

## Adequate & well-equipped laboratories of DS Department

The Data Science department is equipped with modern infrastructure and technical support systems that foster outcome-based education and experiential learning. The institution provides well-equipped laboratories, qualified technical staff, and modern learning resources. Facilities are regularly upgraded to meet curriculum requirements and enhance student learning experiences.

The Data Science department maintains state-of-the-art laboratories designed to support outcome-based education and hands-on learning. Each lab is equipped with high-performance computing systems, including Python, R, and Tableau. Open-Source cloud platforms such as AWS Educate, Microsoft Azure, and Google Collab are integrated into lab sessions to provide scalable computing environments and real-world exposure.

Laboratories are spacious, ergonomically arranged, and ICT-enabled to facilitate interactive learning. Weekly utilization schedules are maintained to ensure optimal engagement and alignment with course outcomes (COs) and program outcomes (POs). Equipment is calibrated regularly, and upgrade logs are documented to reflect continuous improvement.

Qualified technical staff are deployed across all labs, providing consistent support during practical sessions, project work, and system maintenance. Their qualifications, assigned duties, and weekly support hours are recorded and reviewed periodically. This infrastructure and manpower collectively ensure a robust, safe, and outcome-driven laboratory experience for Data Science students.

### LAB STAFF

S. No.	Name of Staff Member	Designation	Date of Joining	Qualification	Total Year of Experience
1	MR. LAKHAN DEV	Sr. Lab TECHNICIAN	24-11-2022	Diploma in Computer	3
2	MR. PAWAN NAGAR	LAB TECHNICIAN	17-02-2021	Diploma in Computer	4
3	MR. MUKESH KUMAR	LAB TECHNICIAN	21-08-2024	Diploma in Computer	2
4	MR. MONU BHATI	LAB TECHNICIAN	21-08-2025	Diploma in Computer	1
5	MS. NEHA GUPTA	LAB TECHNICIAN	20-08-2025	Diploma in Computer	1

## **List of laboratories in Data Science Departments**

- **Data Structure Lab**
- **Project Lab**
- **Software Lab**
- **Artificial Intelligence Lab**
- **Data Analytics Lab**

## Data Structure Lab

The Data Structure Lab aims to provide hands-on experience in implementing and applying fundamental data structures used in Data Science. Students learn how to store, organize, process, and analyse data efficiently using Python. The lab strengthens problem-solving skills and prepares students for advanced subjects like Machine Learning, Data Analytics, and Big Data.

### Course Outcomes (COs)

After completing this lab, students will be able to:

1. Implement basic and advanced data structures using Python.
2. Analyse time and space complexity of algorithms.
3. Apply data structures to solve real-world data science problems.
4. Use arrays, lists, stacks, queues, trees, graphs, and hash tables effectively.
5. Understand how data structures support data preprocessing, feature engineering, and model building.





Greater Noida, Uttar  
Pradesh, India 🇮🇳

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09/25/2025 02:47 PM GMT+05:30

Note : Captured by GPS Map Camera

# Project Lab

The Project Lab in Data Science is designed to provide students with hands-on experience in applying data science concepts to real-world problems. It bridges theoretical knowledge with practical implementation, fostering skills in data handling, analysis, visualization, and model deployment.

## Course Outcomes

By the end of the lab, students will be able to:

- Collect, clean, and preprocess structured and unstructured datasets.
- Apply statistical and machine learning techniques for predictive modelling.
- Use visualization tools to interpret and communicate insights.
- Implement end-to-end data science pipelines.
- Work collaboratively on mini-projects and major projects aligned with industry/healthcare/IoT domains.





# Software Lab

The Software Lab in Data Science equips students with practical skills in programming, data analysis, and visualization tools. It emphasizes software environments and frameworks used in modern data science, enabling students to design, test, and deploy solutions to real-world problems.

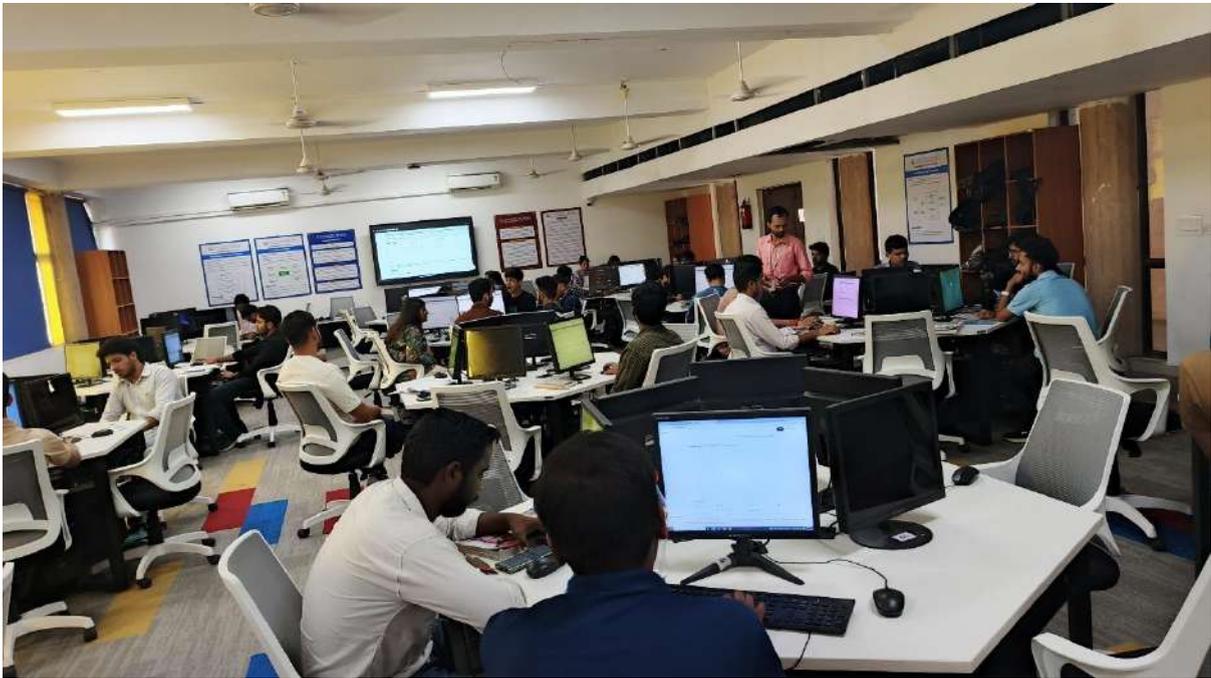
## Course Outcomes

Students will be able to:

- Implement data preprocessing and cleaning using software tools.
- Apply machine learning algorithms through Python/R libraries.
- Perform statistical analysis and hypothesis testing.
- Visualize datasets using advanced plotting libraries and BI tools.
- Integrate databases with data science workflows.
- Develop reproducible code and collaborative projects using GitHub







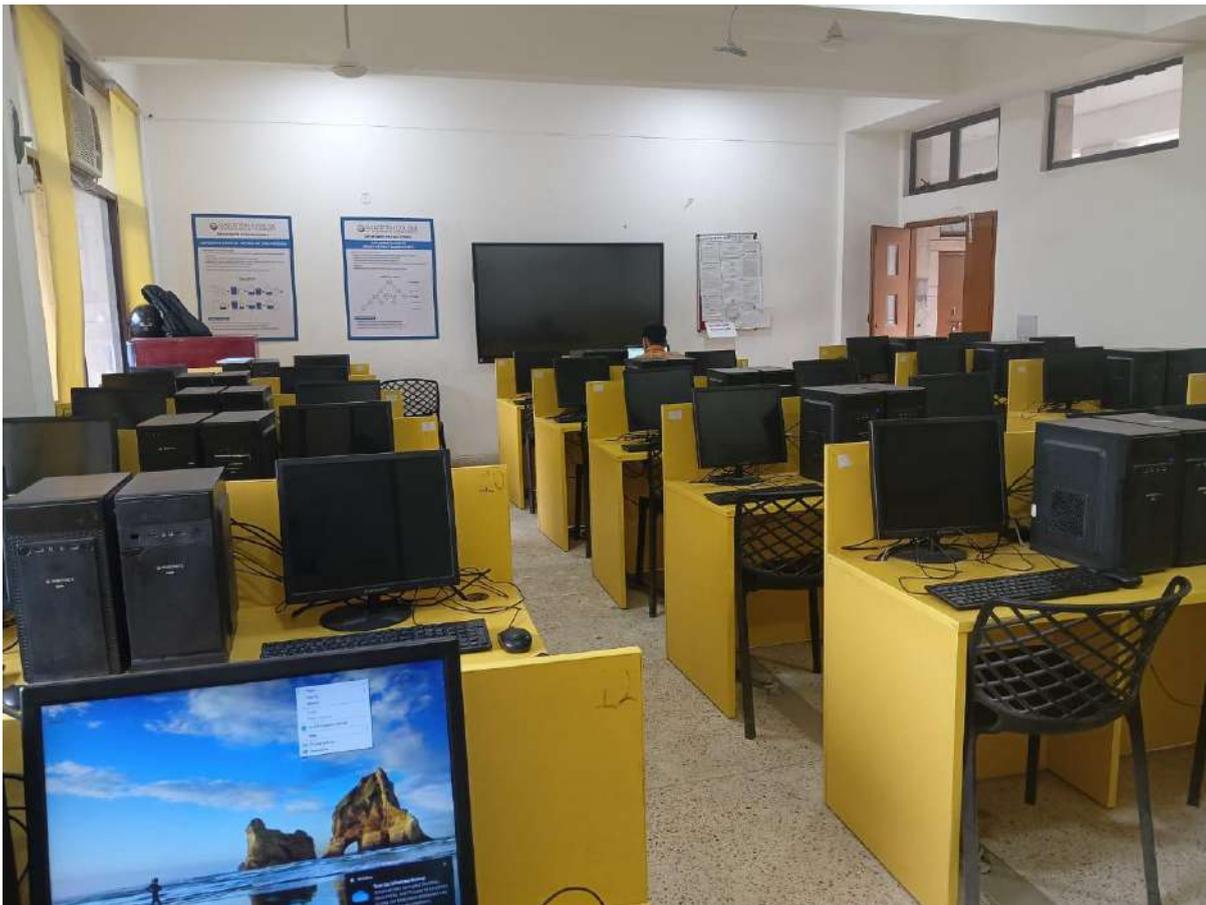
# Artificial Intelligence Lab

The Artificial Intelligence Lab provides students with hands-on exposure to AI algorithms, frameworks, and applications. It focuses on enabling learners to design intelligent systems that can perceive, reason, learn, and act, bridging theory with practical implementation in real-world domains such as healthcare, IoT, and business analytics

## Course Outcomes

### Students will be able to:

- Implement AI algorithms for search, optimization, and reasoning.
- Apply supervised and unsupervised learning techniques.
- Build and train deep learning models for vision and NLP tasks.
- Integrate AI models with IoT and distributed systems.
- Evaluate and deploy AI solutions for real-world applications.





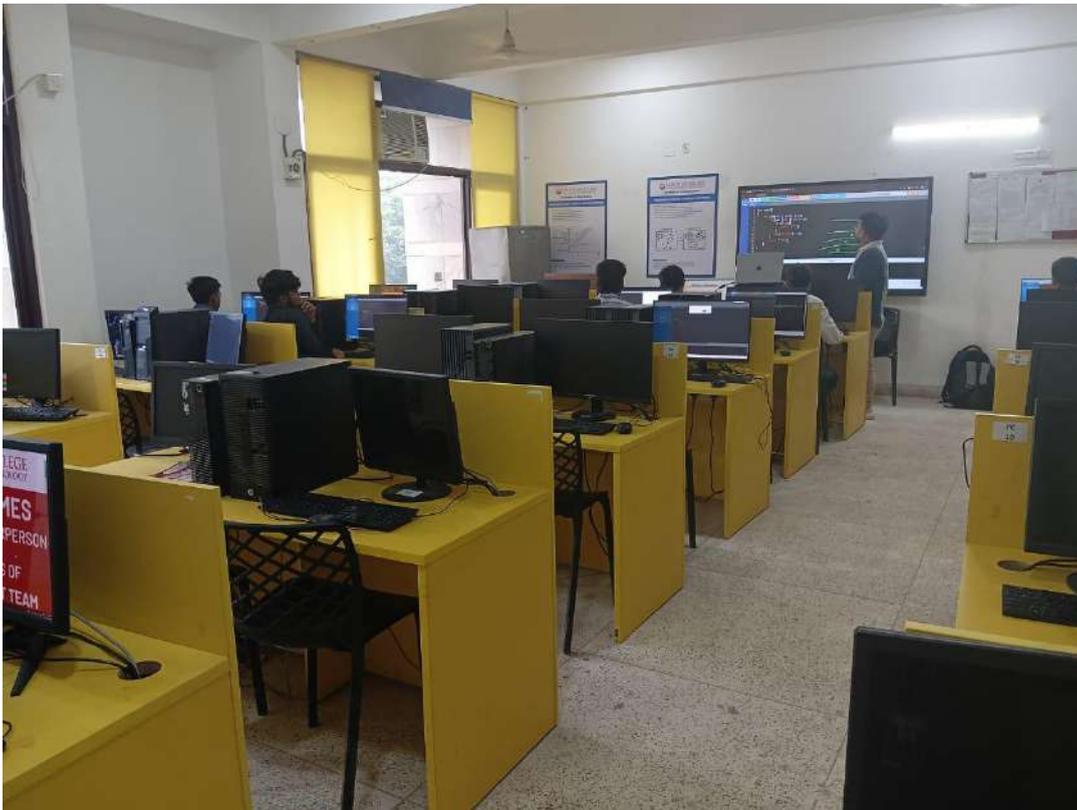
## Data Analytics Lab

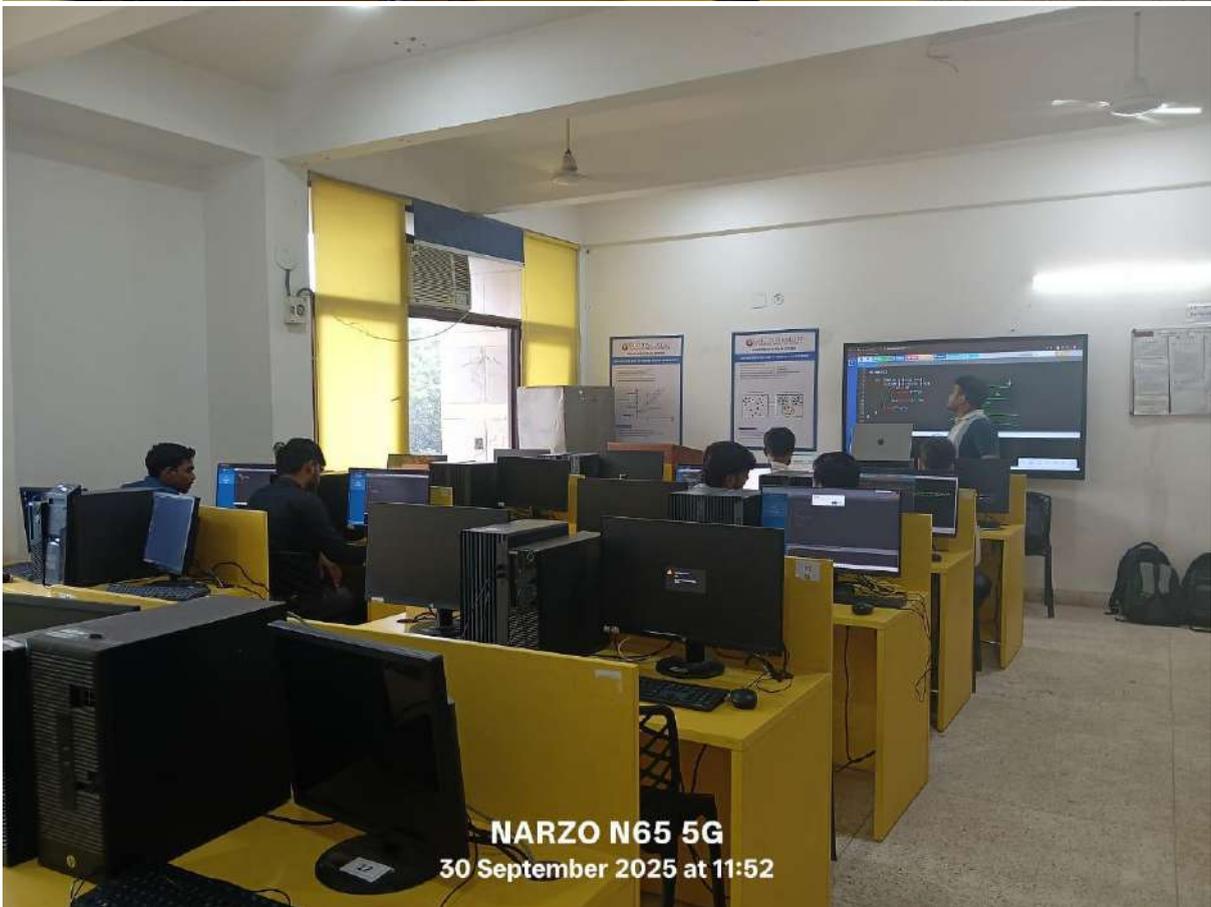
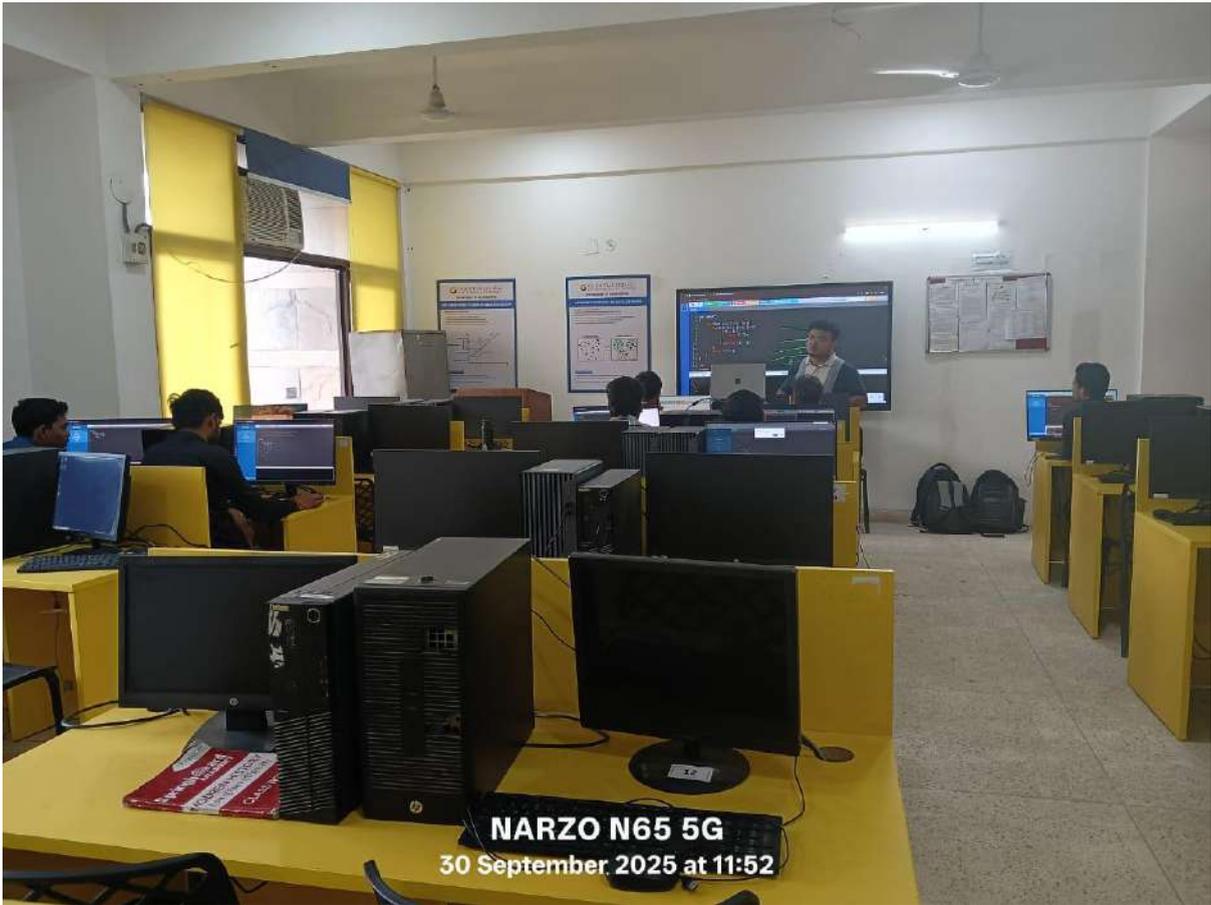
The Data Analytics Lab is designed to provide students with hands-on skills in data collection, preprocessing, analysis, visualization, and interpretation. It emphasizes the use of modern analytical tools and techniques to derive meaningful insights from structured and unstructured datasets, preparing students for industry and research applications.

### Course Outcomes

Students will be able to:

- Perform data preprocessing (cleaning, transformation, normalization).
- Conduct exploratory data analysis (EDA) to identify patterns and trends.
- Apply statistical and machine learning techniques for predictive analytics.
- Use visualization tools to communicate insights effectively.
- Integrate databases and big data frameworks with analytics workflows.
- Develop end-to-end analytical solutions for real-world problems.





**Galgotias College of Engineering & Technology,  
Department of Data Science**

**Artificial Intelligence Lab**

**BCAI-551**

**List of Experiments**

S. No.	Title / Objective of the Experiment to be conducted	Mapped with COx
1	Write a python program to implement Breadth First Search Traversal.	CO1
2	Write a python program to implement Water Jug Problem.	CO1
3	Write a python program to remove punctuations from the given string.	CO1
4	Write a python program to sort the sentence in alphabetical order.	CO1
5	Write a program to implement Hangman game using python.	CO2
6	Write a program to implement Tic-Tac-Toe game using python.	CO2
7	Write a python program to remove stop words for a given passage from a text file using NLTK.	CO3
8	Write a python program to implement stemming for a given sentence using NLTK.	CO3
9	Write a python program to POS (Parts of Speech) tagging for the give sentence using NLTK.	CO3
10	Write a python program to implement Lemmatization using NLTK.	CO3
11	Write a python program to for Text Classification for the given sentence using NLTK	CO3

**Galgotias College of Engineering & Technology,**  
**Department of Data Science**  
**DESIGN & ANALYSIS ALGORITHMS LAB (BCS-553)**

**List of Experiments**

<b>S. No.</b>	<b>Experiment Name</b>	<b>AKTU/ Value Added</b>	<b>Course Objective Mapping</b>
1	Program for Recursive Binary & Linear Search	AKTU	CO1
2	Write a program to implement Heap Sort.	AKTU	CO1
3	Write a program to implement Merge Sort	AKTU	CO1
4	Write a program to implement Selection Sort.	AKTU	CO1
5	Write a program to implement Insertion Sort.	AKTU	CO1
6	Write a program to implement Quick Sort.	AKTU	CO1
7	Write a program to implement Knapsack Problem using Greedy solution.	AKTU	CO2
8	Write a program to perform Travelling salesman problem	AKTU	CO2
9	Write a program to find the minimum Spanning Tree using Kruskal's Algorithm.	AKTU	CO2
10	Write a program to implement the N-Queen problem using Backtracking.	AKTU	CO2
11	Sort a Given n number of integer elements using quick sort method and compute its time complexity. run the program for n>5000 varied values of and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated through random number generator. Demonstrate using java how the divide-and-conquer method works along with its time complexity analysis: worst case, average case and best case	AKTU	CO1

12	Sort a Given n number of integer elements using merge sort method and compute its time complexity. run the program for n>5000 varied values of and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated through random number generator. Demonstrate using java how the divide-and-conquer method works along with its time complexity analysis: worst case, average case and best case.	<b>AKTU</b>	CO1
13	Write a program to implement 0-1 Knapsack problem using a) Dynamic Programming Method b) Greedy Method	<b>AKTU</b>	CO2, CO3
14	Write a program to find shortest paths to other vertices using Dijkstra's algorithm.	<b>AKTU</b>	CO2
15	Write a program to find the minimum cost spanning tree of a given connected undirected graph using Kruskal's algorithm using the Union find algorithm.	<b>AKTU</b>	CO2
16	Write a program to find the minimum cost spanning tree of a given connected undirected graph using Prim's algorithm using the Union find algorithm.	<b>AKTU</b>	CO2
17	Write a program a) To implement all pair shortest problems using Flyod's Algorithm. b) To implement TSP problem using Dynamic	<b>AKTU</b>	CO3
18	Design and implement to find a subset of a given set $S = \{S_1, S_2, \dots, S_n\}$ of n positive integers whose SUM is equal to a given positive integer d. For example, if $S = \{1, 2, 5, 6, 8\}$ and $d= 9$ , there are two solutions $\{1,2,6\}$ and $\{1,8\}$ . Display a suitable message, if the given problem instance doesn't have a solution.	<b>AKTU</b>	CO3
19	Write a program to design and implement to find all Hamiltonian Cycle in a connected undirected graph using Backtracking principles.	<b>AKTU</b>	CO3

20	The absolute difference is the positive difference between two values a and b, is written $ a-b $ or $ b-a $ and they are equal. If $a=3$ and $b=2$ , $ 3-2 = 2-3 =1$ . Given an array of integers, find the minimum absolute difference between any two elements in the array	<b>Value Added</b>	CO2
21	There are two $n$ -element arrays of integers, A and B. Permute them into some A' and B' such that the relation $A'[i]+B'[i] \geq k$ holds for all where $0 \leq i < n$ . There will be q queries consisting of A, B, and k. For each query, return YES if some permutation A', B' satisfying the relation exists. Otherwise, return NO.	<b>Value Added</b>	CO3
22	Given an amount and the denominations of coins available, determine how many ways change can be made for amount. There is a limitless supply of each coin type.	<b>Value Added</b>	CO3

**Galgotias College of Engineering & Technology,  
Department of Data Science**

## HARDWARE AND SOFTWARE REQUIREMENTS

### HARDWARE REQUIREMENTS:

- Intel core i5 & i7, RAM-16GB, HDD-500GB

### SOFTWARE REQUIREMENTS:

- Windows 10 & 11
- Notepad / Notepad++
- HTML5 Editor, CSS3 Editor, JavaScript Editor
- VS Code (latest Version 1.102)

**Galgotias College of Engineering & Technology,  
Department of Data Science**

**Program Name: B. Tech Subject Name: Web Designing Workshop Lab**

**Subject Code: BCS 353**

List of Programs with CO Mapping

S. No	List of the Programs	Prescribed by AKTU / Value-added	CO Mapping
1	Design the following static web pages required for a online book store website: HOMEPAGE: Design a Static Homepage Using HTML. (i) Logo (ii) College name/ Website name.	AKTU	CO1
2	LOGIN PAGE: Design a Static Login page Using HTML. (i) User Name (ii) Password	AKTU	CO1

3	CATALOGUE PAGE: Design a Catalogue page Using HTML. (i) Snap short of the cover page (ii) Author Name (iii) Publisher (iv) Price (v) Add to cart button	AKTU	CO1
4	CART PAGE: Design a Cart page Using HTML.	AKTU	CO1
5	REGISTRATION PAGE: Design a Registration page Using HTML. (i) Name [Text field] (ii) Password [password field] (iii) E-mail id [text field] (iv) Phone No. [text field] (v) Sex [radio button] (vi) DOB [3 select boxes] (vii) Languages Known [Checkboxes- English, Hindi, Urdu, Tamil] (viii) Address [text area].	AKTU	CO1
6	Js VALIDATION: Write JavaScript to validate the following fields of the above registration page. (i) Name [Name should contain alphabets and the length should not be less than 6 characters] (ii) Password [Password should not be less than 6 characters length]	AKTU	CO3
7	Js VALIDATION: (i) E-mail id [should not contain any invalid and must follow the standard pattern(name@domain.com)] (ii) Phone no. [Phone number should contain 10 digits only]	AKTU	CO3
8	CSS: Design a web page using CSS(Cascading Style Sheets) which includes the following: (i) Use different font, styles: In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles. (ii) Set a background image for both the page and single elements on the page.	AKTU	CO2
9	CSS: (i) Control the repetition of the image with the background- repeat property. (ii) Define styles for links as A: link A: visited A: active A: hover	AKTU	CO2

10	<p>Consider a small topic of your choice on which you can develop static Webpages and try to implement all topics of html, CSS and Js within the topic.</p> <p>Choose any one topic:</p> <ol style="list-style-type: none"> <li>1. Your Own Portfolio</li> <li>2. To-Do List</li> <li>3. Survey Form</li> <li>4. A Tribute Page</li> <li>5. A Questionnaire</li> </ol>	AKTU	CO3
11	To create a html registration form and to validate the form using javascript code.	Value - Added	CO3
12	To create a html file. To open new window from the current window using javascript.	Value - Added	CO3
13	To create an html page to change the background color for every click of a button using javascript.	Value - Added	CO3
14	To create an html page with 2 combo box populated with month & year, to display the calendar for the selected month & year from combo box using javascript.	Value - Added	CO3
15	To create a html page to display a new image & text when the mouse comes over the existing content in the page.	Value - Added	CO3

## **List of Equipment**

### **HARDWARE REQUIREMENTS: -**

#### **Laptop or Desktop**

- Processor: Intel Pentium or higher,  $\geq 2.0$  GHz clock speed
- 2 GB RAM
- Operating System: Windows / macOS / Linux

### **HARDWARE AVAILABLE:**

<b>S. No</b>	<b>Name of the Equipment / Apparatus / Setup / Machine etc</b>	<b>Model / Make / Major Specifications</b>
1	Computer System	HP 11 <sup>th</sup> Gen Intel* Core <sup>tm</sup> i7 RAM-16GB SSD-500GB

### **SOFTWARE REQUIREMENTS/ USED: -**

- Windows 10/11
- Oracle 11g (Free to download) [Link to download and Install: <https://www.oracle.com/database/technologies/database-11g-express-edition.html> ]
- Oracle Live -Online Compiler [Link to use: <https://livesql.oracle.com/landing/>]

**Galgotias College of Engineering & Technology,**  
**Department of Data Science**  
**Database Management System Lab (BCS 551)**

**List of Experiments**

S.No.	List of Experiments	Prescribed by AKTU / Value-added	CO	Major Equipment(s) Used
1	a. Introduction to DBMS, RDBMS, DBMS Vs RDBMS b. Introduction to SQL & Types of SQL Statements (DDL, DML, TCL, DCL) c. Introduction to various RDBMS software Oracle Installation, Oracle Live	AKTU	CO1	Oracle 11g/ Oracle live
2	Creating Entity-Relationship Diagram using case tools.	AKTU	CO1	Oracle 11g/ Oracle live
3.	<b>DDL Commands:</b> CREATE, ALTER, DROP, TRUNCATE, CREATING A TABLE From a Table Using SELECT Command	AKTU	CO2	Oracle 11g/ Oracle live
4	<b>DML Commands:</b> Managing data using INSERT, DELETE and UPDATE command	AKTU	CO2	Oracle 11g/ Oracle live
5	<b>Data Constraints at Column Level and Table level:</b> <b>PRIMARY Key, FOREIGN Key, UNIQUE, NOT NULL, CHECK,</b> <b>DEFAULT</b> value concept, Defining and Dropping Constraints using ALTER Table Command Assigning User definednames to constraints Data Constraints at Column Level and Table level	AKTU	CO2	Oracle 11g/ Oracle live
6	<b>DML Commands:</b> Retrieving database using SELECT command, Order by clause			
7	<b>SQL Functions:</b> Date functions, Conversion functions	AKTU	CO2	Oracle 11g/ Oracle live

8	<b>SQL Functions: Aggregate functions</b> , Single row functions	AKTU	CO2	Oracle 11g/ Oracle live
9	Retrieving information from database using <b>Group by and Having clause</b>	AKTU	CO2	Oracle 11g/ Oracle live
10	Retrieving data using <b>Sub queries</b> Single row, Multiple rows, ANY operator, ALL operator, EXIST, Scalar, Multiple columns, Nested, Correlated	AKTU	CO2	Oracle 11g/ Oracle live
11	Retrieving data from multiple tables using <b>JOIN</b> EQUI, INNER, SELF, OUTER	AKTU	CO2	Oracle 11g/ Oracle live
12	<b>PL/SQL Function &amp; Procedure</b>	AKTU	CO2	Oracle 11g/ Oracle live
13	<b>PL/SQL Cursors &amp; Trigger</b>	AKTU	CO2	Oracle 11g/ Oracle live
14	Design and Implementation of Library Information system	AKTU	CO1	Oracle 11g/ Oracle live
15	Retrieving data using <b>SET operators</b> UNION, UNION ALL, INTERSECT, MINUS	VALUE ADDED	CO2	Oracle 11g/ Oracle live
16	PL/SQL Exception Handling	VALUE ADDED	CO3	Oracle 11g/ Oracle live

**Galgotias College of Engineering & Technology,**  
**Department of Data Science**  
**Subject Name: Data Analytics & Visualization Lab**

**List of List of Experiments**

<b>Exp. No.</b>	<b>Name of Experiment</b>	<b>COs</b>
1	Get input from the user and perform numerical operations: MAX, MIN, AVG, SUM, SQRT, ROUND	CO1
2	Perform data import/export operations for .CSV, .XLS, and .TXT using data frames	CO2
3	Input a matrix from the user and perform matrix addition, subtraction, multiplication, inverse, transpose, division using vectors	CO1
4	Perform statistical operations: Mean, Median, Mode, and Standard Deviation	CO2
5	Perform data pre-processing operations: i) Handling missing data ii) Min-Max normalization	CO1
6	Perform dimensionality reduction using PCA on a Houses dataset	CO2
7	Implement Simple Linear Regression in R	CO1
8	Perform K-Means clustering and visualize results using the Iris dataset	CO2
9	Collect data via web scraping, APIs, or data connectors from instructor-specified sources	CO3
10	Perform association analysis (e.g., Apriori) on a dataset and evaluate its accuracy	CO4
11	Build a recommendation system on a dataset and evaluate its accuracy	CO4
12	Build a time-series model on a dataset and evaluate its accuracy	CO3
13	Create cartographic visualizations for datasets involving global countries, Indian states, and districts	CO5
14	Perform text mining on a set of documents and visualize key terms using a word cloud	CO5

**Galgotias College of Engineering & Technology,  
Department of Data Science  
DATA STRUCTURE (BCS-351)**

**Minimum System Requirements**

- CPU Intel Core i5 @3.20 GHz,
- 8 GB RAM,
- 250 GB SSD,
- 16” Inch Display,
- Windows 10 Professional

**Galgotias College of Engineering & Technology,**  
**Department of Data Science**  
**DATA STRUCTURE (BCS-351)**  
**List of Experiments Data Structure**

S.No.	List of Experiments	Prescribed by AKTU / Value- added	CO	Software /IDE Used
1	<b>Sorting Algorithms:</b> A. To implement bubble sort. B. To implement insertion sort. C. To implement selection sort. D. To implement quick sort.	AKTU	C02	Visual Studio Code
2	<b>Searching Algorithms:</b> A. To implement linear search. B. To implement binary search.	AKTU	C02	Visual Studio Code
3.	<b>Stack Operations</b> A. To implement stack using array. B. To implement stack using linked list. C. To implement the conversion of infix notation to postfix notation.	AKTU	C01	Visual Studio Code
4	<b>Queue Implementations</b> A. To implement queue using linked list. B. To implement circular queue using linked list. C. To implement priority queue using array.	AKTU	C01	Visual Studio Code
5	<b>Linked List Structures</b> A. To implement singly linked list. B. To implement circular linked list. C. To implement doubly linked list. D. To implement polynomial addition	AKTU	C01	Visual Studio Code
6	<b>Trees and Heaps</b> A. To implement binary search tree using linked list. B. To implement recursive traversal: Preorder, Postorder, and Inorder. C. To implement heap sort.	AKTU	C03	Visual Studio Code
7	<b>Graph Algorithms</b> A. To implement a graph using the adjacent matrix. B. To implement BFS using linked list. C. To implement any minimum spanning tree algorithm.	AKTU	C03	Visual Studio Code
8	<b>Sorting &amp; Tree Algorithms:</b> A. To implement Counting Sort. B. To implement B+ tree	Value Added	C01, C03	Visual Studio Code

