

للحصول على الدعم الفني/التقني

(K= Knowledge, S= Skills, C= Competences)

مخرجات تعلم المادة الدراسية

رمز مخرج تعلم البرنامج المرتبط	مخرجات تعلم المادة	الرقم
المعارف		
MK4, MK5	Analyzing efficiency of algorithms and comparing time and memory efficiency of different algorithms.	K1
MK4	Using Big-O, Ω , and Θ to represent efficiency levels of algorithms.	K2
MK4, MK5	Applying basic searching and sorting algorithms.	K3
المهارات		
MS1, MS4	Ability to apply hashing methods for data storage and retrieval.	S1
MS1, MS4	Ability to represent graphs dynamically and with arrays.	S2
MS1, MS4	Ability to design and applying basic algorithms for solving graph problems.	S3
MS4	Ability to recognize the main classes of computational complexity.	S4
MS1, MS4	Ability to choose appropriate data structures and designing algorithms for solving the problems discussed and other for related problems	S5
الكفايات		
MC2	Understanding computational complexity	C1
MC2	Performing computation complexity calculation	C2
MC3, MC4	Understanding and analyzing sorting algorithms	C3
MC2	Understanding and analyzing graph algorithms	C4

آليات التقييم المباشر لنتائج التعلم

التعلم الوجيهي (مواد عملية)	التعلم الوجيهي (مواد نظرية)	التعلم المدمج	التعلم الالكتروني	نوع التقييم/ نمط التعلم
30%	40%	30%	30%	امتحان منتصف الفصل
30%	10%	0	0	المشاركة/ التطبيقات العملية
0	0	30%	30%	النشاطات التفاعلية غير المتزامنة
40%	50%	40%	40%	الامتحان النهائي

ملاحظة: النشاطات التفاعلية غير المتزامنة هي النشاطات والمهام والمشاريع والواجبات والأبحاث والدراسات والمشاريع والعمل ضمن مجموعات طلابية... الخ، والتي ينفذها الطالب ذاتياً، بواسطة المنصة الافتراضية دون لقاء مباشر مع مدرس المادة.

جدول اللقاءات المتزامنة/ الوجيهية وموضوعاتها

المرجع **	أسلوب التعلم*	الموضوع	الأسبوع
Ref.1: 3-39, 475-491	Lecture & Discussion	Introduction: specifications of an algorithm, mathematical background. Time and memory efficiency of algorithms: analyzing time and memory requirements of algorithms.	1
Ref.1: 41-95	Lecture & Discussion	Efficiency levels of algorithms: asymptotic growth rates of functions, formal definitions of Big-O, Ω and Θ classes, analysis of iterative algorithms, analysis of recursive algorithms.	2
Ref.1: 61-98, 104-106,	Lecture & Discussion	Searching unsorted and sorted lists: brute force method, linear search, its worst- and	3

المرجع **	أسلوب التعلم*	الموضوع	الأسبوع
150-152		average-case time efficiency, binary search and its analysis.	
Ref.1: 61-95, 150-152, 475-491	Lecture & Discussion	Searching unsorted and sorted lists: solving recursive equations, optimal algorithms, optimality of linear and binary search algorithms for unsorted and sorted lists.	4
Ref.1: 269-276 Ref.1: 98-100	Lecture & Discussion	Hashing method: hash tables, hash functions, resolving collisions, searching, reading and writing in hash tables. Simple sorting algorithms: selection sort and its analysis.	5
Ref.1: 131-138	Lecture & Discussion	Simple sorting algorithms: insertion sort and its analysis. Review of the previous topics, solutions of problems.	6
Ref.1: 169-175	Lecture & Discussion	Divide and conquer technique: recursive sorting algorithms, merging of sorted lists and its analysis, merge sort algorithm, tracing and analysis of merge sort.	7
Ref.1: 176-182	Lecture & Discussion	Divide and conquer technique: quicksort idea, quicksort algorithm, tracing and analysis of quicksort.	8
Ref.1: 25-39, 182-186	Discussion	Graphs and trees: graph types and their static and dynamic representations, space complexity. Midterm Exam.	9
Ref.1: 226-234	Lecture & Discussion	Heapsort: min-heaps and max-heaps, properties, representation, heapsort algorithm, tracing and analysis of heapsort.	10
Ref.1: 122-130	Lecture & Discussion	Graph traversals: depth-first search and breadth-first search of graphs. Review of the previous topics, solution of problems.	11
Ref.1: 315-333	Lecture & Discussion	Greedy algorithms for graph problems: greedy technique, minimum spanning tree (MST), Prim's MST algorithm, Kruskal's MST algorithm, analysis of MST algorithms.	12
Ref.1: 333-338	Lecture & Discussion	Greedy algorithms for graph problems: shortest paths in graphs, Dijkstra's shortest-path algorithm.	13
Ref.1: 283-313 Ref.1: 401-411	Lecture & Discussion	Dynamic programming technique: dynamic programming concept, Fibonacci numbers example. Warshall-Floyd algorithm for transitive closure. Computational complexity: Classes of complexity: P, NP, NP-hard, NP-complete, examples of NP-complete problems.	14
	Discussion	Term paper presentations	15
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* اساليب التعلم: محاضرة، تعلم معكوس، تعلم من خلال المشاريع، تعلم من خلال حل المشكلات، تعلم تشاركي ... الخ.
** المرجع: صفحات في كتاب، قاعدة بيانات، محاضرة مسجلة، محتوى على منصة التعلم الإلكتروني، فيديو، موقع... الخ

جدول النشاطات التفاعلية غير المتزامنة (في حال التعلم الإلكتروني والتعلم المدمج)

النتائج المتوقعة	المرجع	المهمة / النشاط	الأسبوع
Submitted Work	Ref.1: 3-95, 475-491	Compute time and space complexity of iterative algorithms	1
Submitted Work	Ref.1: 3-95, 475-491	Solve recurrence relations	2
Submitted Work	Electronic resources	Select a topic for the term paper and find some references	3
Submitted Work	Ref.1: 61-95, 150-152, 475-491	Analyze average-case complexity	4
Submitted Work	Electronic resources	Write an outline of the term paper	5
Submitted Work	Ref.1: 98-100, 131-138, 269-276	Analyze time and space complexity of some simple sorting algorithms	6
Submitted Work	Electronic resources	Update the list of references of the term paper	7
Submitted Work	Ref.1: 169-182	Apply divide and conquer techniques	8
Discussion	Ref.1	Midterm Exam Review	9
Submitted Work	Ref.1: 226-234	Apply min-heaps and max-heaps	10
Submitted Work	Ref.1: 122-130	Perform depth-first search and breadth-first search of graphs	11
Submitted Work	Electronic resources	Write the first draft of the paper without the abstract and conclusion	12
Submitted Work	Electronic resources	Write a full draft of the term paper	13
Submitted Work	Ref.1: 313-338	Apply graph minimization algorithms	14
Submitted Work	Electronic resources	Make a class presentation of the term paper	15