Academic Program Description Form

University Name: Tikrit

Faculty/Institute: Science and mathematic

Scientific Department: Computer Science

Academic or Professional Program Name: Data structure

Final Certificate Name: Bachelor of Computer Science

Academic System: courses

Description Preparation Date:

File Completion Date:25/3/2024

Signature: **Signature:**

Head of Department Name: **Scientific Associate Name:**

Mohammed Akthim Ahmed   **Mashary Askar**

Date: **Date:**

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

1. Program Vision
This academic program description provides a necessary summary of the most important characteristics of the program and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the available opportunities. It is accompanied by a description of each course within the program
2. Program Mission
3. Program Objectives: The academic program in the Computer Science Department aims to:
Building the student scientifically and qualifying him to work in the field of computer science.
Building and preparing the student psychologically to play his role as a reliable programmer in this field.
Re-explaining the basics of programming to the student in the C++ language.
A general definition of data structures and how data is stored in memory.
The difference between linear and nonlinear data structures.
A detailed explanation of algorithms and how to program them.
Teaching the student to calculate the time complexity of the algorithm.
4. Program Accreditation
A- Cognitive objectives

     A1 - Knowledge of the basic concepts of data structures.

     A2 - The student learns about the importance of general concepts of algorithms.

     A3 - Identify the most important algorithms used to organize data in memory

     A4 - Study the most important factors that affect the speed of algorithm execution |

B - The skills objectives of the course
B1 - The student learns to use appropriate algorithms to organize data in memory.
B2 - Prepare qualified cadres to teach how to build and program the algorithm.
B3 - Identify how to choose the appropriate algorithm in terms of speed of implementation and utilization of memory in terms of space.

5. Other external influences
Traditional lectures and discussion style
Laboratory activities and preparing reports
Advanced lectures (presentation)
Using online class discussion on Google Classroom.
Using simulation programs prepared for this purpose on computers inside the laboratory
Use some illustrative pictures and videos that explain how the algorithms work
Courses structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method
1	4	Code Block Intro DataStructure	Code Block Intro DataStructure	Traditional lectures, discussion style, and presentation	Discussion and tests
2	4	Introduction to Data Structures	Introduction to Data Structures	Traditional lectures, discussion style, and presentation	Discussion and tests
3	4	Complexity analysis	Complexity analysis	Traditional lectures, discussion style, and presentation	Discussion and tests
4	4	Array	Array	Traditional lectures, discussion style, and presentation	Discussion and tests
5	4	Array	Array	Traditional lectures,	Discussion and tests

		Implementation	Implementation	discussion style, and presentation	
6	4	Represent arrays in memory	Represent arrays in memory	Traditional lectures, discussion style, and presentation	Discussion and tests
7	4	Vector	Vector	Traditional lectures, discussion style, and presentation	Discussion and tests
8	4	Stack	Stack	Traditional lectures, discussion style, and presentation	Discussion and tests
9	4	Stack Operations and Applications of Stack	Stack Operations and Applications of Stack	Traditional lectures, discussion style, and presentation	Discussion and tests
10	4	Expression Parsing	Expression Parsing	Traditional lectures, discussion style, and presentation	Discussion and tests
11	4	Infix to Postfix Notation Evaluation of Postfix Expression	Infix to Postfix Notation Evaluation of Postfix Expression	Traditional lectures, discussion style, and presentation	Discussion and tests
12	4	Introduction to Queues	Introduction to Queues	Traditional lectures, discussion style, and presentation	Discussion and tests
13	4	Array Representation of Queue	Array Representation of Queue	Traditional lectures, discussion style, and presentation	Discussion and tests
14	4	Circular Queue-Array	Circular Queue-Array	Traditional lectures, discussion style, and presentation	Discussion and tests
Second Courses					
1	4	Intro of pointer	Explain code of pointer	Traditional lectures, discussion style, and	Discussion and tests

					presentation	
2	4	Intro Linked list and type of linked list	Intro Linked list and type of linked list	Traditional lectures, discussion style, and presentation	Discussion and tests
3	4	Single Linked Lists	Single Linked Lists	Traditional lectures, discussion style, and presentation	Discussion and tests
4	4	Linked Lists Functions	Linked Lists Functions	Traditional lectures, discussion style, and presentation	Discussion and tests
5	4	Reverse List	Reverse List	Traditional lectures, discussion style, and presentation	Discussion and tests
6	4	Binary Search Tree	Binary Search Tree	Traditional lectures, discussion style, and presentation	Discussion and tests
7	4	Insertion in a BST		Traditional lectures, discussion style, and presentation	Discussion and tests
8	4	Deletion in a BST	Insertion in a BST	Traditional lectures, discussion style, and presentation	Discussion and tests
9	4	Searching a Binary Search Tree Tree Traversals		Traditional lectures, discussion style, and presentation	Discussion and tests
10	4	Graphs Basic Terminologies	Deletion in a BST	Traditional lectures, discussion style, and presentation	Discussion and tests
11	4	Representation of Graph Operations on Graph		Traditional lectures, discussion style, and presentation	Discussion and tests
12	4	Breadth First Search	Searching a Binary Search	Traditional lectures, discussion	Discussion and tests

		Depth First Search	Tree	style, and presentation	
13	4	Bubble Sort Selection Sort	Tree Traversals	Traditional lectures, discussion style, and presentation	Discussion and tests
14	4	Insertion Sort Quick Sort	Intro of Graph	Traditional lectures, discussion style, and presentation	Discussion and tests
15	4	Heap Sort	Representation of Graph	Traditional lectures, discussion style, and presentation	Discussion and tests

13. Course development plan
Plans are made to develop the students' personalities by holding discussion sessions with them and asking them to submit weekly reports Vocabulary changes annually by 10% based on modern sources.

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15. The most important sources of information about the program
College website. The department's website and email.

16. Infrastructure	
A- Required textbooks:	Vinu V Das, *Principles of Data Structures Using C and C++*
B- Main references (sources)	• Lectures presented by the subject teacher • Books available in the college library
C- Recommended books and references (scientific journals, reports,...)	• Ramesh Vasappanavara, Anand Vasappanavara, *Data Structures using C by practice*, • D.S. MALIK, *Data Structures Using C++*, 2nd Edition,

	Robert L. Kruse, Alexander J. Ryba, *Data Structures and Program Design in C++*,
D- Electronic references, Internet sites	Any other materials available on the web.