Bachelor of Technology (Computer Science and Engineering - Artificial Intelligence)

Program Outcomes (POs)

PO1: Apply mathematics, science, engineering fundamentals and an engineering specialization to the conceptualization of engineering models.

PO2: Identify, formulate, research literature and solve complex engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

PO3: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO5: Create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.

PO6: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

PO7: Understand the impact of engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.

PO8: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

PO9: Understand and commit to professional ethics and responsibilities and norms of engineering practice.

PO10: 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: Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.

PO12: Recognize the need for, and have the ability to engage in independent and life-long learning.

Program Specific Outcomes (PSO)

PSO1: Apply the knowledge of building the artificial agents, basic and advanced learning techniques, reasoning and inference mechanisms to the knowledge base, natural language processing tools, and software engineering principles to develop the real time Artificial Intelligence based projects.

PSO2: Design and develop the efficient and optimized algorithms for intelligent agents, knowledge base systems and machine learning in the area of artificial intelligence and its sub domains like IoT, image processing, natural language processing, data analytics and so on.

Course Outcomes (COs)

Batch: 2018-2022

Semester	Course Code	Course Name	Course Outcomes (COs)
III	18BS3CS02	**Mathematics for Computer Science**	CO1: Solve logical reasoning to verify the correctness of the logical statements and Perform set operations to describe the languages. CO2 : Use the concepts of relations, partially ordered sets and lattices in relational data bases and data structures. CO3 : Examine the concepts of graphs to understand Mathematical structures and techniques in computer applications. CO4 : Describe the foundations of probabilistic and statistical analysis mostly used in various applications in engineering and computer sciences. CO5 : Use the concept of random variables, Distributions and its properties to analyze the statistical data.

18HSS03	Economics for Engineers	CO1 : Identify and explain economic concepts and theories related to the behavior of economic agents, markets, industry and firm structures, legal institutions, social norms, and government policies
		CO2 : Demonstrate an awareness of the role in the global economics environment
		CO3 : Employ theoretical knowledge with quantitative and qualitative evidence in order to explain past economic events and to formulate predictions on future ones
		CO4 : Assess the consequences of economic activities and institutions for individual and social welfare
		CO5 : Use the basic theories of economics in critical thinking and problem solving

18CSI301	Data Structures using C	CO1 : Describe Various types of data structures, operations and algorithms, Sorting and searching operations, File structures.
		CO2 : Explain the concept of Dynamic memory management, data types, algorithms.
		CO3 : Develop the programs choosing appropriate data structure to implement various operations of stacks, queues, linked lists and their applications.
		CO4 : Use trees concepts to solve problems.
		CO5 : Distinguish various graph algorithms and techniques for finding minimum path.
		CO6 : Identify and use a suitable data structure and algorithm to solve a real world problem.
18CSI302	OOPS Using Java	CO1 : Explain the Basics of Java Environment and Programming basics
		CO2 : Employ Object Oriented Programming concepts
		CO3 : Design programs using Strings and Exception handling
		CO4 : Design applications using Packages and interfaces.
		CO5 : Develop Multithreaded Applications
		CO6 : Develop I/O stream applications and GUI applications using Swing Fundamentals

18CS3SP03	Digital Electronics	CO1 : Describe number systems and its arithmetic operations and Illustrate Use of Boolean algebra.
		CO2 : Illustrate truth table and logic circuits in SOP, POS form & conversion of SOS, POS forms into canonical forms
		CO3 : Formulate and apply Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest POS and SOP forms.
		CO4 : Explain the working of combinational and sequential circuits with characteristic equation and truth table.
		CO5 : Design and implement combinational circuits
		CO6 : Design and implement synchronous and asynchronous sequential circuits

	18CSI301L	Data Structures Using C Lab	CO1 : Describe Various types of data structures, operations and algorithms. Sorting and searching operations. - File structures.
			CO2 : Explain the concept of Dynamic memory management, data types, algorithms.
			CO3 : Develop the programs choosing appropriate data structure to implement various operations of stacks, queues, linked lists and their applications.
			CO4 : Use trees concepts to solve problems.
			CO5 : Distinguish various graph algorithms and techniques for finding minimum path.
			CO6 : Identify and use a suitable data structure and algorithm to solve a real world problem.
	18CSI302L	OOPS Using Java Lab	CO1 : Explain the Basics of Java Environment and Programming basics
			CO2 : Employ Object Oriented Programming concepts
			CO3 : Design programs using Strings and Exception handling
			CO4 : Design applications using Packages and interfaces.
			CO5 : Develop Multithreaded Applications
			CO6 : Develop I/O stream applications and GUI applications using Swing Fundamentals

	18CSI301L	Digital Electronics Lab	CO1 : Describe number systems and its arithmetic operations and Illustrate Use of Boolean algebra.
			CO2 : Illustrate truth table and logic circuits in SOP, POS form & conversion of SOS, POS forms into canonical forms
			CO3 : Formulate and apply Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest POS and SOP forms.
			CO4 : Explain the working of combinational and sequential circuits with characteristic equation and truth table.
			CO5 : Design and implement combinational circuits
			CO6 : Design and implement synchronous and asynchronous sequential circuits
	18MCC02	Energy Studies	CO1 : Describe energy scenario and its importance to the society.
			CO2 : State few energy management and energy conservation techniques in daily life.
			CO3 : Explain energy policies.
			CO4 : Discuss emerging technologies importance in today's energy scenario

IV	18CS4SP04	Database Management Systems	CO1: Define database concepts and its architectural components.
			CO2: Explain the various data models used for designing a database.
			CO3: Use entity relationship and relational models to design a database.
			CO4: Employ relational operations and entity relationship mapping concepts to design the behavior and structure of a database.
			CO5: Use transaction management concepts, inference rules and normalization to optimize database operations.
			CO6: Write SQL and PL/SQL codes to operate and manage database management system.

18CSI401	Design and Analysis of Algorithms	CO1: Explain the process of designing and analyzing an algorithm through basic problem types and asymptotic notations.
		CO2: Identify the key characteristics of a given problem, suitable design approach and its impact on performance.
		CO3: Solve the given real time problems through an appropriate design strategy.
		CO4: Examine the space and time efficiency of an algorithm and compare with other design strategy.
		CO5: Select the best design strategy suitable for optimization problems.
		CO6: Demonstrate an algorithm using appropriate design strategies for problem solving.

18CS4SP05	Principles of Operating Systems	CO1: Use the features of types of operating systems, functions, structure, and operations on the processes executing in the system to solve the problems.
		CO2: Employ the knowledge scheduling algorithms to solve the real life problems.
		CO3: Examine the deadlocks occurred in the real world applications and will be able to provide the remedial measures to avoid the deadlock situation.
		CO4: Employ the concepts of memory management including virtual memory and resource sharing among the user application processes.
		CO5: Solve the problems related to file system interface and implementation, disk management and protect the system.
		CO6: Use UNIX tools using features such as filters pipes, redirection, and regular expressions. Customize their UNIX working environment.

	18HSS04	Business Communication and Presentation Skills	CO1: Develop abilities to overcome common obstacles in public speaking.
			CO2: Demonstrate critical and innovative thinking.
			CO3: Demonstrate competency in oral, written and visualization.
			CO4: Explain the importance of research in developing your topic
			CO5: Use resources to gather information effectively.
	18CS4SP06	Computer Organization and Architecture	CO1: Identify basic computer elements & Explain the basic structure, organization of different computer units..
			CO2: Demonstrate programming proficiency using various addressing modes and instruction set.
			CO3: Design Micro programmed control unit and Develop Arithmetic algorithms
			CO4: Discuss the concepts of Memory and I/O organization
			CO5: Compare the commercially available processor architectures (Pentium &Athlon) and examine the architectural features of advanced processors.
			CO6: Design and Simulate simple CPU using CPUSIM tool

18BS4AD01	**Linear Algebra and Vector spaces**	CO1: Explain matrix operations, including inverses and determinants.
		CO2: Use matrix methods in solving a system of linear algebraic equations.
		CO3: Use computational techniques and algebraic skills essential for the study of eigenvalues and eigenvectors and Diagonalization
		CO4: Construct the matrix representation of a linear transformation given bases of the relevant vector spaces and its applications in engineering. production in the field of data science.
		CO5: Demonstrate importance of Orthogonality, cosine projection. Application of inner products and associated norms.
18CS4SP05L	**Principles of Operating Systems Lab**	CO1: Describe and execute basic commands of shell script.
		CO2: Employ basic operations in shell scripts which are required for different applications
		CO3: Identify and understand concept of file systems in shell script
		CO4: Employ concept of creating new process from parent process
		CO5: Use concept of virtual file and execute basic commands on it
		CO6: Design communication mechanisms ipc and pipe on linux

	18CS4SP04L	DBMS Lab	CO1: Create database using database design principles
			CO2: Construct SQL statements to insert, retrieve and update data in a database
			CO3: Use access control mechanisms
			CO4: Use transaction control mechanisms
			CO5: Use synonym sequence, index and views
			CO6: Write PL/SQL triggers, procedures & functions
	18CSI401L	Design and Analysis of Algorithms Lsb	CO1: Illustrate simple java programs to explore different object oriented concepts.
			CO2: Demonstrate the Exception handling mechanism and multithreading concepts through programming.
			CO3: Use different algorithms such as sorting, graph related, combinatorial, etc., in a high level language.
			CO4: Examine different greedy techniques (Kruskal's algorithm, Prim's algorithm etc) through programming.
			CO5: Solve real world problems using dynamic programming approaches.
			CO6: Test the backtracking algorithms through programming.

V	18BS5AI01	Statistics and Probability	CO1: Explain the fundamental statistical concepts to organize the data.
			CO2: Explain different methods of finding average and calculation of Dispersion, Skewness and kurtosis.
			CO3: Construct Index numbers by using various method.
			CO4: Use components of Time-series to forecast and draw the trend.
			CO5: Describe and analyse the data using statistical tools.
	18CS5SP07	Computer Networks	CO1: Describe basic computer network technology
			CO2: List the layers of the OSI model and TCP/IP and explain the functions of each layer
			CO3: Identify the design issues, perform error detection and correction.
			CO4: Employ the various routing algorithms for the different network designs.
			CO5: Compare and contrast the various protocols used in respective layers of OSI reference model.
			CO6: Design a network for the given scenario.

18CS5AI01	Artificial Intelligence	CO1: Define and outline the basics, importance and application of Artificial Intelligence.
		CO2: Identify the suitable artificial agents in a problem solving environment.
		CO3: Employ the various searching techniques in AI domain.
		CO4: Outline the application of knowledge representation and reasoning in Artificial Intelligence.
		CO5: Employ the planning techniques to understand the importance of Artificial Intelligence in real time environment.
		CO6: Examine the technique of Artificial Neural Network in finding out the importance of predictable power in AI.

18CS5AI03	Human Computer Interaction	CO1: Explain the structure of models and theories of human computer interaction and vision.
		CO2: Design an interactive web interface on the basis of models studied.
		CO3: Interpret the contributions of human factors and technical constraints on human– computer interaction.
		CO4: Assess the role of current HCI theories in the design of software.
		CO5: Employ the skills of Mobile Ecosystem to build the interface for mobile applications.
		CO6: Create the interface for web based applications with Web Interface Design tools.
18AI5DE12	Elective I: Speech Processing	CO1: Define and explain audio and speech analysis, audio synthesis.
		CO2: Define and explain audio synthesis and speech recognition
		CO3: Differentiate different transformation, pattern techniques used in DIP.
		CO4: Demonstrate wave modeling and music production process
		CO5: Explain physiology and psychoacoustics of ear and different perceptions of speech
		CO6: List auditory system's filter bank and automatic speech recognition models

18CS5AI02	Big Data Management	CO1: Define and understand the concept of Big Data and analyze the difference with traditional data
		CO2: Classify, compare and contrast processing mechanism of Hadoop and traditional computation and identify the advantages
		CO3: Construct data analytics using Spark platform
		CO4: Compare and contrast the technical and procedural benefits of HDFS over UFS
		CO5: Assess the performance gain in big data management using data processing through MapReduce paradigm
		CO6: Explain the YARN , compose and build clustered distributed big data processing using YARN
18AI5DE11	Theory of Computation	CO1: To use basic concepts of formal languages of finite automata techniques
		CO2: To Design Finite Automata's for different Regular Expressions and Languages
		CO3: To Construct context free grammar for various languages
		CO4: To solve various problems of applying normal form techniques, push down automata and Turing Machines
		CO5: To participate in GATE, PGECET and other competitive examinations
18AI5DE13	Embedded System	CO1: The Embedded Systems/IoT and their applications
		CO2: The role of Hardware in IoT

			CO3: The basics to intermediate understanding of Open source hardware
			CO4: Design and development of small scale applications using open source platform (Arduino-Hardware/Software).
	18CS5AI02	**Big Data Management Lab**	CO1: Use Hadoop commands for managing HDFS file storage system.
			CO2: Create infrastructure of Ubuntu operating system, communication tools and virtual machine for Hadoop installation.
			CO3: Create Pseudo-distributed Hadoop cluster with different configuration and to meet Hadoop experiment requirements.
			CO4: Use MapReduce programs to exploit Hadoop efficiency.
	18CS5SP08L	**IT Workshop (Python)**	CO1: Expain the basics of Python Programming.
			CO2: Use various data structures for solving real world problems.
			CO3: Create basic data structure of given problem in python programming
			CO4: Dissect the data transformation from one format to another format.
			CO5: Employ MVC design pattern in developing web applications
			CO6: Create web services and consume the web services using REST API call

VI	18AI6DE31	Natural Language Processing	CO1: Outline the basic concepts of natural language processing and its important terminologies
			CO2: Compare the key role of syntactic parsing and semantic analysis in natural language processing in unstructured data
			CO3: Create language generation as a part of sentimental analysis
			CO4: Create corpus for text analysis in natural language processing
			CO5: Appraise important statistical techniques used in natural language processing
			CO6: Use the NLP tools and techniques to solve the structured/unstructured data for simple to complex real time problems
	18CS6AI04	Sensor Technologies	CO1: Describe the physical quantities and human errors.
			CO2: Explain characteristics of measurement of the sensors.
			CO3: Employ the static and dynamic characteristics of transducers in real applications.
			CO4: Dissect the characteristics for embedded sensors in industry.
			CO5: Design the applications of Sensors in Real time systems
			CO6: Develop the smart applications using the sensor technologies.

	18CS6AI05	**Logic Programming and Knowledge Representation**	CO1: Infer the features of Logic Programming basics to applications. CO2: Identify the horn clause usage in Artificial environment. CO3: Interpret the importance of Unification and SLD resolution of Logic Programming in the field of AI. CO4: Demonstrate the database of facts and inference the knowledge for natural Language applications. CO5: Design the Inference Engine in Artificial Intelligence. CO6: Develop the applications with uncertainty using the skills learnt.
	18AI6DE21	**Fuzzy Logic and Application**	CO1: Explain the concept of random process and fuzzy logic properties CO2: Demonstrate the concept of classical relations and fuzzy relations CO3: Employ decision making and fuzzy classification. CO4: Compare and contrast decision making and fuzzy classification. CO5: Compare the concept of fuzzy arithmetic and crisp conversions CO6: Illustrate the applications of fuzzy logic to improve performance of certain algorithms.

18AI6DE23	Data Mining	CO1: Explain the basic concepts of data mining.
		CO2: Use different data preprocessing techniques to obtain cleaned data.
		CO3: Describe the KDD process of data mining.
		CO4: Demonstrate association rule mining for appropriate data set and conclude the results for decision making process.
		CO5: Demonstrate the different data classification techniques and its practical use in data mining project.
		CO6: Choose a suitable preprocessing technique for handling the given data (categorical, numeric and text data).And also apply the suitable algorithms on preprocessed data and compare the performance.
18CS6AI06	Computer Vision and Pattern Recognition with Machine Learning	CO1: Define the basic concepts in pattern recognition and computer vision.
		CO2: Discuss the concepts of feature selection and segmentation.
		CO3: Describe various feature generation techniques.
		CO4: Examine the importance of Sampling Methods
		CO5: Illustrate the concepts of Continuous Latent Variables.
		CO6: Employ the classification techniques for relevant applications

18AI6DE22	**Artificial Intelligent Agents**	CO1: Identify the diverse agents in the various environment.
		CO2: Execute the basic concept of AI based system.
		CO3: Implement the architectural design of agent.
		CO4: Build the agents in different multiagent application environment with detailed design.
		CO5: Apply the knowledge about agent, plan and their capabilities to solve the problem in an environment.
		CO6: Design and Implement multi-Agent System.
18AI6DE32	**Real Time Data Processing**	CO1: Understand the advanced processing of Real time Data
		CO2: Understand different types of Real time Processing Tool
		CO3: Understand architecture of Apache Spark
		CO4: Understand about Deploying Apache Spark and its components
		CO5: Understand different available services for Apache Spark
		CO6: Understand the processing and Storing Challenges for Real time Architecture
		CO7: Know about data storage and processing techniques
		CO8: Concepts of GraphX and Mlib
18AI6DE33	**Probabilistic Graphical Models**	CO1: Understand the different elementary models related to Probabilistic graphical techniques.
		CO2: Know the different representation techniques for

			probabilistic graphical models.
			CO3: Know the important application of undirected graphical models.
			CO4: Understand the use of Gaussian Network models.
			CO5: Apply inference techniques on probabilistic graphical models.
	18CS6AI04L	**Sensor Technologies Lab**	CO1: Describe the physical quantities and human errors.
			CO2: Explain characteristics of measurement of the sensors.
			CO3: Employ the static and dynamic characteristics of transducers in real applications.
			CO4: Dissect the characteristics for embedded sensors in industry.
			CO5: Design the applications of Sensors in Real time systems
			CO6: Develop the smart applications using the sensor technologies.
	18AI6DE31L	**Natural Language Processing Lab**	CO1: Able to cleanse the data for space and punctuation marks, brackets.
			CO2: Able to fit model for text data and interpret them.
			CO3: Able to visualize the data in a better way for non-technical people.
	18AI6DE32L	**Real Time Data Processing Lab**	CO1: Understand the advanced processing of Real time Data
			CO2: Understand different types of Real time Processing Tool
			CO3: Understand architecture of Apache Spark
			CO4: Understand about Deploying

			Apache Spark and its components
			CO5: Understand different available services for Apache Spark
			CO6: Understand the processing and Storing Challenges for Real time Architecture
			CO7: Know about data storage and processing techniques
			CO8: Concepts of GraphX and Mlib
	18AI6DE33L	**Probabilistic Graphical Models Lab**	CO1: Able to fit conditional probabilistic model for the given data base using R user defined function.
			CO2: Able to fit medical expert system model with the help of Probabilistic Graphical Model using R.
			CO3: To learn the parameter for Probabilistic Graphical Model using R

18CTOE611	Information Security	CO1: Explain the basic concepts and importance of information Security for an individual and to the organization/Enterprise.
		CO2: Identify some of the factors driving the need for information security
		CO3: Assess the security threats, attacks and manage the risks involved in the attacks using various risk assessment techniques
		CO4: Assess and critically evaluate techniques for network infrastructure security
		CO5: Illustrate the need of information asset classification
		CO6: Demonstrate the skills learned in the information security into the real-life scenarios.

	18AIOE611	Data Visualization	CO1: Describe the application of different visualization techniques for different business representation
			CO2: Identify the static graphical technique for the better understanding about the business problem.
			CO3: Demonstrate Design the multivariate statistical graphical technique for testing the assumptions of multivariate data
			CO4: Construct the validation techniques for better model fit.
			CO5: Construct Create the customization in graphical representation for user friendly graphics.
			CO6: Appraise with effective data visualizations in order to provide new insights into a research question or communicate information to the viewer.
VII		Artificial Neural Network and Deep Learning	CO1: Explain functioning of feedforward neural networks.
			CO2: Employ deep learnining models for image classification
			CO3: Use deep learning models for sequence prediction problems.
			CO4: Explain the operation of Autoencoder.
			CO5: Discuss the applications of auto encoders.
			CO6: Solve deep learning model optimization problems using genetic algorithm.
		Advanced Natural Language	CO1: Explain NLP using deep

		Processing	learning techniques
			CO2: Choose language models to solve NLP problems
			CO3: Describe the various data preprocessing techniques
			CO4: Employ deep learning techniques to preprocess text data.
			CO5: Compare the various tools used for building NLP applications
			CO6: Design chatbot application
		NoSQL Databases	CO1: Explain the functioning of NoSQL databases..
			CO2: Differentiate between RDBMS and NoSQL.
			CO3: Describe scaling of NoSQL databases
			CO4: Describe visualization of NoSQL databases.
			CO5: Distinguish the different types of NoSQL databases.
			CO6: Design a NoSQL database for a real world application.
		Genetic Algorithm and Applications	CO1: Describe the fundamental concepts of Genetic algorithms.
			CO2: Discuss the utility of genetic algorithms in optimization problems..
			CO3: Explain the functioning of various genetic operators
			CO4: Solve optimization problems using Evolutionary strategies.
			CO5: Explain the basics of genetic machine learning.
			CO6: Discuss the applications of genetic machine learning.

		Advanced Natural Language Processing LAB	CO1: Describe the various NLP python libraries used for building chatbots
			CO2: Use NLP python libraries to build chatbots
			CO3: Employ RNN for sentence genreration problems
			CO4: Recommend a deep learning strategy for NLP applications in various domains.
			CO5: Design a chatbot to handle generic queries
			CO6: Design a chatbot with multilingual conversational capability
		NoSQL Databases LAB	CO1: Demonstrate installation of Mongodb
			CO2: Illustrate basic commands of Mongodb
			CO3: Demonstrate advanced commands of Mongodb
			CO4: Design a database for real world applications in Mongodb
			CO5: Create a distributed database system using Mongodb.
			CO6: Demonstrate report generation using data aggregation commands of Mongodb.
		Genetic Algorithm and Applications LAB	CO1: Illustrate fundamental concepts of Genetic algorithms.
			CO2: Solve numerical inequality problems using genetic algorithm.
			CO3: Demonstrate optimization abilities of genetic algorithm.
			CO4: Use genetic algorithm to provide deceptive solutions.

			CO5: Use the genetic algorithms to solve the resource constraint problems
			CO6: Solve job scheduling problems using genetic algorithm
		AI Platforms	CO1: Explain the various AI services provided by AWS.
			CO2: Illustrate the various testing strategies in ML API.
			CO3: Explain the various AI services provided by IBM Watson.
			CO4: Explain the various cognitive services provided by Microsoft Azure.
			CO5: Develop machine learning wep apps using app development tools.
			CO6: Illustrate deployment of machine learning models on AI platforms.
		Robotics	CO1: Explain robot design concepts.
			CO2: Classify the robots based on the applications.
			CO3: Illustrate movement of robots using coordinate transformation
			CO4: Illustrate movement of robots using trajectory interpolation
			CO5: Explain the basics of autonomous robots
			CO6: Describe the fundamentals of mobile robot kinematics.
		Design and Analysis of Experiments	CO1: Explain the basics of design of experiements.
			CO2: Examine the variance in

			fixed effect models.
			CO3: Examine the variance in random effect models.
			CO4: Compare parameter and non-paremetric values in random effect models.
			CO5: Experiment with block effect models.
			CO6: Design experiments with more than one factor.
		Basics of Big Data Management	CO1: Explain the fundamentals of BigData
			CO2: Describe Hadoop architecture
			CO3: Explain the hadoop distributive file system.
			CO4: Write map reduce programs for simple functions
			CO5: Explain YARN architecture
			CO6: Differentiate Hadoop from RDBMS.
		Artificial Intelligent Agents	CO1: Explain the various types of Agents.
			CO2: Outline the system specification of an AI agent.
			CO3: Sketch the architectural design of an AI agent.
			CO4: Dissect the detailed design of an AI agent
			CO5: Develop protocols from interaction diagrams
			CO6: Explain agent platforms.
		Expert System	CO1: Illustrate knowledge representation using propositional logic

			CO2: Outline the fundamentals of rule based expert system
			CO3: Oultine the fundamentals of fuzzy logic
			CO4: Compare data mining and text mining concepts
			CO5: Sketch the architecture of real time expert system
			CO6: Use prolog to program knowledge base
VIII		Reinforcement Learning	CO1: Explain the main components of Reinforcement Learning strategy.
			CO2: Discuss various solution frameworks in reinforcement learning.
			CO3: Solve the sequential decision problems using reinforcement learning.
			CO4: Compare model based and model free solution techniques
			CO5: Use the baseyian reforcement learning to solve the gaming problems.
			CO6: Explain the challenges in applying reinforcement learning to gaming problems.
		Industry Use-Cases of AI	CO1: Explain the importance of AI across domains.
			CO2: Describe AI applications in Banking sector
			CO3: Discuss AI applications in health care sector
			CO4: Outline the application areas of AI in Industry
			CO5: Discuss the AI models

			employed in Investment Banking
			CO6: Discuss AI applications in other domains.
		Predictive Analytics	CO1: Explain the basic concepts involved in predictive modelling
			CO2: Employ data pre-processing techniques for predictive analytics
			CO3: Use data wrangling techniques for predictive analytics
			CO4: Write python program for performing linear regression
			CO5: Solve classification problems using python
			CO6: Assess the performance of a predictive model
		Human Computer Interaction	CO1: Describe the basic components of human computer interaction.
			CO2: Outline the components involved in interactive interface design.
			CO3: Explain the importance of cognitive models in interface design
			CO4: List the elements of mobile interface design
			CO5: Sketch mobile information architecture.
			CO6: Examine web interface design strategies.
		Robotics	CO1: Explain robot design concepts.
			CO2: Classify the robots based on the applications.
			CO3: Illustrate movement of robots using coordinate transformation

			CO4: Illustrate movement of robots using trajectory interpolation
			CO5: Explain the basics of autonomous robots
			CO6: Describe the fundamentals of mobile robot kinematics.
		Time series Analysis	CO1: Explain the different elementary models related to time series analysis.
			CO2: Use different model evaluation technique to identify better model to forecast.
			CO3: Compare Stationarity, Granger Causality and Johensen Cointegration method in building time series models.
			CO4: Employ Vector Auto Regression (VAR) model to forecast time series data.
			CO5: Employ Vector error Correction model to overcome the Cointegration problem.
			CO6: Use Auto Regressive Moving Average for spectral analysis
		Artificial Neural Network	CO1: Explain the basic concepts of neural networks.
			CO2: Describe the operation of single layer perceptron neural networks.
			CO3: Describe the operation of multilayer perceptron neural networks.
			CO4: Explain the various learning rules employed in neural network training
			CO5: Compare the various forms of neural network.

			CO6: Discuss the applications of neural network.
		AI Platforms	CO1: State the importance of AI platforms
			CO2: Compare the various platforms providing AI services
			CO3: Develop AI solutions using the AI platforms
			CO4: Explain the development tools provided by the AI platforms
			CO5: Illustrate the various testing strategies in ML API.
			CO6: Illustrate deployment of applications on AI platforms
		Application of AI and ML in Robotics	CO1: Explain the basic functioning of robots.
			CO2: Discuss methods employed for robot manipulation
			CO3: Compare the various types of end effectors used in robots.
			CO4: Explain various robot programming methods.
			CO5: Explain robot movements through kinematics of robot manipulators.
			CO6: Classify the different types sensors used for robots.