CS 2300 **Data Structures** **3 Credit Hours**
3 Contact hours

Required/Elective: Required for Computer Science Major, B.S. and Computer Science Minor

Instructor: Curtis Cooper, Ph.D. (660) 543-8851 Email : cooper@ucmo.edu

Office Hrs: WCM 205C, 8-9 am and noon-1 pm MWF and by appointment

Text: Data Structures and Algorithms in Java, by Peter Drake, Pearson, Prentice Hall, 2006

Software: Java

Pre-Reqs: CS 1110 or consent of instructor

Description: An introduction to data representations and information structures including a variety of non-numerical algorithms and their applications. Linear lists, arrays, trees, multilinked structures and dynamic storage allocation are investigated.

Objectives:

- Study data structures such as linked lists, stacks, queues, and trees.
- Apply these various data structures in different settings.

Schedule: WCM 128, 1-1:50 pm, MWF

Grading:

2 tests worth 100 points each and a final worth 150 points
Assignments and programs of various point values will be collected weekly
Grading Scale: 90-100, A; 80-89, B; 70-79, C; 60-69, D; 0-59, F.

Policies:

- All tests are closed-book.
- Make-ups are only given under extreme circumstances
- The Department of Mathematics and Computer Science has instituted a C Policy. The policy is in two parts.
    a. A course with a grade lower than a "C" will not be allowed to fulfill a major or minor requirement in any program offered by the Department of Mathematics and Computer Science.
    b. A student may enroll in a course offered by the Department of Mathematics and Computer Science only if a grade of at least a "C" is earned in each of the course's prerequisites.

Topics:

1. Encapsulation, Polymorphism, and Inheritance
2. Stacks and Queues
3. Array-Based Structures
4. Linked Structures
5. Analysis of Algorithms

6. Searching and Sorting
7. Recursion
8. Trees

<u>ABET Outcomes:</u> a, b, c, i, and j

ABET Criteria a: *An ability to apply knowledge of computing and mathematics appropriate to the discipline.*

ABET Criteria b: *An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.*

The student takes a problem that requires advanced data structures like stacks, queues, linked lists, and trees.

The student takes a problem that requires recursion to solve efficiently.

ABET Criteria c: *An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.*

ABET Criteria i: *An ability to use current techniques, skills, and tools necessary for computing practice.*

The student demonstrates an understanding and proper use of advanced Object Oriented (OO) principles.

The student demonstrates the ability to recognize and use advanced data structures.

ABET Criteria j: *An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.*