applications and improve them through smart technologies		

Class- BE	Course Name: Audit Course 7 Entrepreneurship Development (417529)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417529.1	Develop an understanding of startup eco system and entrepreneurial mindset and its significance in the economy		
417529.2	Create a comprehensive business plan by conducting market research, defining target markets, and designing a value proposition		
417529.3	Evaluate different funding sources and develop financial management skills necessary for startup success		
417529.4	Formulate effective marketing strategies and sales techniques to target specific customer segments		
417529.5	Develop leadership and management skills necessary for leading teams and making informed decisions		
417529.6	Apply innovation and product development concepts to create and refine products or services		

Class- BE	Course Name: MOOC (417528)	Sem- VII	Pattern: 2019
COs	Course Outcomes		
417528.1	To acquire additional knowledge and skill		
417528.2	Explore new areas of interest in a relevant field		
417528.3	Develop the ability to learn independently using online resources.		
417528.4	Demonstrate competency in a subject that can be beneficial for career advancement.		
417528.5	Gain industry-relevant skills that can enhance employability		
417528.6	Expand professional and academic networks through online learning communities.		

Class- BE	Course Name: Computational Intelligence (417530)	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417530.1	Understand Computational Intelligence techniques to solve real-life problems		
417530.2	Apply fuzzy logic techniques to solve real life problems		
417530.3	Design and implement evolutionary algorithms to solve optimization problem		
417530.4	Analyze and evaluate the performance of genetic algorithms in terms of convergence and computational efficiency		
417530.5	Interpret and analyze the results obtained from computational intelligence models in NLP, providing meaningful insights and recommendations		
417530.6	Design and Develop Artificial Immune System to solve complex problems		

Class- BE	Course Name: Distributed Computing (417531)	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417531.1	Understand the features and properties of Distributed computing system with integration of AI		
417531.2	Analyze the Concept of data management and storage in distributed computing		
417531.3	Understand the algorithm used in distributed computing by applying artificial intelligence		
417531.4	Understand the integration of machine learning algorithm and advanced tools used in distributed computing		
417531.5	Analyze how big data is processed in distributed computing		
417531.6	Identify Security and privacy issues of distributed computing and apply on specific application		

Class- BE	Course Name: Big Data Analytics (417532(B))	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417532(B).1	Apply the techniques to handle missing data for real world applications.		
417532(B).2	Exemplify Analytical Methods like Clustering and Association Rule for Big Data Analytics		
417532(B).3	Use the novel architectures and platforms introduced for Big data, in particular Hadoop and Map Reduce		
417532(B).4	Differentiate the advanced predictive analytics algorithms in various applications like Retail, Finance, Healthcare		
417532(B).5	Evaluate needs, challenges, and techniques for big data visualization		
417532(B).6	Design various applications and simulate the analytics tools		

Class- BE	Course Name: Business Intelligence (417533(B))	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417533(B).1	Apply conceptual knowledge on how BI is used in decision support systems		
417533(B).2	Use Modelling Concepts in Business Intelligence		
417533(B).3	Understand and apply the concept of data provisioning and data Visualization		
417533(B).4	Apply different data pre-processing techniques on data set		
417533(B).5	Implement machine learning algorithms as per business needs		
417533(B).6	Identify role of BI in Management, Inventory, Production, Logistics and Management		

Class- BE	Course Name: Computer Laboratory III (417534)	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417534.1	Apply the principles on which the internet and other distributed systems are based		
417534.2	Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving		
417534.3	Apply fuzzy logic techniques to model and solve problems		
417534.4	Design and implement evolutionary algorithms to solve optimization and search problems in diverse domains		
417534.5	Design and implement artificial immune system algorithms to solve complex problems in different domains		
417534.6	Integrate Genetic Algorithms with Neural Networks to enhance learning, optimization, and adaptability in solving complex problems across various domains.		

Class- BE	Course Name: Computer Laboratory IV (417535)	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417535.1	Utilize key big data tools (e.g., Hadoop, Databricks, Snowflake) to solve real-world data problems.		
417535.2	Develop MapReduce programs to process and analyze large datasets for tasks like word frequency and data categorization.		
417535.3	Design applications that integrate big data platforms (e.g., MongoDB, Hive) for data extraction, processing, and analysis.		
417535.4	Integrate data from diverse sources (Excel, SQL Server, Oracle) into a unified system for analysis.		
417535.5	Create and manage ETL processes to transform and prepare data for analysis using tools like SQL Server and Power BI.		
417535.6	Apply data visualization and analysis techniques (e.g., Excel, Power BI) to create dashboards and support decision-making.		

Class- BE	Course Name: Project Stage - II (410256)	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
410256.1	Show evidence of independent investigation		
410256.2	Critically analyze the results and their interpretation		
410256.3	Report and present the original results in an orderly way and placing the openquestions in the right perspective		
410256.4	Link techniques and results from literature as well as actual research and future research lines with the research		
410256.5	Appreciate practical implications and constraints of the specialist subject		
410256.6	Manage project resources effectively, including time and budget.		

Class- BE	Course Name: Audit Course 8 AC8-I: Usability Engineering (417537)	Sem- VIII	Pattern: 2019
COs	Course Outcomes		
417537.1	Describe the human centered design process and usability engineering process and their roles in system design and		
417537.2	Discuss usability design guidelines, their foundations, assumptions, advantages, and weaknesses		
417537.3	Design a user interface based on analysis of human needs and prepare a prototype system		
417537.4	Assess user interfaces using different usability engineering techniques		
417537.5	Present the design decisions		