

## COSC 262-DATA STRUCTURES 3 CREDITS

### SYLLABUS

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#### CATALOG DESCRIPTION

A course in data structures, software methodologies, and analysis of algorithms using an object-oriented programming language. The Standard Template Library (STL) is covered in detail.

Prerequisites: COSC 218

Semester Offered: Fall

#### **Common Student Learning Outcomes**

*Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...*

##### **BROAD AND SPECIALIZED LEARNING**

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

##### **CRITICAL THINKING**

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

##### **CULTURAL AND CIVIC ENGAGEMENT**

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

##### **EFFECTIVE COMMUNICATION**

Students will exchange ideas and information with clarity in multiple contexts.

##### **INFORMATION LITERACY**

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

##### **INTEGRATING TECHNOLOGIES**

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

*Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.*

### Course Learning Outcomes

Upon successful completion of the course, the student will be able to...

1. To learn to use data abstraction.
2. To understand linear collection data structures.
3. Understand and use non-linear data structures.
4. To continue learning these topics: pointers, objects, messages, classes, encapsulation, and

implementation issues.

5. To learn about and understand inheritance.
6. To implement object-oriented, event driven programs, written in a current object-oriented language , specifically C++, using the STL (Standard Template Library).
7. To apply appropriate software design methodologies for larger programs.
8. To have students begin working on team projects.

## Specific Learning Outcomes

Upon successful completion of the course, the student will be able to ...

1. Understanding the advantages of object-oriented design techniques
2. Appreciating and using encapsulation
3. Using abstraction (
4. Learning about inheritance
5. Appreciating the concept of code reusability and putting it to work through classes and data structures
6. Analyzing the system requirements and define the important objects
7. Classifying the system objects into a hierarchy
8. Selecting the attributes of the objects at each level of the hierarchy
9. Determining the method designs for each object at each level
10. Develop a greater understanding and greater facility working with vectors
11. Use algorithmic analysis for searching and sorting operations
12. Understand and use pointers
13. Learn, appreciate, and use stacks
14. Understand and use queues and priority queues
15. Learn, understand and use binary trees
16. Appreciate and work with binary search trees
17. Learn and work with heaps
18. Learn and use hashing
19. Apply appropriate software design methodologies for larger programs
20. Understanding and implementing Windows programs using STL
21. Participating in programming teams in software development
22. Identifying the social responsibilities of the computing professional and the impact computing has on society