

**Institute of Information Technology**  
Noakhali Science and Technology University  
**EDGE-NSTU-IIT Digital Skills Training**



**Curriculum of**  
***Basic Programming with Python***

**Objectives of this Course:**

This course is designed to provide students with a strong foundation in programming, preparing them for more advanced study or practical application in various fields that use Python.

**Course Training outcomes:** Participants will learn how to

- ❖ develop proficiency in Python Programming,
- ❖ handle data structures and apply functions,
- ❖ complete and present a project.

**Course Summary:**

<b>Chapter/Module</b>	<b>No. of Sessions</b>	<b>No. of Class Hours</b>
Introduction	2	06
Control Structures	4	12
Functions and Modules	3	09
Profile Creation	1	03
Data Structures	3	09
File Handling	2	06
Project Discussion	2	06
AI Tools and Integration	1	03
Exception Handling	1	03
Revision	1	03
<b>Total</b>	<b>20</b>	<b>60</b>

## Detailed course content:

Module	Session	Topics	Class Hours
Introduction	01	<p>Introduction of the course          Overview of programming and Python          Setting up an IDE (e.g. PyCharm, VS Code)          Introduction to Python and basic commands</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>• Print "Welcome to IIT!" to the console.</li> <li>• Prompt the user to enter their name and print a greeting with their name.</li> </ul>	3
	02	<p>Basic syntax and discussion on the reserved words          Understanding variables and data types          Basic operations (Arithmetic, String Concatenation)          Sample input and output functions</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>• Ask the user to input two numbers and display their sum.</li> <li>• Ask the user to input two strings first name and last name. Concatenate these strings to display the full name.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>• Create a program to calculate the area of a rectangle from user-inputted (input can be floating point numbers) length and width.</li> </ul>	3
Control Structures	03	<p>Conditional statements (<i>if, elif, else</i>)          Comparison operators          Logical operators</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>• Ask the user to input a number check if it is even or odd.</li> <li>• Ask the user to input a student's score (0-100) as input and determines his grade.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>• Write a program that finds the maximum of three numbers entered by the user.</li> </ul>	3
	04	<p><u>Loops</u>  <i>for</i> loops  <i>while</i> loops</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>• Ask the user to input a string, and print it for five times.</li> <li>• Display the first 10 natural numbers using a loop.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>• Create a program to print the multiplication table of a number entered by the user.</li> </ul>	3

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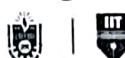
Module	Session	Topics	Class Hours
Control Structures	05	<p>Loop control statements (<i>break</i>, <i>continue</i>)                      Exercise using <i>Loops</i></p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>Ask user to input a number and check if it is prime or not.</li> <li>Display the first 50 natural numbers, skipping any numbers that are divisible by 7, using a loop.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>Use a loop to calculate the factorial of a number entered by the user.</li> </ul>	3
	06	<p><i>Nested Loop</i>                      Nested <i>for</i> loops (using loop control variables)</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>Display a multiplication table from 1 to 5.</li> <li>Print a chess board (8 × 8) pattern of alternating W and B characters.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>Use nested loops to display all possible pairs of numbers from 1 to 8.</li> </ul>	3
Functions and Modules	07	<p><i>Functions</i>                      Defining and calling functions                      Function parameters and return values                      Scope and lifetime of variables</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>Write a function that takes three numbers as parameters and returns their sum.</li> <li>Write a function to determine if a word is a palindrome.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>Create a function that calculates the factorial of a given number.</li> </ul>	3
	08	<p>Recursion (self calling)                      Importing standard library modules (e.g. <i>math</i>, <i>random</i>)</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>Write a recursive function that returns the <math>n^{\text{th}}</math> term of the Fibonacci sequence.</li> <li>Write a recursive function to find the sum of all natural numbers up to a given number.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>Create a recursive function to find the greatest common divisor (GCD) of two numbers.</li> </ul>	3
		<b>Mid Term Examination</b>	

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Module	Session	Topics	Class Hours
<b>Functions (Revise)</b>	09	Revised concepts of Functions <u>Exercises using Functions</u> Provide Solution of Midterm Examination	3
<b>Profile Creation</b>	10	<u>Profiling</u> Creating a Profile on Freelancing Platforms (Fiverr and Upwork) Creating a LinkedIn Profile Writing a Professional Cover Letter Building a Professional CV for Freelancing Effective Client Communication and Professional Response Techniques	3
<b>Data Structures</b>	11	<u>Lists (Arrays)</u> Creating and manipulating lists List operations (indexing, appending, removing) <b>Task:</b> <ul style="list-style-type: none"> <li>• Write a program to count the occurrences of a specific value in a list.</li> <li>• Create a list of five integers and print each element.</li> </ul> <b>Class Work:</b> <ul style="list-style-type: none"> <li>• Use a list to store seven students' names and display them one by one.</li> </ul>	3
	12	<u>Lists (Arrays)</u> Multidimensional array <b>Task:</b> <ul style="list-style-type: none"> <li>• Fill a <math>4 \times 4</math> grid with zeros and then set the diagonal elements to 1.</li> <li>• Define a dynamic 2D list with variable row sizes, populate it, and display the contents of each row in separate line(s).</li> </ul> <b>Class Work:</b> <ul style="list-style-type: none"> <li>• Create a program that takes two <math>3 \times 3</math> matrices as input, adds them element-wise, and displays the resulting matrix.</li> </ul>	3
	13	<u>Tuples and Sets</u> Working with tuples, sets (unique collections of items) Basic operations on tuples and sets <b>Task:</b> <ul style="list-style-type: none"> <li>• Write a program to find the union of two sets of numbers.</li> <li>• Create a tuple of fruits and display the first three items.</li> </ul> <b>Class Work:</b> <ul style="list-style-type: none"> <li>• Create a tuple of numbers and calculate the sum of all its elements.</li> <li>• Create a set of names and check if a specific name is in the set.</li> </ul>	3

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Module	Session	Topics	Class Hours
<b>File Handling</b>	14	Opening text file in several modes Reading from files File handling methods (e.g. <code>read()</code> , <code>readlines()</code> ) <u>Task:</u> <ul style="list-style-type: none"> <li>Open a file and read its contents, then display them on the screen.</li> <li>Count the occurrences of a specific word in a text file.</li> </ul> <u>Class Work:</u> <ul style="list-style-type: none"> <li>Create a program to count the number of lines in a text file.</li> </ul>	3
	15	Writing to files Appending to files Working with file paths <u>Task:</u> <ul style="list-style-type: none"> <li>Write a program to append a new line of text to an existing file.</li> <li>Write a program to create a text file and write "Hello World!" to it.</li> </ul> <u>Class Work:</u> <ul style="list-style-type: none"> <li>Create a program to copy the contents of one file to another.</li> </ul>	3
<b>Project Discussion</b>	16	<u>Project Work (Brief Discussion)</u> Introduction to the project Planning and initial coding <u>Task:</u> <ul style="list-style-type: none"> <li>Complete a mini project titled <i>Wordle</i>.</li> </ul>	3
	17	<u>Project Work (Take Presentations on Students' Project)</u> Continuing project development Implementing features <u>Class Work:</u> <ul style="list-style-type: none"> <li>Complete a mini project titled <i>Guess the number</i>.</li> <li>Complete a mini project titled <i>Currency Converter</i>.</li> </ul>	3
<b>AI Tools and Integration</b>	18	Leveraging AI Tools for Freelancing Brief overview of AI and its impact on programming. Discuss AI's role in boosting efficiency, automating tasks, and enhancing creativity. <u>Task:</u> <ul style="list-style-type: none"> <li>Integrate Gemini with Google Colab and perform matrix multiplication (using Auto-suggestion).</li> <li>Introduction to popular AI tools such as ChatGPT and generate a Python program for matrix multiplication.</li> </ul>	3

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Module	Session	Topics	Class Hours
<b>Exception Handling</b>	19	<p><u>Error Handling</u></p> <p>Understanding exceptions</p> <p>Using <code>try</code>, <code>except</code>, <code>finally</code> blocks.</p> <p><b>Task:</b></p> <ul style="list-style-type: none"> <li>• Create a program that prompts the user for a number and handles invalid (non-numeric) input.</li> <li>• Use error handling to prompt the user until they enter a valid filename.</li> <li>• Create a program that raises a custom exception if a user enters a negative number as input.</li> </ul> <p><b>Class Work:</b></p> <ul style="list-style-type: none"> <li>• Write a program that attempts to open a file and handles the error if the file doesn't exist.</li> </ul>	3
<b>Revision</b>	20	<p><b>Final Examination</b></p> <p><b>Review Class</b></p> <p>Review on the concepts of loops, condition, functions.</p> <p>Provide Solution of Midterm Examination.</p>	3

**Course Completion Criteria:**

The IIT, NSTU will conduct quiz, midterm and final assessments. Upon successful completion of the program, and based on the final evaluation (with at least a 60% score and 80% attendance), each participant will be jointly awarded a certificate by the IIT, NSTU and EDGE.

**Grading based on:**

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