Green University of Bangladesh
Department of CSE
Purbachal American City, Kanchan, Rupganj, Dhaka

Python Programming

Course Outline

Contents

1 Introduction

1.1 About EDGE Program

The Enhancing Digital Government and Economy (EDGE) Project, funded by the Bangladesh Computer Council (BCC), ICT Division, and the World Bank, aims to build resiliency by developing future skilled manpower to address the increasing demand for digitally enabled employment in Bangladesh.

1.2 Course Introduction

This intermediate-level course covers Python programming, from basic syntax to advanced concepts, preparing participants to develop various types of Python applications using Django.

1.3 Course Instructor

Conducted by seasoned faculty from the CSE Department at Green University of Bangladesh, with deep knowledge of Python programming and applications.

2 Course Outline

2.1 Course Outline

2.1.1 Week 1: Introduction to Python Programming (6 hours)

- **Class 1: Python Basic**
  - Introduction to class
  - 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

- **Class 2: Python Input/output**
  - 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

2.1.2 Week 2: Python Data Types and Data Structure (6 hours)

- **Class 3: Strings, List and Tuples**
  - Introduction to DataTypes
  - Python Strings
  - Python List
  - Python Tuples
- **Class 4: Sets, Dictionary and Arrays**
  - Quiz/Assignment
  - Python Sets
  - Python Dictionary
  - Python Arrays

2.1.3 Week 3: Python Variables and Operators (6 hours)

- **Class 5: Python Variables**
  - 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
- **Class 6: Python Operators**

- Basic operator in python
- Logical and bitwise not operator on boolean
- Ternary operator
- Division operator in python
- Operator Overloading in Python
- 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
- Quiz/Assignment

2.1.4 Week 4: Python Control Flow (6 hours)

- **Class 7: Python Control Flow class-1**
  - 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
- **Class 8: Python Control Flow class-2**
  - else with for
  - switch function
  - Using iteration in python effectively
  - Python Itertools
  - Generators in python
  - Generators expression in python

2.1.5 Week 5: Python Function and Modules and OOP(6 hours)

- **Class 9: Python Function**
  - 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
  - Python closures
  - Function Decorators
  - Decorators in Python
  - Decorators with parameters in Python
  - Memoization using decorators in Python
  - Help function in Python

- **Class 10: Python Modules and OOP**
  - Python | import() function
  - Python | range() does not return an iterator
  - Coroutine in Python
  - Built in useful Modules
  - OOP Concepts
  - Classes and Objects
  - Inheritance and Polymorphism
  - Encapsulation and data hiding.
  - Special methods and operator overloading.
  - Quiz/Assignment

2.1.6 Week 6: Python RegEx, Python File Handling, Errors and Exception Handling (6 hours)

- **Class 11: Python RegEx, Python File Handling**
  - Python RegEx
  - Regular Expression (RegEx) in Python with Examples
  - File Handling
  - Write to File
  - Read File
  - Renaming and Deleting Files
  - Accessing Directories
  - File Methods
  - OS File/Directory Methods

- **Class 12: Errors and Exception Handling**
  - Exception handling
  - User defined Exception
  - Built-in Exception
  - clean up action
  - try and except in Python
  - Quiz/Assignment

2.1.7 Week 7: Midterm Examination and Evaluation (3 hours)

2.1.8 Week 8: Python Numpy, Pandas (6 hours)

- **Class 13: Python Numpy**
  - 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
  - Quiz/Assignment
- **Class 14: Python Pandas**
  - 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()
  - Quiz/Assignment

2.1.9 Week 9: Project Work (Two Projects) (6 hours)

- **Class 15: Project-1**
  - Data Visualization using Bokeh/ Matplotlib/ Seaborn etc.
- **Class 16: Project-2**
  - Exploratory Data analysis and Visualization with Python
  - Assignment (Simple Data Analysis with Python)

2.1.10 Week 10: Django Web Framework (6 hours)

- **Class 17: Introduction to Django**
  - Features of Django
  - Django web server
  - Understanding Django environment
  - A simple 'Hello world' application
- **Class 18: Displaying Hyperlinks - project**
  - Django architecture
  - MVC and MTV
  - A view that displays a hyperlink
  - Mapping the views to URLs
  - Running our first app
  - Improving the views using templates
  - The improved templates
  - TSending data from URL to view
  - Sending data from view to template

2.1.11 Week 11: Basic Frontend for Django Web Framework (6 hours)

- **Class 19: Introduction to Frontend**
  - HTML
  - CSS
- **Class 20: JavaScript**
  - JavaScript

2.1.12 Week 12: Django Web Framework (6 hours)

- **Class 21: Creating a website - project**
  - Starting a project, Creating an app inside the project, Activating the app
  - Creating model for our site, Converting the model into a table, Examples for Fields in Models
  - Basic data access using Django shell, Saving objects into database, Retrieving objects from database, Modifying objects of database
  - Sorting objects, Filtering objects, Deleting objects. Making changes in the data model
- **Class 22: Creating Administration Panel**

- Using the admin interface, Customizing the admin interface, Adding users
- Data access and modification using admin panel. Giving permissions to users
- Using the admin interface, Customizing the admin interface, Adding users
- Data access and modification using admin panel. Giving permissions to users

2.1.13 Week 13: Django Web Framework (6 hours)

- **Class 23: Creating first page of our website**
  - The Django template system, Template Inheritance, Improving the website
  - Adding background colour for web pages, Adding banner to the web site
  - Adding background image in the web pages, Storing and displaying images
  - Adding users to our site, Uploading the information by user, Changing the administration interface title
- **Class 24: Django Form Create**
  - Forms basics
  - Creating Contact Us form
  - Form field examples

2.1.14 Week 14: Django Web Framework (6 hours)

- **Class 25: Using Database in Django**
  - Using SQLite, Configuring MySQL database
  - Working PostgreSQL database
- **Class 26: MySQL in Django**
  - Working with MySQL in Django

2.1.15 Week 15: Students Project Assessment, Final Examination and Evaluation (6 hours)

- **Class 27: Students Project Assessment**
- **Final Examination and Evaluation**

3 Performance Evaluation

3.1 Assignments

- Quiz/Assignments will be taken

3.2 Exams

- Midterm Examination and Evaluation
- Final Examination and Evaluation

4 Conclusion

4.1 Course Outcome

- Proficiency in Python programming and libraries
- Ability to develop data-driven and web-based applications

4.2 Conclusion

The course equips participants with the skills to pursue careers in Python programming, from web development to data science.