Department of Information and Communication Technology (ICT)
MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY
Project: Enhancing Digital Government and Economy (EDGE)
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COURSE CURRICULUM (SYLLABUS) - MAY 2024

Abstract: Enhancing Digital Government and Economy (EDGE) is a project of the Bangladesh Computer Council (BCC) under the ICT Division. EDGE Project works on creating the enabling environment for digital government and the digital economy. The project, funded by World Bank and GoB, will ensure an integrated, cloud-computing digital platform for all government agencies and improve cyber-security, which will result in savings of $200 million in the public sector's IT investments. Further, it will build resiliency during future crises, whereby the platform will enable the government to operate virtually and deliver critical public services to citizens and businesses. Being the host, Department of Information and Communication Technology (ICT), Mawlana Bhashani Science and Technology University has designed this course curriculum in light with vision of this project. This syllabus is subject to improved according to the technological advancement and the academic background of trainee of the courses.

List of Courses (Foundational)

Sl	Name of the Course	Level	Total Lectures	Hours
1	Introduction to Programming with Python	Foundational	20 (X 3)	60 Hours
2	Digital marketing	Foundational	20 (X 3)	60 Hours
3	Microsoft Word	Foundational	20 (X 3)	60 Hours
4	Microsoft Excel	Foundational	20 (X 3)	60 Hours
5	Microsoft PowerPoint	Foundational	20 (X 3)	60 Hours

List of Courses (Intermediate)

SL	Name of the Course	Level	Total Lectures	Hours
1	Database (MySQL / Oracle / SQL Server)	Intermediate	27 (X 3)	81 Hours
2	Python (Django)	Intermediate	27 (X 3)	81 Hours

COURSE DETAILS

Course Title	:	**Introduction to Programming with Python**
Course Code	:	ICT-ED-XXX
Name of the Instructor	:	
Number of Lectures	:	20
Hours	:	60
Level	:	Foundational

Trainee Prerequisites

- Trainees are mostly non-IT students or may have little computer programming background.
- Basic computer literacy is required.

Description

The Introduction to Programming with Python course, offered under the Enhancing Digital Government and Economy (EDGE) project by the Bangladesh Computer Council (BCC) under the ICT Division, is designed for non-IT students seeking foundational skills in Python programming. This 60-hour course provides a comprehensive introduction to Python, covering basic concepts such as variables, data types, control structures, data structures, functions, file handling, and basic data analysis. Through a blend of lectures, hands-on exercises, and a capstone project, participants will learn to design and implement fully functional Python programs. The course also emphasizes practical applications, ensuring students can read, write, and analyze data, preparing them for future technological challenges and opportunities. EDGE, funded by the World Bank and GoB, aims to create an enabling environment for digital governance and economy by building an integrated, cloud-computing platform for government agencies. This initiative will enhance cybersecurity, provide significant cost savings, and ensure operational resiliency during future crises, enabling seamless virtual governance and service delivery.

Expected Outcomes

1) **Core Aspects of Programming and Python Language Features**

   o Identify fundamental concepts of programming.

   o Recognize and understand the main features and characteristics of the Python language.

2) **Core Programming Concepts**

   o Understand and apply essential programming concepts:

      ▪ Data Structures (lists, tuples, dictionaries, sets)

      ▪ Conditionals (if, elif, else statements)

      ▪ Loops (for, while loops)

      ▪ Variables (declaration, scope, and types)

      ▪ Functions (definition, arguments, return values)

3) **Design and Implementation of Python Programs**

   o Design, write, and debug fully-functional Python programs.

   o Utilize commonly used data structures effectively.

   o Create custom functions to solve specific problems.

   o Read from and write to files for data storage and manipulation.

4) **Basic Data Analysis with Python**

   o Perform basic data analysis tasks using Python.

   o Use libraries and tools for data manipulation and analysis (e.g., pandas, NumPy).

   o Interpret and visualize data to extract meaningful insights.

Detail Contents

Module 1: Introduction to Python (6 Hours)

   a) Overview of Programming Concepts

   b) Introduction to Python: History, Features, and Installation

   c) Setting Up the Python Environment

   d) Writing and Executing Your First Python Program

   e) Understanding the Python Syntax and Semantics

Module 2: Python Basics (10 Hours)

a) Variables and Data Types
   a. Integers, Floats, Strings, and Booleans
b) Basic Input and Output
c) Operators and Expressions
   a. Arithmetic, Comparison, Logical, and Assignment Operators
d) Type Conversion and Casting

Module 3: Control Structures (8 Hours)

a) Conditional Statements
   a. if, elif, else
b) Looping Constructs
   a. for Loop
   b. while Loop
c) Control Flow Tools
   a. break, continue, pass

Module 4: Data Structures (12 Hours)

a) Lists
   a. Creation, Accessing, and Modifying Elements
   b. List Methods and Operations
b) Tuples
   a. Creation, Accessing Elements
   b. Tuple Methods and Operations
c) Dictionaries
   a. Key-Value Pairs, Accessing, and Modifying Elements
   b. Dictionary Methods and Operations
d) Sets
   a. Creation, Accessing Elements
e) Set Methods and Operations

Module 5: Functions and Modules (10 Hours)

a) Defining and Calling Functions

    a. Parameters and Arguments

    b. Return Values

b) Scope and Lifetime of Variables

c) Lambda Functions

d) Introduction to Modules and Packages

    a. Importing Modules

    b. Standard Library Modules

Module 6: File Handling (6 Hours)

    a. Reading from and Writing to Files

        i. Opening, Reading, Writing, and Closing Files

        ii. File Methods and Operations

    b. Working with Different File Formats

        i. Text Files

        ii. CSV Files

Module 7: Error Handling and Debugging (4 Hours)

a) Understanding Exceptions

b) Try, Except, Else, Finally Blocks

c) Debugging Techniques and Tools

Module 8: Basic Data Analysis with Python (4 Hours)

a) Introduction to Data Analysis Libraries

    o pandas, NumPy

b) Basic Data Manipulation

    o DataFrames and Series in pandas

    o Basic Operations with NumPy Arrays

c) Simple Data Visualization

    o Introduction to Matplotlib

Module 9: Capstone Project (4 Hours)

a) Project Planning and Design
b) Implementing a Python Project
    a. Integrating Concepts Learned
c) Testing and Debugging the Project
d) Presenting the Project

Module 10: Course Review and Q&A (2 Hours)

a) Recap of Key Concepts
b) Addressing Questions and Doubts
c) Additional Resources and Next Steps in Learning Python

Assessment Criteria

The Dept. of ICT, MBSTU 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.

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