

Computing Algorithms

- **Course number and name:**
CC 412 – Computing Algorithms
- **Credits and contact hours**
Credits Hours: 3Hrs
Contact Hours: In Lecture 2Hrs, In Tutorial 2Hrs, and In Lab 2Hrs
- **Instructor’s or course coordinator’s name**
Coordinator Name: Dr. Rowayda Sadek
- **Text book, title, author, and year**
 - Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein. “Introduction to Algorithms”. Prentice-Hall, Second edition, 2001
- **Specific course information**
 - a. **Catalog description**
Analysis and design of computer algorithms - Asymptotic performance of algorithms - Design efficient algorithms - Complexity analysis - Dynamic programming – Backtracking – Graph – Trees – Parallel algorithms.
 - b. **prerequisites or co-requisites**
Prerequisites: CC319
 - c. **Type of the course (required, elective, or selected elective course) in the program**
Elective Course
- **Specific goals for the course**
 - a. **Specific outcomes of instruction**
After the completion of this course the students will be able to:

	Course Learning Outcomes	SO
1	Analyze the asymptotic performance of algorithms and prove the correctness of the algorithms.	J
2	Apply important algorithmic design paradigms and methods of analysis to solve problems.	J
3	Model a real world problem into a computer program (Data Structure + Algorithm).	D

Topics to be covered

- Introduction to Algorithms
- Analysis of Algorithms, Asymptotic Notations
- Divide and Conquer
- Sorting: Heapsort, Priority Queues
- Hashing: Chaining, Universal Hashing
- Greedy Methods
- Binary Search Trees , red black trees and interval trees
- Dynamic Programming
- Graph representation
- Minimum Spanning Trees , Network flow algorithms
- Computational Geometry, closest pair problem
- String Matching
- Introduction to parallel Algorithms