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| Jjjj | nn | | | | | | |
| 1 | Faculty | | | Faculty of Science and Engineering (FSE) | | | |
| 2 | Department | | | CSE | | | |
| 3 | Programme | | | B.Sc. in CSE | | | |
| **4** | **Name of Course** | | | Data Structures Lab | | | |
| **5** | **Course Code** | | | CSE 106 | | | |
| **6** | **Trimester** | | | Summer 2022 | | | |
| **7** | **Pre-requisites** | | | CSE 103 | | | |
| **8** | **Status** | | | Core CSE Course | | | |
| **9** | **Credit Hours** | | | 1.5 | | | |
| **10** | **Section** | | | 213D1, 213D2, 213D3, 213D4, 213D5, 213D6, 213D7, 213D8, 213EA, 213EB,  PC-213 DA, PC-213 DB, PC-213 DC, PC-213DD, PC-213 EM | | | |
| **11** | **Class Hours** | | | | **Section** | **Class Day** | **Class Hours** | **Venue** | | --- | --- | --- | --- | | 213 D1 | Monday | 11:30 AM - 3:00 PM | C-603 | | 213 D2 | Monday | 11:30 AM - 3:00 PM | B-803 | | 213 D3 | Monday | 3:00 PM - 6:00 PM | B-801 | | 213 D4 | Wednesday | 11:30 AM - 3:00 PM | B-803 | | 213 D5 | Tuesday | 11:30 AM - 3:00 PM | B-1006 | | 213 D6 | Thursday | 3:00 PM - 6:00 PM | B-801 | | 213 D7 | Thursday | 11:30 AM - 3:00 PM | B-803 | | 213 D8 | Tuesday | 11:30 AM - 3:00 PM | D-802 | | 213 EA | Wednesday | 6:00 PM- 8:30 PM | B-801 | | 213 EB | Thursday | 6:00 PM - 8:30 PM | B-803 | | PC-213 DA | Wednesday | 09:00 AM - 12:00 PM | PCR-502 | | PC-213 DB | Wednesday | 02:00 PM - 05:00 PM | PCR - 409 A | | PC-213 DC | Wednesday | 02:00 PM - 05:00 PM | PCR - 501 | | PC-213 DD | Thursday | 09:00 AM - 12:00 PM | PCR - 501 | | PC-213 EM | Friday | 10:30 AM - 1:00 PM | PCR - 409 A | | | | |
| **12** | **Class Location** | | | Please find the class location in the section 11 (Class Hours) | | | |
| **13** | **Course website** | | | **Google Classroom Link (Section)**  https://classroom.google.com/c/NTMyNjI4OTA5OTM0 (213 D1)  <https://classroom.google.com/c/NTM0NDg2NTU0MDA0> (213 D2)  <https://classroom.google.com/c/NTMyNjI4OTA5OTg3> (213 D3)  <https://classroom.google.com/u/0/c/NDk2MTE2MDczMzc4> (213 D4)  <https://classroom.google.com/c/NDk2MDU5Nzg5MDgw?cjc=6arkigr> (213 D5)  <https://classroom.google.com/c/NDk1OTg0MDg4MDI5> (213 D6)  <https://classroom.google.com/u/0/c/NDk1OTg2MTY4NDY3>(213D7)  <https://classroom.google.com/u/0/c/NDk1OTg2MTY4NjY5>(213D8)  <https://classroom.google.com/c/NTMyNjI4OTEwMDY2> (213 EA)  <https://classroom.google.com/c/NTMyNDYwNzU1NTc1?cjc=yyug6yf> (213 EB)  <https://classroom.google.com/c/NDk2MDcwMjY3OTE5> (PC-213 DA)  <https://classroom.google.com/c/NDk2MDcwMjY4MDUz> (PC-213 DB)  <https://classroom.google.com/u/2/c/NDk1OTQwMDM3ODMz> (PC-213 DC)  <https://classroom.google.com/u/2/c/NDk1OTQwMDM3ODkz> (PC-213 DD)  <https://classroom.google.com/c/NDk2MDcwMjY4NDYx> PC-213EM) | | | |
| **14** | **Instructor** | | | Dr. Md. Mostafijur Rahman (213 D4)  Tamim Al Mahmud (213 D1, 213 D3, 213 EA)  Fatema Akter (213 D2)  Humayan Kabir Rana (213 D5)  Ahmed Iqbal Pritom (213 D6)  MD. Naimul Pathan (213 EB)  Md. Moshiur Rahman(213D7, 213 D8)  Farhana Akter Sunny (PC-213 DA, PC-213 DB, PC-213EM)  Md. Sultanul Islam Ovi (PC-213 DC, PC-213 DD) | | | |
| **15** | **Contact** | | | **Instructor’s Email (Sections)**  [**tamim@cse.green.edu.bd**](mailto:tamim@cse.green.edu.bd) **(213 D1, 213 D3, 213 EA)**  [**mostafijur@cse.green.edu.bd**](mailto:mostafijur@cse.green.edu.bd)  [**fatema\_akter@cse.green.edu.bd**](mailto:fatema_akter@cse.green.edu.bd) **(213 D2)**  [**humayan@cse.green.edu.bd**](mailto:humayan@cse.green.edu.bd) **(213 D5)**  [**naimul@cse.green.edu.bd**](mailto:naimul@cse.green.edu.bd) **(213 EB)**  [**iqbal@cse.green.edu.bd**](mailto:iqbal@cse.green.edu.bd) **(213 D6)**  [**moshiur@cse.green.edu.bd**](mailto:moshiur@cse.green.edu.bd) **(213D7, 213D8)**  [**farhana@cse.green.edu.bd**](mailto:farhana@cse.green.edu.bd)  [**sultanul@cse.green.edu.bd**](mailto:sultanul@cse.green.edu.bd) | | | |
| **16** | **Office** | | | (Same as the counseling venue) | | | |
| **17** | **Counselling Hours** | | | | **Section** | **Day** | **Counseling Hours** | **Venue** | | --- | --- | --- | --- | | 213 D1 | Wednesday | 4:30 PM - 6:00 PM | B-517 | | 213 D2 | Monday | 09:00 AM - 11:30 PM | C-605 | | 213 D3 | Wednesday | 4:30 PM - 6:00 PM | B-517 | | 213 D4 | Thursday | 3:30 PM - 6:00 PM | A-212 | | 213 D5 | Friday | 3:00 - 6:00 PM |  | | 213 D6 | Wednesday | 4:30 PM - 6:00 PM | B - 502 | | 213 D7 | Monday | 4:30 PM - 6:00 PM | C-501 | | 213 D8 | Wednesday | 4:30 PM - 6:00 PM | C-501 | | 213EA | Friday | 2:00PM - 3:30PM | B-517 | | 213EB | Wednesday | 12:00 PM - 1:30 PM | C-605 | | PC-213 DA | Monday | 09:00 AM - 12:00 PM | PCR-406 | | PC-213 DB | Monday | 09:00 AM - 12:00 PM | PCR-406 | | PC-213 DC | Wednesday | 09:00 AM - 12:00 PM | PCR - 510 | | PC-213 DD | Wednesday | 09:00 AM - 12:00 PM | PCR - 510 | | PC-213 EM | Friday | 09:00 AM - 10:30 AM | PCR - 406 | | | | |
| **18** | **Text Book** | | | 1. Mehlhorn, K. (2013). Data structures and algorithms 1: Sorting and searching (Vol. 1). Springer Science & Business Media. | | | |
| **19** | **Reference** | | | 1. Chang, S. K. (Ed.). (2003). Data structures and algorithms (Vol. 13). World Scientific. 2. Cormen, T. H. (2009). Introduction to algorithms. MIT press. 3. Goodrich, M. T., &Tamassia, R. (2008). Data structures and algorithms in Java. John Wiley & Sons. | | | |
| **20** | **Equipment & Aids** | | | Bring your notebook. Code Block software is installed in the respective laboratory computers. Do collect the software named “Code Block” for home practice. | | | |
| **21** | **Course Rationale** | | | Development of application systems and software that use underlying architecture of machines efficiently and effectively requires the ability to use and manipulate various types of Data Structures and other constructs. The course focuses on the common structures used to store data and the standard algorithms for manipulating them. Standard data structures include lists, stacks, queues, trees, heaps, hash tables, and graphs. Standard algorithms include searching, sorting, and traversals. Along with implementation details, students will learn to analyze the time and space efficiency of algorithms and how to select appropriate data structures and algorithms for a specific application. In homework’s, labs and programming projects, students will implement their own data structures and make use of existing libraries to solve a variety of computational problems. | | | |
| **22** | **Course Description** | | | Internal data representation; Abstract data types; Elementary data structures: arrays, linked lists, stacks, queues, trees and graphs; basic data structures operations: traversal, insertion, deletion, searching, merging, sorting, Tree; Tree traversal and graph traversal; Recursion and recursive algorithm, Pattern matching; Advanced data structures: heaps, Fibonacci heaps; Search trees: Binary search trees, AVL trees, multi-way search trees; sorting, hashing. | | | |
| **23** | **Course Outcomes (CO)** | | | After completing this course students will be able to-  **CO1**: Analyze the performance of linear and non-linear data structures’ operations. [Cognitive]  **CO2:** Design appropriate data structures for solving real life complex computing problem. [Cognitive]  **CO3:** Demonstrate team working skills in selecting the most efficient data structure in terms of time and space complexities while addressing a moderately complex real life problem. [Psychomotor] | | | |
| **24** | **Teaching Methods** | | | Lecture, Laboratory experiments, Project developments. | | | |
| **25** | **Topic Outline** | | | | | | |
|  | **Class** | **Topics or Assignments** | | | **COs** | **Reading Reference** | **Activities** |
| 1 | Basic operations of one dimensional and two-dimensional array and Implementation of array insertion, deletion | | | 1-2 |  | Laboratory  Experiment |
| 2 | Linear search and binary search. | | | 2 |  | Laboratory  Experiment |
| 3 | Implementation of bubble sort, insertion sort, selection sort | | | 1-2 |  | Laboratory  Experiment |
| 4 | Implementation of linked list: traversal, insertion and deletion. | | | 2 |  | Laboratory  Experiment |
| 5 | Implementation of stack ( using array and Linked List) | | | 1-2 |  | Laboratory  Experiment |
| 6 | Implementation of queue. | | | 1-2 |  | Laboratory  Experiment |
| 7 | Implementation of graph traversing using DFS and BFS | | | 1-2 |  | Laboratory  Experiment |
| 8 | Implementation of Prims or Kruskal algorithm | | | 1-2 |  | Laboratory  Experiment |
| 9 | Implementation of Binary tree and its traversing | | | 1-2 |  | Laboratory  Experiment |
| 10 | Implementation of binary search tree and its operations | | | 1-2 |  | Laboratory  Experiment |
| 11 | Project Presentation | | |  |  | Project Presentation |
|  | 12 | Final Term Examination (Lab test, Viva) | | |  |  | Lab test, Viva |
|  | | | | | | | |
| **26** | **Assessment and Marks Distribution:** | | Students will be assessed on the basis of their overall performance in all the exams, quizzes, and class participation. Final numeric reward will be the compilation of (tentative):   * Attendance (10%) * Capstone Project (25%) * Continuous Lab Performance (CLP) (25%) * Lab Report (LR) (10%) * Final Exam (FE) (30%--20%+viva 10%) | | | | |
| **27** | **Assessment Methods of Cos** | | Assessment methods of COs are given below:   |  | **Course Outcomes** | | | | --- | --- | --- | --- | | **Assessment Methods** | **CO1** | **CO2** | **CO3** | | Attendance , Lab Report |  | 10% | 10% | | Capstone Project | 10% | 15% |  | | Continuous Lab Performance | 15% | 10% |  | | Final Exam | 20% | 10% |  | | **Total (100%)** | **45%** | **45%** | **10%** | | | | | |
| **28** | **Mapping of COs with PLOs** | | Mapping of COs with program outcomes (POs) are given below:   | **Program Outcomes (PLOs)** | | | | | | | | | | | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | | **CO1** |  | **√** |  |  |  |  |  |  |  |  |  |  | | **CO2** |  |  | **√** |  |  |  |  |  |  |  |  |  | | **CO3** |  |  |  |  |  |  |  |  | **√** |  |  |  | | | | | |
| **29** | **Grading Policy** | | The following chart will be followed for grading. This has been customized from the guideline provided by the School of Engineering and Computer Science.   | **A+** | **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **D** | **F** | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 80 and above | 75-<80 | 70-<75 | 65-<70 | 60-<65 | 55-<60 | 50-<55 | 45-<50 | 40-<45 | <40 | | | | | |
| **29** | **Additional Course Policies** | | 1. 1. Lab Reports:  Report on previous Experiment must be submitted before the beginning of new experiment. A bonus may be obtained if a student submits a neat, clean and complete lab report.  2. 2. Examination:  There will be a final exam both of which will be closed book.  3. 3. Unfair means policy:  In case of copying/plagiarism in any of the assessments, the students involved will receive zero marks. Zero Tolerance will be shown in this regard. In case of severe offences, actions will be taken as per university rule.  4. 4. Counseling:  Students are expected to follow the counseling hours posted. In case of emergency/unavoidable situations, students can email me to make an appointment.  5. 5. Policy for Absence in Class/Exam:  If a student is absent in the class for anything other than medical reasons, he/she will not receive attendance. If a student misses a class for genuine medical reasons, he/she must submit an application with the supporting documents (prescription/medical report). He/she will then have to follow the instructions given by the instructor for make-up.  In case of absence in the final exam for medical grounds, the student must also get his/her application forwarded by the head of the department before a make-up exam can be taken.  It is recommended that the students inform the instructor beforehand through mail if they feel that they will miss a class/evaluation due to medical reasons. | | | | |
| **30** | **Additional Information** | | 1. Academic Calendar Summer 2022   http://www.green.edu.bd/academics/academic-calendar.   1. Academic Information and Policies: http://www.green.edu.bd/academics/academic-rules-a-regulations. 2. Grading and Performance Evaluation: http://www.green.edu.bd/academics/academic-rules-a-regulations. 3. Proctorial Rules: http://www.green.edu.bd/administrator/proctors-office. | | | | |