

TRAINING APPROACH AND METHODOLOGY

Course Name: Introduction to Programming with Python

01. Pre-Training Assessment	02. Training Content	03. Training Methodology	04. Planned Outcomes
<p>Assessment Outcomes:</p> <ul style="list-style-type: none"> a) All of them are non-IT students b) Little/experience of programming and/or the Python language c) Have basic computer literacy <p>Learning Needs:</p> <ul style="list-style-type: none"> a) Need to teach basic computer programming b) Need to use programming language in real life problem solving c) Hands on training on python language 	<p>Modules:</p> <p>Python basic, I/O, data types and data structure, python variables, operators, flow control, function and module, regex, fine handling, error and exception handling, NumPy, pandas, capstone projects.</p> <p>*Please refer to the table below for details</p>	<ul style="list-style-type: none"> a) Lectures and PowerPoint presentation b) Live coding session, hands-on exercise/assignment, code reviews and feedback c) Group discussions d) Provide necessary video contents, reading materials e) Knowledge check through capstone projects, quizzes and assessments 	<ul style="list-style-type: none"> 1. Identify core aspects of programming and features of the Python language 2. Understand and apply core programming concepts like data structures, conditionals, loops, variables, and functions 3. Design and write fully-functional Python programs using commonly used data structures, custom functions, and reading and writing to files. 4. Understand and perform basic data analysis with python

- 1. Pre-Training Assessment**

Assessment Outcomes

 - a) All of them are non-IT students
 - b) Little or no experience of programming and/or the Python language
 - c) Have basic computer literacy

Learning Needs

 - a) Need to teach basic computer programming
 - b) Need to use programming language in real life problem solving
 - c) Hands on training on python language
- 2. Training Content**

Please refer to the table below for details.
- 3. Training Methodology**

 - a) Lectures and PowerPoint presentation
 - b) Live coding session, hands-on exercise/assignment, code reviews and feedback
 - c) Group discussions
 - d) Provide necessary video contents, reading materials
 - e) Knowledge check through capstone projects, quizzes and assessments
- 4. Planned Outcomes**

 - 1. Identify core aspects of programming and features of the Python language
 - 2. Understand and apply core programming concepts like data structures, conditionals, loops, variables, and functions
 - 3. Design and write fully-functional Python programs using commonly used data structures, custom functions, and reading and writing to files.
 - 4. Understand and perform basic data analysis with python

Training Contents & Training Methodology & Planned Outcomes

Module	Session No. (3 hours each)	Topics	Training Methodology	Planned Outcomes
Python Basic	1	<ul style="list-style-type: none"> What is Programming? Python Language advantages and applications History of Python Programming with important difference between python 2.x and python 3.x Downloading & installing Python Downloading & Installing Jupyter Notebook Get Started with Python Coding: “Hello World” Keywords in Python Namespaces and Scope in Python Statement, Indentation and Comment in Python Structuring Python Programs Assign values to variables in Python 	a, b, c, d	1
Python Input/output	2	<ul style="list-style-type: none"> Quiz/Assignment Taking input in Python Taking input from console in Python Taking multiple inputs from user in Python Python Output using print() function How to print without newline in Python? Python end parameter in print() Python sep parameter in print() Python Output Formatting 	a, b, c, d, e	1
Python Data Types and Data Structure	3	<ul style="list-style-type: none"> Introduction to DataTypes Python Strings Python List Python Tuples 	a, b, c, d, e	2, 3
	4	<ul style="list-style-type: none"> Quiz/Assignment Python Sets Python Dictionary Python Arrays 	a, b, c, d, e	2, 3
Python Variables	5	<ul style="list-style-type: none"> Variables, expression, condition and function Global and local variables in python Packing and unpacking arguments in python Type conversion in python Print single and multiple variable Swap variable Private variables Name (A Special variable) in Python 	a, b, c, d, e	2, 3

Python Operators	6	<ul style="list-style-type: none"> Basic operator in python Logical and bitwise not operator on boolean Ternary operator Division operator in python Operator Overloading in Python 	a, b, c, d, e	2, 3
	7	<ul style="list-style-type: none"> Quiz/Assignment Inplace and standard operators in python Operator function in python Inplace operator Logic Gates in Python Difference between == and is operator in Python Python Membership and Identity Operators in, not in, is, is not 	a, b, c, d, e	2, 3
Python Control Flow	8	<ul style="list-style-type: none"> Python Loops Loops and Control Statements (continue, break and pass) in Python Looping technique in python range vs xrange in python Chaining comparison in python 	a, b, c, d, e	2, 3
	Midterm Examination and Evaluation			
	9	<ul style="list-style-type: none"> else with for switch function Using iteration in python effectively Python Itertools Generators in python Generators expression in python 	a, b, c, d, e	2, 3
Python Function and Modules	10	<ul style="list-style-type: none"> Functions in Python class method vs static method in Python Write an empty function in Python – pass statement Return Multiple Values Precision Handling *args and **kwargs 	a, b, c, d, e	2, 3
	11	<ul style="list-style-type: none"> Quiz/Assignment Python closures Function Decorators Decorators in Python Decorators with parameters in Python Memoization using decorators in Python Help function in Python Python __import__() function Python range() does not return an iterator Coroutine in Python Built in useful Modules 	a, b, c, d, e	2, 3
Python RegEx	12	<ul style="list-style-type: none"> Quiz/Assignment Python RegEx Regular Expression (RegEx) in Python with Examples 	a, b, c, d, e	2, 3, 4
Python File Handling	13	<ul style="list-style-type: none"> File Handling Write to File Read File 	a, b, c, d, e	2, 3, 4

		<ul style="list-style-type: none"> Renaming and Deleting Files Accessing Directories File Methods OS File/Directory Methods 		
Python Errors and Exception Handling	14	<ul style="list-style-type: none"> Quiz/Assignment Exception handling User defined Exception Built-in Exception clean up action try and except in Python 	a, b, c, d, e	2, 3, 4
Python Numpy	15	<ul style="list-style-type: none"> Quiz/Assignment Python Numpy Numpy ndarray Numpy Array Creation Numpy Data Type Objects Data type Object (dtype) in NumPy Numpy Indexing Numpy Basic Slicing and Advanced Indexing Numpy Iterating Over Array Numpy Binary Operations Numpy Linear Algebra Numpy Sorting, Searching and Counting 	a, b, c, d, e	2, 3, 4
Python Pandas	16	<ul style="list-style-type: none"> Quiz/Assignment Python Pandas DataFrame Creating a Pandas DataFrame Dealing with Rows and Columns in Pandas DataFrame Indexing and Selecting Data with Pandas Boolean Indexing in Pandas Conversion Functions in Pandas DataFrame Iterating over rows and columns in Pandas DataFrame Working with Missing Data in Pandas Python Pandas Series Data analysis using Pandas Read csv using pandas.read_csv() 	a, b, c, d, e	2, 3, 4
Project Work (Four Projects)	17	<ul style="list-style-type: none"> Project-1: Data Visualization using Bokeh/ Matplotlib/ Seaborn etc. Project-2: Exploratory Data analysis and Visualization with Python Assignment (Simple Data Analysis with Python) 	a, b, c, d, e	2, 3, 4
	18	<ul style="list-style-type: none"> Project-3: Exploratory Data analysis and Visualization with Python Assignment (Simple Data Analysis with Python) 	a, b, c, d, e	2, 3, 4
Project Work	19	<ul style="list-style-type: none"> Project-4: Exploratory Data analysis and Visualization with Python Assignment (Simple Data Analysis with Python) 	a, b, c, d, e	2, 3, 4



Digital Skills for Students Training Program
Institute of Information and Communication Technology (IICT)
Shahjalal University of Science and Technology, Sylhet



Students Project Assessment	20	<ul style="list-style-type: none">Students Project AssessmentQuestion-Answer SessionFinal Remark on the Introduction to Python Programming Course	a, b, c, d, e	2, 3, 4
Final Examination and Evaluation				
Total	20 Training Sessions (60 hours) + 1 Midterm Examination + 1 Final Examination			

Course Completion Criteria:

IICT, SUST will conduct midterm and final assessments. Upon successful completion of the program, and based on the final evaluation (**with at least an 60% score and 80% attendance**), each participant will be jointly awarded a certificate by the Public Department/Institute/Center/Universities and EDGE

Grading based on:

- ❖ Class attendance: 10%
- ❖ Quiz and Assignment(s): 20%
- ❖ Mid-term assessment: 20%
- ❖ Project: 25%
- ❖ Final Evaluation: 25%