Ministry of Higher Education
and Scientific Research – Iraq
Al-Mustaqbal University College
College of Sciences

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**DATA STRUCTURES**	**Module Delivery**
Module Type	**BASIC**	
Module Code	**uomu0304032**	- Theory Lecture - Lab Tutorial - Practical Seminar
ECTS Credits	**5**	
SWL (hr/sem)	**125**	

Module Level	2	Semester of Delivery	3
Administering Department	Department of Artificial Intelligence	**College**	College of Sciences
Module Leader	Asst. Lec Sarmad salih	**e-mail**	Sarmad.salih@uomus.edu.iq
Module Leader's Acad. Title	**Asst. Lec**	**Module Leader's Qualification**	**M.Sc.**
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	

Relation With Other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		**Semester**	None
Co-requisites module	Sorting and Searching Algorithms		**Semester**	4
Module Aims, Learning Outcomes and Indicative Contents				
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية				

Module Aims أهداف المادة الدراسية	• Getting to know the concept of data structures • Knowing the functions of data structures • Getting to know the application of data structures
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental concepts of data structures and their importance in programming. 2. Learn about linear data structures such as arrays, linked lists, stacks, and queues. 3. Study non-linear data structures, including trees (binary trees, binary search trees, AVL trees, etc.) and graphs. 4. Analyze the time and space complexities of various data structure operations. 5. Implement data structures using programming languages and apply them to solve real-world problems. 6. Learn about algorithms for searching, sorting, and traversing data structures.
Indicative Contents المحتويات الإرشادية	Introduction of data structures, type of data structures, memory representation for 1D and 2D, linear list, stack operations, applications of stack, queue operations, applications of queue, circular queue, linked list, linked stack, linked queue.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Lectures (Theoretical and Practical) 1- Enhance the student's ability to build programs 2- Develop these programs

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 3 and 6
	Assignments	2	10% (10)	2, 12	LO #3, 4, 5 and 6
	Projects / Lab	1	10% (10)	Continuous	

	Report	1	10% (10)	13	LO #4, 5 and 6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 to 6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

<div dir="rtl">المنهاج الاسبوعي النظري</div>

	Material Covered

Week 1	➢ **Introduction to data structures:**
	  • How to choose the suitable data structure
	  • Types of sata structures

Week 2	➢ **Memory Representation** • Introduction to abstract data type

Week 3	• Stack, The stack abstract data type
	  • Array stack
	  • Stack operations
	  • Time complexity of these operations

Week 4	➢ **Applications of stack operations**

Week 5	➢ **The queue abstract data type**
	  • Queue operations
	  • Time complexity of operations

Week 6	➢ **Circular queue and priority queues:**
	  • The abstract data type
	  • Operations

Week 7	➢ **Lists:** • **Array list**
Week 8	➢ **The array list abstract data type**

Week 9	➢ **Linked List**
	  • Storage Allocation
	  • Pointers
	  • Linked list abstract data type

Week 10	➢ **Traversing a linked list** ➢ **Linked list operations**

Week 11	➢ **Linked list design modification:**
	  • Circular linked list
	  • Circular linked list operations

Week 12	➢ **Traversing circular linked list**

Week 13	➢ **Linked list design modification:**
	  • Doubly linked list
	  • Doubly linked list operations

Week 14	➢ **Linked stack, linked queue, Linked circular**
Week 15	**Queue Operations**

Week 16	Final Exam	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	➢ **Applications of stack operations**
Week 2	➢ **The queue abstract data type** • Queue operations • Time complexity of operations
Week 3	➢ **Circular queue and priority queues:** • The abstract data type • operations
Week 4	➢ **Lists** • Array list • The array list abstract data type
Week 5	➢ **Lists** ➢ **Array list** ➢ **The array list abstract data type**
Week 6	➢ **Linked list** • **Storage allocation** • **Pointers** • **Linked list abstract data type**
Week 7	**Traversing a linked list** - **Linked list operations**
Week 8	**Linked List design modification:** - **Circular linked list** - **Circular linked list operations**
Week 9	➢ **Traversing circular linked list**
Week 10	**Linked list design modification:** - **Doubly linked list** - **Doubly linked list operations**
Week 11	➢ **Linked stack, linked queue, linked circular**
Week 12	➢ **Queue operations**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	[1] Michael McMillan, "Data Structures and Algorithms Using C#", 2007. [2] Thomas H. Corman, Charles E. Leiseron "Introduction to Algorithms", 2009.	Yes
Recommended Texts	Special requirements (include for example workshops, periodicals, IT software, websites).	No

Websites	

APPENDIX

Group	Grade	التقدير	Marks (%)	Definition
GRADING SCHEME مخطط الدرجات				
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.