University of Computer Studies (Thaton)
2023-2024 Academic Year
Fourth Year (B.C.Sc. / B.C.Tech.)
Lecture Plan

CST-4111 Analysis of Algorithms   **First Semester**

Textbook   : Design and Analysis of Computer Algorithms by Alfred V. Aho, John E. Hopcroft &
                  Jeffery D. Ullman
Prerequisite : CST-2211 Data Structures and Algorithms
Credit Unit : 3 ACUs
Periods   : 64 periods for 16 weeks (4 periods * 16 weeks) (1 period -1 hr)

No.	Topics	Week	Remark
I	**Chapter (1)** **Models of Computation**		
1.	1.1 Algorithm and Their Complexity	Week 1	Detail Explain why we need to analyze algorithm
2.	1.2 Random Access Machine RAM Instruction & Meaning		Detail Explain RAM model Explain RAM instruction with Table 1.4 and Table 1.5
3.	Teach writing ALGOL program Teach how to write RAM program	Week 2- 4	Detail Explain about Fig 1.6 and 1.7 Detail Explain about Fig 1.8 and 1.9 Example 1.1, 1.2
4.	Exercise for RAM program Ex 1.3, 1.5, 1.19		
5.	1.3 Computational Complexity of RAM programs		Explain how to express the uniform and logarithmic complexity of RAM program (Very Detail)
6.	Exercises for Complexity expression for RAM program Ex. 1.3, 1.4, 1.5, 1.6, 1.9		
7.	1.4 A Stored Program Model (RASP) -Different between RAM and RASP (Theorem 1.1)	Week 5-6	Detail Explain RASP Model and Theorem 1.1
8.	Theorem 1.2 RASP Program Exercise		Detail Explain Theorem 1.2 Explain Complexity of RASP program
9.	1.5 Straight line programs -Bitwise Computations -Bit Vector Operations -Decision Tree		Detail Explain for Bitwise Computational Model & Decision Tree
10.	1.6 Turing Machine Model	Week 7-8	Explain how to construct a Turing Machine and its properties
11	Example 1.8 and 1.9		Fig 1.20, 1.21, 1.22
12	Ex-1.15, 1.16, 1.17		

No.	Topics	Week	Remark
II.	**Chapter (2)** **Design of Efficient Algorithms**		
13.	2.6 Divide and Conquer -Definition, Two Examples of MAXMIN	Week 9-10	Very important section Detail Explain definition and some examples
14.	2.7 Balancing		Briefly Explain
15.	2.8 Dynamic Programming		Very important section Detail Explain definition and some examples
16.	Exercises from old questions		
III	**Chapter (3)** **Sorting and Order Statistics**		
17.	3.1 The Sorting Problem 3.2 Radix Sorting (Bucket Sort)	Week11-12	Explain about sorting problems Briefly Explain
18.	3.2 Lexicographic Sort (Algorithm 3.1)		Detail Explain
19.	3.2 Lexicographic Sort (Algorithm 3.2) Ex- 3.1, 3.2		Detail Explain
20.	3.4 Heap Sort (Heapify, Build Heap Algorithms) Analyze Complexity Ex- 3.4, 3.6, 3.7	Week 13-14	Detail Explain
21.	3.5 Quick Sort (Quick Sort, Partition Algorithms) Analyze Complexity Ex- 3.8		Detail Explain
22.	3.6 Order Statistics (Selection Algorithm) Analyze Complexity	Week15-16	Detail Explain
23.	Ex- 3.11		
24.	Revision		All Chapters

Assessment Plan for the Course

Assignment	15%
Quizzes	10%
Tutorial	15%
Exam	60%