BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207.

4-YEAR DIPLOMA IN ENGINEERING CURRICULUM
COURSE STRUCTURE & SYLLABUS
(PROBIDHAN-2022)

COMPUTER SCIENCE & TECHNOLOGY
TECHNOLOGY CODE: 85

SECOND SEMESTER
(Effective from 2022-2023 Academic Sessions)

DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE

(PROBIDHAN-2022)

TECHNOLOGY NAME: COMPUTER SCIENCE & TECHNOLOGY (85)

(2nd SEMESTER)

Sl	Subject		Period		Credit	Marks Distribution						
						Theory Assessment			Practical Assessment			Grand Total
	Code	Name	Theory	Practical		Continuous	Final	Total	Continuous	Final	Total	
1	25721	Bangla -II	2	-	2	40	60	100	-	-	-	100
2	25722	English-II	2	-	2	40	60	100	-	-	-	100
3	25812	Physical Education & Life skills Development	-	3	1	-	-	-	25	25	50	50
4	25913	Chemistry	3	3	4	60	90	150	25	25	50	200
5	25921	Mathematics-II	3	3	4	60	90	150	25	25	50	200
6	28521	Python Programming	2	3	3	40	60	100	25	25	50	150
7	28522	Computer Graphics Design-I	-	6	2	-	-	-	50	50	100	100
8	26811	Basic Electronics	2	3	3	40	60	100	25	25	50	150
Total			**14**	**21**	**21**	**280**	**420**	**700**	**175**	**175**	**350**	**1050**

Subject Code	Subject Name	Period/Week		Credit
		T	P	C
28521	PYTHON PROGRAMMING	2	3	3

Rationale	This is a Core course of the diploma in engineering program required for enabling the graduates to use and work with ICT. It includes Basics of programming, Basics of python, Variable and data types, Strings, Python operators, Decision making and loops, Lists, Tuples, Sets, dictionaries, Functions, Files i/o. This course also enables a graduate to adopt further study in upper-level courses using IT and other sectors. This course-designed emphasizes teaching practical aspects rather than theory.
Learning Outcome (Theoretical)	After undergoing the subject, students will be able to develop knowledge of the basics of python, variables and data types, string processing, python operators, branch, loop, list, tuple, set, and dictionary structures, function, and I/O operation of Python Programming Language.
Learning Outcome (Practical)	After undergoing the subject, students will be able to: • write & execute programs using variables and operators of python. • write & execute programs using branching & looping statements. • write & execute programs using lists, sets, and dictionary structure • write & execute programs using library & User-defined functions • write & execute programs for I/O operation of files.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Period	Marks
1	BASICS OF PROGRAMMING **1.1 State Computer Programming.** **1.2 Explain Programming Language and its Classification.** 1.3 State Translator Programs. 1.4 Define Algorithm and Flowchart. 1.5 Explain the uses of Flowchart symbols 1.6 Prepare Algorithm and Flowchart for simple problems. 1.7 Explain the Process of Program Planning.	3	3
2	BASICS OF PYTHON **2.1 State the features of Python.** **2.2 Explain Identifiers and Keywords.** **2.3 Explain Lines, Indentation, Multi-Line Statements.** **2.4 State the uses of Quotation and Comments in Python.** **2.5 Describe Command Line Arguments.**	2	3
3	VARIABLES AND DATA TYPES **3.1 State variables** **3.2 Explain the rules of naming variables** **3.3 Assign Values to Variables.** **3.4 Describe Standard Data Types.**	2	4

	3.5 Explain Data Type Conversion. 3.6 Write programs using variable/multiple variables.		
4	PYTHON OPERATORS **4.1 State Operators and their types.** **4.2 Describe Arithmetic Operators, Comparison Operators, and Logical Operators.** **4.3 State Assignment Operators, Bitwise Operators, Membership Operators, and Identity Operators.** **4.4 Explain Operators Precedence.** 4.5 Calculate the value of expression according to the precedence of operators.	**3**	**4**
5	BRANCHING STRUCTURE **5.1 State conditional and unconditional branching with flowchart.** **5.2 Explain the syntax of if, if …. else, if….elif statements.** 5.3 Draw the flowchart of **if, if …. else, if….elif** statements. **5.4 Write programs using if, if …. else, if….elif statements.**	**4**	**10**
6	**LOOPING STRUCTURE** **6.1 State conditional and unconditional loop with flowchart.** **6.2 Explain the syntax of for & while statements.** **6.3 Draw the flowchart of for & while statements.** **6.4 Describe nested loop.** **6.5 Write programs using for, while & nested loop.**	**4**	**10**
7	LIST STRUCTURE 7.1 **Define List structure** 7.2 **Assign Values in List.** 7.3 **Explain Updating and Deleting List Elements.** 7.4 **State Basic List Operations.** 7.5 **Explain Built-in List Functions and Methods.** 7.6 **Write programs using List.**	**2**	**4**
8	**TUPLES STRUCTURE** 8.1 Define Tuple 8.2 Distinguish between List & Tuple 8.3 Assign Values in Tuple 8.4 Explain Updating and Deleting Tuple Elements 8.5 Describe Basic Tuple Operations 8.6 Explain Built-in Tuple Functions. 8.7 Write program using Tuples.	**2**	**4**
9	**SET STRUCTURE** 10.1 State Set structure in Python. 10.2 Mention the properties of Set items. 10.3 Explain creating a Set using curly braces and set() method. 10.4 Explain Adding items to the set and Removing items from the set. 10.5 Describe Python set operation (Union, Intersection, difference). 10.6 Write programs using Set in Python.	**2**	**4**
10	**DICTIONARY STRUCTURE** 11.1 Define Dictionary in Python. **11.2 State Accessing Values in Dictionary**	**2**	**4**

	11.3 Describe the process of values are Added into dictionary values **11.4 Describe the process of elements are Deleted from the Dictionary** **11.4 Mention the properties of Dictionary Keys** **11.5 Explain Built-in Dictionary Functions & Methods** **11.6 Write programs using Dictionary**		
11	**FUNCTION OPERATION** 9.1 Define a Function 9.2 Distinguish between library & user-defined function 9.3 State Calling a Function 9.4 Explain Passing by Reference Versus Passing by Value 9.5 Describe Function Arguments 9.6 Mention Uses of Date and Time Functions. 9.7 Write programs using user-defined functions.	**2**	**5**
12	**FILES I/O OPERATION** 10.1 State the File Operation. 10.2 Describe the File opening modes. 10.3 Describe the File Opening and Closing functions. 10.4 Explain the File Reading and Writing functions. 10.5 Write programs for file input/output operation.	**2**	**5**
	Total	**16**	**60**

Detailed Syllabus (Practical)

Sl.	Experiment name with the procedure	Period (3 periods per class)	Mark s
1	**WRITE & EXECUTE PROGRAMS USING VARIABLES & OPERATORS** 1.1 Prepare Algorithm for given problems (include but not limited to: message printing, arithmetic operation, area calculation, temperature unit conversion) 1.2 Draw the flowchart as per the prepared algorithm 1.3 Write code for the given problem 1.4 Compile the code and debug if required. 1.3 Execute the compiled code. 1.4 Maintain the Record of Performed Job.	**3**	**2.5**
2	WRITE & EXECUTE PROGRAMS USING BRANCHING STATEMENTS. 2.1 Prepare Algorithm for given problems (include but not limited to: larger/largest number from two/three numbers; given number is odd /even, +ve/-ve; area of different types triangles; calculate the different discount for different bill amount, determine GP; GPA calculation; given year is a leap year or not; roots of a quadratic equation, Arithmetic calculator;) 2.2 Draw the flowchart as per the prepared algorithm 2.3 Write code for the given problem 2.4 Compile the code and debug if required. 2.3 Execute the compiled code. 2.4 Maintain the Record of Performed Job.	**3**	**5**
3	**WRITE & EXECUTE PROGRAMS USING LOOPING STATEMENTS** 3.1 Prepare Algorithm for given problems (include but not limited to: Printing of series, even, odd, prime, and Fibonacci number; summation of arithmetic series; check prime number; print prime & Fibonacci; Find factorial value) 3.2 Draw the flowchart as per the prepared algorithm 3.3 Write code for the given problem 3.4 Compile the code and debug if required.	**3**	**5**

	3.5 Execute the compiled code. 3.6 Maintain the Record of Performed Job.		
4	**WRITE & EXECUTE PROGRAMS USING LISTS/ARRAY** 4.1 Prepare Algorithm for given problems (include but not limited to: search an item; Largest/Smallest number; print all index number of the same item; delete all the same item; summation of all elements; sorting data) 4.2 Write code for the given problem using LIST/ARRAY structure (don’t use the python methods) 4.3 Compile the code and debug if required. 4.4 Execute the compiled code. 4.5 Maintain the Record of Performed Job.	**3**	**2.5**
5	**WRITE & EXECUTE PROGRAMS USING USER-DEFINED FUNCTIONS** 5.1 Prepare Algorithm for given problems (include but not limited to: create user-defined function, calling function in different techniques, use of different types of arguments, programs using **def** and **lambda** functions) 5.2 Write code for the given problem 5.3 Compile the code and debug if required. 5.4 Execute the compiled code. 5.5 Maintain the Record of Performed Job.	**3**	**2.5**
6	**WRITE & EXECUTE PROGRAMS USING SET** 6.1 Prepare Algorithm for given problems (include but not limited to: programs using Union, intersection, difference, and symmetric set operations) 6.2 Write code for the given problem 6.3 Compile the code and debug if required. 6.4 Execute the compiled code. 6.5 Maintain the Record of Performed Job.	**3**	**2.5**
7	**WRITE & EXECUTE PROGRAMS USING A DICTIONARY** 7.1 Prepare Algorithm for given problems (include but not limited to: creating a dictionary; accessing elements from the dictionary; adding/removing elements to/from the dictionary) 7.2 Write code for the given problem 7.3 Compile the code and debug if required. 7.4 Execute the compiled code. 7.5 Maintain the Record of Performed Job.	**3**	**2.5**
8	**WRITE & EXECUTE PROGRAMS USING FILES** 8.1 Prepare Algorithm for given problems (include but not limited to: creating a file using python methods; file open and close in different modes, file read/write operation) 8.2 Write code for the given problem 8.3 Compile the code and debug if required. 8.4 Execute the compiled code. 8.5 Maintain the Record of Performed Job.	**3**	**2.5**
9	**COURSE PROJECT (Mandatory):** • **Prepare a small Database project using Python** 1.1 First of all, the Course Instructor will develop a small project as a sample and display it to students. 1.2 Students will develop the teacher’s project as per the requirement 1.3 Teachers may follow the video link to prepare a small sample project as below: https://www.youtube.com/watch?v=-fWXAN9xcVg 1.4 Presentation session for the developed project by students.	**18**	**25**

Necessary Resources (Tools, equipment and Machinery):

Sl	Item Name	Quantity
01	System Unit, Monitor, Mouse, KeyBoard	25 set
02	Printer	1 Set
03	VSCode, IDLE ,PyCharm, SublimeText, Anaconda	5 Set
04	Jupiter notebook	5 Set

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Learning Python	Mark Lutz	5th Edition
02	Python Programming: An Introduction to Computer Science	John Zelle	3rd Edition
03	Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython	Wes Mckinney	2nd Edition
04	Learn Python the Hard Way	ZED SHAW	3rd Edition
05	Learn Python in 1 Day: Complete Python Guide with Examples	ZED SHAW	

Website References:

Sl	Web Link	Remarks
01	http:// python.howtocode.com.bd http://	
02	http://www.learnpython.org	
03	http://pythontutor.com	
04	https://www.gcreddy.com/2021/07/python-data-types.html	
05	https://www.guru99.com/python-tutorials.html	
06	https://docs.python.org/3/tutorial/modules.html	
07	https://techvidvan.com/tutorials/top-python-books/	
08	https://www.w3schools.com/python/default.asp	
09	For Project work: https://www.youtube.com/watch?v=-fWXAN9xcVg	