**Course Objective and Outcome Form**

Department of Electrical and Computer Engineering

School of Engineering and Physical Sciences

North South University, Bashundhara, Dhaka-1229, Bangladesh

1. **Course Number and Title:** CSE225 Data Structures & Algorithms

CSE225 Data Structures & Algorithms Laboratory

1. **Number of Credits:** 3 + 0 = 3 Credits
2. **Type:** Mandatory
3. **Prerequisites:** CSE 215 (Computer Programming II)
4. **Contact Hours:** Lecture – 3 Hours/Week, Lab – 3 Hours/Week
5. **Course Summary:**

This course is about an introduction to the theory and practice of data structuring techniques. Topics include internal data representation, abstract data types (ADT), stacks, queues, list structures, recursive data structures, trees, regraphs and networks. Concept of object orientation as a data abstraction technique will be introduced.

1. **Course Objectives:**

The objectives of this course are to

1. introduce the basic data structures for storage and retrieval of ordered or unordered data using arrays, linked lists, binary trees, heaps, graphs and hash tables.
2. introduce the concept of problem domain analysis and exploit the domain features to improve data structures efficiency.
3. develop the concept of asymptotic analysis using Big-O techniques to compare different algorithmic solutions.
4. **Course Outcomes (COs):**

Upon Successful completion of this course, students will be able to:

|  |  |  |
| --- | --- | --- |
| Sl. | **CO Description** | **Weightage (%)** |
| 1 | identify abstract data structures design techniques; | 40% |
| 2 | use more advanced data structures for appropriate problems; | 10% |
| 3 | apply appropriate data structures to the solve of real world problems; | 25% |
| 4 | use programming tools to write and debug codes for abstract data types. | 25% |

1. **Mapping of CO-PO:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl.** | **CO Description** | **POs** | **Bloom’s taxonomy**  **domain/level** | **Delivery methods**  **and activities** | **Assessment**  **tools** |
| CO1 | **Identify** abstract data structures design techniques. | **a** | Cognitive/ Apply | Lectures/notes | quiz/exam |
| CO2 | **Use** more advanced data structures for  appropriate problems. | **a** | Cognitive/ Analyze | Lectures/notes | homework |
| CO3 | **Apply** appropriate data structures to solve real world problems. | **c** | Cognitive/ Apply | Lectures/notes | quiz/exam |
| CO4 | **Use** programming tools to write and debug codes for abstract data types. | **e** | Psychomotor/ Precision | Lectures/notes/ lab | quiz/exam/lab |

1. **Resources**

**Text books:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No | Name of Author(s) | Year of Publication | Title of Book | Edition | Publisher’s Name | ISBN |
| 1 | Nell Dale | 2013 | C++ Plus Data Structures | 5th | JONES & BARTLETT LEARNING | 978-1-4496-4675-2 |

**Reference books:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No | Name of Author(s) | Year of Publication | Title of Book | Edition | Publisher’s Name | ISBN |
| 1 | Michael T. Goodrich, Roberto Tamassia, David Mount | 2011 | Data Structures and Algorithms in C++ | 2nd | John Wiley &Sons,Inc | 13978-0-470-38327-8 |
| 2 | Herbert Schildt | 2003 | C++: The Complete Reference | 4th | Tata McGraw-Hill | 0-07-053246-X |

1. **Weightage Distribution among Assessment Tools**

|  |  |
| --- | --- |
| **Assessment Tools** | **Weightage (%)** |
| Class Performance | 5% |
| Quizzes | 20% |
| Assignment | 5% |
| Midterm | 25% |
| Final Exam | 25% |
| Lab Work | 20% |

1. **Grading policy:** As per NSU grading policy available in

<http://www.northsouth.edu/academic/grading-policy.html>

**Schedule**

|  |  |
| --- | --- |
| **Lecture** | **Topic** |
| **1** | **Data Structures Introduction and pointers** |
| **2** | **CPP & Algorithm basics** |
| **3** | **ADT Unsorted List (Array based)** |
| **4** | **ADT Unsorted List (Linked List)** |
| **5** | **ADT Unsorted List (Linked List)** |
| **6** | **ADT Sorted List (Array)** |
| **7** | **ADT Sorted List (Linked List)** |
| **8** | **ADT Stack and Queue** |
| **9** | **ADT Stack and Queue (Continued)** |
| **10** | **Programming with Recursion** |
| **11** | **Binary Search Tree** |
| **12** | **Binary Search Tree(Continued)** |
| **13** | **\*\*\*Midterm Exam\*\*\*\*** |
| **14** | **Binary Search Tree(Continued)** |
| **15** | **Heaps** |
| **16** | **Priority Queue, Huffman Coding** |
| **17** | **Graphs** |
| **18** | **Graphs, BFS, DFS** |
| **19** | **Graph(Continued)** |
| **20** | **Sorting Algorithms** |
| **21** | **Sorting Algorithms** |
| **22** | **Hashing** |
| **23** | **Hashing (Continued)** |
| **24** | **Review and/or Project Presentation** |
|  |  |