Al Imam Mohammad ibn Saud Islamic University

College of Computer and Information Sciences

CCIS

Computer Science Department

Course Syllabus

CS215 - Design and Analysis of Algorithms

Catalog Description: This course applies design and analysis techniques to numeric and nonnumeric algorithms which act on data structures. Design is emphasized so that the student feels comfortable with developing new algorithms. Analysis of algorithms is concerned with the resources an algorithm must use to reach a solution. Only theoretical techniques of analysis are covered. Topics include introduction to algorithm, asymptotic complexity, sorting and searching, divide and conquer, data structures, graph algorithms, dynamic programming, and NP-completeness.

Credit Hours: **3 Credit hours:** **3** Lectures per week   **0** Labs. per week   **0** Recitation per week

Prerequisites: CS 242: Data Structures

Course Learning Outcomes:
1. Students should learn the basic skills needed for the Analysis of Algorithms namely, Mathematical Foundations (Growth Functions, Asymptotic Notations, Recurrences)
2. Students should able to demonstrate how worst case complexity of an Algorithm is defined
3. Students should able to design efficient Algorithms using standard algorithm design techniques
4. Students should describe and use major algorithmic techniques (sorting, searching, divide-and-conquer, dynamic programming, greedy paradigm, graph algorithms, NP Completeness) and should able to demonstrate computer science problems for which each technique is suitable
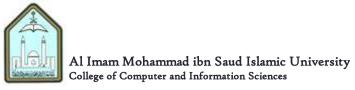
Major Topics:
- Basics of Algorithms, Mathematical Foundations, Growth of Functions, Asymptotic notations.
- Divide-Conquer and Recurrence
- Sorting
- Data Structures
- Graph Theory
- Dynamic Programming
- NP Complete Problems and Solutions using Approximation algorithms

Text Books: Introduction to Algorithms, Cormen, Leiserson, Rivest, and Stein, 3rd edition, MIT Press, 2009

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Grading:	◉ The grading scale for this course is:

    . 95 - 100 A+ Passing
    . 90 - 94   A   Passing
    . 85 - 89   B+ Passing
    . 80 - 84   B   Passing
    . 75 - 79   C+ Passing
    . 70 - 74   C   Passing
    . 65 - 69   D+ Passing
    . 60 - 64   D   Passing
    . 0   - 59   F   Failing

◉ Final grades will be determined based on the following components:
    . 60% Semester Work
    . 40% Final Exam

◉ Students may not do any additional work for extra credit nor resubmit any graded activity to raise a final grade.

◉ Late submissions will not be accepted for any graded activity for any reason.

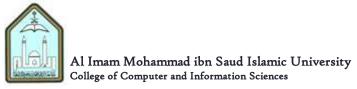◉ Studentshave one week to request the re-grading of any semester work.

Attendance Policy:	Students should attend 80% of the overall course hours taught in the semester as per the University regulations.

If a student fails to achieve this portion, he/she shall not be allowed to appear in the final exam and shall be awarded "DN" grade and repeat the course.

Cheating and Plagiarism Policy:	The instructor will use several manual and automated means to detect cheating and/or plagiarism in any work submitted by students for this course.

When a student is suspected of cheating or plagiarism, the instructor raises the issue to the disciplinary committee.

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Communications: Registered students will be given access to a section of the Blackboard Learning System for this course. Bb will used as the primary mechanism to disseminate course information, including announcements, lecture slides, assignments, and grades.

Communication with the instructor on issues relating to the individual student should be conducted using CIS email, via telephone, or in person.