اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Data Structure
Course Code:	CSI 312
Program:	Computer Science &Information
Department:	Computer Science and Information
College:	College of Science at Az Zulfi
Institution:	Majmaah university

Table of Contents

A. Course Identification

1. **Credit hours:**

2. Course type

a. University ☐ College ☐ Department ☑ Others ☐

b. Required ☐ Elective ☐

3. Level/year at which this course is offered:
level 5

4. Pre-requisites for this course (if any)**:**
CSI 221 and CSI 212

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**	48	80%
2	**Blended**	6	10%
3	**E-learning**	6	10%
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

Review of Basic concepts: Definition of an algorithm, asymptotic analysis of upper and average complexity bounds. Identifying differences among best, average and worst case behaviors. Big O, little o, omega, and theta notations. Time and space tradeoffs in algorithms. Algorithms strategies

Basic algorithms: Sorting (insertion sort, merge sort), searching (linear search, binary search). Basic data structures: Lists, linked lists, double linked lists, stacks, queues. Advanced data structures: Graphs, trees, heaps, dynamic sets, and has tables

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 introducing the student to the basic concepts

of studying algorithms, 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	Recall the basic data structures and their relative advantages and disadvantages.	K1
1.2	Describe data structure types and their process (insertion, deletion , and search).	K2
1.3	Describe the common search algorithms techniques.	K3
1...		
2	**Skills :**	
2.1	An ability to implement and use common data structures	S1
2.2	An ability to implement and use data structure types (linked list, tree , stack, and queue) in storing , insertion, deletion , and searching data on a disk file	S2
2.3	Apply the common search algorithms techniques on data structures types (linked list, tree , stack, and queue) .	S2
2...	Present a short report in a written form and orally using appropriate scientific language	S3
3	**Values:**	
3.1	Communicate with teacher, ask questions, solve problems, and use computers	C1
3.2	Illustrate deal with confidence with differential equations, integrations, and differentials	C2
3.3	Operate questions during the lecture, work in groups, and communicate with each other and with me electronically, and periodically visit the sites I recommended.	C2
3...	Communicate with teacher, ask questions, solve problems, and use computers	C3

C. Course Content

No	List of Topics	Contact Hours
1	Review Basic topics of C++ Classes and Structures	8
2	Basic data structures. Arrays (Insertion & Deletion) . Sorting(non-recursive)	8
3	Linked Lists(single , doubly and circularly)	8
4	Stacks and Queues (static and dynamic)	8
5	Recursion and Sorting Algorithms	4
6	Trees	8
7	Searching algorithms	4
8	Hashing	8
9	Graphs , Networks, and File Structure	4
Total		60

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	Recall the basic data structures and their relative advantages and disadvantages.	-Developing basic communicative - Ability through short and varied situated discourse. - Lecturing - Team work - Exercises	-Homework. - Group Discussion - Presentation - Mid-term exam - Final exam
1.2	Describe data structure types and their process (insertion, deletion , and search).		
1.3	Describe the common search algorithms techniques.		
2.0	**Skills**		
2.1	An ability to implement and use common data structures	Problem solving - Class discussion - presentation -Individual meeting with the instructor (encouraging students to discuss different topics outside the classroom)	-Class Participation - Presentation - Essay Question - Research - Mid-term exam - Final exam
2.2	An ability to implement and use data structure types (linked list, tree , stack, and queue) in storing , insertion, deletion , and searching data on a disk file		
2.3	Apply the common search algorithms techniques on data structures types (linked list, tree , stack, and queue) .		
2.4	Present a short report in a written form and orally using appropriate scientific language		
3.0	**Values**		
3.1	Communicate with teacher, ask questions, solve problems, and use computers	-Exercises - Problem solving - oral quizzes - Essay questions - Encourage students to use programming by C++ or C#	-Write reports - Exercises related to -specific topics -Mid-term exam - Final exam
3.2	Illustrate deal with confidence with differential equations, integrations, and differentials		
3.3…	Operate questions during the lecture, work in groups, and communicate with each other and with me electronically, and periodically visit the sites I recommended.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	15%
2	Second written mid-term exam	12	15%
3	Presentation, class activities, and group discussion	Every week	10%
4	Homework assignments	After Every chapter	10%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
5	Implementation of presented programs	Every two weeks	10%
6	Final written exam	16	40%

*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 :
Office hours - Office call – BLACK BOARD-Email - Mobile

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Robert Sedgewick: Algorithms in C++, Parts 1-4: Fundamentals, Data Structure, Sorting, Searching, 2011, Addison-Wesley.	
Essential References Materials	Michael T. Goodrich , Roberto Tamassis, and David Mount ,Data structures& Algorithms in C++, second edition, John Wiley ,2011	
Electronic Materials	Determines as the course is going on	
Other Learning Materials	Video and presentation	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom and Lab, as those that are available at college of science at AzZulfi.
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board - data show
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	A/N

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
course evaluation	Student-faculty management meeting	Questionnaires
Evaluation of Teaching	Program/Department Instructor	Discussion within the staff members teaching the course Departmental internal review of the course.

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	
Reference No.	
Date	