KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

Re-accredited by NAAC with 'A+' Grade (4th Cycle) College of Excellence (UGC) Coimbatore – 641 029

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

COURSE OUTCOMES (CO) OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

For the students admitted In the AcademicYear2021 -2022

Sub Code: **21UAI101**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : Core Paper 1 - Object Oriented Programming in C++			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	4	60	4

Course Objectives

1. To introduce he concepts of Object Oriented Programming Paradigm and the programming Constructs of C++.

2. To develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
3. To program using more advanced OOP's features such as objects, operator overloading, dynamic memory allocation, inheritance and polymorphism, File I/O.

Course Outcomes (CO)

K1 to K5	CO1	Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
	CO2	Demonstrate the various basic programming constructs like decision-making statements. Looping statements and functions.
	CO3	Explain the object oriented concepts like overloading, inheritance, polymorphism, virtual functions, constructors and destructors.
	CO4	Explain the various file stream classes; file types, usage of templates and exception handling mechanisms.
	CO5	Develop programs incorporating the programming constructs of object oriented programming concepts.

Sub Code: 21UAI102

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 2 - Data Structures**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021 - 2022	4	60	4

Course Objectives

1. To introduce the concept of data structures and the types of data structures.
2. To demonstrate how various data structures can be implemented and used in various applications.
3. To study various algorithms of Sorting , Searching methods in Data structures.

Course Outcomes (CO)

K1 to K5	CO1	Define the concept of data structure and list the various classifications of data structures.
	CO2	Demonstrate how arrays, stacks, queues, lists, trees and graphs are represented in the main memory and various operations are performed on those data structures.
	CO3	Discover the real time applications of the various data structures.
	CO4	Design algorithms for various sorting and searching techniques.
	CO5	Analyzing file organizations and various indexing techniques.

Sub Code: **21UAI1CL**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 1: Programming Lab - C++**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	2	30	2

Course Objectives

1. To introduce the concepts of Object-Oriented Programming Paradigm and the programming constructs of C++.
2. To develop the ability to write a program to solve specific problems.
3. To practice the fundamental methodology to implement file and I/O stream concepts.

Course Outcomes (CO)

K3 to K5	CO1	Apply the various basic programming constructs like decision making statements, Looping statements, functions, concepts like overloading , inheritance, polymorphism, virtual functions , constructors and destructors
	CO2	Designing programs using appropriate predefined functions and classes in C++.
	CO3	Developing applications using Friend functions, Inheritance and polymorphism.
	CO4	Developing a C++ application using the concepts of templates.
	CO5	Implementing stream I/O, Files and usage of the available classes to handle stream objects.

Sub Code: **21UAI203**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 3 - Java Programming**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	4	60	4

Course Objectives

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including managing classes, objects, invoking methods etc and exception handling mechanisms.
3. To demonstrate skills in writing programs using exception handling techniques and multithreading.

Course Outcomes (CO)

K1 to K5	CO1	Recite the history of Java and its evolution.
	CO2	Explain the various programming language constructs, object oriented concepts like overloading, inheritance, polymorphism, Interfaces , threads, exception handling and packages.
	CO3	Outline the benefits and applications of objects oriented programming concepts and defend how Java differs from other programming languages.
	CO4	Judge the pros and cons of other object oriented language with the concepts of applets, graphics and exceptions.
	CO5	Evaluating applications using files and stream classes.

Sub Code: **21UAI2CM**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 2 – Java Programming Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	4	60	2

Course Objectives

1. To introduce the concepts of Object Oriented Programming Paradigm and the programming constructs of Java.
2. To implement the Java language syntax and semantics.
3. To implement concepts such as variables, conditional and iterative execution methods.

Course Outcomes (CO)

K3 to K5	CO1	Applying the concepts of control structures, inheritance, method overriding in Java.
	CO2	Implementing the concept of interface, packages, multithreading and applets.
	CO3	Apply the various basic programming constructs of Java like decision making statements. Looping statements, overloading, inheritance, polymorphism, constructors and destructors.
	CO4	Design programs using frames, menubars, listboxes etc.,
	CO5	Evaluate programs using various file stream classes, file types and frames.

Sub Code: **21UAI2CN**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 3 - Internet Basics Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	2	30	2

Course Objectives

1. Introduce the fundamentals of Internet and the Web functions.
2. Impart knowledge and essential skills necessary to use the internet and its various components.
3. Find, evaluate, and use online information resources.
4. Use Google Apps for education effectively.

Course Outcomes (CO)

K3 to K5	CO1	Understand features of Internet and email.
	CO2	Apply the predefined procedures to create Gmail account, check and receive messages.
	CO3	Apply the predefined procedures to perform various basic operations on internet.
	CO4	Utilize various google applications like docs, google classroom, google drive, google forms, google meet.
	CO5	Design various google applications like google sheets and slides.

Sub Code: **21UAI304**

Programme Code: C24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 4 - Python Programming**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	5

Course Objectives

1. To provide comprehensive knowledge of python programming paradigms.
2. To understand the important functions in python programming.
3. To introduce the concepts of the various programming constructs of Python programming.

Course Outcomes (CO)

K1 to K5	CO1	Summarize the concept of lists, tuples , functions and error handling
	CO2	Evaluate a program incorporating all the python language constructs
	CO3	To implement numerical programming, data handling through NumPy Modules
	CO4	To Visualize through MatplotLib modules.
	CO5	To Manipulate Pandas Data Frame

Sub Code: **21UAI305**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 5 - Introduction to Artificial Intelligence and Machine Learning**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	4

Course Objectives

1. To introduce the basic concepts of artificial intelligence and expert systems.
2. To imparts the knowledge of predictions.
3. To introduce the basic concepts and techniques of Machine Learning.

Course Outcomes (CO)

K1 to K5	CO1	To develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents.
	CO2	To learn the overview of artificial intelligence principles and approaches.
	CO3	To understand about fundamental areas of Local Search Algorithms, Adversarial Searching and Neural Networks.
	CO4	To enable students to understand different techniques related to Machine Learning.
	CO5	Choose the suitable machine learning methods/algorithms for various type of learning problems.

Sub Code: **21UAI3CO**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 4 - Python Programming Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	2

Course Objectives

1. To gain knowledge about the concepts of python programming.
2. To understand the concepts of Built-in functions and User-defined functions.
3. To develop programs using Numpy and Pandas.

Course Outcomes (CO)

K3 to K5	CO1	Apply the concept of Decision making statements, looping constructs , functions for solving basic programs.
	CO2	Analyze the concepts of Lists, tuples and error handling mechanisms.
	CO3	Evaluate a program incorporating all the python language constructs.
	CO4	Develop programs to solve real-world problem using the language idioms, data structures and standard library.
	CO5	Implement numerical programming, data handling and visualization through NumPy, Pandas and MatplotLib modules.

Sub Code: **21UAI3CP**

Programme Code: 24C	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 5 – Web Designing Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	3	45	2

Course Objectives

1. To design and develop websites using fundamental web languages, technologies, and tools.
2. To implement the concepts in visual design and content structuring.
3. To develop an ability to design and implement static and dynamic website.
4. To develop skills in analyzing the usability of a web site.
5. To demonstrate the role of languages like HTML, CSS, JavaScript, PHP and protocols in the workings of the web and web applications.

Course Outcomes (CO)

K3 to K5	CO1	Understanding the use of HTML tags.
	CO2	Create web pages using HTML and Cascading Stylesheets and Develop dynamic web pages using JavaScript.
	CO3	Use cascading style sheets to design web pages
	CO4	Use JavaScript and HTML to create web pages with advanced interactivity
	CO5	Understand, analyze and build web applications using PHP and Integrate HTML forms to PHP scripts.

Sub Code : **21UAI3A3**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Allied Paper 3 - Data Mining and Warehousing**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	5

Course Objectives

1. To learn the basic concepts of Data Mining algorithms, methods and tools.
2. To develop and apply critical thinking, problem-solving, and decision-making skills.
3. To discover interesting patterns, analyze supervised and unsupervised models and estimate theaccuracy of the algorithms.

Course Outcomes (CO)

K1 to K5	CO1	Understand the functionality of the various data mining and data warehousing components.
	CO2	Describe different methodologies used in data mining and data ware housing.
	CO3	Explain the analyzing techniques and Online Analytical Processing.
	CO4	Explain about the association rule mining and classification.
	CO5	Compare different approaches of data ware housing and data mining with various technologies.

Sub. Code : **21UAI3SL**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Skill Based Subject 1 - Advanced Excel Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021 - 2022	2	30	3

Course Objectives

1. The course introduces the basic concepts of Microsoft Excel.
2. To develop an ability to understand about different features of Excel.
3. To understand the functions available in Excel.

Course Outcomes (CO)

K3 to K5	CO1	To understand the spreadsheets, worksheets.
	CO2	To know about formatting features.
	CO3	To analyze the various functions available in Excel.
	CO4	To understand about sorting and filtering data.
	CO5	To describe about protecting workbooks, worksheets.

Sub Code: **21UAI406**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 6 - R Programming**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	4

Course Objectives

1. To expose the student sot the fundamental concepts of R Programming
2. To understand the important programming concepts of R, class and objects.
3. To understand the R programming environment and data important R Statistical packages.

Course Outcomes (CO)

K1 to K5	CO1	To understand the basics of R programming including matrix and vectors etc.
	CO2	To understand the use of R for Big Data analytics.
	CO3	To identify and implement appropriate control structures to solve a particular programming problem.
	CO4	To perform appropriate statistical tests using R Create and edit visualizations.
	CO5	To understand the foundations of and be able to design and describe simulation studies.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 7 - Database Management System**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To understand the fundamentals of relational systems including data models, database architectures and database manipulations.
2. To learn the basic concepts of databases in general with an emphasis on relational databases, modeling techniques and writing queries.
3. To provide knowledge about relational database model.

Course Outcomes (CO)

K1 to K5	CO1	Explain the role of data and databases in information systems.
	CO2	Design relational model and pose complex SQL queries of relational databases
	CO3	Describe normalization and its role in the database design process
	CO4	Illustrate the concepts of transaction processing, concurrency control and recovery procedure
	CO5	Summarize the storage structures using different indexing techniques, query Optimization

Sub Code : **21UAI4CQ**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 6 - R Programming Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	2

Course Objectives

1. To provide students a hands-on exposure to scientific programming using R.
2. To provide wider knowledge to know about data structures in R and its types.
3. To know the customized graphical techniques in R using inbuilt graph packages.

Course Outcomes (CO)

K3 to K5	CO1	Understand the basics in R programming in terms of constructs, control statements, string functions.
	CO2	Understand the use of R for Big Data analytics.
	CO3	Apply R programming for Text processing.
	CO4	Appreciate and apply the R programming from a statistical perspective.
	CO5	Perform the Matrix operations using R built in functions.

Sub Code: **21UAI4CR**

Programme Code: 24	**B.Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 7 – Database Management System Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	2

Course Objectives

1. To understand the use of Structured Query Language (SQL) and its syntax.
2. To understand and apply the principles of data modeling using Entity Relationship and develop a good database design.
3. To studythe concepts and techniques relating query processing using SQL engines.

Course Outcomes (CO)

K3 to K5	CO1	Designing the basic concepts of databases.
	CO2	Implementing data Integrity constraints in Database.
	CO3	Validating the various fundamental tasks to perform datamodeling.
	CO4	Implementing functions, packages, stored procedures and user definedexception.
	CO5	Evaluate the trigger function to perform event.

Sub Code : **21UAI4A4**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Allied Paper 4 - Big Data Analytics**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	5

Course Objectives

1. To explore, design, and implement basic concepts of big data analytics.
2. To introduce the big data framework, its characteristics and use cases associated with it.
3. To introduce the Hadoop framework will prepare students to handle industry scenarios of big data analytics.

Course Outcomes (CO)

K1 to K5	CO1	To work with big data platform learn intelligent data analysis and compare old and modern data analytic tool.
	CO2	Learn about the advanced analytics techniques to gain knowledge of latest techniques.
	CO3	Understand the concepts of Hadoop Distributed file system and hadoop file system interfaces.
	CO4	Understand the YARN Infrastructure.
	CO5	Use HDFS and Map Reduce to analyze various industry use cases of big data analytics.

Sub Code : **21UAI4S1**

Programme Code: 24	**Bachelor of Artificial Intelligence and Machine Learning**		
Title of the Paper : **Skill Based Subject 2 - Ethical Hacking**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	2	30	3

Course Objectives

1. To introduce the concepts of security and carious kinds of attacks.
2. To explain about system hacking and penetration testing.

Course Outcomes (CO)

K1 to K5	CO1	Explain the importance of security and various types of attacks.
	CO2	Understand the concepts of scanning and system hacking.
	CO3	Explain about penetration testing and its methodology.
	CO4	Identify the various programming languages used by security professional.
	CO5	Analyze and understand the concept of penetration testing.

Sub Code : **21UAI508**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 8 - Machine Learning Techniques**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	5

Course Objectives

1. To understand the basics of Machine Learning.
2. To understand the techniques of Machine Learning.
3. To know about the implementation aspects of Machine Learning.
4. To understand the concepts of Tree and Probabilistic Models.
5. To implement the graphical models in Machine Learning.

Course Outcomes (CO)

K1 to K5	CO1	To understand the basic concepts and techniques of Machine Learning.
	CO2	To understand the inference and learning algorithms for the hidden Markov model.
	CO3	To explain the regression methods, classification methods, clustering methods.
	CO4	To demonstrate Dimensionality reduction Techniques
	CO5	To analyse and appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

Sub Code : **21UAI509**

Sub Code : **21UAI509**

Programme Code: 24	**B.Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 9 - Deep Learning**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	4

Course Objectives

1. To solve a wide range of problems in Computer Vision and Natural Language Processing.
2. To learn about the building blocks used in these Deep Learning based solutions.
3. To learn about feed forward neural networks, convolutional neural networks, recurrent neural networks and attention mechanisms.

Course Outcomes (CO)

K1 to K5	CO1	Understanding the fundamentals of Deep Learning.
	CO2	To know the main techniques in deep learning and the main research in this field.
	CO3	Gaining knowledge of the different modalities of Deep learning currently used.
	CO4	Be able to design and implement deep neural network systems.
	CO5	Implement deep learning algorithms and solve real-world problems.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 10 - Foundations of Robotics**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	4

Course Objectives

1. To learn the basics of robotics.
2. To understand the robot end effectors.
3. To learn the techniques used in robot mechanics.

Course Outcomes (CO)

K1 to K5	CO1	Able to know the basics of robotics.
	CO2	Able to understand the concepts of robot end effectors.
	CO3	Obtain forward, reverse kinematics and dynamics model of the industrial robot arm.
	CO4	Develop the vision algorithms.
	CO5	Understand the robot programming and applications of robots.

Sub Code**: 21UAI5CS**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 8 - Machine Learning Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021 - 2022	5	75	2

Course Objectives

1. To introduce students to the concepts and techniques of Machine Learning.
2. To design and implement logical reasoning agents
3. To understand the theoretical and practical aspects of probabilistic graphical models.
4. To get practical knowledge on implementing machine learning algorithms in real time problems.

Course Outcomes (CO)

K3 to K5	CO1	Understand the basic concepts and techniques of Machine Learning.
	CO2	Understand the inference and learning algorithms for the hidden Markov model.
	CO3	Explain the regression methods, classification methods, clustering methods.
	CO4	Demonstrate Dimensionality reduction Techniques
	CO5	Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

Sub Code : **21UAI611**

Sub Code : **21UAI611**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 11 - Natural Language Processing**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	5

Course Objectives

1. To make students understand syntactic and semantic elements of NLP.
2. To conceive basics of knowledge representation and inference.
3 .To provides the models, methods, and algorithms of statistical NLP tasks.

Course Outcomes (CO)

K1 to K5	CO1	An ability to apply core computer science concepts and algorithms, such as dynamic programming.
	CO2	To understand the linguistic phenomena and to explore the linguistic features relevant to each NLP task.
	CO3	The student will be familiar with some of the NLP literature and will read and suggest improvements to published work
	CO4	The student will also analyze experimental results and write reports for each course project to develop scientific writing skills.
	CO5	To understand natural language processing and to learn how to apply basic algorithms in this field.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Paper 12 - Block Chain Technology**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	4

Course Objectives

1. To introduce the technical aspects of public distributed ledgers, block chain systems, Crypto currencies and smart contracts.
2. Students will learn how these systems are built, how to interact with them, how to design and build secure distributed applications.

Course Outcomes (CO)

K1 to K5	CO1	Stating block chain technologies basics are made possible through learning Distributed Database and various types of database.
	CO2	Stating the Mining strategies followed in block chain teach the basic architecture behind the perfect building of block chain for industries.
	CO3	Classifying the limitations and proofs are another essential part of block chain technologies, which are learned for betterment of creating block chain.
	CO4	Describing the history behind the block chain and learning about Vulnerability, Attacks and Side chain gives an additional support for creating a secured block chain.
	CO5	Design a method for solving a problem case study with different perspective.

Sub Code **: 21UAI6CT**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Core Practical 9 - Natural Language Processing Lab**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	6	90	2

Course Objectives.

1. To introduce the fundamental concepts and techniques of natural language processing (NLP)
2. To understand natural language processing and to learn how to apply basic algorithms in this field.
3. To understand the semantics and pragmatics of languages for processing.

Course Outcomes (CO)

K3 to K5	CO1	To understand the fundamental concepts and techniques of natural language processing (NLP)
	CO2	To understand the models and algorithms in the field of NLP.
	CO3	To demonstrate the computational properties of natural languages and the commonly used algorithms for processing linguistic information
	CO4	To understand the syntax, semantics and pragmatics of various languages.
	CO5	To analyse natural language processing and to learn how to apply basic algorithms in this field.

Sub Code: **21UAI6Z1**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Project and Viva - Voce *****			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To acquire the knowledge about selecting the task based on their course skills.
2. To get the knowledge about analytical skill for solving the selected task.
3. To get confidence by implementing the task in a real time projects.

Course Outcomes (CO)

K3 to K5	CO1	Apply the programming skills for solving the project.
	CO2	Analyze the task and to collect the necessary information about thesoftware.
	CO3	Evaluate the task based on the software.
	CO4	Test the project for its successful implementation.
	CO5	Implement and maintain the developed system.

Sub Code: **21UAI6S2**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Skill Based Subject 3 - Social and Ethical Issues in Artificial Intelligence**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	2	30	3

Course Objectives

1. To analyze whether AI poses an existential threat to humanity.
2. To check learning algorithms from acquiring morally objectionable biases.
3. To study the ethical rules to be followed in using self driving cars.
4. To check the accountability while building artificial moral agents.

Course Outcomes (CO)

K1 to K5	CO1	Demonstrate knowledge of philosophical issues involved in ethics of AI.
	CO2	Develop a super intelligent system without having to reveal the system itself.
	CO3	Understand workplace automation in employment.
	CO4	Appreciate the potential responsibility in handling ethics of artificial moral agents
	CO5	To build intelligent systems those are safe without any global risk.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Elective Paper - Internet Of Things**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To understand the fundamentals of Internet of Things.
2. To learn about the basics of IOT protocols.
3. To build a small low cost embedded system using Raspberry Pi.
4. To apply the concept of Internet of Things in the real world scenario.

Course Outcomes (CO)

K1 to K5	CO1	Analyze various protocols for IoT .
	CO2	Develop web services to access/control IoT devices.
	CO3	Design a portable IoT using Rasperry Pi.
	CO4	Deploy an IoT application and connect to the cloud.
	CO5	Analyze applications of IoT in real time scenario.

UAI-30

Programme Code: 24	Bachelor of Artificial Intelligence and Machine Learning		
Title of the Paper : **Elective Paper - Open Source Systems**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To recognize the benefits and features of Open Source Technology.
2. To utilize open source software for developing a variety of software applications, particularly Web applications.
3. To understand concepts, strategies, and methodologies related to open source software development.

Course Outcomes (CO)

K1 to K5	CO1	Understand the use of various open source software available in the industry.
	CO2	Summarize the basic concepts of how a database stores information via tables.
	CO3	Learn how to use lists, tuples, and dictionaries in Python programs.
	CO4	Applying exception handling methods in Python programs.
	CO5	Evaluate applications by applying programming concepts to solve real time problems.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Elective Paper - Digital Forensics**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To introduce the principle and concepts of digital forensics.
2. To detail about the various investigation procedures like data acquisition and evidence gathering.
3. To understand the basics of digital forensics and the techniques for conducting the forensic examination on different digital devices.
4. To understand how to examine digital evidences such as the data acquisition, identification analysis.
5. To understand the various categories of tools and procedures used in the digital forensic process.

Course Outcomes (CO)

K1 to K5	CO1	Analyzing the digital evidences and arriving at conclusions.
	CO2	Examine the Volatile and Non-volatile Digital Evidence.
	CO3	Apply various techniques of digital forensics for the systematic crime investigation.
	CO4	Apply the cyber-crime techniques to data acquisition and evidence collection.
	CO5	Know how to apply forensic analysis tools to recover important evidence for Identifying computer crime.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Elective Paper - Data Analytics And Visualization**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To learn the data representation techniques.
2. To understand the data analysis pipeline.
3. To acquire knowledge on data mining techniques for analysis.
4. To study the visualization and its various types.

Course Outcomes (CO)

K1 to K5	CO1	To understand data representation techniques.
	CO2	To appreciate the data analysis pipeline.
	CO3	To implement data mining techniques for analysis.
	CO4	To apply multivariate data visualization on various applications.
	CO5	To implement data analysis techniques using R.

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Elective Paper - Virtual Reality**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To understand geometric modeling and virtual environment.
2. To study about Virtual Hardware and Software.
3. To develop Virtual Reality applications.
4. To design virtual environment.

Course Outcomes (CO)

K1 to K5	CO1	To design the virtual environment.
	CO2	To implement Virtual Hardware and software and geometric transformations.
	CO3	To design geometric modeling applications.
	CO4	To understand Virtual Reality toolkits.
	CO5	To implement Virtual Reality applications.

Program Code : 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Elective Paper – Artificial Intelligence in Cyber Security**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	5	75	5

Course Objectives

1. To apply core knowledge of AI concepts and tools.
2. To analyze a problem, identify and detect cyber security threats with AI.
3. To detect network anomaly and prevent frauds with GANs.
4. To evaluate AI arsenal and to prevent authentication abuse.

Course Outcomes(CO)

K1 to K5	CO1	Understand the basic concepts of AI and the necessary tools for cyber security.
	CO2	Detect cyber security threats in AI.
	CO3	Understand the fundamentals of Network anomaly detection with AI and authentication abuse prevention.
	CO4	Demonstrate working knowledge fraud prevention with cloud AI solutions.
	CO5	Ability to evaluate algorithms and to test AI arsenal.

Sub Code : **21UAI5X1**

Programme Code: 24	**B. Sc Artificial Intelligence and Machine Learning**		
Title of the Paper : **Extra Departmental Course - Mobile Application Development**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2022	2	30	3

Course Objectives

1. To demonstrate their understanding of the fundamentals of Android operating systems
2. To demonstrate their skills of using Android software development tools.
3. To demonstrate their ability to develop software with reasonable complexity on mobileplatform.

Course Outcomes (CO)

K1 to K5	CO1	Develop the basic Android App using Activity Lifecycle methods.
	CO2	Design Android User Interfaces & Event Handling mechanisms.
	CO3	Implement the different Intents and Notifications.
	CO4	Design and Implement back end Android App using SQLite database.
	CO5	Develop advanced Android App using location based services.