Syl*labus and Course Description*

Analysis and Design of Algorithms
901340

Prince Hussein bin Abdullah for Information Technology College	
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Course title and reference number or code (if applicable)	*Analysis and Design of Algorithms* 901340
Aims of the Course	
By the end of the semester, the student should be able to: (1) recognize the use of several design techniques (greedy, divide-and-conquer, dynamic programming) and use these methods to solve simple Problems. (2) write and solve recurrence relations for recursive algorithms. (3) Determine asymptotic growth rates for algorithms. (4) Prove correctness of simple algorithms.	

Assessment of Learning Outcomes:
Learning outcomes are assessed by examination, tutorial and project work.

Modes of Assessment:
First Exam (20%);
Second Exam (20%);
Assignment and Homework (10%)
Final Exam: written Exam (50%)

Contribution to Program Learning Outcomes

Syllabus:

Algorithm analysis, Efficiency of algorithms, Complexity of algorithms, Divide & Conquer concept and analysis, Mergesort algorithm, quick sort algorithm, Heap sort, Binomial heap, Fibonacci heap. Counting sort, Binary search tree & Red-Black tree, Matrix-chain multiplication & Greedy algorithm, Knapsack problem, Huffman code, Graph & Topological sort, Minimum spanning tree, Shortest paths.

Textbook and Supporting Material:

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1. Introduction to Algorithms
By Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest
1997, McGraw-Hill Book Company

2. Computer Algorithms: Introduction to Design and Analysis
By Sara Baase, 3rd Edition, Addison-Wesley Publishing Company

Course/module academic calendar

Week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Introduction	
(2)	**Sorting algorithms** 1. Insertion sort. 2. Bubble Sort 3. Mergesort 4. Quicksort 5. Counting sort	
(3)	**Recurrences +** **Sorting algorithms**	
(4)	**Recurrences**	
(5)	***Divide and Conquer***	
(6)	**Binary Search Trees**	
(7)	**Binary Search Trees**	
(8)	Dynamic programming & Matrix chain multiplication First Exam	
(9)	**Graph Theory and Representation**	
(10)	**Graph Theory and Representation** **First exam**	
(11)	Minimum Spanning Trees	
(12)	Data Compression Algorithms Second exam	
(13)	Binomial Heaps Second Exam	
(14)	Binomial Heaps Second Exam	
(15)	Fibonacci Heap	
(16)	Final Exam	