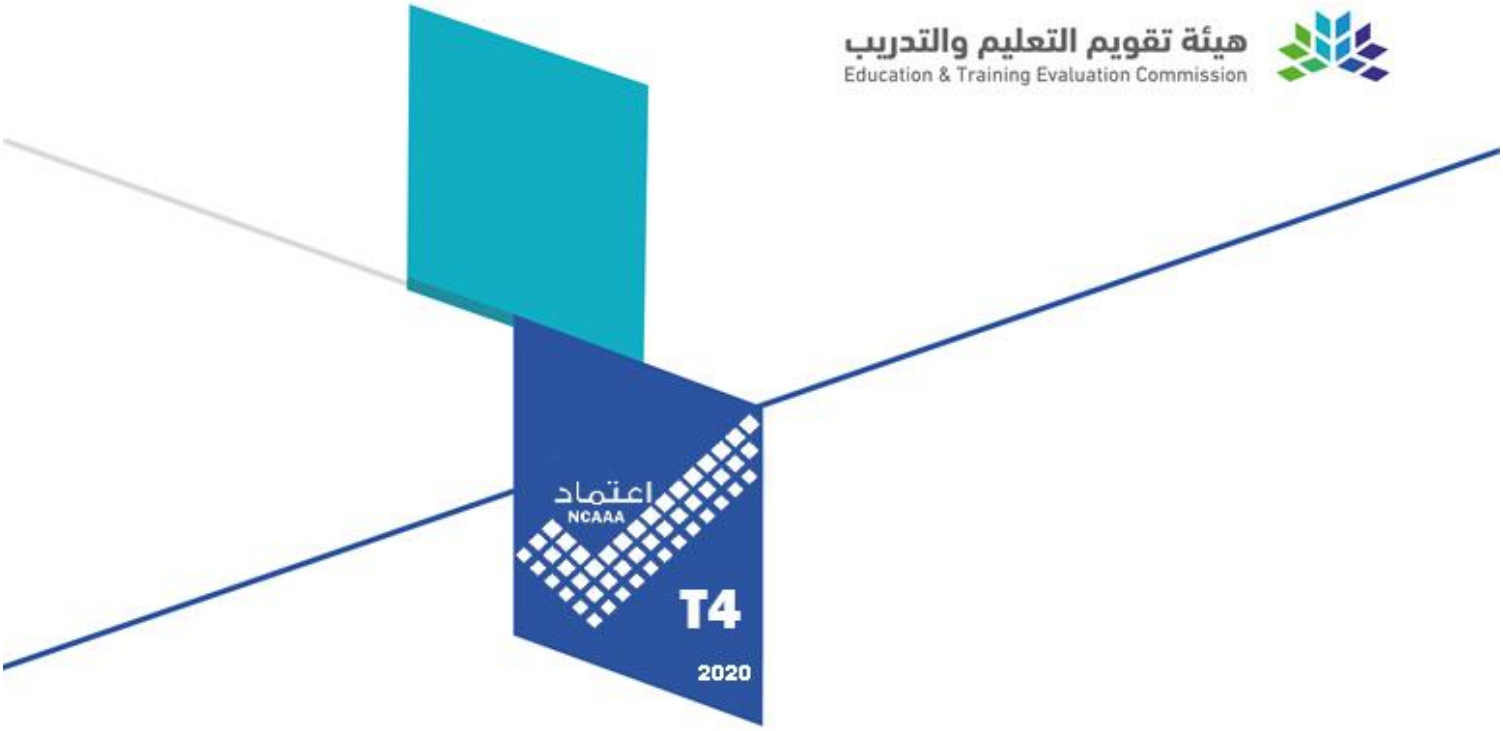
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Data Structures**
Course Code:	**CS231**
Program:	**Computer Science**
Department:	**Computer Science**
College:	**College of Computer and Information Sciences**
Institution:	**Majmaah University**

Table of Contents

A. Course Identification

1. Credit hours:	3 (3+0+1)
2. Course type	
a.	University ☐ College ☑ Department ☐ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered:	**Level-6 / 2**
4. Pre-requisites for this course (if any)**:**	**CS 211**
5. Co-requisites for this course (if any)**:**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	44	100
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	33
2	**Laboratory/Studio**	
3	**Tutorial**	11
4	**Others** (specify)	
	Total	44

B. Course Objectives and Learning Outcomes

1. Course Description

The purpose of this course is to provide the students with solid foundations in the basic concepts of programming data structures and algorithms. The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter. This course is also about comparing algorithms and studying their correctness and computational complexity. This course offers the students a mixture of theoretical knowledge and practical experience using C++.

2. Course Main Objective

The main objective of the course is to teach the students how to select and design data structures and algorithms that are appropriate for problems that they might encounter. This course is also about comparing algorithms and studying their correctness and computational complexity. This course offers the students a mixture of theoretical knowledge and practical experience using C++.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understanding the variety of data structures such as stack, queue, hash tables, trees and graph	K1
1.2		
1.3		
1...		
2	**Skills :**	
2.1	Able to implement the insert, delete, and search operations on all the structures presented such as the efficiency trade-offs of using arrays, hash tables, linked lists, and trees.	S1
2.2	Implement and evaluate some of data structure such as stack, queue and graph structure is required to solve a problem.	S2
2.3		
2...		
3	**Values:**	
3.1	Students learn how to solve problems using algorithms and data structures. They work as team in mini project and do exam individually	V1
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Data Design and Implementation (algorithm analysis, growth of functions, ADTs)	4
2	Unsorted lists (Array-based, Linked Lists)	4
3	Stacks (Array-based, Linked Lists)	6
4	Queues (Array-based, Linked Lists)	6
5	Programming with Recursion, Binary Search Trees	4
6	Hashing	6
7	Graphs (DFS, BFS)	6
8	Sorting (selection, bubble)	4
9	Searching,	4
10		
11		
Total		44

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1			
1.2			

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
…			
2.0	**Skills**		
2.1	Able to implement the insert, delete, and search operations on all the structures presented such as the efficiency trade-offs of using arrays, hash tables, linked lists, and trees.	Classroom Teaching	Class Test, Mid Exam, Final Exam
2.2	Implement, and evaluate some of data structure such as stack, queue and graph structure is required to solve a problem.	Mini Project, Lab Exercises	Lab Based Assignments, Mini Project
…			
3.0	**Values**		
3.1	Students learn how to solve problems using algorithms and data structures. They works as team in mini project and do exam individually	Classroom Teaching, Mini Project	Class Test, Mid Exam, Final Exam
3.2			
…			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	Week 4 and 8	5%
2	Assignments	Week 3, 7 and 9	15%
3	Mid Term	Week 7	25%
4	Project	Every Week	15%
5	Final Exam	Week 12	40%
6			
7			
8			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- Each student is allotted to an academic advisor for guidance and counselling.
- Available for a minimum of 4 hours per week/course, as communicated to the students.
- Student also contacts through social networking websites / D2L/ Email for advice and consultations

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	**Nell Dale, "C++ Plus Data Structures", Jones & Bartlet Learning; 5th ed. (2011). ISBN-10: 1449646751, ISBN-13: 978-1449646752.**	
Essential References Materials		
Electronic Materials		
Other Learning Materials	**Dev C++/Visual studio C++**	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Class Room, PC laboratory**
Technology Resources (AV, data show, Smart Board, software, etc.)	**LCD Projector, Dev C++/Visual studio C++**
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Final Exam Answer Scripts Verification	Peer faculty members	Review
Course Feedback	Students	Survey

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	CS Council
Reference No.	
Date	