PROGRAMME PROJECT REPORT
OF
DIPLOMA IN ARTIFICIAL INTELLIGENCE
(ODL/ONLINE MODE)

ONE YEAR (TWO SEMESTER) PROGRAMME
(Effective from Session 2025-26)

CENTRE FOR DISTANCE AND
ONLINE EDUCATION

**GURU JAMBHESHWAR UNIVERSITY OF SCIENCE
AND TECHNOLOGY HISAR-125001, HARYANA**

(YEAR:2025-26)

PROGRAMME PROJECT REPORT (PPR)
DIPLOMA IN ARTIFICIAL INTELLIGENCE

1. PROGRAMME'S MISSION & OBJECTIVE

1.1 PROGRAMME MISSION:

The mission of the Diploma in Artificial Intelligence (AI) programme is to equip learners with the foundational knowledge, practical skills, and ethical understanding required to develop intelligent systems and contribute meaningfully to the AI-driven technological landscape. The programme is designed to introduce students to core concepts in artificial intelligence, including machine learning, neural networks, natural language processing, computer vision, and data analytics.

By combining theoretical instruction with hands-on training, the programme aims to build strong technical competencies that enable students to design, implement, and evaluate AI-based solutions across various domains such as healthcare, finance, education, manufacturing, and smart systems. It also emphasizes problem-solving, creativity, and critical thinking to help learners apply AI techniques to real-world challenges.

An essential aspect of the programme is to foster awareness of the ethical, legal, and social implications of AI, ensuring that graduates use AI responsibly and for the greater good. The mission also includes encouraging innovation, continuous learning, and research-oriented thinking to keep pace with rapidly evolving technologies.

Ultimately, the programme strives to prepare industry-ready professionals who are capable of contributing to AI innovation, supporting digital transformation, and meeting the growing demand for skilled talent in the field of artificial intelligence.

1.2 PROGRAMME OBJECTIVES:

- **Provide Fundamental Understanding:** To offer a strong foundation in the principles and concepts of Artificial Intelligence and related technologies.
- **Develop Practical Skills:** To equip students with hands-on experience in AI tools and frameworks, including machine learning, data analysis, and programming.
- **Introduce Key AI Technologies:** To familiarize learners with essential AI domains such as neural networks, natural language processing, computer vision, and robotics.
- **Encourage Problem-Solving Abilities:** To develop critical thinking and analytical skills for applying AI techniques to real-world problems.

- **Promote Ethical and Responsible AI Use:** To create awareness about ethical, legal, and societal implications of AI applications.
- **Prepare for Industry Readiness:** To align student competencies with current industry demands, making them suitable for entry-level AI roles.
- **Support Innovation and Research:** To inspire learners to engage in innovative projects and research activities in the field of AI.
- **Enhance Communication and Collaboration Skills:** To improve learners' abilities to communicate technical ideas effectively and work in multidisciplinary teams.
- **Foster Lifelong Learning:** To encourage a mindset of continuous learning and upskilling to keep pace with evolving AI technologies.
- **Build a Pathway for Higher Education and Careers:** To prepare learners for advanced studies or careers in AI, data science, or related emerging technology fields.

2. RELEVANCE OF THE PROGRAMME WITH HIGHER EDUCATIONAL INSTITUTION'S (HEI'S) MISSION & GOALS

2.1 HEI'S MISSION:

The University aspires to be a globally recognized Centre of excellence in the field of technical education and research. It strives to achieve this by introducing innovative job-oriented courses, employing competent and motivated faculty, developing state-of-the-art infrastructure, striking purposeful linkages with industry and professional bodies, and promoting quality of work life on campus. The University focuses on the student community to imbue them with passion for knowledge and creativity and to promote sustainable growth in academic resources, student placements, and holistic human development with a strong conviction for professional ethical, social and environmental issues.

2.2 HEI's GOALS

The goals of the University as enshrined in the Act are to facilitate and promote studies and research in emerging areas of higher education with focus on new frontiers of and also to achieve excellence in these and connected fields.

2.3 PROGRAMMES OFFERED TO ACHIEVE HEI'S MISSION AND GOALS

The HEI's mission and goals are holistically inherited in the Diploma in Artificial Intelligence of Centre for Distance & Online Education. The Scheme and syllabus of this

programme is designed by Board of Studies and the same is approved by Academic Council. Latest and updated curriculum is used to meet the Artificial Intelligence. This programme focuses primarily on Artificial Intelligence which is an amalgamation of computer sciences, and technologies that has become one of the most prominent applications of technology in the world. It will also help students develop the necessary skills to carry out analytical procedures and support an organization by figuring out ways to improve and optimize existing business processes with ease.

The cost of the programmes and provision for scholarship have been designed with objective of spreading mass education to meet needs of all class of learners. Personal Contact Programme (PCP) is offered by competent faculty as students' support services which ensures timely response to student's queries and, enhances overall quality standards.

3. NATURE OF PROSPECTIVE TARGET GROUP OF LEARNERS

The Diploma in Artificial Intelligence is designed for a broad and diverse group of learners who are interested in entering the rapidly growing field of AI and intelligent systems. The primary target group includes students who have completed their 10+2 education in Science, Commerce, or Arts with an interest in technology and innovation. It is also suitable for diploma holders or undergraduate students from engineering, computer science, mathematics, or related disciplines who wish to specialize in AI. Working professionals in IT, data analysis, or software development fields looking to upgrade their skills and stay relevant in the evolving tech landscape are also ideal candidates. Additionally, the programme caters to aspiring entrepreneurs, freelancers, and startup enthusiasts who aim to apply AI in business and product development. Career changers from non-technical backgrounds with a passion for data and intelligent technologies can also benefit from the programme, as it builds AI capabilities from the ground up. The programme supports learners from both urban and rural areas, offering flexible learning opportunities through open and distance learning or online modes, thereby promoting inclusivity and accessibility. Overall, the target group is diverse, united by a shared goal of mastering AI skills for academic, professional, or entrepreneurial growth.

4. APPROPRIATENESS OF PROGRAMME TO BE CONDUCTED IN OPEN AND DISTANCE LEARNING (ODL), AND ONLINE MODE TO ACQUIRE SPECIFIC SKILLS AND COMPETENCE

The Diploma in Artificial Intelligence is highly appropriate for delivery through Open and Distance Learning (ODL) and online modes, given the digital and computational nature of the subject. AI is a technology-driven field that relies heavily on software tools, coding environments, and data analysis platforms—all of which can be effectively accessed and practiced through virtual labs and online resources. These modes allow learners to study at their own pace, making it ideal for students, professionals, and career switchers who require flexibility due to work, location, or personal commitments.

Online platforms support interactive learning through video lectures, simulations, coding exercises, and real-world project work using AI tools such as Python, TensorFlow, and machine learning libraries. Learners can develop core skills in data handling, model training, and algorithm development through guided virtual environments. The programme's structure can include peer discussions, online mentoring, and assessments that ensure engagement and progress tracking.

Moreover, AI education does not demand extensive physical infrastructure, making it well-suited for remote and online delivery. The ODL and online mode also support wider reach and inclusivity, enabling access to quality education for learners from rural and underserved areas. Thus, the programme is highly effective for acquiring both theoretical understanding and practical competencies in AI.

All the courses in the programme are theoretical and problem based. So, no laboratory or experiment is needed to impart the skills and competence required for the programme. The specific skill and competencies required for a post graduate can be imparted to a great extent through SLM reference books, E-content and E-tutorial prepared with the approach of self-explanatory self-contained, self-directed, self- motivating and self-evaluating. Centre for Distance and Online Education Department is more costs effective and can take place while continuing full-time employment. The Department offers outcome-based education, having industry centric curriculum. This enables the students to satisfy their needs and aspirations as the system provides enhanced learning opportunities.

4.1 LEARNING OUTCOMES:

Upon successful completion of the Diploma in Artificial Intelligence programme, learners will be able to:

- **Demonstrate Understanding of AI Concepts:** Understand the core principles, techniques, and applications of Artificial Intelligence and its subfields like machine learning, deep learning, and neural networks.

- **Apply Programming and AI Tools:** Use programming languages such as Python and AI frameworks like TensorFlow, Keras, or Scikit-learn to build and train intelligent systems.

- **Analyze and Interpret Data:** Collect, process, and analyze datasets to derive insights and make data-driven decisions using AI techniques.

- **Develop AI Models:** Design, implement, and evaluate machine learning models for solving classification, regression, and prediction problems in real-world scenarios.

- **Solve Real-World Problems:** Apply AI techniques to domains such as image recognition, natural language processing, speech analysis, and recommendation systems.

- **Understand Ethical and Social Implications:** Recognize the ethical, legal, and societal impacts of AI, and apply responsible practices in AI development and deployment.

- **Communicate Technical Ideas Effectively:** Prepare and present reports, project documentation, and AI solutions clearly to both technical and non-technical audiences.

- **Work Collaboratively:** Function effectively as a member of a team in multidisciplinary environments to develop AI-based applications.

- **Adapt to Emerging Technologies:** Stay updated with advancements in AI and related technologies and pursue lifelong learning for career growth.

- **Prepare for Higher Education and Careers:** Be ready for advanced studies in AI or take up entry-level roles such as AI technician, data analyst, machine learning assistant, or AI support specialist.

5. <u>INSTRUCTIONAL DESIGN</u>

Need based courses have been identified and the courses are developed. They have been fine-tuned taking into consideration industry/social requirements and also to educate rural people professionally. The course, curriculum and syllabi are designed and evaluated by a Departmental Committee. The curriculum and syllabi are then placed in the Board of Studies. The finalized curriculum and syllabi are then placed in the Academic Council for the final approval. In addition, courses have been introduced specifically for CDOE programmes to suit the requirements of the dynamic changes taking place in the economy and Industry. However, courses can be introduced as and when the need arises after obtaining necessary approvals from the appropriate academic bodies of the University. Approval of Board of Studies and Academic Council are obtained whenever modifications/additions are made in the existing curriculum and syllabi.

5.1 CURRICLUM DESIGN

The Diploma in Artificial Intelligence is a one-year programme divided into two semesters. The course structure, viz, the scheme and syllabus of the Diploma in Artificial Intelligence is given as under:

Scheme of Diploma in Artificial Intelligence 2025-26

SEMESTER I

Sr. No.	Paper Code	Nomenclature of the Paper	Credits	Internal Marks	External Marks	Max. Marks
1.	DAI-11-T	Mathematics	3	30	70	100
2.	DAI-12-T	Probability and Statistics	3	30	70	100
3.	DAI-13-T	Data Structures	3	30	70	100
4.	DAI-14-T	Introduction to Artificial Intelligence	3	30	70	100
5.	DAI-15-T	Python Programming	3	30	70	100
6.	DAI-16-P	Data Structures Lab.	2	30	70	100
7.	DAI-17-P	Data Analysis using Excel Lab.	2	30	70	100
8.	DAI-18-P	Python Programming Lab.	2	30	70	100
		Total	21	240	560	800

SEMESTER II

Sr. No.	Paper Code	Nomenclature of the Paper	Credits	Internal Marks	External Marks	Max. Marks
1.	DAI-21-T	Database Management System	3	30	70	100
2.	DAI-22-T	Fuzzy Logic and Neural Networks	3	30	70	100
3.	DAI-23-T	Machine Learning	3	30	70	100
4.	DAI-24-T	Natural Language Processing	3	30	70	100
5.	DAI-25-T	Data Analytics	3	30	70	100
6.	DAI-26-P	DBMS Lab.	2	30	70	100
7.	DAI-27-P	Data Analytics Lab.	2	30	70	100
8.	DAI-28-MP	Major Project	8	30	70	100
		Total	27	240	560	800

Note: To be eligible for the award of the Diploma in Artificial Intelligence, a student has to complete all the 16 courses as shown in the above tables. However, a candidate can take exit option after 6 months (Semester I) and upon successful completion he/she will get Certificate in Artificial Intelligence.

SEMESTER - I

Mathematics

General Course Information

Course Code: DAI-11-T	Course Assessment Methods:
Course Credits: 3	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I

Matrices Elementary row transformations – rank – echelon form, normal form – solutions of linear system of homogenous and non homogeneous equations.

Unit II

Eigen Values, Eigen vectors Eigen values, eigen vectors – properties – cayley – hamilton theorem – inverse and power of a matrix by cayley – hamilton theorem;

Quadratic forms Linear transformation – reduction of quadratic form to canonical form and their nature (rank, signature and index).

Unit III

Mean value theorems Rolle's theorem – lagrange's mean value theorem – (excluding proof). Simple examples of taylor's and maclaurin's series. maxima and minima of functions of two variables - lagrange method of multipliers with three variables only.

Unit IV

Multiple integrals Evaluation of double integrals (cartesian and polar) – change of variables – change of order of integration – changing into polar coordinates – evaluation of triple integrals.

Text and Reference Books:

1. T.K.V. Iyengar, B. Krishna Gandhi, Mathematical Methods, S. Chand & Company.
2. T.K.V. Iyengar, B. Krishna Gandhi, A Text Book of Engineering Mathematics, Vol – I, S. Chand & Company.
3. T.K.V. Iyengar, B. Krishna Gandhi, A Text Book of Engineering Mathematics, Vol – III, S. Chand & Company.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2000.

Probability and Statistics

General Course Information

Course Code: DAI-12-T	**Course Assessment Methods:**
Course Credits: 3	**Max. Marks: 100**
Exam Duration: 3 hours	**(Internal Marks: 30; External: 70)**
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I
Probability: Sample Space and events – Probability – The axioms of Probability – Some Elementary theorems – Conditional Probability – Baye's theorem.

Unit II
Random Variables: Discrete and continuous - Distribution – Distribution functions – Properties – Discrete Random variables – Probability mass function – Continuous Random variables – Probability density function.

Unit III
Binomial, Poisson and Normal distributions – Related properties – Fitting distributions. Sampling distribution : Population and samples – Sampling distribution of mean (known and unknown) Estimation: Point estimation – Interval estimation – Bayesian estimation..

Unit IV
Test of Hypothesis – Means – Proportions – Hypothesis concerning one and two means – One tail, two tail tests – Type I and Type II errors; Tests of significance – Student's t –test, F – test.

Text and Reference Books:

1. T.K.V. Iyengar, B. Krishna Gandhi and others, Probability and Statistics, S.Chand and company.
2. Dr. Shahnaz Bathul, A Text book of Probability and Statistics, Cengage Learning India Pvt Ltd
3. B.V. Ramana, Engineering Mathematics, Tata McGraw Hill .

Data Structures

General Course Information

Course Code: DAI-13-T	Course Assessment Methods:
Course Credits: 3	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I
Introduction to data structures and their types, Abstract data types, Linear lists: Arrays and linked lists: memory representations, implementing operations like traversing, searching, inserting and deleting etc. Applications of arrays and linked lists.

Unit II
Stack and Queue: Static and linked implementations, Operations and Applications. Type of queues. Circular queues. De-queue. Priority Queues.
Application of stacks: Infix to postfix Transformation, Evaluating Arithmetic Expressions.

Unit III
Trees: Binary Trees, terminology, representation and traversals- pre, post & in-order traversals. Binary Search Trees implementation and operations.
Graphs: Graph definitions and related terminology, memory representations for graphs and associated algorithms for searching, inserting and deleting nodes and related algorithms, Graph traversals and applications (DFS, BFS).

Unit IV
Sequential and Binary search, Sorting algorithms: Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Internal and external sorting and stable sorting techniques.
Heapsort - Heaps, Maintaining the heap property, Building a heap, heapsort algorithm

Text and Reference Books:

1. A. Tanenbaum, Y. Lanhgsamand A. J. Augenstein, "Data Structures Using C", PHI.
2. Seymour Lipschultz, "Theory and Practice of Data Structures", Tata McGraw-Hill.
3. G. S. Baluja, Data Structures through C, 4th Edition – Dhanpat Rai & Co.

Introduction to Artificial Intelligence

General Course Information

Course Code: DAI-14-T	Course Assessment Methods:
Course Credits: 3	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I

Overview of Artificial Intelligence: Introduction to AI, Importance of AI, AI and its related field, Turing Test, AI techniques, Problems, Problem Space and search: Defining the problem as a state space search, Production system and its characteristics.

Unit II

Search Techniques: Depth first search, Breadth First Search, Heuristic Search Technique: Generate and test, Hill climbing, best first search technique, A* algorithm, Searching of AND/ OR graph using AO* algorithm.

Unit III

Logic: Propositional Logic, Syntax of propositional Logic, Predicate Logic, Representing facts in logic, Normal forms in logic, clause form, Unification, Resolution in predicate logic.
Knowledge representation: Significance of Knowledge representation, Semantic Networks, Frames.

Unit IV

Probabilistic reasoning: Need of probabilistic reasoning, Probability and Baye's theorem, Bayesian belief Networks.

Text and Reference Books:

1. Elaine Rich, Kevin Knight and Shivashankar B Nair, Artificial intelligence, McGraw Hill Education, 2009.
2. Rajiv Chopra, Artificial Intelligence (A Practical Approach), S Chand Publishing, 2012.
3. Stuart Russel and Peter Norvig, Artificial intelligence: A modern Approach, Pearson Education, 2015.
4. Dan W. Patterson, Introduction to Artificial Intelligence and Expert System, Pearson Education.1st edition, 2007.
5. Deepak Khemani, A first course in Artificial Intelligence, McGraw Hill Education. 3rd edition, 1st edition, 2013.
6. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 5th edition, 2009

Python Programming

General Course Information

Course Code: DAI-15-T	**Course Assessment Methods:**
Course Credits: 3	**Max. Marks: 100**
Exam Duration: 3 hours	**(Internal Marks: 30; External: 70)**
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I

Introduction to Python, History of Python, Features of Python, Python Identifiers, Python Character Set, Keywords and Indentation, Comments, Command Line Arguments, Assignment Operator, Operators and Expressions, print() Function, input() Function, eval() Function, Python Data Types: int, float, complex, Variables, Mutable vs Immutable variables, Namespaces, Decision Statements: Boolean Type, Boolean Operators, if statement, else statement, Nested Conditionals Statements, Multi-way Decision Statements (elif statement).

Unit II

Loop Control Statements: While loop, range() Function, For Loop, Nested Loops, Infinite Loop, Break Statement, Continue Statement, Pass Statement, Introduction to Strings, String Operations: Indexing and Slicing, Lists: Operations on List: Slicing, Inbuilt Functions for Lists, List Processing: Searching and Sorting, Dictionaries: Need of Dictionary, Operations on Directories: Creation, Addition, Retrieving Values, Deletion; Tuples, operations on Tuples, Inbuilt Functions for Tuples, Introduction to Sets, operations on sets.

Unit III

Python Functions, Inbuilt functions, Main function, User Defined functions, Defining and Calling Function, Parameter Passing, Actual and Formal Parameters, Default Parameters, Global and Local Variables, Recursion, Passing Functions as Data, Lamda Function, Modules, Importing Own Module, Packages.
Operations on File: Reading text files, read functions, read(), readline() and readlines(), writing Text Files, write functions, write() and writelines(),Manipulating file pointer using seek, Appending to Files.

Unit IV

Python Object Oriented: Overview of OOP, Classes and objects, Accessing attributes, Built-In Class Attributes, Methods, Class and Instance Variables, Destroying Objects, Polymorphism, Overlapping and Overloading of Operators, Class Inheritance: super(), Method Overriding, Exception Handling, Try-except-else clause, Python Standard Exceptions, User-Defined Exceptions

Text and Reference Books:

1. Martin C. Brown, "Python: The Complete Reference" McGraw Hill Education, Fourth edition , 2018
2. R. Nageswara Rao , "Core Python Programming" Dreamtech Press India Pvt Ltd 2018.
3. Ashok Namdev Kamthane, Programming and Problem Solving with Python, Mc Graw Hill Education Publication, 2018.

4. John Guttag, Introduction to Computation and Programming using Python, Springer
5. Lutz, M., Learning Python: Powerful Object-Oriented Programming. O'Reilly Media, Inc., 2013.
4. Michael T Goodrich and Robertto. Thamassia, Micheal S Goldwasser, Data Structures and Algorithms in Python, Wiley, 2016.
6. Y. Daniel Liang, Introduction to Programming Using Python, Pearson, 2013.
7. Reema Thareja, Python Programming Using Problem Solving Approach , Oxford Publications, 2017.
8. Kenneth A. Lambert, The Fundamentals of Python: First Programs, Cengage Learning, 2011.

Data Structures Lab.

General Course Information

Course Code: DAI-16-P	Course Assessment Methods:
Course Credits: 2	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)

List of Experiments

1. Perform Linear Search and Binary Search on an array.
   a. Read an array of type integer.
   b. Input element from user for searching.
   c. Search the element by passing the array to a function and then returning the position of the element from the function else return -1 if the element is not found.
   d. Display the position where the element has been found.
2. Implement sparse matrix using array. Description of program:
   a. Read a 2D array from the user.
   b. Store it in the sparse matrix form, use array of structures.
   c. Print the final array.
3. Create a linked list with nodes having information about a student and perform
   a. Insert a new node at specified position.
   b. Delete of a node with the roll number of student specified.
   c. Reversal of that linked list.
4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and perform deletion at end of that doubly linked list.
5. Create circular linked list having information about an college and perform Insertion at front perform Deletion at end.
6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.
7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queue elements.
8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.
9. Implement insertion, deletion and display (inorder, preorder and postorder) on binary search tree.
10. To implement Quick sort, and Bubble sort using array as a data structure.

Data Analysis using Excel Lab.

General Course Information

Course Code: DAI-17-P	Course Assessment Methods:
Course Credits: 2	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)

List of Experiments

Experiment: 1
- a. Study functions and features of Microsoft Excel
- b. Getting started with excel: Opening a blank or new workbook, general organization
- c. Highlights and main functions: Home, Insert, page layout, formulas
- d. Highlights and main functions: Data, review, view, add-inns

Experiment: 2
- a. Customizing the Quick Access Toolbar,
- b. Working with Data: Entering, Editing, Copy, Cut, Paste, Paste Special

Experiment: 3
- a. Manipulating Data, using Data Names and Ranges, Filters and Sort and Validation Lists
- b. Data from External Sources
- c. Basic Formulas and Use of Functions
- d. Data Analysis Using Charts and Graphs

Experiment: 4

Advanced Formulas and Functions, Advanced Worksheet Features

Experiment: 5

Advanced Data Analysis using PivotTables and Pivot Charts

Experiment: 6
- a. Tabulation
- b. Bar diagram
- c. Multiple Bar diagram
- d. Pie diagram

Experiment: 7

Measure of central tendency: Mean, median, mode

Experiment: 8
- a. Measure of dispersion: variance, standard deviation, Coefficient of variation
- b. Correlation, regression lines

Experiment: 9

t-test, F-test

Experiment: 10

ANOVA one way classification

Experiment: 11

t-test , F-test, ANOVA one way classification, chi square test, independence of attributes.

Experiment: 12

Chi square test, independence of attributes

Experiment: 13

Time series: forecasting Method of least squares

Experiment: 14

Moving average method, Inference and discussion of results

Python Programming Lab.

General Course Information

Course Code: DAI-18-P	Course Assessment Methods:
Course Credits: 2	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)

List of Experiments

1. Install Python and explore various popular IDE like IDLE, PyCharm, and Anaconda.
2. Assignments to perform various number operations like
   a. Find maximum from a list of numbers
   b. GCD of two number
   c. Square root of a number
   d. Check number is prime or not.
   e. Print first N prime numbers
   f. Remove duplicate numbers from list
   g. Print the Fibonacci series.
3. Assignments to perform various operations on Strings like creation, deletion, concatenation.
4. Create a List L = [10, 20, 30]. Write programs to perform following operations:
   a. Insert new numbers to list L.
   b. Delete numbers from list L.
   c. Sum all numbers in list L.
   d. Sum all prime numbers in list L.
   e. Delete the list L.
5. Create a Dictionary D= {'Name': 'Allen', 'Age': 27, 5:123456}. Write programs to perform following operations:
   a. Insert new entry in D.
   b. Delete an entry from D.
   c. Check whether a key present in D.
   d. Update the value of a key.
   e. Clear dictionary D.
6. Two assignments on Sets to perform various operation like union, intersection, difference etc.
7. Two assignments related to searching operation like linear search, binary search.
8. Three assignments related to sorting like selection sort, bubble sort, insertion sort.
9. Demonstrate the use of dictionary for measuring student marks in five subjects and you have to find the student having maximum and minimum average marks.
10. Two assignment on usage of different available packages like random package to perform
    a. Print N random numbers ranging from 100 to 500.
    b. Print 10 random strings whose length between 3 and 5.
11. Implement and demonstrate the functions of a simple calculator.
12. One assignment on implementing object oriented concept such as classes, inheritance, and polymorphism.

SEMESTER - II

Database Management System

General Course Information

Course Code: DAI-21-T	**Course Assessment Methods:**
Course Credits: 3	**Max. Marks: 100**
Exam Duration: 3 hours	**(Internal Marks: 30; External: 70)**
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I

Overview: Overview of File Systems and Database Systems, Characteristics of the Data Base Approach, Database users, Advantages and Disadvantages of a DBMS.

Data Base Systems Concepts and Architecture: DBMS architecture and various views of Data, Data Independence, Database languages.

Unit II

E-R Model: Entity Types, Attributes & Keys, Relationships, Roles and Structural Constraints, E-R Diagrams.

Relational Model and Query Language: Overview of Relational Database, Key Integrity Constraints, Relational Algebra, SQL fundamentals, Basic Operators, Missing information and NULL values.

Unit III

Relational Database Design: Overview of normalization, Database Anomalies, Candidate and Super Key, Functional Dependencies, Integrity Constraints, Decomposition, Normal forms: First, Second, Third Normal, Boyce Codd Normal Form.

Unit IV

Concurrency Control Techniques: Overview of database Transactions, Transaction states, ACID properties of a Transaction, Transaction Recovery, Concurrency Control, Locking Techniques, Time stamp ordering, Deadlock, Recovery Techniques in centralized DBMS.

▢▢▢▢ ▢▢d ▢▢▢▢r▢▢▢▢ ▢▢▢▢▢▢

1. Elmasri, R., and Navathe, S. B., Fundamentals of Database Systems, 7th Edition, Pearson.
2. Silberschatz, A., Korth, H. F., and Sudarshan, S., Database System Concepts, McGraw Hill, 2011.
3. Pannerselvam R., Database Management Systems, 2nd Edition, PHI Learning, 2011.
4. Desai, B. C., An Introduction to Database System, Galgotia Publication, 2010.
5. Leon, A., and Leon, M., Database Management Systems, Ist Edition, Vikas Publishing, 2009.
6. Mata -Toledo, R., Cushman, P., Sahoo, D., Database Management Systems, Schaums' Outline series, TMH, 2007

Fuzzy Logic and Neural Networks

General Course Information

Course Code: DAI-22-T	Course Assessment Methods:
Course Credits: 3	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I

Fuzzy Sets: Crisp Sets, Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy sets, Fuzzy Relations. Fuzzy Logic: Crisp Logic, Fuzzy Logic, Fuzzy truth in terms of fuzzy sets, Fuzzy rules, Fuzzy reasoning.

Unit II

Fuzzy inference Systems: Introduction, Fuzzification of Input variables, Application of Fuzzy operators on the Antecedent Parts of Rules, Evaluation of the fuzzy rules, Aggregation of output fuzzy sets across the rules, Defuzzification of the resultant Aggregate fuzzy set.

Unit III

Artificial Neural Networks: Introduction, Computation in terms of Patterns, The McCulloch-Pitts Neural Model, The Perceptron, Neural Network Architectures, Activation Functions, Learning by Neural Nets, Hebb Nets.

Unit IV

Backpropagation: Multi-layer Feedforward Net: Architecture, Notational Convention, Activation functions, The Generalized Delta Rule, The Backpropagation Algorithm.

Text and Reference Books

1. Samir Roy, Udit Chakraborty, *Introduction to Soft Computing*, Pearson India, 2013.
2. S.N. Deepa, S.N. Sivanandam, *Principles of Soft Computing*, Wiley, 2011.
3. Jang, Sun, Mizutani, *Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence*, Pearson Education India, 2015
4. Saroj Kaushik, Sunita Tewari, *Soft Computing*, McGraw Hill Education, 2018.

Machine Learning

General Course Information

Course Code: DAI-23-T	Course Assessment Methods:
Course Credits: 3	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I
Machine learning: Introduction, Types of machine learning, applications of machine learning, machine learning activities, basic types of data in machine learning, exploring structure of the data, data preprocessing.

Unit II
Machine learning Models: Introduction, selecting a model, training a model, model representation and interpretability, evaluating the performance of a model, improving the performance of a model.
Feature Engineering: Introduction, feature transformation, principal component analysis (PCA), linear discriminant analysis (LDA), feature subset selection, feature selection approaches.

Unit III
Supervised Learning: Introduction, examples of supervised learning, classification model, steps for developing a classification model, common classification algorithms: k-nearest neighbor, decision tree, random forest, support vector machines.

Unit IV
Unsupervised Learning: Introduction, supervised vs. unsupervised learning, clustering, different types of clustering techniques, partitioning methods, hierarchical clustering, finding pattern using association rules.

Text and Reference Books:
1. Saikat Dutt, S Chandramouli, Amit K Das, *Machine learning,* Pearson, 2019
2. Jiawei Han, Micheline Kamber, Jian Pei, *Data Mining - Concepts And Techniques,* 3rd Edition, Morgan ,Kaufmann, Elsevier, 2012
3. Tom M Mitchell, *Machine learning,* McGraw-hill, 1997.
4. Dr. R. Nageshwar Rao, *Machine Learning in Data Science using python,* dreamtech Presss, 2022.

Natural Language Processing

General Course Information

Course Code: DAI-24-T Course	Course Assessment Methods:
Credits: 3	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)
	Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I

Introduction to Natural Language Processing: Definition and scope of NLP, Importance of NLP in human-computer interaction, Applications of NLP, Chatbots, Machine translation, Voice assistants, Search engines, Historical evolution of NLP, Rule-based approaches, Statistical models, Machine learning, Deep learning.

Basics of Human Language (Linguistics for NLP): Phonetics, Morphology, Syntax, Semantics, Pragmatics, Words, phrases, clauses, sentences, Constituents and phrase structure, Word Formation— Prefixes, suffixes, roots, Compound words, Inflectional vs derivational morphology, Parts of Speech, Syntax Rules and Sentence Structure, Phrase structure grammar, Dependency and constituency structures, Lexical semantics, Compositional semantics, Pragmatics, Discourse and conversational context, Language Ambiguity— Lexical ambiguity, Syntactic ambiguity, Semantic ambiguity

Unit II

Text Preprocessing Concepts: Text Normalization Techniques, Tokenization, Stopword Removal, Word Standardization, Handling Noise in Text, Handling Contractions and Slang, Text Encoding and Representation, Handling Case Studies in Preprocessing

Text Representation: Representing Language as Data, Need for numerical representations in NLP, Basic Text Representation Techniques, Bag of Words (BoW), Term Weighting Schemes, Vector Space Model of Text, Word Embeddings, Contextualized Word Representations (Overview), Document-Level Representations, Dimensionality and Sparsity Issues

Unit III

Syntax and Parsing: Role of syntax in language understanding, Syntax vs semantics, Grammatical Structure of Sentences, Part-of-Speech (POS) Tagging, Syntactic Ambiguity, Parsing Techniques, Constituency Parsing, Dependency Parsing, Shallow Parsing (Chunking), Statistical and Neural Parsing (Overview)

Semantics and Meaning: Introduction to Semantics in NLP, Types of Meaning, Semantic Roles and Relationships, Lexical Semantics, Word Sense Disambiguation (WSD), Named Entity Recognition (NER), Coreference and Anaphora Resolution, Semantic Parsing

Introduction to NLP Tasks: Role of tasks in language understanding, Importance in real-world systems, Text Classification, Sentiment Analysis, Part-of-Speech Tagging, Machine Translation, Question Answering, Text Summarization, Supervised vs unsupervised learning in NLP, Dialogue Systems and Chatbots

Unit IV

Language Models: Introduction to Language Models, Word Prediction and Sequence Modeling, Natural Language Generation, Types of Language Models, Rule-based language models, Statistical Language Models, Neural Language Models, Contextual vs Static Language Models, Generation tasks— Text generation, Image captioning Applications of Language Models, Evaluation of Language Models

Ethics and Challenges in NLP: Ethical Considerations in NLP, Social responsibility of NLP practitioners, Bias

in NLP Systems, Privacy and Data Protection, Transparency and Explainability, Language Diversity and Inclusivity, Misuse of NLP Technologies, Algorithmic Fairness in NLP, Guidelines and Ethical Frameworks

NLP in the Real World and the Future: Applications in daily-use technology, Virtual assistants, Grammar checkers, Voice-controlled systems, Customer support automation, Future directions Multilingual NLP, Multimodal NLP, Emotion-aware NLP

Text and Reference Books

1. Mastering Natural Language Processing using Python: From Fundamentals to Advanced Techniques by Dr. Goonjan Jain & Dr. Kanika Garg, Sultan Chand & Sons, 2025
2. Speech and Language Processing by Daniel Jurafsky and James H. Martin, Pearson Education India; 2013
3. Natural Language Processing with Python (NLTK Book) by Steven Bird, Ewan Klein, Edward Loper, Shroff; First Edition, 2011

Data Analytics

General Course Information

Course Code: DAI-25-T Course Credits: 3 Exam Duration: 3 hours	**Course Assessment Methods:** **Max. Marks: 100** **(Internal Marks: 30; External: 70)** Examiner will be required to set nine questions in all. First question will be compulsory, consisting of objective type/short answer type questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory question number one. All questions will carry equal marks.

Course Content

Unit I
Introduction: Importance of Data Analytics, Types of Data Analytics, Descriptive Analytics, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics, Benefits of Data Analytics, Data visualization and decision Making.

Unit II
Introduction to simple Linear Regression: The Regression Equation, Introduction to Multiple Linear Regression: Assessing the Model, Cross-Validation, Logistic Regression: Logistic Response function and logit, Logistic Regression.

Unit III
Mining Data Streams: Stream Data Model and Architecture, Stream Computing, Sampling Data in a stream, Filtering Streams, Counting Distinct Elements in a stream, Estimating Moments, Counting Oneness in a window, Real Time Analytics Platform (RTAP) Applications.

Unit IV
Data analytics and visualization with R and Python: Attribute and Data type, Descriptive statistics. Exploratory Data Analysis: Visualization before analysis, Dirty Data, visualizing single variable, examining Multiple variable, Data Exploration versus presentation.

Text and Reference Books:

4. EMC Education Services, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, EMC Education services Wiley Publication
5. Bharati Motwani, Data Analytics using Python, Wiley Publications.
6. Bharati Motwani, Data Analytics using R, Wiley Publications
7. Andrew Bruce, Peter Bruce, and Peter Gedeck, Practical Statistics for Data Scientists 50+ Essential Concepts Using Rand Python, O'Reilly Publications 2nd Edition
8. A, Rajaraman, J.D. Ullman, Mining of Massive Datasets, Cambridge University Press, 2012
9. Jiawei Han, Micheline Kamber and Jian Pei, Data Mining, Concepts and Techniques: 3rd edition,
10. Wes McKinney, Python for Data Analysis: 3rd Edition, O'Reilly Media, Inc.

DBMS Lab.

General Course Information

Course Code: DDS-26-P	Course Assessment Methods:
Course Credits: 2	Max. Marks: 100
Exam Duration: 3 hours	(Internal Marks: 30; External: 70)

List of Experiments

1. Create a database table, add constraints (primary key, unique, check, not null) using SQL commands
2. Insert rows, update and delete rows using SQL commands.
3. Create a set of tables, add foreign key constraints and incorporate referential integrity.
4. Query the database tables using different where clause conditions and also implement aggregate functions.
5. Query the database tables and explore sub queries and simple join operations.
6. Query the database tables and explore natural, equi and outer joins.
7. Write user defined functions and stored procedures in SQL.
8. Execute complex transactions and realize DCL and TCL commands.
9. Write SQL Triggers for insert, delete, and update operations in a database table.
10. Create View and index for database tables with a large number of records.

Data Analytics Lab.

General Course Information

Course Code: DAI-27-P	**Course Assessment Methods:**
Course Credits: 2	**Max. Marks: 100**
Exam Duration: 3 hours	**(Internal Marks: 30; External: 70)**

List of Experiments

1. Write a program in python for cleaning and handling missing values in dataset and data normalization.
2. Write a program to perform descriptive statistics.
3. Write a program for creating line charts, bar plots, scatter plots, and histograms.
4. Write a program for hypothesis testing.
5. Write a program for linear regression analysis.
6. Write a program for logistic regression analysis.
7. Write a program for binary classification.
8. Write a program for model evaluation using accuracy, precision, recall, F1-score.
9. Write a program for test processing.
10. Write a program for cross validation.

Major Project

General Course Information

Course Code: DAI-28-MP	**Course Assessment Methods:**
Course Credits: 8	**Max. Marks: 100**
Exam Duration: 3 hours	**(Internal Marks: 30; External: 70)**

Students are required to complete their project work in the domain of Artificial Intelligence by the end of 2nd semester. Students carry out implementation of their respective projects based on the problem identified, methodology and tools suggested in the synopsis submitted in the second week in the starting of 2nd semester. They prepare the final project reports according to the format provided. At the end of 2nd semester, each student is required to present his/her project work in front of internal project guide and external examiner appointed by Controller of Examination.

5.2 DURATION OF PROGRAMME

The duration of the Diploma in Artificial Intelligence is one year and the maximum duration is three years.

1. A student who for whatever reasons is not able to complete the programme within the normal period or the minimum duration prescribed for the programme shall be allowed two years period beyond the normal period to clear the backlog to be qualified for the degree. The general formula, therefore, will be as follows:

   a) Time span = N+2 years for the completion of programme. Where N stands for the normal or minimum duration prescribed for completion of the programme.

   b) In exceptional circumstances a further extension of one more year may be granted. The exceptional circumstances are spelt out clearly by the relevant statutory body of the University.

2. Further, the mercy chance, if any will be given within maximum allowed period of the programme as per UGC guidelines. In normal circumstances, only two chances will be given to pass re-appear examination.

5.3 FACULTY AND SUPPORT STAFF

FACULTY

The Centre for Distance & Online Education (CDOE) have qualified teaching faculty to look after the programme as a programme coordinator. They look for the following activities related to the distance education:

- Conducting Personal Contact Programme (PCP) classes for the students.
- Assisting in the change of Regulations and Curriculum, admission work, counseling new students and other issues such as break of study, exemptions etc.
- Coordinating for the preparation of study materials for all semesters/year.
- Coordinating with the faculty members for the preparation and evaluation of assignments of students, and viva voce examinations.

SUPPORT STAFF

The Centre for Distance and Online Education (CDOE) of the university is headed by the director who is a full-time faculty member (Professor) of the university appointed by Vice-Chancellor to facilitate the development, implementation and monitoring the programmes offered at CDOE and to attend all administrative matters concerned with the activities of

directorate. The supporting staffs such as one Deputy Registrar, one Assistant Director, one Superintendent, two Deputy Superintendent, one Hindi Officer, Six Assistants and other clerical staff are coordinating the activities of Centre for Distance and Online Education (CDOE) and looks after the problems of the students. The Supporting staff looks after the problems of the students through online admission help line, examination related work, study material delivery, grievance redressal and so on. The CDOE is assisted by the IT CELL for the online uploading and evaluation of assignments and other student support activities. The CDOE also assisted by Pt. Deendayal Upadhyaya Computer and Informatics Centre (PDUCIC) department for communicating important information to the students through CDOE website of Guru Jambheshwar University of Science and Technology, Hisar. The PDUCIC department managed the CDOE Website of the University. There are six faculties of commerce & management in the Centre for Distance and Online Education who are looking after the programme as programme coordinator(s) and course co-ordinator(s). Further, support from faculties of parent teaching department

5.4 INSTRUCTIONAL DELIVERY MECHANISM

The Instructional delivery mechanisms of the University for ODL/online courses different components, viz, SLM, Personal Contact Programme (PCP), E-Content, E-Tutorial, Internal Assignments and End Term Examination.

- **Self Learning Material–** The success and effectiveness of the department largely depends on the e-content in the form of self-learning mode (SLM). So, it is necessary that the online study material must be ideal for easy and better understanding. Learning Material through electronic media named Self-learning Material (SLM) is developed with the approach of self-explanatory, self-contained, self-motivating and self-evacuating followed by the UGC guidelines.

- **Personal Contact Programme-** PCP sessions guide the learners as the prgramme proceeds. The PCP schedule is communicated to the learners through our website or Email service. During PCP, the learner gets guidance for better understanding of the programme and subject. The Personal Contact Programme (PCP) is arranged for each of the course by respective Programme Coordinator. The learners get their doubts cleared with the help of subject experts sop as to improve their self-learning capability. Learners are required to attend PCP sessions for all their respective subjects.

- **E-Contents–** The success and effectiveness of online distance education systems largely depends on the e-content in the form of self-learning mode (SLM). So, it is necessary that

the online study material must be ideal for easy and better understanding. Learning Material through electronic media named Self-learning Material (SLM) is developed with the approach of self-explanatory, self-contained, self-motivating and self-evacuating followed by the UGC guidelines. Beside this, the E-content also may include e-book, illustrations, case studies, presentations and web resources such as further references, related links, open-source content on internet, video, case studies, research papers, journals, anecdotal information, articles, historical development of the subject etc.

- **E-Tutorial** – E-Tutorial in the form of video-audio lectures, PPTs, virtual labs etc., guide the learners for better insights on subject matters. It shall be the responsibility of the programme coordinator to ensure that none of the graphics, animation, images, sound clips, video clips used are plagiarized or cited without formal permission from owners. The information for the e-tutorial is communicated to the learners through our website or SMS Services. During e-tutorial, the learner gets guidance for better insights of the subject. A five credit course shall typically have 20 hours of video content and 20 hours of reading material.

- **Discussion Forum:** The facility of discussion forum also provided for raising of doubts and clarifying the same on real time basis for programme by the respective Programme Coordinator and his/her team. The learners get their doubts cleared with the help of subject experts so as to improve their self- learning capability. Learners are required to attend e-tutorial as well as discussion forum sessions for all their respective subjects. The mentor shall be the subject matter expert adept in handling technology. The Programme coordinator and mentor shall need to participate actively in discussion forum. Apart from discussion forum other interactive platforms like web conferencing may also be used.

- **Internal Assessments-** Centre for Distance and Online Education learners have to depend much on self-study. In order to ascertain the writing skill and level of comprehension of the learner, assignment work is compulsory for all learners. The Centre for Distance and Online Education (CDOE) of this university has an online portal for the uploading of the assignments and same has been evaluated online by the subject expert. Two assignments of 30 marks i.e. 15 marks each is allotted for each subject consists of questions with practical based. The assignment question papers are uploaded on the website within a scheduled time and the learners are required to respond them within a specified period of time. The response of the learner is examined by a faculty member.

End Term Examination- At the end of every session, learners will give theory exam for 70 marks for each subject. For examination (ODL Mode/Online Mode), there will be of nine questions. The first question will be compulsory consisting of seven short questions of two marks each covering the entire syllabus (all four Units). In addition, eight more questions of 14 marks each will be set comprising from the entire syllabus and the students are required to attempt any four questions from these. The online mode examination will be conducted either using computer-based test or pen and paper test in a proctored environment in designated test center with all the security arrangements ensuring transparency and credibility of the examinations. Online examination may also be conducted through technology mediated proctoring.

5.5 STUDENT SUPPORT SERVICES

The department of the university provides the Student Support Services through online mode. Following are the main student support services provided by university through online mode:

- Online Admission Portal for students
- Online fee portal for students
- SMS alert facility for the students for information related to PCPs, Project, Deadlines and Viva-voce etc.
- Grievance handling mechanism is adopted with the help of supporting technical staff
- Practical Questions Based Assignments
- Online availability of Old Question Papers and study material
- Comprehensive viva-voce is conducted after term end examination in the University
- Student Help Desk

6. PROCEDURE FOR ADMISSIONS, CURRICULUM TRANSACTION AND EVALUATION

6.1 PROCEDURE FOR ADMISSIONS

6.1.1 Admission Procedure

Whole admission process is online as per the University rules.

6.1.2 Admission policy for the programme

Admission is based on filling online Admission Form. The procedure of filling the online application form is a four-step procedure, i.e.

- Candidate Registration.
- Payment option through Net Banking, Debit card or Credit card.
- Filling of application form.
- Uploading required scanned documents.
- Generating Preview

6.1.3 Eligibility

Sr. No.	Title of Programme	Eligibility
1.	Diploma in Artificial Intelligence	12th pass in any discipline

6.1.4 Fee structure

Diploma in Artificial Intelligence (ODL Mode)

Installment No.	Amount	Without late fee	With late fee of ₹ 1000/- per month
1st Installment	₹ 7,500/-	At the time of admission	-
2nd Installment	₹ 4,500/-	31st January every year	30th April every year

Diploma in Artificial Intelligence (Online Mode)

Installment No.	Amount	Without late fee	With late fee of ₹ 1000/- per month
1st Installment	₹ 10,500/-	At the time of admission	-
2nd Installment	₹ 7,500/-	31st January every year	30th April every year

6.1.5 Curriculum Transaction

The Centre for Distance and Online Education supply study material in the form of self learning mode (SLM), printed books/lessons as well as in the electronic form. The students get the same directly from the department either by hand or will be sent by post/courier service. Similarly, soft copy of the SLM is uploaded on the CDOE website. Personal contact programme (PCP) for students is also arranged by the expert teachers to resolve the queries and doubt regarding the syllabus. E-tutorial for programme is arranged for each semester by the respective Programme Coordinator. Theory / Practical teaching as per requirements will be provided to the students by the subject specialists. Video lectures are also provided to the students on their LMS portal. The e-tutorial held as per the schedule given in the prospectus.

In addition to this student are informed about e-tutorial and other activities through website and mail as well.

6.1.5 Evaluation

Internal assessment will be based on practical assignments and the evaluation will be done by experts in relevant field. External term end evaluation is done by experts in relevant field.

Last Date of online submission of Internal Assignments

Odd Semester	Even Semester
15th January every year	30th April every year
Last Date of submission of Internal Assignment with a late fee of Rs. 500/-	
31st January every year	31st May every year
Last Date of submission of Internal Assignment with a late fee of Rs.1000/-	
15th February every year	15th June every year

NOTE:

1. The students have to upload two internal handwritten assignments of each theory paper of 30% weightage in the stipulated time period mentioned above. Assignments will be prepared by the students will be available on the CDOE website and student portal/LMS as well. It is the sole responsibility of the student to download the question paper of the assignment and upload the solved assignments.

2. The students who fail in internal assessment as well as in aggregate will have the option to improve their score in the internal assessment giving a special chance to such students.

3. A student who could not score 40% marks in external examination of the particular course will have to reappear in the external examination of the respective paper as per university rules in this connection.

7. <u>REQUIREMENT OF THE LABORATORY SUPPORT AND LIBRARY RESOURCES</u>

7.1 Laboratory Support:

A well-equipped Computer lab with latest version of MS Office and internet facility is also available in the department of Centre for Distance and Online Education of this university. This Computer Lab is established with an aim to meet the computing requirements of all the learners of the University. This lab is equipped with 12 desktop computers of latest configuration i.e. Window 7, Window 10 and I3 processor. In addition to this, there is one printer, one scanner and one LED in the Computer Lab for teaching through presentation and video lectures to

students. There is one lab attendant for handling the queries regarding online admission, fee payment, uploading of assignments, any other queries through mail, etc.

7.2 Library Resources:

The infrastructure related to library resources is available in the present set-up of the university whereby, we have a well stacked library with latest books, journals, magazines and newspapers. It is named after the great Indian Jurist, Economist, Politician and Social reformer Dr. Bhim Rao Ambedkar. The seating capacity of the University Library is 400 seats. By the end of December 2018, the Library has a collection of 106566 books. The library in its electronic repository has the access to 7000+ e-journals from 14 publishers and 5 Databases. Moreover, 2149 e-books of national and international repute publishers have also been added in e-repository to enrich the students, but within the university premises. University library provides different services to distance learners such as Air-Conditioned Reading Halls, Reading Facility for 400 students, Laptop Lab for SC/ST students consisting of 20 Laptops with internet facility and Potable Water facility on every floor. The online e-library resources namely INFLIBNET is also available for the accessibility of books and journals.

8. **COST ESTIMATE OF THE PROGRAMME AND THE PROVISIONS**

Cost estimates of programme are based on following components:
- Study Material development and delivery such as cost of writing, vetting, editing, SLM conversion, printing and dispatch etc.
- Personal Contact Programme (PCP) related activities
- E-tutorial/Video Lectures
- Proctored examination and evaluation
- Internal assessment preparation and evaluation
- Miscellaneous cost like advertising on FM radio broadcast, newspapers and SMS alert
- Salary to Teaching and Non-Teaching Staff

9. **QUALITY ASSURANCE MECHANISM**

9.1 Quality Policy of University:

The Guru Jambheshwar University of Science & Technology (GJUST) is committed to achieve excellence in teaching, research, and extension by follow and implement following points of quality policy:
- Imparting globally competitive education

- Selecting and retaining competent and motivating faculty
- Providing state or the art infrastructural resources
- Promoting quality research culture
- Ensuring transparent and accountable governance
- Focusing on holistic development of learners
- Symbiotic relationship with industry, other academic institutions, and society
- Striving for financial self-reliance

9.2 Advisory Committee:

The Advisory Committee headed by the Vice-Chancellor has been constituted to monitor the activities of the Department along-with matters related to quality assurance (Functions and List of members attached). Following is the composition of Advisory Committee:

1	Vice Chancellor, GJUS&T	Chairperson
2	Registrar, GJUS&T	Member
3	Dean Academic Affairs, GJUS&T	Member
4	Dean of Colleges, GJUS&T	Member
5	Controller of Examination, GJUS&T	Member
6	Prof. Sandeep Rana, (TA-HRM), GJUS&T	Member
7	Chairperson, Department of CSE, GJUS&T	Member
8	Director, HSB, GJUS&T	Member
9	Chairperson, Department of Mass Communication, GJUS&T	Member
10	Director, DE, KUK	Member
11	Prof. R. Baskar, IGNOU, Delhi	Member
12	Director, DE, MDU	Member
13	Director, PDUCIC, GJUS&T	Member
14	Dy. Registrar (CDOE), GJUS&T	Member
15	DR/AR (Accounts), GJUS&T	Member
16	DR/AR (Academic), GJUS&T	Member
17	Director, Centre for Distance and Online Education, GJUS&T	Member Secretary

9.3 Centre for Internal Quality Assurance (CIQA)

The CIQA also oversees the development and preparation of SLMs, then it is submitted to the Board of Studies concerned for the approval. The objective of establishment of Centre for

Internal Quality Assurance (CIQA) is to develop and put in place a comprehensive and dynamic internal quality assurance system to provide high quality programmes of higher education in the Open and Distance Learning mode.

	CENTRE FOR INTERNAL QUALITY ASSURANCE (C.I.Q.A.)	
1	Vice Chancellor, GJUS&T	Chairperson
2	Registrar, GJUS&T	Member
3	Dean Academic Affairs, GJUS&T	Member
4	Dean of Colleges, GJUS&T	Member
5	Controller of Examination, GJUS&T	Member
6	Prof. Sandeep Rana, (TA-HRM), GJUS&T	Member
7	Chairperson, Department of CSE, GJUS&T	Member
8	Director, HSB, GJUS&T	Member
9	Chairperson, Department of Mass Communication, GJUS&T	Member
10	Director, DE, KUK	Member
11	Prof. R. Baskar, IGNOU, Delhi	Member
12	Director, DE, MDU	Member
13	Director, PDUCIC, GJUS&T	Member
14	Dy. Registrar (CDOE), GJUS&T	Member
15	DR/AR (Accounts), GJUS&T	Member
16	DR/AR (Academic), GJUS&T	Member
17	Director, Centre for Distance and Online Education, GJUS&T	Member Secretary

9.3 Functions of Centre for Internal Quality Assurance (CIQA)

Following are the main functions of CIQA:

- To maintain quality in the services provided to the learners.
- To ensure continuous improvement in the entire operations of the Higher Education Institution.
- To identify the key areas in which the Higher Education Institution should maintain quality.
- To disseminate information on quality assurance.
- To device mechanisms for interaction and obtaining feedback from various Departments or Centres or Schools in the Higher Education Institution.

- To suggest to the authorities of the Higher Education Institution, measures for qualitative improvement.
- To ensure the implementation of its recommendations through regular monitoring.
- To ensure participation of all stake holders namely, learners, teachers, staff, parents, society, employers and Government in Quality Improvement Process.
- To prepare Programme Project Report and ensure another launch of programme(s).
- Collection, collation and dissemination of accurate, complete and reliable statistics about the quality of the programme(s).

9.4 Activities of Centre for Internal Quality Assurance (CIQA)

Following are the main activities of CIQA:

- Prepare a Programme Project Report (PPR) for each programme according to the norms and guidelines prescribed by the Commission and wherever necessary by the appropriate regulatory authority having control over the programme;
- Get the Programme Project Report (PPR) approved by the appropriate authority of the Higher Educational Institution and the Commission before launch of the programme;
- Oversee the development of Study Learning Material (SLM), e-Content, e-tutorial, integration of Information and Communication Technology (ICT), setting up of Learning Centres and coordination with the parent institution and relevant Regulatory authorities;
- Put in place monitoring mechanism to ensure the proper implementation of Programme Project Reports (PPRs);
- Design annual plans for quality level enhancement at the level of the Higher Educational Institution and ensure their implementation;
- Arrange for feedback responses from students, employers and other stakeholders for quality related institutional processes;
- Develop quality benchmarks or parameters for the various academic and administrative activities of the Higher Educational Institution;
- Obtain information from other Higher Educational Institutions on various quality benchmarks or parameters and best practices;
- Organize workshops or seminars on quality related themes and Higher Educational Institution wise dissemination of the proceedings of such activities;
- Suggest restructuring of programmes in order to make them relevant to the job market;
- Develop and implement innovative practices in major areas leading to quality enhancement in services to the learners;
- Create learner centric environment rather than institution centric environment;

- Adopt measures to ensure internalisation and institutionalisation of quality enhancement practices through periodic accreditation and audit;
- Conduct or encourage system-based research to bring about qualitative change in the entire system;
- Coordinate between the Higher Educational Institution and the Commission for various quality related issues or guidelines;
- Record activities undertaken on quality assurance in the form of an annual report; and
- To coordinate recognition and accreditation of the Higher Educational Institution.

10. PROGRAMME OUTCOMES

The Diploma in Artificial Intelligence programme is designed to produce graduates who possess a balanced mix of theoretical knowledge, technical proficiency, and ethical awareness to meet the demands of the evolving AI industry. The programme aims to equip learners with core competencies in AI technologies, the ability to apply these skills to real-world problems, and the readiness to pursue advanced studies or professional careers in the field. It also focuses on fostering critical thinking, effective communication, teamwork, and a commitment to lifelong learning. The programme is aimed at following outcomes:

- **PO1:** Learners will acquire comprehensive knowledge of AI fundamentals, including machine learning, deep learning, natural language processing, and data analytics.
- **PO2:** Graduates will be able to design, develop, and implement AI models using programming languages and tools.
- **PO3:** Learners will understand the ethical considerations, data privacy concerns, and societal impact of AI technologies.
- **PO4:** Learners will demonstrate strong communication and collaborative skills and apply analytical thinking to develop AI-based solutions.
- **PO5:** Learners will be equipped for continuous learning and advancement in the field of AI, and prepared to take up entry-level roles or pursue higher education in AI and related domains.