Course Specification
(Bachelor)

Course Title:	Data Structure
Course Code:	٢٤٦CIS-٣
Program:	Information system
Department:	**computer**
College:	Applied College
Institution:	Najran University
Version:	٢
Last Revision Date:	٢٩/٣/١٤٤٦

Table of Contents

A. General information about the course:

١. Course Identification

١. Credit hours: (.....)

٢. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		

٣. Level/year at which this course is offered: (٤th level ٢nd year)

٤. 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.

٥. Pre-requirements for this course (if any)**:**

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

٧. 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.

٢. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
١	Traditional classroom	٤ hrs per week	
٢	E-learning		
٣	Hybrid • Traditional classroom • E-learning		
٤	Distance learning		

٣. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
١.	**Lectures**	٢٨
٢.	**Laboratory/Studio**	٢٨
٣.	**Field**	
٤.	**Tutorial**	
٥.	**Others (specify)**	
Total		٥٦

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
١,٠	**Knowledge and understanding**			
١,١	Describe basic Abstract Data Types (ADTs) and their related data structure implementations.	K١	Lectures/discussions in forums/seminars	Discussion-based evaluation Practical tests Application duties research
١,٢	Distinguish between ADTs, data structures and algorithms	K٢		
١,٣	Calculate the costs (space/time) of data structures and their related algorithms using the asymptotic notation.	K٣		
٢,٠	**Skills**			
٢,١	Explain basic concepts and techniques (recursive, sorting, searching, and graph) used in data structures	S١	Discussion and dialogue style / problem solving behavior / scientific statement style / workshop style / group activities / cooperative	Tests and assignments
٢,٢	Implement basic algorithms and ADTs using different data structures strategies.	S٢		

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
...	Select the type of data structures and algorithms in problem solving	S٣	education / case study style	
٣,٠	**Values, autonomy, and responsibility**			
٣,١	The student is committed to work ethics in the work environment	V١	Individual and group activities cooperative education Worksheet	Note cards
٣,٢	The student is Communicates effectively in writing and orally	V٢		
...				

C. Course Content

No	List of Topics	Contact Hours
١.	Introduction to Data Structures: Definition, operation of common Abstract Data Types (ADTs).	٤ ٤
٢.	basic data structures include arrays and design and analysis of algorithms Lab: python Programs on arrays applications.	٢ ٢
٣.	Stacks: Definition, Array representation of stack, Operations on stack: PUSH, POP Lab :python Program operations and applications of stack	٤ ٤
٤.	Queues : Definition, Array representation of queue, Types of queues Program Lab: Java program Queue operations and applications	٢ ٢
٥.	Linked List representation, operations and applications Lab: python program linked list application	٢ ٢
٦.	Hash table Lab: python programming hash table	٢ ٢
٧.	Mid-term exam Lab: Review	٢ ٢

٨.	Searching methods: Linear and Binary search. Trace of algorithms Lab: python Program on Linear search	٢ ٢
٩.	Searching methods: Binary search. Trace of algorithms Lab: python Program on Binary search	٢ ٢
١٠.	Sorting methods Bubble sort and Quick sort Lab: Python programming sort methods Bubble, Quick sort	٢ ٢
١١.	Graph representation and applications Lab: programming Graph applications	٢ ٢
Total		٥٦

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
١.	assignments	٤ , ٦	١٠٪
٢.	Midterm exam	٨	٢٠٪
٣.	**Lab exam**	١٣	٢٠٪
...	**finalexam**	١٤	٥٠٪

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

E. Learning Resources and Facilities

١. References and Learning Resources

Essential References	Data Structures and Algorithms in python, Michael T. Goodrich, Department of Computer Science,University of California, Irvine Roberto Tamassia,Department of Computer Science Brown University Michael H. Goldwasser,Department of Mathematics and Computer Science,Saint Louis University,٢٠١٣
Supportive References	
Electronic Materials	
Other Learning Materials	

٢. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A classroom equipped with a projector (imageand sound) and a smart board
Technology equipment (projector, smart board, software)	Business automation lab equipped with computers and connected to the Internet
Other equipment (depending on the nature of the specialty)	Electrical connections to use when necessary

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	students	Questionnaires
Effectiveness of Students assessment	Faculty members / quality committee / peer reviewer	Direct observation/peer review/correction of a sample by another member of a similar programmer
Quality of learning resources	Faculty members and leaders/students	Achievement file / typical tests and answers / assessments and assignments / questionnaires
The extent to which CLOs have been achieved	Planning and curricula committee/students/faculty members	Expert pinion /questionnaires/ workshops
Other	Students and faculty members	Questionnaires/note card

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	