NAU NORTHERN ARIZONA UNIVERSITY

Course Title: CS 249 Data Structures
Term: Fall 2022
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

This course studies design, analysis, and implementation techniques of abstract data types such as sets, lists, trees, heaps, and graphs. Students will learn how these data structures are implemented in different programming languages and will practice implementing them in our programming assignments. This course will also help students to understand what is going on inside a particular built-in implementation of a data structure and what to expect from it, they will also learn typical use cases for these data structures.

Course Prerequisites:

CS 105 Computing Tools I; CS 136 - Computer Science II

Learning Outcomes:

By the end of the course, the student should be able to:

A. Gain insights into the basic concepts, and terminologies covered in this course;

B. Describe the techniques of algorithm analysis;

C. Know and apply various data structures such as stacks, queues, trees and graphs;

D. Introduce data abstraction and data representation in memory;

E. Describe the design and performance of various searching and sorting algorithms;

F. Demonstrate the application of the knowledge learnt in this course.

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Course Material:

Narasimha Karumanchi, ***Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles***, CareerMonk Plublications, 2016

Evaluation:

- Quizzes [20%]
- Practices [20%]
- Mid-term Exam [25%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1

1	Data Structure
2	Recursion
3	Backtracking
4	Stacks

5	Queues **Quiz #1**

Week 2

6	Trees
7	Priority Queue
8	Heaps
9	Disjoint Sets ADT
10	Graph Algorithms **Practice# 1**

Week 3

11	Graph Algorithms (Cont.)
12	**Midterm Exam**
13	Sorting and Searching
14	Sorting and Searching (Cont.)
15	Selection Algorithms **Quiz #2**

Week 4

16	Symbol Tables
17	Hashing
18	String Algorithms
19	Algorithms Design Techniques
20	Algorithms Design Techniques (Cont.) **Practice# 2**

Week 5

21	Greedy Algorithms Divide and Conquer Algorithms
22	Dynamic Programming
23	Complexity Classes
24	Miscellaneous Concepts
25	**Final Exam**