MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	ANALYSIS AND DESIGN OF ALGORITHMS	**Module Delivery**
Module Type	CORE	Theory Lecture
Module Code	ANDA215	
ECTS Credits	5	
SWL (hr/sem)	125	

Module Level	2	**Semester of Delivery**	3
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	EMAN SHAKIR MAHMOOD	**e-mail**	110036@uotechnology.edu.iq
Module Leader's Acad. Title	Assit. Lecturer	**Module Leader's Qualification**	Msc.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Aims أهداف المادة الدراسية	1. Enable the student to be able to identify, the best way to design and Analyze an algorithm. 2. Study the basic types of algorithms to solve a group of known problems with their Practical application. **3.** Enable the student to know the Basic methods of how to analyze complexity of algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enable the student to Know and understand the theoretical Principles of algorithms and calculate their complexity. 2. Enable the student to understand the correct analysis Methods for the complexity of algorithms. 3. Enable the student to handle cases of high complexity to achieve optimization, 4. Motivate the student to practically apply the algorithm and use it to solve a set of problems.

Indicative Contents
المحتويات الإرشادية
	Indicative content includes the following.
	- Concepts and properties of algorithms
	- Differences among best, expected, and worst case behaviors of an algorithm
	- Computing by calculating how programs are evaluated.
	- Rule of algorithms in problem solving process
	- Problem solving strategies, Iteration and recursive traversal of data structure, Modularity
	- implementation of algorithms
	- Algorithms strategy
	   • 4-color mapping
	   • Traveling Salesman
	   • Shortest Path
	   • Brute force algorithm
	   • Greedy algorithm
	   • Divide and conquer
	   • Recursive backtracking
	   • Dynamic programming
	   • Network flow
	   • Branch and bound
	   • heuristics
	   • reduction : transform and conquer
	   • Approximation Algorithms (Euclidian tour, Vertex cover, Knapsack).

	- algorithms efficiency (e.g. operation count).
	- fundamental design concepts and principals
	    • abstraction
	    • decomposition
	    • encapsulation

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

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	3.1
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	5% (5)	5, 10	LO #1, 2,3 and 4
	Assignments	2	5% (5)	2, 12	LO #1, 2,3 and 4
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO #1, 2,3 and 4
	Final Exam	2hr	70% (70)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري
	Material Covered
Week 1	**Concepts and properties of algorithms**
Week 2	**Differences among best ,expected, and worst case behaviours of an algorithm**
Week 3	●**Computing by calculating how programs are evaluated.** ●**Rule of algorithms in problem solving process**
Week 4	**Problem solving strategies** ●**Iteration and recursive traversal of data structure** ●**Modularity**
Week 5	●**implementation of algorithms** ●**Algorithms strategy** ● **4-color mapping**
Week 6	● **Traveling Salesman** ●**Shortest Path**
Week 7	● **Brute force algorithm** ●**Greedy algorithm**
Week 8	●**Divide and conquer** ●**Recursive backtracking**
Week 9	●**Dynamic programming** ●**Network flow**
Week 10	●**Branch and bound** ●**heuristics**
Week 11	**reduction : transform and conquer**
Week 12	●**Approximation Algorithms (Euclidian tour, Vertex cover, Knapsack).**
Week 13	**algorithms efficiency (e.g. operation count).**
Week 14	**fundamental design concepts and principals** • **abstraction**

	- decomposition - encapsulation
Week 15	Final exam

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	What are data type in python
Week 2	pattern in python
Week 3	Solve any number pattern
Week 4	Solve any number pattern
Week 5	Solve any character pattern
Week 6	Solve any character pattern
Week 7	Python lambda function
Week 8	Python lambda function
Week 9	recursive function
Week 10	recursive function
Week 11	Greedy algorithm
Week 12	Greedy algorithm
Week 13	Divide and conquer algorithm
Week 14	Divide and conquer algorithm
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1-Algorithm Design**" by Jon Kleinberg &Eva Tardos , Addison Wesley (Pearson Inc.),2008 **2-DESIGN AND ANALYSIS OF ALGORITHMS,**Fall 2008	No

	1.	
Recommended Texts		
Websites		

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	**التقدير**	**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 (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.	