

COURSE CONTENT

PYTHON PROGRAMMING								
II Semester: CE / ME								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
2520503	Foundation	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisites: C Programming and Data structures								

Course overview:

This course provides a strong foundation in Python programming, starting with an introduction to Python features, syntax, data types, operators, input/output functions, and core control structures such as conditional statements and loops. Students then explore Python's built-in data structures—including strings, lists, tuples, sets, and dictionaries—and learn efficient data manipulation using comprehensions and iteration techniques. The course emphasizes modular and reusable code through functions, lambda expressions, recursion, and the use of standard and user-defined modules and packages.

Course Objectives:

1. Develop structured, modular, and efficient Python programs to solve computational problems.
2. Explain the use of Python's built-in data structures such as lists, tuples, dictionaries, and sets for effective data handling.
3. Utilize Python libraries and modules to construct solutions for scientific and business applications.
4. Illustrate file handling, exception handling, and object-oriented programming features in software development tasks.
5. Implement Python-based solutions for real-world applications including automation, data processing, and problem-solving.

Course Outcomes: After completion of course, student should be able to

1. Write Python programs using variables, operators, expressions, and control structures.
2. Implement Python programs using built-in data structures like lists, tuples, sets, and dictionaries.
3. Apply modular and object-oriented programming principles in Python.
4. Handle files, exceptions, and apply Python libraries for problem-solving.
5. Develop small-scale applications in Python for automation and data manipulation.

UNIT-1 – Introduction to Python and Basics of Programming

Introduction to Python: Features, Applications, Installation, IDEs, Python Syntax, Indentation, Comments, Variables, Data Types, Type Casting, Operators: Arithmetic, Relational, Logical, Assignment, Membership, Identity, Bitwise, Input/Output functions (input(), print()), Control Structures: if, if-else, if-elif-else, Nested Conditions, Looping: for, while, Nested Loops, break, continue, pass.

UNIT-2 – Data Structures in Python

Strings: Creation, Indexing, Slicing, Methods, String Formatting, Lists: Creation, Indexing, Slicing, List Comprehension, Methods, Tuples: Properties, Indexing, Methods, Sets: Creation, Operations, Methods, Dictionaries: Creation, Access, Methods, Dictionary Comprehension, Iterating over data structures.

UNIT-3 – Functions and Modules

Functions: Defining, Calling, Parameters, Return Values, Types of Arguments: Positional, Keyword, Default, Variable Length, Scope of Variables: Local and Global, Lambda Functions, Map, Filter, Reduce, Recursion in Python, Modules: Importing, Creating User-defined Modules, Standard Modules (math, random, datetime), Packages in Python.

UNIT-4 – File Handling and Exception Handling

File Handling: Opening, Reading, Writing, Appending, File Modes, File Methods, Working with CSV and JSON Files, Exception Handling: try, except, else, finally, Built-in Exceptions, Raising Exceptions, Introduction to Regular Expressions (re module).

UNIT-5 – Object-Oriented Programming and Applications

OOP Basics: Classes, Objects, Attributes, Methods, Constructor (__init__), self keyword, Inheritance: Single, Multiple, Multilevel, Hierarchical, Method Overriding, Method Overloading (conceptual), Encapsulation and Polymorphism, Application Development: Data Processing Script, Basic Calculator, File Organizer, Simple Data Analysis with pandas.

TEXT BOOKS:

1. Python Programming: Using Problem Solving Approach by Reema Thareja.
2. Python Crash Course by Eric Matthes, Learning Python by Mark Lutz.

REFERENCE BOOKS:

1. Introduction to Python Programming by Gowrishankar S., Veena A.
2. Python Cookbook by David Beazley and Brian K. Jones.
3. Fluent Python by Luciano Ramalho, Automate the Boring Stuff with Python by Al Sweigart.



ELECTRONIC RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc26_cs84/preview
2. <https://www.geeksforgeeks.org/python/python-programming-language-tutorial/>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper-I
8. Model question paper-II
9. Lecture notes
10. E-Learning Readiness Videos(ELRV)