University of Texas at El Paso
Course Syllabus

COURSE DESCRIPTION

Dept., Number	CS2401	**Course Title**	Elementary Data Structures
Approval Date	September 2018	**Course Coordinator**	Martine Ceberio

CATALOG DESCRIPTION

Programming and Algorithms (3-3) Second course for students majoring in Computer Science. Fundamental computing algorithms including searching and sorting; elementary abstract data types including linked lists, stacks, queues and trees; introduction to algorithm analysis.

TEXT BOOK

CS2401: Elementary Data Structures / Algorithms, by Zybooks, available at zybooks.zyante.com.

COURSE OUTCOMES

Level 1: Knowledge and Comprehension:
Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. Upon successful completion of this course, students will be able to describe, at a high level:

1. Explain the concept of polymorphism

Level 2: Application and Analysis:
Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of this course, students will be able to:

1. Describe, implement, and use the following concepts:
    a. classes, subclasses, and inheritance
    b. encapsulation and information hiding
2. Describe, implement, and use the following algorithms:
    a. sequential and binary search
    b. quadratic and O(n log n) sorting
    c. string manipulation and parsing
3. Describe and trace computer representation and memory allocation of:
    a. integers, real numbers, arrays and objects
    b. methods, including recursive methods and the use of activation records
4. Use basic notions of algorithm complexity:
    a. use Big-O notation to express the best-, average- and worst-case behaviors of an algorithm
    b. determine the best, average and worst-case behaviors of a simple algorithm
5. Use recursion and iteration as problem solving techniques

Level 3: Synthesis and Evaluation
Level 3 outcomes are those in which the student can apply the material in new situations. This is the highest level of mastery. Upon successful completion of this course, students will be able to use the syntax and semantics of a higher-level language to express solutions to programming problems, including the correct use of:

1. Design and implement solutions to computational problems using the following data structures:
    a. multi-dimensional arrays;
    b. lists implemented as arrays or linked lists;
    c. stacks;
    d. queues;
    e. binary trees and binary search trees.

ABET STUDENT OUTCOMES

Course outcomes	Student Outcomes
2.2.a-b, 2.4.a-b, 2.5	1
2.2a-c, 2.3a-b, 2.5, 3.1a-e	2 (ABET 1)
2.1a-b, 2.2a-c, 3.1a-e	3 (ABET 2)
None	4 (ABET 5)
None	5 (ABET 4)
None	6 (ABET 3)
None	7
None	8
None	9
None	10 (ABET 6)

PREREQUISITES BY TOPIC

(CS 1401 w/C or better) OR (CS 1101 w/C or better AND CS 1301 w/C or better)