2023

TP-153

Data Structures

Course Specification

(Bachelor)

Course Title:	Data Structures
Course Code:	CS231
Program:	Computer Science
Department:	Computer Science
College:	College of Computer and Information Sciences
Institution:	Majmaah University
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 3 (3+1+1)					
2. Course type					
A.	☐University	☒ College	☐Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level-6 / 2)					
4. Course general 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++.					
5. Pre-requirements for this course (if any)**:**					
CS 211					
6. Pre-requirements for this course (if any)**:**					
7. Course Main Objective(s):					
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. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	44	100

No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	30
5.	**Others (specify)**	
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Understanding the variety of data structures such as stack, queue, hash tables, trees and graph	K1	Classroom Teaching	Class Test, Mid Exam, Final Exam
1.2				
...				
2.0	**Skills**			
2.1	Able to implement the insert, delete, and search operations on all the structures presented such as the	S1	Classroom Teaching	Class Test, Mid Exam, Final Exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	efficiency trade-offs of using arrays, hash tables, linked lists, and trees.			
2.2	Implement and evaluate some of data structure such as stack, queue and graph structure is required to solve a problem.	S2	Mini Project, Lab Exercises	Lab Based Assignments, Mini Project
...				
3.0	**Values, autonomy, and responsibility**			
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	Classroom Teaching, Mini Project	Class Test, Mid Exam, Final Exam
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Data Design and Implementation (algorithm analysis, growth of functions, ADTs)	9
2.	Unsorted lists (Array-based, Linked Lists)	8
3.	Stacks (Array-based, Linked Lists)	8
4.	Queues (Array-based, Linked Lists)	8
5.	Programming with Recursion, Binary Search Trees	9
6.	Hashing	8
7.	Graphs (DFS, BFS)	8
8.	Sorting (selection, bubble)	9
9.	Searching,	8
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	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%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

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

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class Room, PC laboratory
Technology equipment (projector, smart board, software)	LCD Projector, Dev C++/Visual studio C++
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer faculty members	Review
Effectiveness of Students assessment	Students	Survey
Quality of learning resources		
The extent to which CLOs have been achieved		

Assessment Areas/Issues	Assessor	Assessment Methods
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**CS COUNCIL**
REFERENCE NO.	
DATE	