

## B.Sc. Honours in Artificial Intelligence (Major)

Paper	Paper Name	Outcomes After completion of the course the student should be able to
<b>SEMESTER I</b>		
<b>COURSE 1</b>	<b>ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES</b>	<p><b>CO 1 : Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.</b></p> <p><b>CO 2 : To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations</b></p> <p><b>CO 3 : To Explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.</b></p> <p><b>CO 4 : Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.</b></p> <p><b>CO 5 : To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.</b></p>
<b>COURSE 2</b>	<b>ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES</b>	<p><b>CO 1: Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.</b></p> <p><b>CO 2 : To Explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to Connect their knowledge of physics to everyday situations. 3. Understand the different sources of renewable energy and their generation processes and advances in nanomaterials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.</b></p> <p><b>Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.</b></p> <p><b>CO 3 : Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.</b></p> <p><b>CO 4: Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics. Gain knowledge of different types of</b></p>

		transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite).
<b>SEMESTER II</b>		
<b>COURSE 3</b>	<b>Python for Data Science</b>	<p><b>CO 1 :Understand basic Python syntax, data types, operators, control flow statements, functions, and object-oriented programming principles.</b></p> <p><b>CO 2 : Data Manipulation with Pandas</b></p> <p><b>CO 3: Understand NumPy arrays and their efficient operations for mathematical calculations.</b></p> <p><b>CO 3 : Data Visualization with Matplotlib &amp; Exploratory Data Analysis</b></p> <p><b>CO 4 : Machine Learning with Scikit-learn &amp;Data Preprocessing</b></p>
	<b>Practical</b>	<p><b>CO 1: Implement a given problem as a python program.</b></p> <p><b>CO 2: To write loops and decision statements in Python</b></p> <p><b>CO 3: To implement functions and modules in Python.</b></p> <p><b>CO 4: To implement different data structures in python</b></p> <p><b>CO 5: To implement data analysis using pandas and graphs</b></p>
<b>COURSE 4</b>	<b>Statistical Methods and Probability Distribution</b>	<p><b>CO 1:Aims to equip students with the ability to understand and apply basic probability concepts.</b></p> <p><b>CO 2: Identify relevant probability distributions for real-world scenarios,</b></p> <p><b>CO 3:Calculate key statistical measures, and interpret data using statistical inference techniques,</b></p> <p><b>CO 4:Allowing them to analyze and draw conclusions from data sets across various fields;</b></p> <p><b>CO 5:Key course outcomes might include</b></p>
	<b>Practical</b>	<p><b>CO 1:Apply the various statistical methods for real life problems</b></p> <p><b>CO 2: Analyze the uni-variate and bivariate data using statistical techniques.</b></p>
<b>SEMESTER III</b>		
<b>COURSE 5</b>	<b>DOCUMENT ORIENTED DATABASE</b>	<p><b>CO 1: Explain the core principles of document databases, differentiating them from traditional relational databases.</b></p> <p><b>CO 2 :Describe the concept of a flexible schema and how it benefits data modeling in document databases.</b></p> <p><b>CO 3:Create and manage collections within a document</b></p>

		<p>database.</p> <p><b>CO 4: Apply normalization techniques appropriate for document databases to avoid redundancy and maintain data consistency.</b></p> <p><b>CO 5: Integrate a document database with application code in various programming languages.</b></p>
<b>COURSE 6</b>	<b>Practical</b>	<p><b>CO 1 : Installation of mongo db ,configuring, running mongo db</b></p> <p><b>CO 2 : Implementation of crud operations</b></p> <p><b>CO 3 : Implementing index methods, aggregation methods</b></p> <p><b>CO 4 : To study and implement DDL, DML commands using MYSQL</b></p> <p><b>CO 5 : Implementing MySQL Programmes using Control Structures and functions</b></p>
<b>COURSE 6</b>	<b>OPERATING SYSTEM</b>	<p><b>CO 1 : Analyse the services and functions of operating systems</b></p> <p><b>CO 2 : Analyse the concepts of processes in operating system and illustration of the scheduling of processor for a given problem instance.</b></p> <p><b>CO 3 : Analyse memory management techniques, concepts of virtual memory</b></p> <p><b>CO 4 : To understand Introduction to Unix:- Architecture of Unix, Features of Unix , Unix Commands</b></p> <p><b>CO 5 : To understand Shell programming and Simple shell program</b></p>
	<b>Practical</b>	<p><b>CO 1: To implement CPU scheduling algorithms in c programming language</b></p> <p><b>CO 2: To implement file/directory handling commands in Unix.</b></p> <p><b>CO 3: To display list of currently logged users in Unix shell script</b></p> <p><b>CO 4: To implement binary search using shell script</b></p> <p><b>CO 5: To implement Fibonacci series using shell script</b></p>
<b>COURSE 7</b>	<b>OBJECT ORIENTED PROGRAMMING</b>	<p><b>CO 1 : Overview of java programming, history and its features.</b></p> <p><b>CO 2 : Understand fundamentals of programming such as variables, conditional and iterative execution, statements, etc.</b></p>

		<p><b>CO 3 :</b> Understand the principles of arrays, inheritance, packages and multi-threading.</p> <p><b>CO 4 :</b> Understand the Fundamental features of Managing Errors, Exceptions and Applet Programming.</p> <p><b>CO 5 :</b> Understand the Files concept in java.</p>
<b>COURSE 7</b>	<b>Practical</b>	<p><b>CO 1:</b> Overview of java programming.</p> <p><b>CO 2:</b> Understand fundamentals of programming such as variables, conditional and iterative execution, statements, etc</p> <p><b>CO 3:</b> Understand the principles of arrays, inheritance, packages and multi-threading.</p> <p><b>CO 4:</b> Understand the Fundamental features of Exceptions and Applet Programming.</p> <p><b>CO 5:</b> Understand the Files concept in java.</p>
<b>COURSE 8</b>	<b>INFERENCEAL STATISTICS</b>	<p><b>CO 1 ::</b> A fundamental understanding of Parametric models for developing relevant inferences on associated parameters</p> <p><b>CO 2 :</b> Knowledge of point and interval estimation procedures and different methods of point estimation,</p> <p><b>CO 3 :</b> Using Neyman Pearson Lemma and finding Uniformly Most Powerful Test,</p> <p><b>CO 4 :</b> Various basic concepts on sampling distributions and large sample tests based on normal distribution,</p> <p><b>CO 5 :</b> Small sample tests based on chi-square, Student's and Snedecor's F distributions</p>
	<b>Practical</b>	<p><b>CO 1:</b> Apply the various statistical methods for real life problems</p> <p><b>CO 2:</b> Apply the SPSS techniques and give the interpretations.</p>
<b>SEMESTER IV</b>		
<b>COURSE 9</b>	<b>DATA WAREHOUSING AND DATA MINING</b>	<p><b>CO 1 :</b> To understand the principles of Data warehousing and Data Mining.</p> <p><b>CO 2 :</b> To be familiar with the Data warehouse architecture and its Implementation.</p> <p><b>CO 3 :</b> To know the Architecture of a Data Mining system.</p> <p><b>CO 4 :</b> To understand the various Data preprocess.</p> <p><b>CO 5 :</b> To perform classification and prediction of data.</p>
	<b>Practical</b>	<p><b>CO 1:</b> Implement data files conversions and can train, test data sets for an application.</p> <p><b>CO 2:</b> Generate accurate models, and demonstrate data pre - processing.</p> <p><b>CO 3:</b> Demonstrate text mining and web mining techniques.</p>
<b>COURSE 10</b>	<b>MACHINE LEARNING USING PYTHON</b>	<p><b>CO 1 :</b>The basic concepts of machine learning.</p> <p><b>CO 2 :</b>Construct supervised learning models.</p> <p><b>CO 3 :</b>Construct unsupervised learning algorithms</p> <p><b>CO 4 :</b>Evaluate and compare different models</p> <p><b>CO 5 :</b>ENSEMBLE TECHNIQUES AND UNSUPERVISED</p>

		<b>LEARNING AND NEURAL NETWORKS</b>
	<b>Practical</b>	<b>CO 1: Explain the basic concepts of machine learning</b> <b>CO 2: Construct supervised learning models.</b> <b>CO 3: Construct unsupervised learning algorithms.</b> <b>CO 4: Evaluate and compare different models</b>
<b>COURSE 11</b>	<b>INTRODUCTION TO AI</b>	<b>CO 1 : Understand the informed and uninformed problem types and apply search strategies to solve them.</b> <b>CO 2 : Apply difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.</b> <b>CO 3 : Design and evaluate intelligent expert models for perception and prediction from intelligent environment.</b> <b>CO 4 : Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.</b> <b>CO 5 : Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area.</b>
	<b>Practical</b>	<b>CO 1: Develop various basic python programs</b> <b>CO 2: Analyse and develop solutions for various problems like water jug, Tic – Tack – Toe, etc.</b> <b>CO 3: Develop programs using DFS, BFS, A* and hill climbing algorithms.</b> <b>CO 4: Develop python programs for analysing given data set</b> <b>CO 5: Develop python programs for implementing Bayes Classification.</b>
<b>SEMESTER V</b>		
<b>COURSE 12</b>	<b>PREDICTIVE ANALYTICS USING PYTHON</b>	<b>CO 1: Understand prediction-related principles, theories and approaches.</b> <b>CO 2: Learn model assessment and validation.</b> <b>CO 3: Understand the basics of predictive techniques and statistical approaches.</b> <b>CO 4: Understand basics of neural networks</b> <b>CO 5: Analyse supervised and unsupervised algorithms.</b>
	<b>Practical</b>	<b>CO 1: Implement various logistics regression algorithms</b> <b>CO 2: Implement numerical optimization and test errors</b> <b>CO 3: Implement K - Nearest algorithms</b> <b>CO 4: Implement Random forests analysis</b>
<b>COURSE 13</b>	<b>ALGORITHMS FOR INTELLIGENT SYSTEMS</b>	<b>CO 1 : Understanding the foundations of Artificial Intelligence</b> <b>CO 2 : Representing a problem as a search solving problem</b> <b>CO 3 : Searching a space of answers for a solution to a problem in practical time.</b> <b>CO 4 : Representing problems in terms of logic and deduction.</b> <b>CO 5 : Representing intelligent behavior in terms of agent.</b>

	<b>Practical</b>	<b>CO 1: understand PROLOG</b> <b>CO 2: Develop algorithms for solving logical problems.</b>
<b>COURSE 14</b>	<b>NATURAL LANGUAGE PROCESSING</b>	<b>CO 1 : Upon successful completion of this course, students should have the knowledge and skills to Apply basic principles of AI in solutions that require problem solving, knowledge representation</b> <b>CO 2 : Show sensitivity to linguistic phenomena and an ability to model them with formal grammars</b> <b>CO 3 : Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems</b> <b>CO 4 : To apply the NLP techniques to IR applications</b> <b>CO 5 : To construct data and perform data analysis.</b>
	<b>Practical</b>	<b>CO 1: Apply basic principles of AI in solutions that require problem solving, knowledge representation</b> <b>CO 2: Show sensitivity to linguistic phenomena and an ability to model them with formal grammars</b> <b>CO 3: Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems</b> <b>CO 4: Able to design, implement</b> <b>CO 5: Analyze NLP algorithm</b>
<b>COURSE 15</b>	<b>Software Project Management</b>	<b>CO 1 : implement function point analysis and models like flexi and SEL.</b> <b>CO 2 : implement basic, intermediate and detailed COCOMO.</b> <b>CO 3 : Determine and classify the project life cycle and estimate the effort of Agile methods</b> <b>CO 4 : Formulate the project activity plan and project risk management</b> <b>CO 5 : Organize and manage the project contracts and Establishing the staffing pattern and Document the organizational behavior.</b>
	<b>Practical</b>	<b>CO 1: Implement function point analysis and models like flexi and SEL.</b> <b>CO 2: Implement basic, intermediate and detailed COCOMO</b>