BANGLADESH TECHNICAL EDUCATION BOARD

Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: **666**

4th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

Sl. No.	Subject Code	Name of the Subject	T	P	C	Marks				Total
						Theory		Practical		
						Cont. Assess	Final Exam	Cont. Assess	Final Exam	
1	66641	Object Oriented Programming	2	3	3	40	60	25	25	150
2	66642	Data Structure & Algorithm	2	3	3	40	60	25	25	150
3	66643	Web Development	0	6	2	-	-	50	50	100
4	66644	Data Communication System	2	6	4	40	60	50	50	200
5	66645	Computer Peripherals	1	6	3	20	30	50	50	150
6	66842	Principle of Digital Electronics	3	3	4	60	90	25	25	200
7	65841	Business Organization & Communication	2	0	2	40	60	-	-	100
7										
Total			**12**	**27**	**21**	**240**	**360**	**225**	**225**	**1050**

66642　　　　　DATA STRUCTURE & ALGORITHM　　　T　P　C
                                                    2　3　3

AIMS
• To provide the knowledge & skill on data structures.
• To provide the knowledge & skill on writing simple algorithms.
• To develop and test simple programs related to data structures.

SHORT DESCRIPTION
Data types, data structure and algorithm; Arrays, records, pointers and linked lists;
Stack, queue and recursion; Searching & sorting.

DETAIL DESCRIPTION
Theory:

1 Understand the idea of data structure.
1.1 Define data & information.
1.2 State data types.
1.3 Define Memory Location
1.4 Define data structure.
1.5 Mention Different types of data structure.
1.6　　Describe different types of data operation.

2 Understand the basic concept of algorithm
2.1 State the characteristics of algorithm
2.2 Define the pseudo code & algorithmic notations.
2.3 Describe the structured programming and flowcharts.
2.4 Describe the Complexity of algorithm

3 Understand the concept of arrays, records and pointers.
3.1 Define linear array.
3.2 Write the algorithm for traversing linear arrays.
3.3 State the representation of linear array in Memory.
3.4 Write the algorithm for inserting and deleting elements into/from linear arrays.
3.5 Write the algorithm of matrix multiplication.
3.6　　State the use of pointer arrays, Jagged array and records.

4 Understand the properties of the linked lists.
4.1　　Define linked lists.
4.2　　Describe the representation of linked lists in memory.
4.3　　Write the algorithms to traverse a linked list.
4.4　　Write the algorithms for searching a linked list.
4.5　　Write the algorithms for inserting/deleting nodes into/from a linked list.

5. Understand the Operation of Stack
5.1　　State the meaning of the terms PUSH, POP&LIFO.
5.2 Write the algorithm for adding or removing data into / from a Stack.
5.3　　Describe the Polish and Reverse Polish Notation of arithmetic expression.
5.4　　Describe the operation of Infix, Postfix & Prefix transformation.
5.5　　Write the algorithms to transform Prefix expression into Prefix expression and vice versa.

6. Understand the Operation of Queue
6.1　　Define Queue.
6.2 Describe Priority queues.
6.3　　Mention differences between stack and queue
6.4 Write the algorithms for inserting/deleting data into/from queues.

7. Understand the Operation of Recursion.
7.1 Define Recursion
7.2　　Explain the uses of recursive functions.
7.3　　Write the algorithms to compute factorial N by recursive functions.
7.4 Explain Fibonacci number generation algorithm by recursive functions.

8 Understand the Operation of searching.
8.1   State the different techniques of searching.
8.2   Describe the linear and binary search algorithm.
8.3   Write the algorithms for linear & binary search.
8.4 Compare the complexity of linear & binary search algorithms.

9 Understand the Operation of sorting.
9.1 State the different techniques of Sorting.
9.2   Describe the technique of bubble sort, quick sort, heap sort, insertion
          sort, selection sort and merge sort.
9.3   Write the algorithms for bubble sort, quick sort, heap sort, insertion
          sort, selection sort and merge sort.
9.4   Compare the complexity of different sorting algorithms.

10 Understand the basics of Storing string
10.1   Define String
10.2   State the types of structures for storing strings.
10.3   Describe the Record – oriented, Fixed-Length storage procedure of strings.
10.4   State the advantages and disadvantages of record oriented, fixed-length storage.

Practical:
1. Develop and Test a program for data insertion & Deletion in a Linear Array.
2. Develop and Test a program for Multiplication of two Matrices
3. Develop and Test a program for inserting/Deleting nodes into/from a Linked List.
4. Develop and Test a program using PUSH and POP Operation in Stack.
5. Develop and Test a program to convert an infix expression to postfix expression.
6. Develop and Test a program for Data insertion and Deletion from a Queue.
7. Develop and Test a program for calculating factorial N and Fibonacci number using Recursion.
8. Develop and Test a program to find out data using linear search and binary search.
9. Develop and Test a program to arrange Data Ascending and Descending using Bubble Sort algorithm.
10. Develop and Test a program to arrange Data Ascending and Descending using Quick Sort algorithm.

REFERENCE BOOKS:

1. Data Structures
        BY- Seymour Lipchitz (Schaum's Outline Series)
2. Data Structure and Algorithm
        By- Md. Mokter Hossain
            Md. Masud Karim
            Md. Moynul Hoque