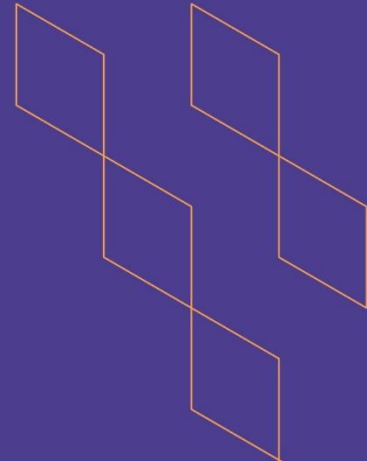




T-104
2022

Course Specification



Course Title: Data Structure
Course Code: 264 CIS-3
Program: Information system
Department: Computer Department
College: Applied college
Institution: Najran University
Version: T -104 2022
Last Revision Date: 9 Aug 2023



Table of Contents:

Content	Page
A. General Information about the course	3
1. Teaching mode (mark all that apply)	3
2. Contact Hours (based on the academic semester)	3
B. Course Learning Outcomes, Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Student Assessment Activities	6
E. Learning Resources and Facilities	6
1. References and Learning Resources	6
2. Required Facilities and Equipment	6
F. Assessment of Course Quality	7
G. Specification Approval Data	7



A. General information about the course:

Course Identification	
1. Credit hours:	3(2+1)
2. Course type	
a.	University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Track <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:	4 th semester
4. Course general Description	
Study of common Abstract Data Types (ADTs), basic data structures include arrays, design, and analysis of algorithms. Common ADTs: stack, queue, tree, linked lists, hash tables. Basic design and analysis of algorithms covers asymptotic notation, recursive algorithms, searching and sorting algorithms, graphs and trees.	
5. Pre-requirements for this course (if any):	
Not Exist	
6. Co- requirements for this course (if any):	
Not Exist	
7. Course Main Objective(s)	
The main objective of this course is a specialized format for organizing and storing data.	
Demonstrate analytical comprehension of concepts such as abstract data types (Arrays, Vectors and Linked lists), algorithms (Stacks, Queues, Searching and sorting techniques), and Complexity Analysis and Asymptotic notations.	
Design, write and analyze the performance of programs that handle structured data and perform more complex tasks and software projects.	

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3 hours per week	95%
2.	E-learning		5%
3.	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4.	Distance learning		
Total			100%





2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30 Hours
2.	Laboratory/Studio	30 Hours
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
Total		60 Hours

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	Describe basic Abstract Data Types (ADTs) and their related data structure implementations.	K1	<ul style="list-style-type: none"> Lecture Individual and group discussions 	<ul style="list-style-type: none"> Exams Assignments
1.2	Distinguish between ADTs, data structures and algorithms	K2	<ul style="list-style-type: none"> Lecture Individual and group discussions 	<ul style="list-style-type: none"> Exams Assignments
...	Calculate the costs (space/time) of data structures and their related algorithms using the asymptotic notation.	K3	<ul style="list-style-type: none"> Lecture Individual and group discussions 	<ul style="list-style-type: none"> Exams Assignments
2.0	Skills			
2.1	Explain basic concepts and techniques (recursive, sorting, searching, and graph) used in data structures.	S1	<ul style="list-style-type: none"> Lecture Brainstorming Small Group Work Lab Demonstration Project 	<ul style="list-style-type: none"> Exam Group Reports Lab Reports
2.2	Implement basic algorithms and ADTs using different data structures strategies.	S2	<ul style="list-style-type: none"> Lecture Brainstorming Small Group Work Lab Demonstration Project 	<ul style="list-style-type: none"> Exam Group Reports Lab Reports





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
...	Select the type of data structures and algorithms in problem solving	S1	<ul style="list-style-type: none"> Lecture Brainstorming Small Group Work Lab Demonstration Project 	<ul style="list-style-type: none"> Exam Group Reports Lab Reports
3.0	Values, autonomy, and responsibility			
3.1	Demonstrate projects and assignments in team work to solve data structure problems	V1	<ul style="list-style-type: none"> Lecture Brainstorming Small Group Work Lab Demonstration Project 	<ul style="list-style-type: none"> Exam Group Reports Lab Reports
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Data Structures: Definition, operation of common Abstract Data Types (ADTs).	2 2
2.	basic data structures include arrays and design and analysis of algorithms Lab: Python Programs on arrays applications.	2 2
3.	Stacks: Definition, Array representation of stack, Operations on stack: PUSH, POP Lab :Python Program operations and applications of stack	2 2
4.	Queues : Definition, Array representation of queue, Types of queues Program Lab: Python program Queue operations and applications	2 2
5.	Linked List representation, operations and applications Lab: Python program linked list application	2 2
6.	Basic design and analysis of algorithms covers asymptotic notation, recursive algorithms Lab: Python programming recursive algorithms problems	2 2
7.	Searching methods: Linear and Binary search. Trace of algorithms Lab: Python Program on Linear search	2 2
8.	Searching methods: Binary search. Trace of algorithms Python Program on Binary search	2 2
9.	Sorting methods Bubble sort and Quick sort Lab: Python programming sort methods Bubble, Quick sort	2 2
10.	Trees representation and applications Lab: Python programming trees applications	4 4
11.	Graph representation and applications	4





	Lab: Python programming Graph applications	4
12.	Hash table	4
	Lab: Python programming hash table	4
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Monthly Exam	7	20%
2.	Year duties	continuously	10%
3.	Practical exam	11	20%
...	Final exam	١٢	50%

*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	Goodrich, M. T., Tamassia, R., & Goldwasser, M. H. (2013). <i>Data structures and algorithms in Python</i> (pp. 978-1). Hoboken: Wiley.
Supportive References	Hetland, M. L. (2014). <i>Python Algorithms: mastering basic algorithms in the Python Language</i> . Apress.
Electronic Materials	https://www.tutorialspoint.com/python_data_structure/index.htm https://www.geeksforgeeks.org/python-data-structures-and-algorithms/ https://pythongeeks.org/python-data-structures/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture rooms should be large enough to accommodate the number of registered students
Technology equipment (projector, smart board, software)	Black Board/Data Show/ Python
Other equipment (depending on the nature of the specialty)	



F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Questionnaire
Effectiveness of students assessment	Staff committee	Questionnaire and exam audit
Quality of learning resources	Faculty Administration	Review and check the results
The extent to which CLOs have been achieved	Quality management in the department	A review of the measurement of learning outcomes
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE			
REFERENCE NO.			
DATE	4-05-2023		