



Course Specifications

Course Title:	Data Structures
Course Code:	501324-3
Program:	Bachelor in Computer Science
Department:	Department of Computer Science
College:	College of Computers and Information Technology
Institution:	Taif University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 7/3
4. Pre-requisites for this course (if any): 501222-3 (Programming 2)
5. Co-requisites for this course (if any): NON

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	5	62.5%
2	Blended	0	0
3	E-learning	0	0
4	Distance learning	0	0
5	Other (Lab)	3	37.5%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	50
2	Laboratory/Studio	30
3	Tutorial	0
4	Others (specify)	0
	Total	80

B. Course Objectives and Learning Outcomes

1. Course Description

Introduces students to development, implementation, and analysis of efficient data structures and algorithms. Topics include analysis of sorting and searching algorithms and abstract data types such as stacks, queues, linked list, trees, graphs, and hash tables.

2. Course Main Objective

To develop students' knowledge in data structures and the associated algorithms, introduce the concepts and techniques of structuring and operating on Abstract Data Types in problem solving, discuss common sorting, searching and graph algorithms, study the complexity and comparisons among these various techniques and apply and implement learned algorithm design techniques and data structures to solve problems.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding:	
1.1	Understand pointer and the linked list data structure to solve problems.	K1
1.2	Understand the stack and queues data structures to solve problems.	K1
2	Skills:	
2.1	Apply basic data structures in implementing simple applications.	S1
2.2	Apply different data structures (binary tree, binary search tree, hash, graph etc.) to solve problems	S1
2.3	Use different search and sort algorithms to analyze collection of data, and analyze algorithms using big-O notation	S1
3	Values:	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Data Structures and understanding standard data structures.	10
2	Linked Lists	10
3	Stacks and Queues	12
4	Trees	12
5	Algorithm Analysis	6
..6.	Searching and sorting Algorithms Analysis	10
7	Hash Tables	10
8	Graph	10
Total		80

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		
2.0	Skills		
2.1	Implement basic data structures in implementing simple applications.	Lectures Labs	Direct Assessment Tool Class Discussions /Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.2	Implement pointer and the linked list data structure to solve problems.	Lectures Labs	Direct Assessment Tool Class Discussions/Quizzes / Homework/Project/

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			Exams Indirect Assessment Tool Course Exit Survey
2.3	Implement the stack and queues data structures to solve problems.	Lectures Labs	Direct Assessment Tool Class Discussions/Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.4	Implement and use different data structures (binary tree, binary search tree, hash, graph.) to solve problems	Lectures Labs	Direct Assessment Tool Class Discussions /Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
2.5	Use different search and sort algorithms to analyze collection of data, and analyze simple algorithms using big-O notation	Lectures Labs	Direct Assessment Tool Class Discussions /Quizzes / Homework/Project/ Exams Indirect Assessment Tool Course Exit Survey
3.0	Values		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home Work / Students' Participation in class discussion-Attendance	Every Week	15%
2	Quizzes	Week 4 & 9	10%
3	Mid-Term and Final lab Exam	Weeks 5 & 11	15%
4	Mid-Term	Week 6	20%
5	Final Examination	Week 12	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 :

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with

his/her advisor and to provide student motivation and involvement with the institution.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program.

Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer “at risk” students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	* Text Book: Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss *Lectures Slides
Essential References Materials	Algorithms and Data Structures by N. Wirth
Electronic Materials	NON
Other Learning Materials	NON

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board. A Lab room appropriate for maximum 15 students with a personal computer, a data show and a smart board.
Technology Resources (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> Lab materials and required software
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
Effectiveness of Teaching	Students	Students’ surveys and Student’s course evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Improvement of Teaching	Course Coordinator	deficiencies based on the student Evaluation, faculty input, course file, and program assessment
Verifying Standards of Student Achievement	Curriculum Committee	<ul style="list-style-type: none"> Review CAF (Course assessment file) Alumni surveys. Periodic exchange and remarking of tests or a sample of assignments with staff at another

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.	Meeting #12
Date	23-10-1443

