



Ministry of Higher Education and
Scientific Research - Iraq
Al-Mustaqlal University
Department of Cyber Security



MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	DATA STRUCTURES			Module Delivery	
Module Type	BASIC			Theory Lecture Lab Tutorial Practical Seminar	
Module Code	UOMU033032				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2	Semester of Delivery		3	
Administering Department	Cyber Security Dept.	College	Sciences		
Module Leader	Dr. Ali Kadhum M. Al-Qurabat	e-mail	ali.kadhum.mohammed@uomus.edu.iq		
Module Leader's Acad. Title	Assist Prof.	Module Leader's Qualification		Ph.D.	
Module Tutor	None	e-mail	None		
Peer Reviewer Name		e-mail			
Review Committee Approval		Version Number			

<h3 style="text-align: center;">Relation With Other Modules</h3> <p style="text-align: center;">العلاقة مع المواد الدراسية الأخرى</p>			
Prerequisite module	None	Semester	None
Co-requisites module	Sorting and Searching Algorithms	Semester	4
<h3 style="text-align: center;">Module Aims, Learning Outcomes and Indicative Contents</h3> <p style="text-align: center;">أهداف المادة الدراسية ونتائج التعلم والمحويات الارشادية</p>			
Module Aims أهداف المادة الدراسية	<ul style="list-style-type: none"> Getting to know the concept of data structures Knowing the functions of data structures Getting to know the applications of data structures 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>1-Understand the fundamental concepts of data structures and their importance in programming.</p> <p>2-Learn about linear data structures, such as arrays, linked lists, stacks, and queues.</p> <p>3-Study non-linear data structures, including trees (binary trees, binary search trees, AVL trees, etc.) and graphs.</p> <p>4-Analyze the time and space complexities of various data structure operations.</p> <p>5-Implement data structures using programming languages and apply them to solve real-world problems.</p> <p>6-Learn about algorithms for searching, sorting, and traversing data structures.</p>		
Indicative Contents المحويات الارشادية	<p>Introduction of data structure, Type of data structure, Memory representetion for D1 and D2, Linear list & types, Stack operations, Application of stack, Queue operations, Applications of Queue, Circular Queue, Linked list, Linked Stack, Linked Queue</p>		
<h3 style="text-align: center;">Learning and Teaching Strategies</h3> <p style="text-align: center;">استراتيجيات التعلم والتعليم</p>			
Strategies	<p>Lectures (Theoretical and Practical)</p> <p>1-Enhance the student's ability to build programs</p> <p>2-Develop these programs</p>		

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنظم للطالب أسبوعيا	5	
Unstructured SWL (h/sem) الحمل الدراسي غير المنظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنظم للطالب أسبوعيا	3	
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	2 hr	10% (10)	7	LO # 1-6
	Final Exam	2hr	50% (50)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Data Structures: - How to choose the suitable data structure - Types of data 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 - The array List Abstract Data Type
Week 8	Lists : - Array list - 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	Queue - Operations

Delivery Plan (Weekly Lab. Syllabus) المنهج 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. Title :" Data Structures and Algorithms Using C#", 2007 [2]: Thomas H. Cormen , CHARLES E. LEISERSON Title :"Introduction to Algorithms ", third edition ,2009	Yes
Recommended Texts	Special requirements (include for example workshops, periodicals, IT software, websites)	No
Websites		

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التفصيل	Marks (%)	Definition
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	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded

(0 – 49)	F – Fail	رسب	(0-44)	Considerable amount of work required
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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.