A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
I B.Sc. – I Semester

Course: PROBLEM SOLVING IN C

Course Code: **No. of Hours/Week: 4**
Paper : I

Course Objective:
To explore the Fundamentals of computers and reinforce computer vocabulary, particularly with respect to personal use of computer hardware and software. To impart basic knowledge of C Programming language so that Students will be able to develop logics and applications to solve real time problems using C.

Course Outcomes:
At the end of the course the student will be able to

1. Understand the fundamentals of C programming.
2. Make use of loops, decision making statements and functions to solve the problem.
3. Implement different Operations on Arrays.
4. Understand Pointers, Structures and Unions.
5. Implement File Operations for a given application using C file handling functions.

UNIT I

General Fundamentals: Introduction to computers: Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, computer generations.
Introduction to Algorithms and Programming Languages: Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language- Design and Implementation of Correct, Efficient and Maintainable Programs.

UNIT II

Introduction to C: Introduction – Structure of C Program – Writing the first C Program –File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.
Decision Control and Looping Statements: Introduction to Decision Control Statements– Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

UNIT III

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array– Operations on Arrays – one dimensional, two dimensional and multi dimensional arrays, character handling and strings.

UNIT IV

Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.
Structure, Union, and Enumerated Data Types: Introduction – Nested Structures – Arrays of Structures – Structures and Functions– Union – Differences between Structures and Unions – Enumerated Data Types.

UNIT V

Pointers: Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers
Files: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

Additional Inputs:
C Pre-processor, Conditional Compilation, Header Files, Sparse Matrices

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. E Balagurusamy – Programming in ANSIC – Tata McGraw-Hill publications.
2. Brain W Kernighan and Dennis M Ritchie - The 'C' Programming language" - Pearson publications.
3. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publications.
4. YashavantKanetkar - Let Us 'C' – BPB Publications.

Reference Books:

1. Introduction to C programming by REEMA THAREJA, OXFORD UNIVERSITY PRESS.
2. Schaum's Outline of Programming with C, by Byron Gottfried, 2nd Edition, (Indian Adapted Edition), TMH publications, New Delhi, 2006.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
I B.Sc. – I Semester

Course: PROBLEM SOLVING IN C

Course Code: **No. of Hours/Week: 2**

Course Objective:
To develop programming skills using the fundamentals of C Language and to enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.

Course Outcomes:
At the end of the course the student will be able to

1. Implement programs using fundamental features of C Language.
2. Solve problems with the use of loops, decision making statements and functions.
3. Implement programs performing various Operations on Arrays.

List of Experiments

1. Write a program to check whether the given number is Armstrong or not.

2. Write a program to find the sum of individual digits of a positive integer.

3. Write a program to generate the first n terms of the Fibonacci sequence.

4. Write a program to find both the largest and smallest number in a list of integer values

5. Write a program to demonstrate refection of parameters in swapping of two integer values using **Call by Value&Call by Address**

6. Write a program that uses functions to add two matrices.

7. Write a program to calculate factorial of given integer value using recursive functions

8. Write a program for multiplication of twoN X N matrices.

9. Write a program to perform various string operations.

10. Write a program to search an element in a given list of values.

11. Write a program to sort a given list of integers in ascending order.

12. Write a program to calculate the salaries of all employees using ***Employee (ID, Name, Designation, Basic Pay, DA, HRA, Gross Salary, Deduction, Net Salary)*** structure.
    a. DA is 30 % of Basic Pay

    b. HRA is 15% of Basic Pay

    c. Deduction is 10% of (Basic Pay + DA)

    d. Gross Salary = Basic Pay + DA+ HRA

    e. Net Salary = Gross Salary - Deduction

13. Write a program to illustrate pointer arithmetic.

14. Write a program to read the data character by character from a file.

15. Write a program to create ***Book (ISBN,Title, Author, Price, Pages, Publisher)*** structureand store book details in a file and perform the following operations

a. Add book details

b. Search a book details for a given ISBN and display book details, if available

c. Update a book details using ISBN

d. Delete book details for a given ISBN and display list of remaining Books .

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
LIFE SKILLS COURSE
Course: BASIC COMPUTER APPLICATIONS

SEMESTER-I

Course Code: **No. of Hours/Week: 2**
Paper :

Objectives: This course aims at providing exposure to students in skill development towards basic office applications.

Course Learning Outcomes:
After successful completion of the course, student will be able to:

1. Demonstrate basic understanding of computer hardware and software.
2. Apply skills and concepts for basic use of a computer.
3. Identify appropriate tool of MS office to prepare basic documents, charts, spreadsheets and presentations.
4. Create personal, academic and business documents using MS office.
5. Create spreadsheets, charts and presentations.
6. Analyze data using charts and spread sheets

UNIT-I
Basics of Computers: Definition of a Computer - Characteristics of computers, Applications of Computers Block Diagram of a Digital Computer – I/O Devices, hardware, software human ware, application software, system software, Memories - Primary, Auxiliary and Cache Memory.
MS Windows – Desktop, Recycle bin, My Computer, Documents, Pictures, Music, Videos, Task Bar, Control Panel.

Unit-II
MS-Word : Features of MS-Word - MS-Word Window Components - Creating, Editing, Formatting and Printing of Documents – Headers and Footers – Insert/Draw Tables, Table Auto format – Page Borders and Shading – Inserting Symbols, Shapes, Word Art, Page Numbers, Mail Merge.

Unit-III:
MS-Excel : Overview of Excel features – Creating a new worksheet, Selecting cells, Entering and editing Text, Numbers, Inserting Rows/Columns –Changing column widths and row heights, Formulae, Referencing cells , Changing font sizes and colors, Insertion of Charts, Auto fill, Sort.
MS-PowerPoint: Features of PowerPoint – Creating a Presentation - Inserting and Deleting Slides in a Presentation – Adding Clip Art/Pictures -Inserting Other Objects, Audio, Video - Resizing and scaling of an Object – Slide Transition – Custom Animation

TEXT BOOKS:

1. Working in Microsoft Office – Ron Mansfield - TMH.
2. MS Office 2007 in a Nutshell –Sanjay Saxena – Vikas Publishing House.
3. Excel 2020 in easy steps-Michael Price – TMH publications

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
I B.Sc. – II Semester

Course: DATA STRUCTURES USING C

Course Code: **No. of Hours/Week: 4**
Paper : II

Course Objective:
To introduce the basic concepts of Data Structures and inculcate Knowledge on various types of Data Structures. Also to provide exposure on various Searching and Sorting Techniques.

Course Outcomes:
At the end of the course the student will be able to

1. Understand fundamental concepts of Data structures and to design Linked lists.
2. Implement linear data structures stacks, queues.
3. Design non-linear data structures like trees, graphs and implement their operations.
4. Compare and Contrast different searching and sorting techniques.
5. Have knowledge on Data Structures basic operations like insert, delete, search, update and traversal
6. Design and develop programs using various data structures

UNIT I

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages
Principles of Programming and Analysis of Algorithms: Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big 'O' Notation, Algorithm Analysis.

UNIT II

Arrays: Introduction to Linear and Non- Linear Data Structures, One- Dimensional Arrays, Array Operations, Two- Dimensional arrays, Multidimensional Arrays.
Linked Lists: Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays

UNIT III

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks, Stacks and Recursion
Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues

UNIT IV

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of Binary Trees, Applications of Binary Tree

UNIT V

Searching and sorting: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort Searching – An Introduction, Linear or Sequential Search, Binary Search.
Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

Additional Inputs:

Polynomial Representation using Linked List, Drawback of Binary Search Trees, Right Skewed and Left Skewed Binary Search Trees, Balanced Trees: AVL Trees.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. "Data Structures using C", ISRD group Second Edition, TMH
2. "Data Structures through C", YashavantKanetkar, BPB Publications
3. "Data Structures Using C" Balagurusamy E. TMH

Reference Books:

1. Data Structures Using C++ by D S Malik, Thomson, India Edition 2006.
2. Data Structures, Algorithms and Applications in C++ by Sahni S, McGraw-Hill, 2002.
3. Classic Data Structures by Samanta.D,Prentice-Hall of India, 2001.
4. Data Structures and Algorithms with Object-Oriented Programming by Heilman G I,Tata McGraw-l lill. 2002. (Chapters I and 14).
5. Introduction to Data Structures with Applications by Tremblay P. and Sorenson P. G.,Tata McGraw-Hill,

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
I B.Sc. – II Semester

Course: DATA STRUCTURES USING C LAB

Course Code: **No. of Hours/Week: 2**

Course Objective:
To enable the students implement various linear and Non-Linear Data Structures.

Course Outcomes:
At the end of the course the student will be able to

1. Implement various operations on arrays
2. Implement Linked list and Perform operations on it.
3. Make use of arrays and linked lists to implement Stack and Queues.
4. Implement various traversals on Trees and Graphs.
5. Implement various shortest path algorithms.
6. Implement various searching and sorting techniques.

List of Experiments

1. Write a program to read 'N' numbers of elements into an array and also perform the following operation on an array

   a. Add an element at the begging of an array

   b. Insert an element at given index of array

   c. Update a element using a values and index

   d. Delete an existing element

2. Write a program using stacks to convert a given

   a. postfix expression to prefix

   b. prefix expression to postfix

   c. infix expression to postfix

3. Write Programs to implement the Stack operations using an array

4. Write Programs to implement the Stack operations using Liked List.

5. Write Programs to implement the Queue operations using an array.

6. Write Programs to implement the Queue operations using Liked List.

7. Write a program for arithmetic expression evaluation.

8. Write a program for Binary Search Tree Traversals.

9. Write a program to implement dequeue using a doubly linked list.

10. Write a program to search an item in a given list using the following Searching Algorithms

    a. Linear Search b. Binary Search.

11. Write a program for implementation of the following Sorting Algorithms
    a. Bubble Sort
    b. Insertion Sort
    c. Quick Sort
12. Write a program for polynomial addition using single linked list
13. Write a program to find out shortest path between given Source Node and Destination Node in a given graph using Dijkstrar’s algorithm.
14. Write a program to implement Depth First Search graph traversals algorithm
15. Write a program to implement Breadth First Search graph traversals algorithm

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE

Life Skill Course

Common for B.Sc./B.Com/B.A-SEMESTER II

INFORMATION & COMMUNICATION TECHNOLOGY

Course Code: **No. of Hours/Week: 2**

Objectives:

This course aims at acquainting the students with basic ICT tools which help them in their day to day and life as well as in office and research.

Course outcomes:

After completion of the course, student will be able to

1. Understand the literature of social networks and their properties.
2. Explain which network is suitable for whom.
3. Develop skills to use various social networking sites like twitter, flickr, etc.
4. Learn few GOI digital initiatives in higher education.
5. Apply skills to use online forums, docs, spreadsheets, etc for communication, collaboration and research.
6. Get acquainted with internet threats and security mechanisms.

SYLLABUS

UNIT-I: (08 hrs)

Fundamentals of Internet: What is Internet?, Internet applications,Internet Addressing – Entering a Web Site Address, URL–Components of URL, Searching the Internet, Browser–Types of Browsers,Introduction to Social Networking: Twitter, Tumblr, LinkedIn,Facebook, flickr, Skype, yahoo, YouTube, WhatsApp.

UNIT-II: (08 hrs)

E-mail:Definition of E-mail-Advantages and Disadvantages–User Ids, Passwords, Email addresses, Domain Names, Mailers, Message Components, Message Composition, Mail Management. G-Suite: Google drive, Google documents, Google spread sheets, Google Slides and Google forms.

UNIT-III: (10 hrs)

Overview of Internet security, E-mail threats and secure E-mail, Viruses and antivirus software, Firewalls, Cryptography, Digital signatures, Copyright issues. What are GOI digital initiatives in higher education? (SWAYAM, SwayamPrabha, National Academic Depository, National Digital Library of India, E-Sodh-Sindhu, Virtual labs, e-acharya, e-Yantra and NPTEL)

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – III Semester

Course: DATA BASE MANAGEMENT SYSTEM

Course Code : **No. of Hours/Week: 4**
Paper : III

Course Objective:
To present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes:
At the end of the course the student will be able to

1. Understand DBMS concepts, data models and Architecture.
2. Understand ER concepts and ER mapping to relational model
3. Improve the database design by normalization.
4. Make use of SQL to retrieve and maintain relational database.
5. Illustrate various constructs in PL/SQL.

UNIT - I
Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.

UNIT - II
Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, **IS A** relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modelling.

UNIT III
Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rd normal form.

UNIT IV
Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.

UNIT V
PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

Additional Inputs:

Transaction Management and Concurrency Control: What is transaction, Concurrency control, Concurrency control with locking Methods, Concurrency control with time stamping methods.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill, 2010.
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill, 2002.
3. Fundamentals of Relational Database Management Systems by S. Sumathi, S. Esakkirajan, Springer Publications.
4. SQL: The Ultimate Beginners Guide by Steve Tale.

Reference Books:

1. An Introduction to Database Systems by Bipin C Desai
2. Principles of Database Systems by J. D. Ullman
3. Fundamentals of Database System by R. Elmasri and S. Navathe
4. Database Systems Design, Implementation and Management by Peter Rob, Carlos CoronelSeventh Edition, Thomson , 2007.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – III Semester
Course: DATA BASE MANAGEMENT SYSTEMS LAB

Course Code : **No. of Hours/Week: 2**

Course Objective:

To provide a strong formal foundation in database concepts and emphasis is on practice to the students to groom them into well-informed database application developers.

Course Outcomes:

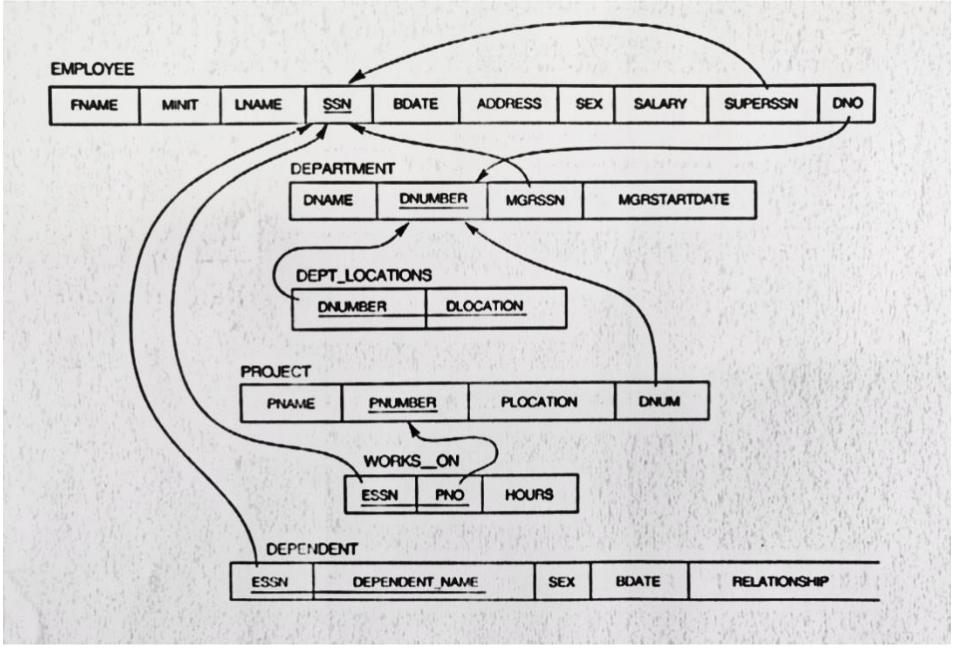
At the end of the course the student will be able to

1. Design database and ER diagrams for the real world scenarios
2. Understand ER concepts and ER mapping to relational model
3. Make use of SQL and PL/SQL to efficiently retrieve and maintain relational database.

List of Experiments

1. Draw ER diagram for hospital administration
2. Creation of college database and establish relationships between tables
3. Relational database schema of a company is given in the following figure.

Relational Database Schema – COMPANY



Questions to be performed on the previous schema

1. Create above tables with relevant ***Primary Key, Foreign Key and other constraints***
2. Populate the tables with data
3. Display all the details of all employees working in the company.
4. Display ***ssn, lname, fname, address*** of employees who work in department no 7.
5. Retrieve the ***Birthdate and Address*** of the employee whose name is 'Franklin T. Wong'
6. Retrieve the name and salary of every employee

7. Retrieve all distinct salary values
8. Retrieve all employee names whose address is in ‘Bellaire’
9. Retrieve all employees who were born during the 1950s
10. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
11. Retrieve the names of all employees who do not have supervisors
12. Retrieve SSN and department name for all employees
13. Retrieve the name and address of all employees who work for the 'Research' department
14. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
15. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
16. Retrieve all combinations of Employee Name and Department Name
17. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan’ either as a worker or as a manager of the department that controls the project.
18. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
19. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
20. Select the names of employees whose salary does not match with salary of any employee in department 10.
21. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
22. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
23. Find the sum of the salaries and number of employees of all employees of the ‘Marketing’ department, as well as the maximum salary, the minimum salary, and the average salary in this department.
24. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
25. Delete all dependents of employee whose ***ssn is ‘123456789’***.
26. Perform a query using alter command to drop/add field and a constraint in Employee table.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – IV Semester
Course: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Code: **No. of Hours/Week: 4**
Paper : IV

Course Objective:

To impart knowledge on fundamentals of Object Oriented Programming, classes, inheritance, interfaces and packages and to make the students understand the concept of exception handling and multithreading.

Course Outcomes:

At the end of the course the student will be able to

1. Understand and Apply Object Oriented features and understand the basics of Java.
2. Develop problem-solving and programming skills using OOP concepts.
3. Apply the concepts of inheritance and to create arrays, strings.
4. Able to demonstrate Exception Handling and Multithreading.
5. Develop efficient Java applets and applications using OOP concepts.

UNIT- I

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java
Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals
Operators in Java: Operators, Priority of Operators
Control Statements in Java: if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement
Input and Output: Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format()
Arrays: Types of Arrays, Three Dimensional Arrays (3D array), arrayname.length, Command Line Arguments

UNIT-II

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings
Introduction to OOPs: Problems in Procedure Oriented Approach, Features of Object-Oriented Programming System (OOPS)
Classes and Objects: Object Creation, Initializing the Instance Variables, Access Specifiers, Constructors
Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data
Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods
Inheritance: Inheritance, The keyword 'super', The Protected Specifier, Types of Inheritance

UNIT-III

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class
Type Casting: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class , **Abstract Classes:** Abstract Method and Abstract Class
Interfaces: Interface, Multiple Inheritance using Interfaces
Packages: Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document

Exception Handling: Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing an Exception

UNIT-IV

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File uingFileInputStream, Creating a File using FileWriter, Reading a File using FileReader, **Threads:** Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads,

Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle

UNIT-V

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements,

Additional Inputs:

Vectors, Wrapper classes, Hiding classes, static Import, Event Handling in Java, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class, Using jdbc–odbc Bridge Driver to Connect to Oracle Database, Retrieving Data from MySQL Database, Retrieving Data from MS Access Database, Stored Procedures and Callable Statements, Types of Result Sets

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Java - The Complete Reference by Herbert Schildt,9th Edition, Oreilly Publications.
2. Introduction to Java Programming, by Y Daniel Liang, Seventh Edition, Pearson, 2017.

Reference Books:

1. Programming with JAVA, A primer by E.Balaguruswamy, 3e, TATA McGraw-HillCompany.
2. Programming with Java by John R. Hubbard, Second Edition, Schaum’s outline Series, TATA McGraw-Hill.
3. Java TM: How to Program by Deitel&Deitel, PHI (2007).
4. Java Programming: From Problem Analysis to Program Design by D.S Mallik.
5. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao &Kogent Learning Solutions Inc.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – IV Semester
Course: OBJECT ORIENTED PROGRAMMING USING JAVA LAB

Course Code: **No. of Hours/Week: 2**

Course Objective:

To introduce various Object Oriented Concepts through which the students will be enabled to implement classes, inheritance, interface, package and multithreading concepts.

Course Outcomes:

At the end of the course the student will be able to

1. Apply OOP concepts to solve real time problems.
2. Make use of class, inheritance, interface and packages to develop solutions for complex problems.
3. Build java applications using Exception handling and Threads.

List of Experiments

1. Write a program to read ***Student Name, Reg.No, Marks[5]*** and calculate ***Total***, ***Percentage, Result***. Display all the details of students
2. Write a program to perform the following String Operations
   a. Read a string
   b. Find out whether there is a given substring or not
   c. Compare existing string by another string and display status
   d. Replace existing string character with another character
   e. Count number of works in a string
3. Java program to implements Addition and Multiplication of two N X N matrices.
4. Java program to demonstrate the use of Constructor.
5. Calculate area of the following shapes using method overloading.
   a. Triangle b.Rectangle c. Circle d. Square
6. Implement inheritance between ***Person (Aadhar, Surname, Name, DOB, and Age)*** and ***Student (Admission Number, College, Course, Year)***classes where ReadData(), DisplayData() are overriding methods.
7. Java program for implementing Interfaces
8. Java program on Multiple Inheritance.
9. Java program for to display ***Serial Number from 1 to N*** by creating two Threads
10. Java program to demonstrate the following exception handlings
    a. Divided by Zero
    b. Array Index Out of Bound
    c. File Not Found
    d. Arithmetic Exception
    e. User Defined Exception
11. Create an Applet to display different shapes such as Circle, Oval, Rectangle, Square and Triangle.
12. Write a program to create ***Book (ISBN,Title, Author, Price, Pages, Publisher)***structure and store book details in a file and perform the following operations
    a. Add book details
    b. Search a book details for a given ISBN and display book details, if available
    c. Update a book details using ISBN
    d. Delete book details for a given ISBN and display list of remaining Books

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – IV Semester

Course: OPERATING SYSTEMS

Course Code: **No. of Hours/Week: 4**
Paper : V

Course Objective:

To provide knowledge about the services and functions rendered by operating systems and inculcate knowledge on Process Scheduling and Memory Management.

Course Outcomes:

At the end of the course the student will be able to

1. Interpret the basic structure of OS and architectural components.
2. Compare and contrast various Process scheduling algorithms.
3. Analyze various mechanisms of Synchronization and the principles of deadlock.
4. Make use of paging and segmentation in Memory management.
5. Discuss the issues related to file system interface, implementation and disk management.

UNIT - I

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNIT - II

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT - III

Process Management: Deadlock, Deadlock Characterization, Necessary and Sufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery.

Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter-process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT - IV

Memory Management: Physical and Virtual Address Space; Memory Allocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, Virtual Memory.

UNIT - V

File and I/O Management, OS Security : Directory Structure, File Operations, File Allocation Methods, Disk Scheduling: SCAN and CSCAN, Pipes, Protection, Authentication and Internal Access Authorization, Security Policy Mechanism.

Introduction to Android Operating System, Android Development Framework, Android Application Architecture,

Additional Inputs:
Inter process Communication, Inter process Communication in Linux, Multithreading: Benefits, Multithreading Models, Device Management, Buffer, Shared Memory, Android Process Management and File System, Small Application Development using Android Development Framework.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Operating System Concepts - Abraham Silberschatz, Peter Baer Galvin and Greg Gagne,9thEdition, John Wiley and Sons Inc., 2012.
2. Operating Systems - Internals and Design Principles, William Stallings, 7th Edition,Prentice Hall, 2011.

Reference Books:

1. Modern Operating Systems, Andrew S. Tanenbaum, Second Edition, Addison Wesley, 2001.
2. Operating Systems: A Design-Oriented Approach, Charles Crowley, Tata McGraw Hill Education", 1996.
3. Operating Systems: A Concept-Based Approach, D M Dhamdhere, Second Edition, Tata McGraw-Hill Education, 2007.
4. Operating Systems by J. Archer Harris (Author), Jyoti Singh (Author) (TMH)
5. Online Resources for UNIT V

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
II B.Sc. – IV Semester
Course: OPERATING SYSTEMS LAB USING C/JAVA

Course Code: **No. of Hours/Week: 2**

Course Objective:

To impart knowledge on Operating System design Principles and demonstrate Process Scheduling and Page Replacement Algorithms.

Course Outcomes:

At the end of the course the student will be able to

1. Implement Process Scheduling and Page Replacement Algorithms.
2. Implement Various File Organization schemes
3. Implement Deadlock Avoidance and prevention algorithms

List of Experiments

1. Write a program to implement Round Robin CPU Scheduling algorithm
2. Simulate SJF CPU Scheduling algorithm
3. Write a program the FCFS CPU Scheduling algorithm
4. Write a program to Priority CPU Scheduling algorithm
5. Simulate Sequential file allocation strategies
6. Simulate Indexed file allocation strategies
7. Simulate Linked file allocation strategies
8. Simulate MVT and MFT memory management techniques
9. Simulate Single level directory File organization techniques
10. Simulate Two level File organization techniques
11. Simulate Hierarchical File organization techniques

13. Write a program for Bankers Algorithm for Dead Lock Avoidance
14. Implement Bankers Algorithm Dead Lock Prevention.
15. Simulate all Page replacement algorithms.
    a. FIFO
    b. LRU
    c. LFU
16. Simulate Paging Techniques of memory management

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester
Course: WEB INTERFACE DESIGNING TECHNOLOGIES

Course Code: **No. of Hours/Week: 4**

Paper : VI-A

Course Objective:

To provide knowledge about Web architecture and services and inculcate the competency of building a Website.

Course Outcomes:

At the end of the course the student will be able to

1. Understand and appreciate the web architecture and services.
2. Gain knowledge about various components of a website.
3. Demonstrate skills regarding creation of a static website and an interface to dynamic website.
4. Learn how to install word press and gain the knowledge of installing various plugins to use in their websites.

Unit - I

HTML: Introduction to web designing, difference between web applications and desktop applications, introduction to HTML, HTML structure, elements, attributes, headings, paragraphs, styles, colours, HTML formatting, Quotations, Comments, images, tables, lists, blocks and classes, HTML CSS, HTML frames, file paths, layout, symbols, HTML responsive.

Unit – II

HTML forms: HTML form elements, input types, input attributes, HTML5, HTML graphics, HTML media – video, audio, plug INS, you tube.

HTML API'S: Geo location, Drag/drop, local storage, HTML SSE.

CSS: CSS home, introduction, syntax, colours, back ground, borders, margins, padding, height/width, text, fonts, icons, tables, lists, position, over flow, float, CSS combinators, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters, CSS responsive.

Unit – III

Client side Validation: Introduction to JavaScript - What is DHTML, JavaScript, basics, variables, string manipulations, mathematical functions, statements, operators, arrays, functions. Objects in JavaScript - Data and objects in JavaScript, regular expressions, exception handling. DHTML with JavaScript - Data validation, opening a new window, messages and confirmations, the status bar, different frames, rollover buttons, moving images.

Unit – IV

Word press: Introduction to word press, servers like wamp, bitnami etc, installing and configuring word press, understanding admin panel, working with posts and pages, using editor, text formatting with shortcuts, working with media-Adding, editing, deleting media elements, working with widgets, menus.

Unit – V

Working with themes-parent and child themes, using featured images, configuring settings, user and user roles and profiles, adding external links, extending word press with plug-ins. Customizing the site

Additional Inputs: Changing the appearance of site using css, protecting word press website from hackers. **Note: Concepts from Additional inputs must be excluded from Examinations**

Text Books:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley (2007)
2. Paul S.WangSanda S. Katila, an Introduction to Web Design plus Programming, Thomson (2007).

Reference Books:

1. Head First HTML and CSS, Elisabeth Robson, Eric Freeman, O'Reilly Media Inc.
2. An Introduction to HTML and JavaScript: for Scientists and Engineers, David R. Brooks. Springer, 2007
3. Schaum's Easy Outline HTML, David Mercer, Mcgraw Hill Professional.
4. Word press for Beginners, Dr.Andy Williams.
5. Professional word press, Brad Williams, David damstra, Hanstern.
6. Web resources:
   a. http://www.codecademy.com/tracks/web
   b. http://www.w3schools.com
   c. https://www.w3schools.in/wordpress-tutorial/
   d. http://www.homeandlearn.co.uk

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester
Course: WEB INTERFACE DESIGNING TECHNOLOGIES LAB

Course Code: **No. of Hours/Week: 2**

Course Objective:

To inculcate knowledge on web architecture, web services, client side and server side scripting technologies and to provide skills to design interactive and dynamic web sites.

Course Outcomes:

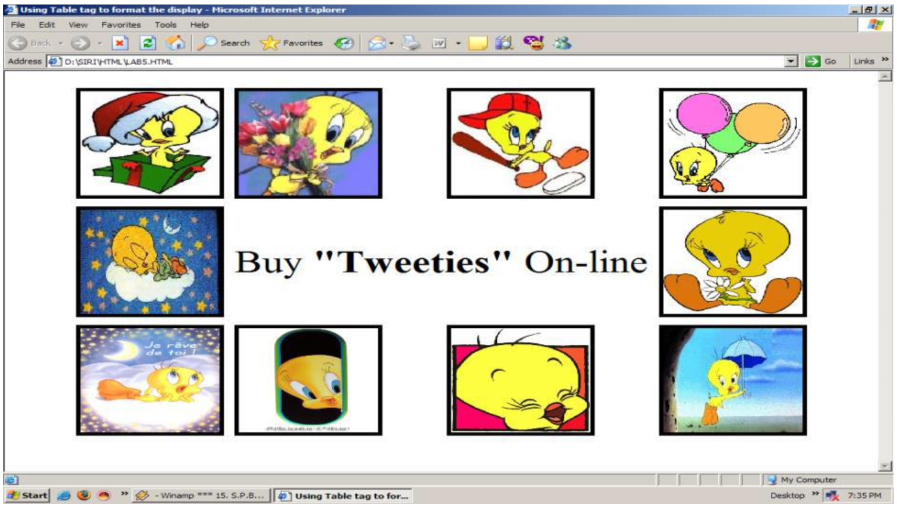
At the end of the course the student will be able to

1. Create a basic website with the help of HTML and CSS.
2. Acquire the skill of installing word press and various plugins of Word press.
3. Create a static website with the help of Word press.
4. Create an interface for a dynamic website.
5. Apply various themes for their websites using Word press.

List of Experiments

HTML and CSS:

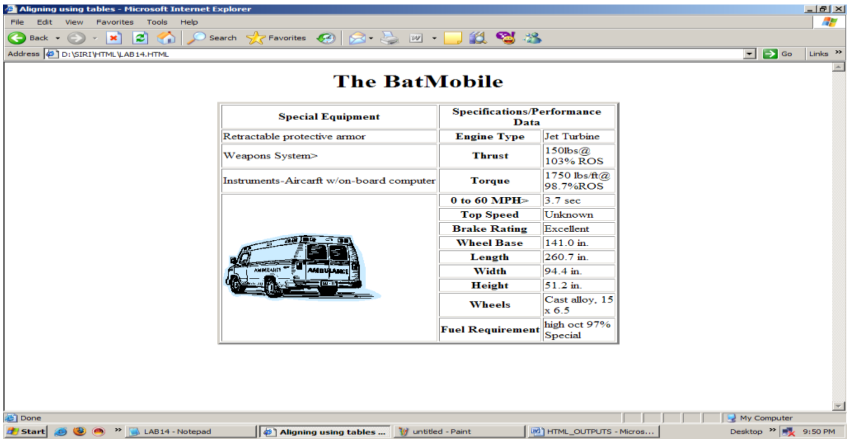
1. Create an HTML document with the following formatting options:
(a)Bold, (b) Italics, (c) Underline, (d) Headings (Using H1 to H6 heading styles), (e) Font (Type, Size and Color), (f) Background (Colored background/Image in background), (g) Paragraph, (h) Line Break, (i) Horizontal Rule, (j) Pre tag
2. Create an HTML document which consists of:
(a) Ordered List (b) Unordered List (c) Nested List (d) Image
3. Create a Table with four rows and five columns. Place an image in one column.
4. **Using "table" tag, align the images as follows:**


Using Table tag to format the display - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address D:\SIRI\HTML\LAB5.HTML
Go Links
My Computer
Start
Using Table tag to for...
Desktop
7:35 PM

Buy "Tweeties" On-line

5. Create a menu form using html.
6. Style the menu buttons using css.
7. Create a form using HTML which has the following types of controls:
(a) Text Box (b) Option/radio buttons (c) Check boxes (d) Reset and Submit buttons
8. Embed a calendar object in your web page.
9. Create an applet that accepts two numbers and perform all the arithmetic operations on them.
10. Create nested table to store your curriculum.
11. Create a form that accepts the information from the subscriber of a mailing system.

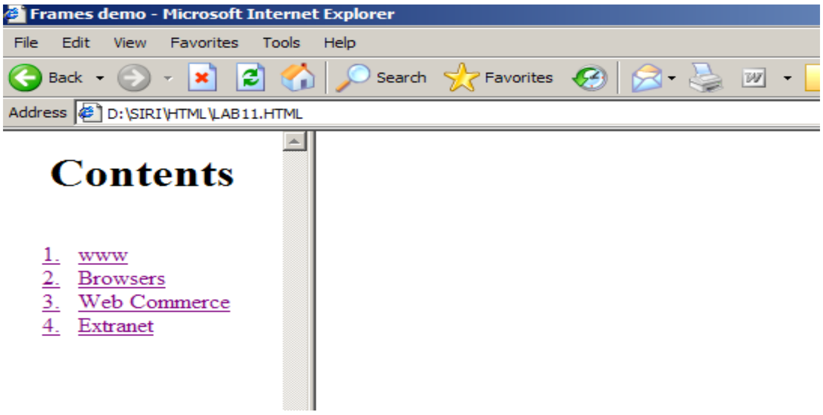
12. Design the page as follows:


Aligning using tables - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address D:\SIRI\HTML\LAB14.HTML
Go Links
Done
My Computer
Start
LAB14 - Notepad
Aligning using tables ...
untitled - Paint
HTML_OUTPUTS - Micros...
Desktop
9:50 PM

The BatMobile

Special Equipment	Specifications/Performance Data	
Retractable protective armor	**Engine Type**	Jet Turbine
Weapons System>	**Thrust**	150lbs@ 103% ROS
Instruments-Aircarft w/on-board computer	**Torque**	1750 lbs/ft@ 98.7%ROS
	0 to 60 MPH>	3.7 sec
	Top Speed	Unknown
	Brake Rating	Excellent
	Wheel Base	141.0 in.
	Length	260.7 in.
	Width	94.4 in.
	Height	51.2 in.
	Wheels	Cast alloy, 15 x 6.5
	Fuel Requirement	high oct 97% Special

13. Create a help file as follows:


Frames demo - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address D:\SIRI\HTML\LAB11.HTML

Contents

1. www
2. Browsers
3. Web Commerce
4. Extranet

14. Create a webpage containing your bio data (assume the form and fields).
15. Write a html program including style sheets.
16. Write a html program to layers of information in web page.
17. Create a static webpage.

Word press:

18. Installation and configuration of word press.
19. Create a site and add a theme to it.
20 Create a child theme
21. Create five pages on COVID – 19 and link them to the home page. .
22. Create a simple post with featured image.
23. Add an external video link with size 640 X 360.
24. Create a user and assign a role to him.
25. Create a login page to word press using custom links
26. Create a website for your college.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester

Course: WEB APPLICATIONS DEVELOPMENT USING PHP & MYSQL

Course Code: **No. of Hours/Week: 4**

Paper : VII-A

Course Objective:

To provide knowledge about development of Web Applications

Course Outcomes:

At the end of the course the student will be able to

1. Write simple programs in PHP.
2. Understand how to use regular expressions, handle exceptions, and validate data using PHP.
3. Apply In-Built functions and Create User defined functions in PHP programming.
4. Write PHP scripts to handle HTML forms.
5. Write programs to create dynamic and interactive web based applications using PHP and MYSQL.
6. Know how to use PHP with a MySQL database and can write database driven web pages

Unit-I:

The Building blocks of PHP: Variables, Data Types, Operators and Expressions, Constants. Flow Control Functions in PHP: Switching Flow, Loops, Code Blocks and Browser Output. Working with Functions: What is function?, Calling functions, Defining Functions, Returning the values from User-Defined Functions, Variable Scope, Saving state between Function calls with the static statement, more about arguments.

Unit-II:

Working with Arrays: What are Arrays? Creating Arrays, Some Array-Related Functions. Working with Objects: Creating Objects, Object Instance Working with Strings, Dates and Time: Formatting strings with PHP, Investigating Strings with PHP, Manipulating Strings with PHP, Using Date and Time Functions in PHP.

Unit-III:

Working with Forms: Creating Forms, Accessing Form Input with User defined Arrays, Combining HTML and PHP code on a single Page, Using Hidden Fields to save state, Redirecting the user, Sending Mail on Form Submission, and Working with File Uploads. Working with Cookies and User Sessions: Introducing Cookies, Setting a Cookie with PHP, Session Function Overview, Starting a Session, Working with session variables, passing session IDs in the Query String, Destroying Sessions and Unsetting Variables, Using Sessions in an Environment with Registered Users.

Unit-IV:

Working with Files and Directories: Including Files with include(), Validating Files, Creating and Deleting Files, Opening a File for Writing, Reading or Appending, Reading from Files, Writing or Appending to a File, Working with Directories, Open Pipes to and from Process Using popen(), Running Commands with exec(), Running Commands with system() or passthru().

Unit-V:

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, Connecting to MySQL with PHP, Working with MySQL Data. Creating an Online Address Book: Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism, Adding Sub-entities to a Record.

Additional Inputs: Working with Images: Understanding the Image-Creation Process, Necessary Modifications to PHP, Drawing a New Image, Getting Fancy with Pie Charts, Modifying Existing Images, Image Creation from User Input.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Julie C. Meloni, SAMS Teach yourself PHP MySQL and Apache, Pearson Education (2007).
2. Steven Holzner , PHP: The Complete Reference, McGraw-Hill

Reference Books:

1. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O'reilly, 2014
2. Xue Bai Michael Ekedahl, The web warrior guide to Web Programming, Thomson (2006).
3. Web resources:
    a. http://www.codecademy.com/tracks/php
    b. http://www.w3schools.com/PHP
    c. http://www.tutorialpoint.com

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester
Course: WEB APPLICATIONS DEVELOPMENT USING PHP & MYSQL LAB

Course Code: **No. of Hours/Week: 2**

Course Objective:

To inculcate knowledge on web applications using PHP and MYSQL Lab.

Course Outcomes:

At the end of the course the student will be able to

1. Write, debug and implement the Programs by applying concepts and error handling techniques of PHP.
2. Create an interactive and dynamic website.
3. Create a website with reports generated from a database.
4. Write programs to create an interactive website for e-commerce sites like online shopping, etc.

List of Experiments

1. Write a PHP program to Display "Hello"
2. Write a PHP Program to display the today's date.
3. Write a PHP program to display Fibonacci series.
4. Write a PHP Program to read the employee details.
5. Write a PHP program to prepare the student marks list.
6. Write a PHP program to generate the multiplication of two matrices.
7. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
8. Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
9. Write PHP script to demonstrate passing variables with cookies.
10. Write a program to keep track of how many times a visitor has loaded the page.
11. Write a PHP application to add new Rows in a Table.
12. Write a PHP application to modify the Rows in a Table.
13. Write a PHP application to delete the Rows from a Table.
14. Write a PHP application to fetch the Rows in a Table.
15. Develop an PHP application to implement the following Operations
    - i. Registration of Users.
    - ii. Insert the details of the Users.
    - iii. Modify the Details.
    - iv. Transaction Maintenance.
        - a) No of times Logged in
        - b) Time Spent on each login.
        - c) Restrict the user for three trials only.
        - d) Delete the user if he spent more than 100 Hrs of transaction.
16. Write a PHP script to connect MySQL server from your website.
17. Write a program to read customer information like cust-no, cust-name, item-purchased, and mob-no, from customer table and display all these information in table format on output screen.
18. Write a program to edit name of customer to "Kiran" with cust-no =1, and to delete record with cust-no=3.
19. Write a program to read employee information like emp-no, emp-name, designation and salary from EMP table and display all this information using table format in your website.
20. Create a dynamic web site using PHP and MySQL.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester
Course: INTERNET OF THINGS

Course Code: **No. of Hours/Week: 4**
Paper : VI-B

Course Objective:

To provide knowledge on IoT, its concepts and architecture

Course Outcomes:

At the end of the course the student will be able to

1. Appreciate the technology for IoT
2. Understand various concepts, terminologies and architecture of IoT systems.
3. Understand various applications of IoT
4. Learn how to use various sensors and actuators for design of IoT.
5. Learn how to connect various things to Internet.
6. Learn the skills to develop simple IOT Devices.

Unit - I

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.
Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

Unit - II

Sensors Networks : Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

Unit - III

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet And Modbus.
IP Based Protocols for IoT IPv6, 6LowPAN, LoRA, RPL, REST

Unit - IV

Arduino Simulation Environment: Arduino Uno Architecture, Setting up the IDE, Writing Arduino Software, Arduino Libraries, Basics of Embedded C programming for Arduino, Interfacing LED, push button and buzzer with Arduino, Interfacing Arduino with LCD.
Sensor & Actuators with Arduino: Overview of Sensors working, Analog and Digital Sensors, Interfacing of Temperature, Humidity, Motion, Light and Gas Sensors with Arduino, Interfacing of Actuators with Arduino, Interfacing of Relay Switch and Servo Motor with Arduino.

Unit - V

Developing IOT's: Implementation of IoT with Arduino, Connecting and using various IoT Cloud Based Platforms such as Blynk, Thingspeak, AWS IoT, Google Cloud IoT Core etc. Privacy and Security Issues in IoT.

Additional Inputs: AMPQ, CoAP, MQTT. Edge connectivity and protocols, Cloud Computing, Fog Computing.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-onApproach)", 1st Edition, VPT, 2014

Reference Books:

1. Daniel Minoli, ― "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
2. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press
3. Open source software / learning websites
   a. https://github.com/connectIOT/iottoolkit
   b. https://www.arduino.cc/
   c. https://onlinecourses.nptel.ac.in/noc17_cs22/course
   d. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html
   e. Contiki (Open source IoT operating system)
   f. Ardudroid (open source IoT project)
   g. https://blynk.io (Mobile app)
   h. IoT Toolkit (smart object API gateway service reference implementation)

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester
Course: INTERNET OF THINGS LAB

Course Code: **No. of Hours/Week: 2**

Course Objective:

To inculcate knowledge on using Arduino and IoT devices.

Course Outcomes:

At the end of the course the student will be able to

1. Acquire the skills to design a small IoT device.
2. Connect various sensors, actuators, etc to Arduino board.
3. Connect the things to Internet
4. Design a small mobile app to control the sensors.
5. Deploy a simple IoT device.

List of Experiments

1. Understanding Arduino UNO Board and Components
2. Installing and work with Arduino IDE
3. Blinking LED sketch with Arduino
4. Simulation of 4-Way Traffic Light with Arduino
5. Using Pulse Width Modulation
6. LED Fade Sketch and Button Sketch
7. Analog Input Sketch (Bar Graph with LEDs and Potentiometre)
8. Digital Read Serial Sketch (Working with DHT/IR/Gas or Any other Sensor)
9. Working with Adafruit Libraries in Arduino
10. Spinning a DC Motor and Motor Speed Control Sketch
11. Working with Shields
12. Design APP using Blink App or Things peak API and connect it LED bulb.
13. Design APP Using Blynk App and Connect to Temperature, magnetic Sensors.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. (M.P.Cs) – V Semester

Course: APPLICATION DEVELOPMENT USING PYTHON

Course Code: **No. of Hours/Week: 4**
Paper : VII-B

Course Objective: To develop applications using Python

Course Outcomes:
Students after successful completion of the course will be able to:

1. Understand and appreciate the web architecture and services.
2. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
3. Demonstrate proficiency in handling Strings and File Systems.
4. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
5. Interpret the concepts of Object-Oriented Programming as used in Python.
6. Apply concepts of Python programming in various fields related to IOT, Web Services and Databases in Python

UNIT-I

Python basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types **Numbers** - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules
Sequences - Strings, Lists, and Tuples, Mapping and Set Types

UNIT-II

Files: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related **Modules Exceptions**: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related Modules
Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

UNIT-III

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded **Programming:** Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

UNIT-IV

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

UNIT-V

Database Programming: Introduction, Python Database Application Programmer's Interface (DBAPI), Object Relational Managers (ORMs), Related Modules

Additional Inputs: Web Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application, Advanced CGI, Web (HTTP) Servers

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Think Python, Allen Downey, Green Tea Press.

Reference Books:

1. Introduction to Python, Kenneth A. Lambert, Cengage.
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
3. Learning Python, Mark Lutz, O' Really.
4. Web sources suggested by the teacher concerned and the college librarian including reading material.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. (M.P.Cs) – V Semester
Course: APPLICATION DEVELOPMENT USING PYTHON LAB

Course Code: **No. of Hours/Week: 2**
Paper : VII-B

Course Objective:

To develop various applications using Python

Course Outcomes:

On successful completion of this practical course, student shall be able to:

1. Implement simple programs in Python
2. Implement programs related to various data structures like lists, dictionaries, etc.
3. Implement programs related to files. 16
4. Implement applications related to databases, Web services and IOT.

List of Experiments

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Write a python program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :
   Grade A: Percentage >=80
   Grade B: Percentage>=70 and <80
   Grade C: Percentage>=60 and <70
   Grade D: Percentage>=40 and <60
   Grade E: Percentage<40
3. Write a python program to display the first n terms of Fibonacci series.
4. Write a python program to calculate the sum and product of two compatible matrices.
5. Write a function that takes a character and returns True if it is a vowel and False otherwise.
6. Write a menu-driven program to create mathematical 3D objects I. curve II. sphere III. cone IV. arrow V. ring VI. Cylinder.
7. Write a python program to read n integers and display them as a histogram.
8. Write a python program to display sine, cosine, polynomial and exponential curves.
9. Write a python program to plot a graph of people with pulse rate p vs. height h. The values of P and H are to be entered by the user.
10. Write a python program to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/ (t+2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.
11. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows: P (t) = (15000(1+t))/ (15+ e)
12. Where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
13. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
    I. velocity wrt time (v=u+at)
    II. distance wrt time (s=u*t+0.5*a*t*t) 17
    III. distance wrt velocity (s=(v*v-u*u)/2*a)
14. Write a program that takes two lists and returns True if they have at least one common member.
15. Write a Python program to print a specified list after removing the 0th, 2nd, 4th and 5th elements.
16. Write a program to implement exception handling.

17. Try to configure the widget with various options like: bg=”green”, family=”times”, size=20.
18. Write a Python program to read last 5 lines of a file.
19. Design a simple database application that stores the records and retrieve the same
20. Design a database application to search the specified record from the database.
21. Design a database application to that allows the user to add, delete and modify the records.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc.(M.P.Cs) – V Semester
Course: DATA SCIENCE

Course Code: **No. of Hours/Week: 4**
Paper : VI-C

Course Objective:

To develop knowledge on various concepts in Data Science

Course Outcomes:

Students after successful completion of the course will be able to:

1. Develop relevant programming abilities.
2. Demonstrate proficiency with statistical analysis of data.
3. Develop the ability to build and assess data-based models.
4. Demonstrate skill in data management
5. Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

UNIT-I

Introduction: The Ascendance of Data, What is Data Science? , Finding key Connectors, Data Scientists You May Know, Salaries and Experience, Paid Accounts, Topics of Interest, Onward.
Python: Getting Python, The Zen of Python, Whitespace Formatting, Modules, Arithmetic, Functions, Strings, Exceptions, Lists, Tuples, Dictionaries, Sets, Control Flow, Truthiness, Sorting, List Comprehensions, Generators and Iterators, Randomness, Object – Orienting Programming, Functional Tools, enumerate, zip and Argument Unpacking, args and kwargs, Welcome to Data Sciencester!
Visualizing Data: matplotlib, Bar charts, Line charts, Scatterplots.
Linear Algebra: Vectors, Matrices

UNIT-II

Statistics: Describing a Single Set of Data, Correlation, Simpson's Paradox, some Other Correlation Caveats, Correlation and Causation.
Probability: Dependence and Independence, Conditional Probability, Bayes's Theorem, Random Variables, Continuous Distributions, The Normal Distribution, The Central Limit Theorem.
Hypothesis and Inference: Statistical Hypothesis Testing, Example: Flipping a Coin, Confidence Intervals, P-hacking, Example: Running an A/B Test, Bayesian Inference.
Gradient Descent: The Idea behind Gradient Descent, Estimating the Gradient, Using the Gradient, Choosing the Right Step Size, Putting It All Together, Stochastic Gradient Descent.

UNIT-III

Getting Data: stdin and stdout, Reading Files – The Basics of Text Files, Delimited Files, Scraping the Web - HTML and the parsing Thereof, Example: O'Reilly Books About Data, Using APIs – JSON (and XML), Using an Unauthenticated API, Finding APIs.
Working with Data: Exploring Your Data, Exploring One-Dimensional Data, Two Dimensions Many Dimensions, Cleaning and Munging, Manipulating Data, Rescaling, Dimensionality Reduction.
Machine Learning: Modeling, What Is Machine Learning? Over fitting and under fitting, Correctness, The Bias-Variance Trade-off, Feature Extraction and Selection

UNIT-IV

K-Nearest Neighbors: The Model, Example: Favorite Languages, The Curse of Dimensionality.
Naive Bayes: A Really Dumb Spam Filter, A More Sophisticated Spam Filter, Implementation, Testing Our Model.
Simple Linear Regression: The Model, Using Gradient Descent, Maximum Likelihood Estimation.

UNIT-V

Logistic Regression: The Problem, The Logistic Function, Applying the Model, Goodness of Fit Support Vector Machines.
Decision Trees: What Is a Decision Tree? Entropy, The Entropy of a Partition, Creating a Decision Tree, Putting It All Together, Random Forests.
Neural Networks: Perceptron, Feed-Forward Neural Networks And Back propagation, Example: Defeating a CAPTCHA.
Clustering: The Idea, The Model, Example: Meetups , Choosing k, Example: Clustering Colors, Bottom-up Hierarchical Clustering.

Additional Inputs: Multiple Regression: The Model, Further Assumptions of the Least Squares Model, Fitting the Model, Interpreting the Model, Goodness of Fit.

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Data Science from Scratch by Joel Grus O'Reilly Media
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

Reference Books:

1. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.
2. Web resources: a. https://www.edx.org/course/analyzing-data-with-python
   b.http://math.ecnu.edu.cn/~lfzhou/seminar/[Joel_Grus]_Data_Science_from_Scr atch_First_Princ.pdf
3. 9. Other web sources suggested by the teacher concerned and the college librarian including reading material.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc.(M.P.Cs) – V Semester
Course: DATA SCIENCE LAB

Course Code: **No. of Hours/Week: 2**

Paper : VII-B

Course Objective:

To implement solutions to various problems in Data Science using Python

Course Outcomes:

On successful completion of this practical course, student shall be able to:

1. Implement simple programs in Python
2. Implement programs related to various data structures like lists, dictionaries, etc.
3. Implement programs related to files. 16
4. Implement applications related to databases, Web services and IOT.

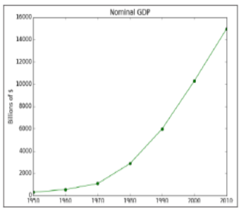
V. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

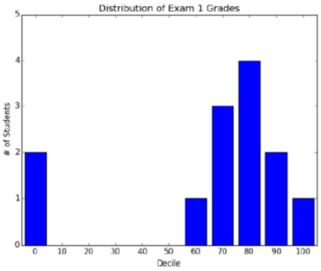
1. Apply data science solutions to real world problems.
2. Implement the programs to get the required data, process it and present the outputs using Python language.
3. Execute statistical analyses with Open source Python software.

List of Experiments

1. Write a Python program to create a line chart for values of year and GDP as given below



2. Write a Python program to create a bar chart to display number of students secured different grading as given below 21



3. Write a Python program to create a time series chart by taking one year month wise stock data in a CSV file
4. Write a Python program to plot distribution curve
5. Import a CSV file and perform various Statistical and Comparison operations on rows/columns. Write a python program to plot a graph of people with pulse rate p vs. height h. The values of P and H are to be entered by the user.
6. Import rainfall data of some location with the help of packages available in R Studio and plot a chart of your choice.

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)

DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester

Course: PYTHON FOR DATA SCIENCE

Course Code: **No. of Hours/Week: 4**
Paper : VII-C

Course Objective:

To inculcate knowledge on Data Science and solving problems in Data Science using Python

Course Outcomes:

At the end of the course the student will be able to

1. Identify the need for data science and solve basic problems using Python built-in data types and their methods.
2. Design an application with user-defined modules and packages using OOP concept
3. Employ efficient storage and data operations using NumPy arrays.
4. Apply powerful data manipulations using Pandas.
5. Do data pre-processing and visualization using Pandas

UNIT - I

Introduction to Data Science - Why Python? - Essential Python libraries - Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set - Type Conversion- Operators.

Decision Making- Looping- Loop Control statement- Math and Random number functions. User defined functions - function arguments & its types.

UNIT –II

User defined Modules and Packages in Python- Files: File manipulations, File and Directory related methods - Python Exception Handling.

OOPs Concepts -Class and Objects, Constructors – Data hiding- Data Abstraction- Inheritance.

UNIT –III

NumPy Basics: Arrays and Vectorized Computation- The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes.

Universal Functions: Fast Element-Wise Array Functions- Mathematical and Statistical Methods-Sorting-Unique and Other Set Logic.

UNIT –IV

Introduction to pandas Data Structures: Series, Data Frame and Essential Functionality: Dropping Entries-Indexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking.

UNIT –V

Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- String

Manipulation: Vectorized String Functions in pandas. Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

Additional Inputs: Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format

Note: Concepts from Additional inputs must be excluded from Examinations

Text Books:

1. Y. Daniel Liang, "Introduction to Programming using Python", Pearson, 2012.
2. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.

Reference Books:

1. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.
3. Wesley J. Chun, "Core Python Programming", Prentice Hall, 2006.
4. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009.
5. Web resources:
   a. https://www.edx.org/course/python-basics-for-data-science
   b. https://www.edx.org/course/analyzing-data-with-python
   c. https://www.coursera.org/learn/python-plotting?specialization=data-science-python
   d. https://www.programmer-books.com/introducing-data-science-pdf/
   e. https://www.cs.uky.edu/~keen/115/Haltermanpythonbook.pdf

A.S.D. GOVERNMENT DEGREE COLLEGE FOR WOMEN(A)
DEPARTMENT OF COMPUTER SCIENCE
III B.Sc. – V Semester

Course: PYTHON FOR DATA SCIENCE LAB

Course Code: **No. of Hours/Week: 2**

Course Objective:

To provide knowledge on implementing programs in Python.

Course Outcomes:

At the end of the course the student will be able to

1. Implement simple programs in Python.
2. Implement programs related to various structures like arrays, lists, Data frames, etc.
3. Implement programs related to files.
4. Implement applications related to data science

List of Experiments

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, Set
2. Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem.
3. Handle numerical operations using math and random number functions
4. Create user-defined functions with different types of function arguments.
5. Create packages and import modules from packages.
6. Perform File manipulations- open, close, read, write, append and copy from one file to another.
7. Write a program for Handle Exceptions using Python Built-in Exceptions
8. Write a program to implement OOP concepts like Data hiding and Data Abstraction.
9. Create NumPy arrays from Python Data Structures, Intrinsic NumPy objects and Random Functions.
10. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
11. Computation on NumPy arrays using Universal Functions and Mathematical methods.
12. Load an image file and do crop and flip operation using NumPy Indexing.
13. Create Pandas Series and Data Frame from various inputs.
14. Import any CSV file to Pandas Data Frame and perform the following:
    (a) Visualize the first and last 10 records
    (b) Get the shape, index and column details
    (c) Select/Delete the records (rows)/columns based on conditions.
    (d) Perform ranking and sorting operations.
    (e) Do required statistical operations on the given columns.
    (f) Find the count and uniqueness of the given categorical values.
    (g) Rename single/multiple columns
15. Import any CSV file to Pandas Data Frame and perform the following:
    (a) Handle missing data by detecting and dropping/ filling missing values.
    (b) Transform data using apply () and map() method.
    (c) Detect and filter outliers.
    (d) Perform Vectorized String operations on Pandas Series.
    (e) Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.