

ARIZONA WESTERN COLLEGE
SYLLABUS

AIM 204 DATA STRUCTURES AND ALGORITHMS

Credit Hours: 3 Lec 2 Lab 2

PREREQUISITE: GME-122 Python Programming

COURSE DESCRIPTION

Study of fundamental data structures and algorithms with emphasis on efficiency, implementation, and application. Topics include arrays, linked lists, stacks, queues, hash tables, trees, graphs, recursion, sorting, and searching.

1. COURSE GOAL

This course will teach the fundamentals of data structures and algorithms with a focus on data science applications. Course will cover various data structures including arrays, hash-tables, heaps, trees and graphs along with algorithms including sorting, searching, traversal and shortest path algorithms. Learners will solve data-structure problems by analyzing and designing algorithms for searching, sorting, and indexing; creating trees and graphs; and addressing intractability, also include conceptual algorithm design problems as well as opportunities to program data-structures/algorithms in the python

2. OUTCOMES

Upon satisfactory completion of this course, students will be able to:

- 2.1 Demonstrate how to Implement and apply data structures such as stacks, queues, trees, Binary search tree, and graphs
- 2.2 Apply algorithms for searching and sorting
- 2.3 Analyze algorithmic efficiency using Big O notation
- 2.4 Demonstrate how to solve problems using recursion and dynamic programming
- 2.5 Describe how to evaluate tradeoffs in algorithm and data structure design

3. METHODS OF INSTRUCTION

- 3.1 Lecture
- 3.2 Coding demonstrations
- 3.3 Problem-solving sessions

4. LEARNING ACTIVITIES

- 4.1 Lab programming exercises
- 4.2 Algorithm design assignments
- 4.3 Group coding challenges

5. EVALUATION

- 5.1 Quizzes/Exams

5.2 Lab assignments

5.3 Final project

6. STUDENT RESPONSIBILITIES

- 6.1 Under AWC Policy, students are expected to attend every session of class in which they are enrolled.
- 6.2 Classroom Assignments: Students are responsible for work missed and for completing all work before the next class meeting. Students are responsible for participating in all oral drills and for taking all exams.
- 6.3 If a student is unable to attend the course or must drop the course for any reason, it will be the responsibility of the student to withdraw from the course. Students who are not attending as of the 45th day of the course may be withdrawn by the instructor. If the student does not withdraw from the course and fails to complete the requirements of the course, the student will receive a failing grade.
- 6.4 Americans with Disabilities Act Accommodations: Arizona Western College provides academic accommodations to students with disabilities through AccessABILITY Resource Services (ARS). ARS provides reasonable and appropriate accommodations to students who have documented disabilities. It is the responsibility of the student to make the ARS Coordinator aware of the need for accommodations in the classroom prior to the beginning of the semester. Students should follow up with their instructors once the semester begins. To make an appointment call the ARS front desk at (928) 344-7674 or ARS Coordinator at (928) 344-7629, in the College Community Center (3C) building, next to Advising.
- 6.5 Academic Integrity: Any student participating in acts of academic dishonesty including, but not limited to, copying the work of other students, using unauthorized “crib notes”, plagiarism, stealing tests, or forging an instructor’s signature—will be subject to the procedures and consequences outlined in AWC’s Student Code of Conduct.
- 6.6 Textbooks and materials: Students are required to bring notebook or looseleaf book, pens, pencils, dictionaries, and purchase textbook required for class.
- 6.7 Arizona Western College students are expected to attend every class session in which they are enrolled. To comply with Federal Financial Aid regulations (34 CFR 668.21), Arizona Western College (AWC) has established an Attendance Verification process for "No Show" reporting during the first 10 days of each semester. Students who have enrolled but have never attended class may be issued a “No Show” (NS) grade by the professor or instructor and receive a final grade of “NS” on their official academic record. An NS grade may result in a student losing their federal financial aid.

For online classes, *student attendance in an online class is defined as the following* (FSA Handbook, 2012, 5-90):

- Submitting an academic assignment
- Taking an exam, an interactive tutorial or computer-assisted instruction
- Attending a study group that is assigned by the school
- Participating in an online discussion about academic matters
- Initiating contact with a faculty member to ask a question about the academic subject studied in the course