



**Prince Sultan University**  
**College of Computer and Info Sciences / Department of Computer Science**  
**Term 232**  
**2nd Semester 2023 – 2024**

**COURSE SYLLABUS**

1. **Course number and name:** CS210 Data Structures and Algorithms
2. **Credits and contact hours:** 3 credits and 4 contact hours (Lectures: 3 Tutorials:1 Lab:0)
3. **Instructor's or course coordinator's name:** Dr. Basit Qureshi
  - a. **Scheduled Office Hours:** As posted on the office door.
  - b. **Office Location:** Building 105 – 2B 20
  - c. **Email:** qureshi@psu.edu.sa
4. **Text book, title, author, and year**
  - a. **Primary Text:** [Good] Data structures and algorithms in Java, M. Goodrich, R. Tamassia, 2014, 6th Edition, Wiley, ISBN 978-0-470-39880- 7.
  - b. **Other References:**
    - [SW] Algorithms, 4th Edition by Robert Sedgewick and Kevin Wayne, Addison-Wesley Professional, ISBN-13: 978- 0321573513
    - [CLR] Thomas R. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, Introduction to Algorithms, Second edition, MIT Press, 2001; ISBN: 0-262-03293-7
    - [Online book] John Bullinaria, Lecture Notes on Data Structures, [<https://www.cs.bham.ac.uk/~jxb/DSA/dsa.pdf>]
  - c. **Course Website:** <https://www.ieeepsu.org/basit/cs210>
  - d. **Learning Management System:** Moodle available at <https://lms.psu.edu.sa>
  - e. **Online Class handle (if applicable):**  
N/A
5. **Specific course information**
  - a. **Brief description of the content of the course (catalog description):**  
This course introduces classical data structures and algorithms with emphasis on performance using asymptotic analysis of algorithms and complexity classes. Fundamental data structure includes lists, stacks, queues, heaps, trees, and graphs. The student will learn a variety of algorithms for searching, sorting, traversing and hashing. In addition, the course covers the application of these data structures and algorithms in real-life problems and implementing them in modern programming languages.
  - b. **Prerequisites or co-requisites:** CS102 Programming II
  - c. **Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program:** Required as a Core course in BSc CS, BSc IS and BSc SE programs.
6. **Specific goals for the course**
  - a. **Specific outcomes of instruction. The student will be able to:**



CLO1: Describe fundamental data structures and their related algorithms including lists, stacks, queues, trees and their types, heaps, and graphs.

CLO2: Demonstrate understanding of run-time analysis for manipulating data using fundamental data structures and their related algorithms.

CLO3: Understand Hash-functions and hash tables for faster data storage and access.

CLO4: Write programs to apply data structures and algorithms.

- b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course. The course addresses ABET SOs 1, and 2.

Course LOs #	Student Outcomes (SOs)		
	Computer Science	Information Systems	Software Engineering
1	SO1	SO1	SO1
2	SO1	SO1	SO1
3	SO1	SO1	SO1
4	SO2	SO2	SO2

#### 7. Brief list of topics to be covered

Week No.	Topics	Assessments
1	Linked objects and Data Structures	
2-3	Linked Lists, Single, Double, Circular	
4-5	Analysis of Iterative and recursive algorithms	Quiz 1
6-7	Sorting Algorithms: Selection, Insertion, Merge and Quick Sorts	Major Exam 1
8	Basic data structures: Stacks and Queues	
9-10	Binary trees, BST and AVL Trees	Quiz 2
	<b>Ramadhan Break</b>	
11-12	Heaps, Priority queues	Major Exam 2
13	Hashing: Chaining, Probing	
14-15	Directed and Undirected Graphs	

#### 8. Weight of Assessments

- 2 Major Exams 30%
  - **Major 1 (unified)** on Monday, February 19, 2024 at 12:00 pm to 1:00 pm.
  - **Major 2 (unified)** on Monday, April 29, 2024 at 12:00 pm to 1:00 pm
- 2 Quizzes 10%



- 2 Projects 15%
- Class Attendance and Participation 5%
- Final Exam 40% - During the Final Exams period (**unified**)

### 9. Additional Information

**Plagiarism and Academic Dishonesty:** “Plagiarism can be defined as unintentionally or deliberately using another person’s writing or ideas as though they are one’s own. Plagiarism includes, but is not limited to, copying another individual’s work and taking credit for it, paraphrasing information from a source without proper documentation, and mixing one’s own words with those of another author without attribution. In addition, buying a paper or project, or downloading a paper from the Internet, and submitting them as your own are also plagiarism. The penalty for academic dishonesty will bring course expulsion and failure, or even suspension” (Academic Integrity and Syllabus Acknowledgement Form).

**Attendance Policies:** The University attendance policy will be strictly followed. Students are expected to attend all class sessions and be in class on-time. Attendance is taken during the first few minutes of the class. Missing a class session is a student’s responsibility. Missed classes will not be repeated. A total of **16** absences will lead to denial grade DN. It is the student’s responsibility to periodically check course website for course content, projects assignments, updates and notifications.

#### **New attendance policy of 5 marks for attendance:**

	No Deduction	1-mark Deduction	2-mark Deduction	3-mark Deduction	4-mark Deduction	5-mark Deduction	DN
Four Times Weekly	Total of or less than 3 absences	Total of 4 absences	Total of 7 absences	Total of 10 absences	Total of 13 absences	Total of 15 absences	Total of 16 absences

**Exam Policies:** Major exams are unified among all sections (if applicable) and their dates are announced from the onset of the semester. Arrangements with the Registration Office and the department are made before the beginning of the semester so that all sections will take the same exam and during the same time. It is not possible to reschedule any major exam. No student is allowed to take any assessment with another section unless there is a strong argument and in limited cases, to be approved by the course coordinator at least two days BEFORE the quiz date of the original student section. If any student missed an assessment, the makeup will be at the end of the semester and all the materials are included (comprehensive assessment). Makeup exam will only be approved in limited cases as stipulated in the university bylaws. Generally, the final exam includes all material covered during the semester (comprehensive).

**Assignment/Project Policies:** Students are expected to actively participate in class discussion and activities. Students are expected to solve the assignment and submit the solution during the concerned tutorial session. Late assignments are not accepted. However, lowest score assignment is dropped. It is the student’s responsibility to check/test/verify/debug the code before submission. It is the student’s responsibility to verify that all files have been uploaded to the LMS. For each project, instructor will provide 1-2 sample test-cases to verify the execution of your program. After an assignment/project has been graded, re-submission with an intention to improve an assignments scores will not be allowed. After the assignment/project has been graded, the instructor will post test-cases used for grading on the website. The Instructor has the right to share project execution reports that may have been auto-generated on the course website.