



Course Specification

— (Bachelor)

Course Title: **Algorithms and Data Structures**

Course Code: **DSC 211**

Program: **Applied Statistics & Data Management**

Department: **Mathematics**

College: **College of Science**

Institution: **Majmaah University, Saudi Arabia**

Version: **2023**

Last Revision Date: **9/26/2023**



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A. General information about the course:

1. Course Identification

1. Credit hours: 3(2+2)

2. Course type

A. University College Department Track Others

B. Required Elective

3. Level/year at which this course is offered: (Level 3/2nd Year)

4. Course general Description:

You will study the fundamental data structures and algorithms that serve as the foundation for all applications in this course. You will discover how they operate and see instances from the actual world that you may use in your upcoming project.

You will learn foundational knowledge of several common data structures and associated algorithms. First, you will learn about arrays and the asymptotic analysis of algorithms. Next, you will discover several data structures including linked lists, stacks, queues, binary search trees, and hash tables. Finally, you will explore how to modify a real-world application to use these data structures to improve usability and increase performance while reducing the amount of code

5. Pre-requirements for this course (if any): **MTHS 212 Mathematical Programming I**

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

After complete this course students will be able to understand: When you're finished with this course, you will have the skills and knowledge of fundamental data structures and their algorithms needed to know when to use them in your own software development

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	75%





No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		0%
3	Hybrid <ul style="list-style-type: none"> Traditional classroom E-learning 	15	25%
4	Distance learning		0%

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		60

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	Foundational knowledge of several common data structures and associated algorithms. First, you will learn about arrays and the asymptotic analysis of algorithms	K1	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam
1.2	you will discover several data structures including	K3	Direct teaching: Inquiry-based instruction	Homework Quiz Midterms Final



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	linked lists, stacks, queues, binary search trees, and hash tables		PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Exams E-exam Oral Exam
...				
2.0	Skills			
2.1				
2.2				
2.3	you will explore how to modify a real-world application to use these data structures to improve usability and increase performance while reducing the amount of code	S3	Direct teaching: Inquiry-based instruction PowerPoints Discussions Aimed teaching: Discovery Oral questions Indirect teaching: Peer Learning	Homework Quiz Midterms Final Exams E-exam Oral Exam
3.0	Values, autonomy, and responsibility			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	foundational knowledge of several common data structures and associated algorithms	12
2.	you will learn about arrays and the asymptotic analysis of algorithms	12
3.	you will discover several data structures including linked lists, stacks, queues, binary search trees, and hash tables	12
4.	you will explore how to modify a real-world application	12
5.	Use real-world application in these data structures to improve usability and increase performance while reducing the amount of code	12





Total

60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1 & 2	6th week & 11 th week	40%
2.	Quizes	Every 2 week	10%
3.	Assignments/ Class Activities	Every 2 weel	2.5%
4.	Assignments/ Class Activities	2 time in semester	2.5%
5	Electronic Test	One time in semester 15 week	5%
6	Final	After 15th week	40%
			100%

*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	Introduction to Algorithms, Thomas H. Cormen
Supportive References	The Art of Computer Programming, Donald E. Knuth
Electronic Materials	https://www.pluralsight.com/
Other Learning Materials	https://www.programiz.com/dsa

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with capacity of 30-students. Computer Lab of Mathematics Department
Technology equipment (projector, smart board, software)	Mathematical & Statistical software packages like: 1- R, SPSS, MATHEMATICA. 2- MATLAB. 3- MAPLE. SCIENTIFIC WORKPLACE, PYTHON
Other equipment (depending on the nature of the specialty)	Desktop or laptop with internet facility



F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Effectiveness of Students assessment	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
The extent to which CLOs have been achieved	Staff members (Peer Reviewer)	Direct (Meeting between course coordinators and the tutors)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

