

SEMESTER-V

St. Xavier's College (Autonomous), Ahmedabad

Syllabus of Semester – V of the following departments under Faculty of Computer Science based on Undergraduate Curriculum Framework to be implemented from the Academic Year 2025-26.

DEPARTMENT OF COMPUTER SCIENCE

Major Course – 1: Python Programming

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Python Programming CSMC551C	2	0	2	Nil	Programming Basics

Learning Objectives:

This course introduces students to Python programming, covering fundamental concepts such as syntax, control structures, and data structures. Students will learn to write efficient programs, handle files, and implement Object-Oriented Programming (OOP).

Learning Outcomes:

Upon successful completion, students will be able to implement:

- Write and execute Python programs using variables, operators, and expressions.
- Implement decision-making statements (if-else) and loops (for, while).
- Define functions, pass arguments, and handle exceptions effectively.
- Work with strings, lists, tuples, dictionaries, and sets.
- Perform file handling operations like reading, writing, and appending files.
- Implement mathematical and logical operations such as factorial, prime numbers, Fibonacci series, HCF, and LCM.
- Use list comprehension and set operations for efficient data processing.
- Apply OOP principles including classes, inheritance, and operator overloading.
- Read and process files for statistical analysis, computing mean, median, and mode.
- Handle errors and exceptions in Python programs.

Unit	Particulars	Hours
I	▪ Introduction to Python ▪ History and evolution of Python ▪ Features and applications of Python ▪ Installing Python and setting up the environment ▪ Python Basics • Variables, constants, and data types • Operators: Arithmetic, Relational, Logical, Bitwise • Taking input and printing output • Type conversion and typecasting ▪ Control Structures • Conditional statements: if, elif, else • Looping structures: for, while • Loop control statements: break, continue, pass	15
II	▪ Functions and Exception Handling • Defining and calling functions • Function arguments and return values • Recursion vs. Iteration • Exception handling (try, except, finally) ▪ Basic Python Programs ▪ Demonstration of Decision Statements ▪ Implementation of Looping Structures ▪ Demonstration on Functions ▪ Implementation on Exception Handling	30
III	▪ Strings and String Manipulation • String operations (split(), join(), replace(), find()) • String formatting (format(), f-strings) • Reversing and modifying strings ▪ Data Structures ▪ Lists, tuples, dictionaries, sets ▪ List comprehension and set comprehension ▪ Sorting and filtering data	15
IV	▪ File Handling • Reading, writing, and appending files • Counting lines and words in a file • Copying and modifying files • Checking file status (closed or not) ▪ Object-Oriented Programming • Classes and objects • Constructors (__init__) • Operator overloading (e.g., Complex number operations) • Inheritance and polymorphism	30

Textbook:

1. Python Programming for the absolute beginner 3rd edition – Michael Dawson – Cengage Learning.
2. Python 3 for Absolute Beginners – Tim Hall and J P Stacey – Apress.

Reference Books:

1. Introducing Python - by Bill Lubanovic - O'Reilly
2. Python Cookbook – Alex Martelli, Anna Martelli Ravenscroft and David Ascher - O'Reilly
3. Think Python – Allen B Downey - O'Reillypython Data Science Cookbook – Gopi Subramanian – PACKT Publishing.
4. Python for Data Analysis – Wes McKinney - O'Reilly
5. Python Machine Learning – Sebastian Rachka - PACKT Publishing

Sample Programs

1. Write a function to print the factorial of a number{no recursion}
2. Calculate simple interest. accept P,T,R from user.
3. To check the given number is armstrong.
4. To print all armstrong numbers between two range.
5. To check a given number is prime. use function
6. print all prime numbers between two range
7. To print nth prime number
8. To print all composite numbers within n. use function
9. Find the area of circle.
10. To print all fibonacci number till use{ 0,1,1,2,3,..}use function
11. To print nth fibonacci number
12. sum of the square of 1st n natural numbers using function
13. sum of the cube of 1st n natural numbers
14. to check palindrome.use 2 functions
15. Reverse words in a long string using function
16. To remove a character from a string at specific position and print the remaining string.
17. input a string and split the string into words and print only the odd length of words in that string
18. Find the length of a string without using built in function len() 3.. swap commas and dots in a string
19. find words whose length greater than n in a given sentence.
20. count the number of vowels in a list.
21. prints all the numbers from 12 to 31 except 17 and 19.using 'continue statement
22. calculate the sum and average of n integer numbers given by user. Input 0 to finish
23. to check the triangle is equilateral, isosceles, scalene.(nested if)
24. print all numbers which are divisible by 2 and 7 in the range of within n
25. convert temperatures for celsius entry to fahrenheit and vice versa{ $c/5=f-32/9$ }
26. Input a year and check for leapyear.
27. count the number of even and odd numbers from a given tuple
28. Print multiplication table of 11,12,13 (1*11 to 10*11)
29. print number of alphabets,special characters and numbers in the string input numbers between two numbers, print the odd numbers separated by comma{237=3,7}
30. Program to calculate the HCF and LCM of two numbers.
31. Program to make a simple calculator
32. Write a Python program to read an entire text file.
33. Write a Python program to read first n lines of a file.

34. Write a Python program to append text to a file and display the text.
35. Write a Python program to read a file line by line and store it into a list.
36. Write a Python program to count the number of lines in a text file.
37. Write a Python program to count the frequency of words in a file.
38. Write a Python program to get the file size of a plain file.
39. Write a Python program to write a list to a file.
40. Write a Python program to copy the contents of a file to another file.

41. Write a Python program to combine each line from first file with the corresponding line in second file.
42. Write a Python program to read a random line from a file.
43. Write a Python program to assess if a file is closed or not.
44. Write a Python program to remove newline characters from a file.
45. Write a function using exceptions that asks the user to enter a set of integers. Calculate mean. The user indicates that she is done by typing "Done".
46. Write two versions of a function that calculates the harmonic mean of a list of integers. The first version uses an if-statement to make sure that the list element is not zero. List elements with zero value are ignored. The second version uses exceptions to do the same thing.
$$n/(1/a_1 + 1/a_2 + 1/a_3 + \dots)$$
47. Write a function that takes a list as a single argument. The function returns the number of items that cannot be converted into a floating point number. Use exceptions.
48. Perform the above question with the help of isinstance() method
49. Program to add, subtract, equality of two complex numbers
50. Program to multiply and divide of two complex numbers.
51. Use list comprehension to generate a list of all cube between 1 and 100
52. Use list comprehension to generate a list of all multiples of 7 between 1 and 100
53. Use set comprehension and intersection to find all numbers divisible by 15 and divisible by 21 between 1 and 1000
54. Create a list of the first 20 powers of 2 [1,2,4,8,16.....]
55. Create a list of all numbers between 10000 and 20000 that have last digit 3 and are divisible by 13
56. Work with all widgets of Tkinter
57. Write a program to perform descriptive statistics of a set of numbers

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Syllabus of Semester – V of the following departments under Faculty of Computer Science based on Undergraduate Curriculum Framework to be implemented from the Academic Year 2025-26.

DEPARTMENT OF COMPUTER SCIENCE

Major Course – 2 : Web Technology Using PHP

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-Requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Web Technology Using PHP (CSMC552C)	2	0	2	10 + 2 from a recognized board in any stream	Nil

Learning Objectives:

The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP.

Learning Outcomes:

Upon successful completion, students will be able to implement:

- To demonstrate the concepts of dynamic web development design and to describe the features of Integrated Development Environment precisely
- To install the features of .Java JDK, Netbeans and Xampp server.
- To implement the basic workings of PHP Functions, Objects and Arrays.
- To demonstrate the basic concepts of MySQL including CRUD Operations.
- To describe the File handling.
- To work with Forms, Cookies, sessions and Authentication

UNIT	Particulars	Hours
	• Introduction to Dynamic Web Content • Setting up a Development Server • Introduction to PHP • Expressions, Operators, Conditions, Loops	15

- **Form Handling**
 - Building Forms
 - Retrieving Submitted Data
 - HTML5 Form Features
 - PHP Arrays
 - Strings & Patterns (Quoting, Matching, Extracting, Searching, Replacing, Formatting, PCRE, NOWDOC)
 - File Handling
- Running PHP scripts
- **PHP Basics**
 - Writing PHP scripts with control structures and loops
 - Implementing operators and expressions

• **Working with Strings, Arrays, and File Handling** (10 Hours)

2	• String manipulations using regex and pattern matching • Implementing file handling operations	30
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Building Dynamic Web Forms (10 Hours)

- Validating and processing form data
- Storing and retrieving form data from MySQL

3	• Introduction to MySQL (Basics, Database Terms, Indexes, SQL Commands) • Accessing MySQL using PHPMyAdmin • Connecting PHP with MySQL • Creating, Retrieving, Updating, Deleting Tables • Preventing SQL & HTML Injections • Database Design, Normalization, Relationships, Transactions, Backup & Restore • Cookies, Sessions, and Authentication • Using Placeholders, MySQLi Extension • HTTP Authentication • Creating and managing MySQL databases and tables • Writing SQL queries for CRUD operations	15
4	• Preventing SQL & HTML injections User Authentication & Sessions (10 Hours) • Implementing cookies and sessions in PHP • User login/logout system	30

Textbook:

Reference Books:

Sample Programs for Implementation in PHP

1. Write a PHP script to concatenate two strings and display it on screen.
2. Write a Program to display count, from 5 to 15 using PHP loop as given below.
3. Write a program to check student grade based on the marks using if-else statement. If marks are 80% or more, grade will be Distinction. If marks between 60% to 79%, grade will be First Division. If marks between 40% to 59%, grade will be Third Division. If marks are less than 35%, student will be Fail.
4. Write a program to show day of the week (for example: Monday) based on numbers using switch/case statements.
5. You need to write a PHP program to calculate electricity bill using if-else conditions. For first 50 units – Rs. 3.50/unit For next 100 units – Rs. 4.00/unit For next 100 units – Rs. 5.20/unit For units above 250 – Rs. 6.50/unit
6. You need to write a simple calculator program in PHP using switch case. Addition, Subtraction, Multiplication and Division.
7. Write a PHP script to calculate factorial of a number using function
8. Create a class student with any 3 properties and functions to get and set the data. Create instance of the class and display the data on the console.
9. Create shape class as class having area function. Create rectangle, triangle, square class based on this class.
10. Write a program to implement the class Employee. Show Constructor Overloading.
11. Write a program to find the greatest and the smallest element of the given array
12. Write a program in PHP to remove specific element by value from an array using PHP program.
13. Write a program to sort, shuffle, extract and reset the array elements.
14. Write a PHP script to find the length of the string and whether a string is palindrome or not. Also Count Number of vowels, spaces, words and digits
15. Write a PHP Script to replace and reverse the string
16. Design the personal information form ,submit and retrieve the form data using php \$_POST,\$_GET,\$REQUEST variable
17. Design Login Form and Validate that form using PHP Code
18. Write a PHP Script to read from the file
19. Write a PHP Script to create and write into the file 10. Write a PHP script to copy the file.
20. Create a database in MYSQL Customer (Code, Fname, Lname, city). Assign Primary Key. Insert 5 records out of which 3 customer should belong to Baroda. Then Update the city field to “Vadodara”.
21. Create an Employee database. Assign Primary key. Employee(emp_ID, Name, designation, dept,salary) • List out the details of Executives • List out the details of managers • Update the designation of “Manager” to “Branch

Manager”.

22. Create an Emp_Leave database. Assign Primary key. Emp_Leave (emp_ID, Name, DateofLeave, Leavetype)
Note: Leavetype can be CL, PL or ML • List out the details of Employees taken CL with its count • List out the details of Employees taken PL with its count • List out the details of Employees taken ML with its count

23. Create an Order database. Assign Primary key

Order (ID, Date, ProductName, CustomerName, City)

- Perform a Parameterized query to display the order city-wise
- Perform a Parameterized query to display the order Productwise
- Perform a Parameterized query to display the order-details in different range of dates.

24. Create a student database (rollno, name, surname, course, hscmarks) Assign Primary Key and Insert 10 records.

- Display students details with the surname “Patel”
- Display student details who has scored above 80% marks in HSC
- Display student details who failed in HSC 8. In the database which is created in Program No. 02, Execute the following queries:
- Display the employee with salary 20000.
- Display the employee with the salary > 20000 and less than 50000
- Display employee details from Designing department

25. Write a PHP code to create database & table in Mysql.

26. Write a PHP code to insert ,delete, select the data from database 3. Write a program to get the username & password from user. If the given username is “admin” and password is “xyz” show the welcome message otherwise show the error and redirect to login page.

27. Create the pages for fruits and vegetables; write the program to display the selected item in separate page using cookies.

28. Create the pages for fruits and vegetables with their rates, no. of qty, write the program to calculate the subtotal & total display the selected item and subtotal & total display in separate page using cookies.

29. Create the login web page using session.

30. Create the page to get the employee personal information and store the information in mysql db. Include Registration Page, login page and profile page. Implement CRUD operation.

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DEPARTMENT OF COMPUTER SCIENCE

Major Course – 3 : Software Development Project - 1

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-Requisite(s) of the Course (if any)
	Lecture	Tutorial	Practical / Practice		
Software Development Project-1 (CSMC553C)	0	0	8	10 + 2 from a recognized board in any stream	Nil

Learning Objectives:

1. Students will be exposed to software development process by choosing a typical business/scientific/administrative/system application
2. Define project scope, assess feasibility, and establish a project schedule.
3. Get some experience in working with a client organization.
4. Gain experience in working in a group for successfully developing the deliverables

Learning Outcomes:

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

- To analyse in depth the existing as well as the proposed system.
- To prepare the blueprint of any real time system using various diagrams such as DFD, ERD and UML diagrams.
- To create the datastore and normalize them by identifying the relationships between the different data tables.
- To improve their communication as well as presentation skills.
- To achieve the goal within the given time constraint.
- To manage the team work effectively

Mode of study: Half / One day off to work on the project in a week. (At least three hours must be allotted in weekly timetable for discussion/preparation of deliverables)

Course Contents:

Students are expected to work on the following during the semester.

- Doing System Analysis
- Preparing System Flow Diagram
- Developing Entity Relationship Diagram
- Developing Data Flow Diagram / UML Diagram
- Building Data Dictionary

Guidelines:

- **Group Size: 2 or 3 students.**
- **Where to look for Project?**
- Government Organizations
- Local Self Government (Municipalities, Panchayats, Urban Development Authorities etc.) or public / private bodies or NGOs.
- Public Sector Organizations
- Educational institutes
- Trading/Business houses
- Private Organizations
- Software Consultancy companies (only if the project work seem to be original and beneficial)
- A challenging in-house software project.
The location of the organization is immaterial. It can be Local in the city In the vicinity of the city.
- Mostly the work will have to be done at home or the institute.

Which Project to Avoid?

- The project of system study
- Involves only modification in existing software, such as porting of software or few updates
- Involves only data storage and retrieval without any processing.

Conventional small applications such as

- Library Management
- Examination (conduct or Results)
- Educational Institute Management
- Payroll
- Accounting system or inventory Human Resource

Note: Students can take up any of the above only if the application would handle real volume and will have substantial complexities

Preferred Projects:

- Will be such as that caters to Innovative areas/ideas
- Use of emerging technology – RFID GPS Biometrics Bioinformatics, GIS etc.
- Challenging uses of Communication and Internet
- Scientific applications
- Graphics applications
- Systems software and utilities
- Embedded software o ERP modules

Preferred Tools:

- Students should feel free to use the tools of their choice subject to permission of the organization. Working on any acceptable project would give good exposure to use of

analytical tools, programming skills and development tools. Hence, any programming or development environment should be acceptable.

Deliverables by the students:

- At the end of the semester, the student should be able to work on the identified the project and submit the documentation (hard copy) and the presentation.

Documentation:

A hard copy of the documentation should consist of the following:

- Cover Page
 - Company Certificate
 - College Certificate
 - Acknowledgement
 - Index (with page nos.)
 - Organization / Company Profile
 - Project Profile Existing System Proposed System Development Tools and Technology used
 - System Flow Diagram (if applicable)
 - UML Diagram
 - Data Flow Diagram *
 - Entity Relationship Diagram *
 - Data Dictionary / Table Design * *
- In applications which uses database.

• Presentation:

- Presentations can be prepared through slides using any Open Source / PowerPoint /Flash or any other multimedia tool, covering the work shown in the documentation.
- During viva examination, students will be expected to satisfactorily answer questions pertaining to the project profile, diagrams and tables/data dictionary prepared by them.