V Semester

Course 12: Web Interface Designing Technologies

Credits -3

Learning Objectives:

To enable students to understand web architecture, develop aesthetic websites, create static and dynamic web pages, implement user interactivity, and gain proficiency in installing and utilizing WordPress and plugins

Learning Outcomes: On successful completion of the course, students will be able to

1. Understand and appreciate the web architecture and services along with its basic building blocks
2. Gain knowledge about various components of a website related to aesthetics
3. Demonstrate skills regarding creation of a static website and addition of dynamic behaviorto a website
4. Get experience on making user-interactive web pages.
5. Learn how to install word press and gain the knowledge of installing various plugins to usein 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, images, tables, lists, blocks, symbols, embedding multi-media components in HTML, HTML forms

UNIT – II

CSS: CSS home, introduction, syntax, CSS combinators, colors, background, borders, margins, padding, height/width, text, fonts, tables, lists, position, overflow, float, pseudo class, pseudo elements, opacity, tool tips, image gallery, CSS forms, CSS counters.

UNIT – III

Java Script: What is DHTML, JavaScript, basics, variables, operators, statements, string manipulations, mathematical functions, arrays, functions. objects, regular expressions, exception handling.

UNIT-IV

Client-Side Scripting: Accessing HTML form elements using Java Script object model, basic data validations, data format validations, generating responsive messages, opening windows using java script, different kinds of dialog boxes, accessing status bar using java script, embedding basic animative features using different keyboard and mouse events.

UNIT – V

Word press: Introduction to word press, features, and advantages, installing and configuring word press and understanding its admin panel (demonstration only), working with posts, managing pages, working with media - Adding, editing, deleting media elements, working with widgets, using menus, working with themes, defining users, roles and profiles, adding external links, extending word press with plug-ins.

Text Book(s)

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.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Infographic explaining the necessity to have a web site for each of the agenciessuch as hotels, hospitals, supermarkets, and educational institutions.

Evaluation Method: Assess the accuracy, visual design, clarity, creativity, use of visual elements, presentation of the infographic explaining the necessity of a website for different agencies.

Unit 2: Activity: Seminar though PPT on various Look and Feel components that websites relatedto different agencies

Evaluation Method: Content knowledge, organization, clarity, presentation skills, visualaids, audience engagement

Unit 3: Activity: Code snippets Challenge.

Evaluation Method: Accuracy, functionality, efficiency, code readability, and problem-solving approach of the JavaScript code snippets

Unit 4: Activity: Group discussion on different kinds of web forms that take and validate userinput using java script validations

Evaluation Method: Active participation, knowledge sharing, critical thinking, and demonstration of different web forms and JavaScript validations

Unit 5: Activity: Creation of Personal website using wordpress

Evaluation Method: Design aesthetics, functionality, user interactivity, contentorganization, and utilization of plugins.

V Semester

Course 12: Web Interface Designing Technologies

Credits -1

List of Experiments:

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:

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 a form that accepts the information from the subscriber of a mailing system.

Word press:

10. Installation and configuration of word press

11. Access admin panel and manage posts

12. Access admin panel and manage pages

13. Add widgets and menus

14. Create users and assign roles
15. Create a site and add a theme to it

V Semester

Course 13: Web Applications Development using PHP & MYSQL

Credits -3

Learning Objectives:

To enable students to understand open-source tools to create dynamic web pages, implement user interactivity, and gain proficiency in developing web sites

Learning Outcomes: On successful completion of the course, students 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. 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:** Creating functions, Calling functions, Returning the values from User- Defined Functions, Variable Scope, Saving state between Function calls with the static statement,arguments of functions

UNIT-II

Working with Arrays: Creating Arrays, Some Array-Related Functions.

Working with Objects: Creating Objects, Accessing Object Instances, **Working with Strings**, **Dates and Time:** Formatting 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, Redirectingthe user, Sending Mail on Form Submission, and **Working with File Uploads**, Managing files onserver, **Exception handling.**

UNIT-IV

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-V

Interacting with MySQL using PHP: MySQL Versus MySQLi Functions, connecting to MySQL with PHP, Working with MySQL Data. Planning and Creating Database Tables, Creating Menu, Creating Record Addition Mechanism, Viewing Records, Creating the Record Deletion Mechanism.

Text Book(s)

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).

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Infographic explanation of client-server architecture and different server-side scripting languages.

Evaluation Method: Assess the accuracy, visual design, clarity, creativity, use of visual elements, presentation of the infographic explaining the benefits of server-side scripting languages.

Unit 2: Activity: Presentation on various open-source frameworks available in LAMP model

Evaluation Method: Content knowledge, organization, clarity, presentation skills, visual aids, audience engagement

Unit 3: Activity: Code snippets Challenge.

Evaluation Method: Accuracy, functionality, efficiency, code readability, and problem-solving approach of the PHP code snippets

Unit 4: Activity: Group discussion on Session Management in PHP

Evaluation Method: Active participation, knowledge sharing, critical thinking, and demonstration of Session Management

Unit 5: Activity: Hands-on Lab Session on MYSQL Queries

Evaluation Method: Lab Performance and Correctness of solution Implementation

V Semester

Course 13: Web Applications Development using PHP & MYSQL

Credits -1

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. Create student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
7. Create Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.
8. Write PHP script to demonstrate passing variables with cookies.
9. Write a PHP script to connect MySQL server from your website.
10. Write a program to keep track of how many times a visitor has loaded the page.
11. Write a PHP application to perform CRUD (Create, Read, Update and Delete) operations on a database table.
12. Create a web site using any open-source framework built on PHP and MySQL – It is a team activity wherein students are divided into multiple groups and each group comes up with their own website with basic features.

V Semester

Course 14 A: Internet of Things

Credits -3

Learning Objectives:

To enable students to understand basic IoT constructs, create IoT solutions to real world problems using IoT

Learning Outcomes: On successful completion of the course, students will be able to

1. Understand various concepts, terminologies and applications of IoT
2. Learn how to build IoT devices with development boards
3. Understand various Wireless protocols for IoT
4. Learn how to use various sensors and actuators & develop IoT solutions using Arduino
5. Develop and Connect IoT with Cloud Platforms.

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, AMPQ, CoAP, MQTT. Edge connectivity and protocols.

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. Cloud Computing, Fog Computing, Privacy and Security Issues in IoT.

Text Book(s)

1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Sudip Mishra, Anandarup Mukherjee, Arijit Roy: Introduction to IOT, Cambridge University Press.
3. Internet of Things- Dr Surya Durbha & Dr Jyoti Joglekar, Oxford University Press

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

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Seminar on various applications of IoT through PPT

Evaluation Method: Content knowledge, organization, clarity, presentation skills, visualaids, audience engagement

Unit 2: Activity: Hands-on Lab activity on Arduino Development

Evaluation Method: Lab Performance and Correctness of Circuit Implementation

Unit 3: Activity: Group discussion on Future Wireless Technologies.

Evaluation Method: Active participation, knowledge sharing, critical thinking, and demonstration of different wireless technologies for IoT

Unit 4: Activity: Peer activity on different types of Sensors

Evaluation Method: Peer evaluation of working principle of Sensor, use-cases of sensors.

Unit 5: Activity: Guest Lecture or Expert talk on Cloud based IoT platforms

Evaluation Method: Active Participation, Post Talk report presentation

V Semester

Course 14 A: Internet of Things

Credits -1

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.

V Semester

Course 14 B: Foundations of Data Science

Credits -3

Learning Objectives:

To enable students to develop IoT solutions for real-world problems

Learning Outcomes: On successful completion of the course, students will be able to

1. Identify the need for data science and understand various data collection strategies
2. Understand about NoSQL and Descriptive Statistics
3. Apply Numpy methods to process the data in an array.
4. Summarize and Compute Descriptive Statistics using Pandas.
5. Apply powerful data manipulations visualization using Pandas

UNIT-I

Introduction to Data Science: Need for Data Science – What is Data Science - Evolution of Data Science, Data Science Process – Business Intelligence and Data Science – Prerequisites for a Data Scientist – Tools and Skills required. Applications of Data Science in various fields – Data Security Issues.

Data Collection Strategies, Data Pre-Processing Overview, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization, Data Munging, Filtering

UNIT-II

Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis; Box Plots – Pivot Table – Heat Map – Correlation Statistics –ANOVA.

No-SQL: Document Databases, Wide-column Databases and Graphical Databases.

UNIT-III

Python for Data Science –Python Libraries, Python integrated Development Environments (IDE) for Data Science, **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- Sortingand Ranking.

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

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-

Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

Text Book(s)

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. Sanjeev Wagh, Manisha Bhende, Anuradha Thakare, 'Fundamentals of Data Science, CRC Press, 1st Edition, 2022
2. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Seminar on Role of Data Science in Politics

Evaluation Method: Content knowledge, organization, clarity, presentation skills, visualaids, audience engagement

Unit 2: Activity: Exercises on Descriptive Statistics

Evaluation Method: Problem Solving, Accuracy

Unit 3: Activity: Hands-on Lab using Numpy

Evaluation Method: Lab Performance and Correctness of solution Implementation

Unit 4: Activity: Hands-on Lab Activity on Pandas

Evaluation Method: Lab Performance and Correctness of solution Implementation.

Unit 5: Activity: Group Activity to visualize college performance records using various plots

Evaluation Method: Active Participation, Post Talk report presentation

V Semester

Course 14 B : Foundations of Data Science

Credits -1

List of Experiments:

1. Study on various python IDEs for Data Science
2. Create NumPy arrays from Python Data Structures, Intrinsic NumPy objects and Random Functions.
3. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
4. Computation on NumPy arrays using Universal Functions and Mathematical methods.
5. Create Pandas Series and Data Frame from various inputs.
6. 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 column
7. 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.

V Semester

Course 15 A: IoT Applications Development and Programming

Theory 03 hours /Week Credits -3

Learning Objectives:

To enable students to develop IoT solutions for real-world problems

Learning Outcomes: On successful completion of the course, students will be able to

1. Understand the Basic Concepts of Internet of Things
2. Learn various Sensors and their associative protocols
3. Learn the Single Board Computers for development of IoT
4. Build the IoT devices with the Node-RED without Complex coding
5. Develop various IoT real-time applications

UNIT-I

Overview of the Internet of Things (IoT) and Sensors: Sensors - Energy-based, Signal Output, Mode of Operation, Electronic Sensors. Connectivity - Bluetooth, Zigbee, Wi-Fi, LoRa, Wired Communication. Machine Intelligence, Active Management, Sensor Fusion, Smart Devices-Human-Computer Interaction, Context Awareness, Actuators, IoT and Smart City Applications- Automobile Sensors, Smart Home Sensors, Smart Transportation Sensors.

UNIT-II

IoT Sensors and Their Interfacing Protocols: Vision and Imaging Sensors- Line Scan Cameras, 3D Depth Cameras, **Sensors That Measure Temperature**-Thermocouples, Resistance Temperature Detector (RTD), Temperature Thermistor Sensors, Semiconductor Temperature Sensors, Radiation Sensors; Proximity Sensors, Pressure Sensors, Position Sensors, Photoelectric Sensors, Particle Sensors, Types of Particle Sensors-Metal Detectors, Level Sensors, Leak Detectors, Humidity Sensors, Gas and Chemical Sensors, Gas Detectors,Carbon Monoxide (MQ7) Detectors, Flame Detectors, **Sensor Communication Protocols**

UNIT-III

Programming Single Board Computers: Arduino Programming, Raspberry Pi-Basic functionality of Raspberry Pi B+ board, setting up the board, configuration and use, Basics of Linux and its use, Introduction to Raspberry Pi GPIO Access, Interfacing DHT, Interfacing Picam to Raspberry Pi zero w, Pi Camera Specifications, Pi Camera Access, Interfacing PIR Sensor **Python:**

File Concepts, Spreadsheet Concepts, Communication Concepts, Wired and WirelessProgramming Concepts

UNIT-IV

Node-RED: Node-RED Features, Installation of Node-RED, Node-RED Architecture, Node- RED Flow Editor, Basic Function Nodes, Node-RED Library, Node-RED Applications; MQTT Protocols, Google Sheets Programming (gspread), Firebase Programming, Matplotlib- Getting Started, Bar Graphs, Scatter Plot, Spectrum Representation, Coherence of Two Signals, Cross- Correlation Graph, Autocorreleation Graph, Changing Figure Size in Different Units, Scale Pie Charts, Style Sheets- FiveThirtyEight Style Sheet, Solarized Light Style Sheet.

UNIT-V

Wireless Connectivity in IoT: Introduction, Low-Power Wide-Area Networks (LPWANs),RFID Protocol, XBEE Radios with Arduino, Bluetooth with Arduino, Arduino with a GSMModem, Arduino with Firebase Cloud Connectivity

The Internet of Things through the Raspberry Pi: Introduction, Cluster Computing with Raspberry Pi Zero W-Message Passing Interface (MPI), Networking with RP is for Simple MPI Scripts, Simple MPI Programming

Text Book(s)

1. **Internet of Things Using Single Board Computers**, *G. R. Kanagachidambaresan,* Apress, 2022.
2. **Practical Node-RED Programming**, *Taiji Hagino*, Packt Publishing, 2021

Reference Books

1. **Internet of Things Programming Projects: Build modern IoT solutions with the Raspberry Pi 3 and Python,** *Colin Dow***,** Packt Publishing, 2021
2. **Programming the Internet of Things: An Introduction to Building Integrated, Device-to-Cloud IoT Solutions,** *Andy King***,** O'Reilly Media, 2021

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Case Study Presentation on Smart City IoT realization

Evaluation Method: Content knowledge, organization, clarity, presentation skills, visualaids, audience engagement

Unit 2: Activity: Poster Presentation for various kinds of Sensors

Evaluation Method: Creative & informative posters or infographics on Sensors

Unit 3: Activity: Hands-on Lab using RPi.

Evaluation Method: Lab Performance and Correctness of solution Implementation

Unit 4: Activity: Hands-on Lab Activity on Node-RED

Evaluation Method: Lab Performance and Correctness of solution Implementation.

Unit 5: Activity: Guest Lecture or Expert talk on Cloud based IoT platforms

Evaluation Method: Active Participation, Post Talk report presentation

V Semester

Course 15 A: IoT Applications Development and Programming

Credits -1

List of Experiments:

1. Write a program to switch light on when the input is 1 and switch the light off when the input is 0 using Raspberry pi
2. Install Node-RED and Flow-based Programming Development Environment
3. Create Basic Flows with Major Nodes
4. Develop a Node-Red Flow for various Case Studies
5. Implement Node-RED in the Cloud Calling a Web API from Node-RED
6. Create a To Do Application with Node-RED Handling Sensor Data on the Raspberry Pi
7. Develop a Dashboard with various 2D Graphs with Matplotlib
8. Install MySQL database in Raspberry pi.
9. Write a program to work with basic MySQL queries by fetching data from database in Raspberry pi.
10. Arduino with Firebase Cloud Connectivity
11. Visualize Data by Creating a Server-side Application in the Firebase

V Semester

Course 15 B : Application Development using Python

Credits -3

Learning Objectives:

To enable students to develop IoT solutions for real-world problems

Learning Outcomes: On successful completion of the course, students will be able to

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
4. Interpret the concepts of Web Programming and GUI in Python
5. 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, Dictionaries and Set Types

Control Flow, Truthiness, Sorting, List Comprehensions, Generators and Iterators

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

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

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

UNIT-V

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

Text Book(s)

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.

SUGGESTED CO-CURRICULAR ACTIVITIES & EVALUATION METHODS:

Unit 1: Activity: Hands-on Lab exercise on Python Control Statements
Evaluation Method: Lab Performance and Correctness of solution Implementation

Unit 2: Activity: Assignment of Files in Python
Evaluation Method: Problem Solving, Accuracy

Unit 3: Activity: Exercises on Regular expressions
Evaluation Method: Solutions, Accuracy of Validation

Unit 4: Activity: Poster Presentation on various GUI components in Python
Evaluation Method: Content knowledge, organization, clarity, presentation skills, visualaids.

Unit 5: Activity: Group Project
Evaluation Method: Project effectiveness, User interface, Solution to the Problem

V Semester

Course 15 B: Application Development using Python

Credits -1

List of Experiments:

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsiusand 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 accordingto 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. Demonstrate various methods of Sequence Data Types
4. Write a python program to display the first n terms of Fibonacci series.
5. Write a python program to calculate the sum and product of two compatible matrices.
6. Write a function that takes a character and returns True if it is a vowel and False otherwise.
7. Write a program to implement exception handling.
8. Write a program to implement Multithreading
9. Develop a Python GUI calculator using Tkinter
10. Write a Python program to read last 5 lines of a file.
11. Design a simple database application that stores the records and retrieve the same
12. Design a database application to search the specified record from the database.
13. Design a database application to that allows the user to add, delete and modify the records.