

Branch Name:	Artificial Intelligence & Machine Learning (AI/ML)
Program Code:	ET409
Course Name:	Python Programming
Course Code:	1ET4090201
Pre-requisite Course:	Basic knowledge of Programming

Rationale:

- Easy to code: With the clear syntax developers get an idea on code identification instead of {};
- Simple Syntax: Python has a simple syntax similar to the English Language.

Course Objective:

- To provide students with contemporary knowledge in PYTHON PROGRAMMING.
- To equip students with skills to explore real-world software development challenges with python programming.

Teaching and Evaluation Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
3	-	2	4	60	40	20	30

Course Contents:

Sr. No	Topic	Total Hours	Weight (%)
1	Introduction to Python Programming: Introduction to Programming, History and Features of Python, Applications of Python in AI, Machine Learning and Data Science, Installing Python and Python IDE, Structure of Python Program, Keywords and Identifiers, Variables and Data Types, Type Casting, Input and Output Functions (input(), print()), Literals and Constants.	05	12%
2	Operators and Control Flow Statements: Arithmetic Operators, Logical Operators, Comparison Operators, Assignment Operators, Bitwise Operators, Membership and Identity Operators, Operator Precedence, Concept of Indentation, Conditional Statements (if, if-else, if-elif-else), Looping Statements (while loop, for loop), range() function, break, continue and pass statements.	08	20%
3	Data Structure in Python: Lists: Defining Lists, accessing values in Lists, deleting values in	12	25%

	Lists, updating values in Lists, Basic List operations, Built in List functions Tuples: Defining Tuples, accessing values in Tuples, deleting values in Tuples, updating values in Tuples, Basic Tuple operations, Built in Tuple functions Sets: Defining Sets, accessing values in Sets, deleting values in Sets, updating values in Sets, Basic Sets operations, Built in Sets functions Dictionaries: Defining Dictionary, accessing values in Dictionary, deleting values in Dictionary, updating values in Dictionary, Basic Dictionary operations, Built in Dictionary functions		
4	Functions and File Handling Built-in Functions, math functions, String functions, File handling Functions, User defined Functions Testing, Debugging, Exceptions and Assertions: Debugging, Handling Exceptions	05	16%
5	Python Libraries for AI/ML Modules: Introduction to python module, Writing Module, Importing Module , importing objects from module, Built-in Modules- Numeric and Mathematic module Packages: Introduction to Packages, Writing Packaging, Matplotlib Package:- plot(),show(), xlabel(), ylabel(),grid(),bar(), hist(), subplot(), pie(), savefig() Graphics and GUI Programming: Drawing using Turtle, Tkinter	08	15%
6	Python MySQL: Environment Setup, creating new databases, Create Table	04	12%

Course Outcomes (COs)

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

CO1: Explain the fundamentals of Python programming, including program structure, data types, variables, operators, input/output, and control flow statements to develop simple Python programs.

CO2: Apply Python data structures such as lists, tuples, sets, and dictionaries to organize, manipulate, and process data effectively.

CO3: Develop modular Python programs using user-defined functions, built-in functions, file handling, and exception handling techniques.

CO4: Utilize Python modules, packages, and libraries including Matplotlib, Turtle, and Tkinter to create visualizations and simple GUI-based applications.

CO5: Develop Python applications that interact with MySQL databases by creating databases, tables, and performing basic database operations.

CO6: Apply Python programming concepts and libraries to solve basic Artificial Intelligence, Machine Learning, and real-world computational problems.

List of References:

1. **Allen B. Downey**, *Think Python: How to Think Like a Computer Scientist*, 3rd Edition, O'Reilly Media, 2024.
2. **Eric Matthes**, *Python Crash Course*, 3rd Edition, No Starch Press, 2023.
3. **Reema Thareja**, *Python Programming: Using Problem Solving Approach*, Oxford University Press, 2022.
4. **R. Nageswara Rao**, *Core Python Programming*, 3rd Edition, Dreamtech Press, 2018.
5. **John V. Guttag**, *Introduction to Computation and Programming Using Python*, 3rd Edition, MIT Press, 2021.
6. **Wesley J. Chun**, *Core Python Programming*, 2nd Edition, Pearson Education.
7. **Mark Lutz**, *Learning Python*, 5th Edition, O'Reilly Media.
8. **Al Sweigart**, *Automate the Boring Stuff with Python*, 2nd Edition, No Starch Press.

E-Resources / Web Links

1. Python Official Documentation: <https://docs.python.org/>
2. Python Software Foundation: <https://www.python.org/>
3. Matplotlib Documentation: <https://matplotlib.org/stable/>
4. Tkinter Documentation: <https://docs.python.org/3/library/tkinter.html>
5. MySQL Documentation: <https://dev.mysql.com/doc/>
6. W3Schools Python Tutorial: <https://www.w3schools.com/python/>
7. NPTEL Python Programming: <https://nptel.ac.in/>
8. Kaggle Learn – Python: <https://www.kaggle.com/learn/python>

List of Experiments:

Note: The experiment list provided beneath is for reference only. The course teacher may Change/formulate it as per his/her methodology and requirement.

1	Install and configure the Python environment. Run basic Python commands to verify the Python environment.
2	Design and Test Python program to read your name, contact number, email, and birth-date and print those details on the screen.
3	Design and Test Python Program to perform create access, update and delete operation on List, Tuple, Sets and Dictionary.
4	Design and Test Python Program to demonstrate use of conditional statements: if, if...else, if...elif...else statement.
5	Design and Test Python Program to demonstrate use of Operators: Arithmetic, Logical, Comparison, Assignment, Bitwise, Membership and Identity Operator.
6	Design and Test Python Program to demonstrate use of looping statement: while, for, and Nested loop.
7	Design and test a Python program using user defined function for given problem.
8	Design and Test Python Program to demonstrate use of math and string in-built functions.

9	Design and Test Python Program to demonstrate use of built-in modules and user defined modules.
10	Design and Test Python Program to demonstrate use of built-in packages and user defined packages.
11	Design and Test Python Program to demonstrate use of string processing functions.
12	Design and Test Python Program to demonstrate use of basic file functions.
13	Develop simple graphics using Turtle and GUI applications using Tkinter (labels, buttons, text boxes, and event handling).
14	Connect Python with MySQL, create a database and table, and perform basic database operations (Create, Insert, Select, Update, Delete).

Mapping of CLO with PO and PSO

Legend: H = High, M = Medium, L = Low

CLO	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	H	M	L										H			
CO2	H	H	M										H	M		
CO3	H	H	H	M									H	M		
CO4	M	M	H	H	M								M	H		M
CO5	H	H	H	M	H								H	H	M	
CO6	H	H	H	H	H	M	M						H	H	H	M