RowanCollege
SOUTH JERSEY

STEM Division
3322 College Drive, Vineland, New Jersey 08360
856-691-8600

CSC 232: DATA STRUCTURES AND ALGORITHM

Syllabus

Lecture Hours/Lab Hours/Credits: 3/3/4

Catalog Description

Prerequisite: CS 212 – Programming in C++

This course provides the concepts of data structures through the topics in lists, strings, stacks, queues, trees, graphs, networks, file structures, recursive functions, search algorithms, sorting algorithms, hashing and basics of analysis of algorithms. All lecture topics are supported by a lab component.

Textbook and Course Materials

It is the responsibility of the student to confirm with the bookstore and/or their instructor the textbook, handbook, and any other materials required for their specific course and section.

Click here to see current textbook prices at cccnj.bncollege.com.

Evaluation Assessment
Online Proctoring
All courses offered at RCSJ, whether they are web-enhanced, hybrid, or fully online, may include assessments that make use of Online Proctoring. To find out more about Online Proctoring and to learn about the minimum technical requirements, visit rcsj.edu/elearning/online-proctoring.

Grading Distribution.

Grading to be determined by individual instructors. Students will be provided with hands-on projects to design, integrate, and demonstrate their learning experience that complements the textbook material. Individual instructors may include the following assessment(s):

- Exams
- Quizzes
- Class Discussions
- Written Assignments
- Attendance and Participation

Grading

The grading scale for each course and section will be determined by the instructor and distributed on the first day of class.

Rowan College of South Jersey Core Competencies

(Based on the NJCCC General Education Foundation - August 15, 2007; Revised 2011; Adopted 2014)

This comprehensive list reflects the core competencies that are essential for all RCSJ graduates; however, each program varies regarding competencies required for a specific degree. Critical thinking is embedded in all courses, while teamwork and personal skills are embedded in many courses.

1. **Written and Oral Communication**: Students will communicate effectively in both speech and writing.
2. **Quantitative Knowledge and Skills:** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems
3. **Scientific Knowledge and Reasoning:** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
4. **Technological Competency:** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals
5. **Society and Human Behavior:** Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens.
6. **Humanistic Perspective:** Students will analyze works in the fields of art, history, music, or theater; literature; philosophy and/or religious studies; and/or will gain competence in the use of a foreign language
7. **Historical Perspective:** Students will understand historical events and movements in World, Western, non-Western, or American societies and assess their subsequent significance.
8. **Global and Cultural Awareness:** Students will understand the importance of a global perspective and culturally diverse peoples.
9. **Ethical Reasoning and Action:** Students will understand ethical issues and situations.
10. **Information Literacy:** Students will address an information need by locating, evaluating, and effectively using information.

CS 224 CORE COMPETENCIES

This course focuses on three of RCSJ's Core Competencies:

- Technological Competency
- Information Literacy

Student Learning Outcomes: DATA STRUCTURES AND ALGORITHM

Successful completion of CS 224 will help students:	RCSJ Core Competencies	Evaluation / Assessment (Additional means of evaluation may be included by individual instructors
Understand the use of stacks and their C++ implementation.	Technological Competency Information Literacy	Assignments, Exams
Evaluate infix, postfix, and prefix expressions.	Technological Competency Information Literacy	Assignments, Exams
Understand the use of queues and its sequential representation.	Technological Competency Information Literacy	Assignments, Exams
Understand linked lists, linked implementation of stacks, and linked implementation of queues.	Technological Competency Information Literacy	Assignments, Exams
Understand use of doubly linked lists.	Technological Competency Information Literacy	Assignments, Exams
Understand the need for dynamic storage and implementing lists using dynamic storage.	Technological Competency Information Literacy	Assignments, Exams
Understand the application of binary trees, preorder, post-order and in-order traversing.	Technological Competency Information Literacy	Assignments, Exams
Understand the Huffman Algorithm.	Technological Competency Information Literacy	Assignments, Exams
Understand sorting – efficiency considerations O notation	Technological Competency Information Literacy	Assignments, Exams

Topical Outline

Abstract Data Types

Data Structures, Static Array, Dynamic Array, Two-Dimensional Arrays

Object-Oriented Programming, Classes Class Constructors

Input/Output and String Classes

List, List as ADT, Array Based Implementation of List

Linked List, Array Based Implementation of List with Dynamic allocation

Stacks, Designing and Building a Stack Class—Array Based

Stacks, Postfix (RPN) Notation, Evaluating Postfix Expression, Converting Infix Expression to Postfix

Queues, Designing and Building a Queue Class—Array Based, Linked Queues, Application of Queues

Recursion, Algorithm Analysis, Implementing Recursion, Algorithm Efficiency

Linking Up with Linked Lists

Some Variants of Singly-Linked lists, Doubly Linked List, Multiply-Linked List

Binary Trees, Binary Trees as Recursive Data Structures

Binary Search Trees, Threaded Binary Search Trees Hash Tables

Sorting – Different Sorting Schemes

Heaps, Heapsort and Priority Queues

Quicksort, Mergesort

Trees, Huffman Codes, Tree Balancing

Representing Trees and Forests as Binary Trees

Graphs, Directed Graphs, Searching and Traversing Diagraphs

Affirmative Action Statement

The Board of Trustees is committed to providing a work and academic environment that maintains and promotes affirmative action and equal opportunity for all employees and students without discrimination on the basis of certain enumerated and protected categories. These categories are race, creed (religion), color, national origin, nationality, ancestry, age, sex (including pregnancy and sexual harassment), marital status, domestic partnership or civil union status, affectional or sexual orientation, gender identity or expression, atypical hereditary cellular or blood trait, genetic information, liability for military service, or mental or physical disability, including AIDS and HIV related illnesses.

For questions concerning discrimination, contact Almarie J. Jones, Special Assistant to the President, Diversity and Equity/Title IX and Compliance, 856-415-2154 or ajones@rcsj.edu or (Cumberland) Nathaniel Alridge, Jr., JD, Director, Diversity and Equity/Title IX and Judicial Affairs, 856-691-8600, ext. 1414 or nalridge@rcsj.edu. For disability issues or any barriers in the learning or physical environment related to a document condition/disability please contact: Gloucester campus – Carol Weinhardt, Director, Department of Special Services, ADAAA/504 Officer at 856-415-2247 or cweinhar@rcsj.edu; or Cumberland Campus – Meredith Vicente, Senior Director, Department of Special Services/Project Assist at 856-200-4688 or mvicent1@rcsj.edu

Department of Special Services

The Department of Special Services is committed to providing support services and ensuring equal access to eligible students with documented conditions/disabilities as outlined by the Americans with Disabilities Act (ADA) and the Americans with Disabilities Act with Amendments Act (ADAAA).

(Gloucester Campus Location and Contact)

Location: Instructional Center, room 425A.

Primary Contact: Director, Carol Weinhardt, (email) cweinhar@rcsj.edu; or (phone) 856-415-2247.

(Cumberland Campus Location and Contact)

Location: Center for Academic & Student Success (CASS)

Primary Contact: Senior Director, Meredith Vicente, (email) mvicent1@rcsj.edu; or (phone) 856-200-4688.

Reporting Allegations of Sexual Assault Resource Referrals *(8/2021)*
Cumberland Campus

There are multiple safe places for students to report allegations of sexual assault, both on and off campus. Reports of sexual assault can be made to any of the following offices listed in the chart below.

All students are encouraged to report alleged crimes on campus.
Employees <u>must</u> report crimes that pose an immediate threat to the campus Security Office, the local Police Department or the Sheriff's Office.

Service	Resource	Phone Number/Location/Website
Non-Confidential Reporting Law Enforcement	Vineland Police Dept.	856-691-4111
	Millville Police Department	856-825-7010
	Cumberland Co. Sheriff's Office	856-451-4449
	Cumberland County Emergency Services	9-1-1
	Cumberland Campus Security 856-200-4706 (Direct)	Andres Lopez, Director Safety and Security 856-200-4706
Non-Confidential On-Campus Reporting Support Services	Almarie J. Jones Special Assistant to the President Diversity and Equity, Title IX and Compliance	856-415-2154 Gloucester Campus College Center, Room116 *ajones@rcsj.edu*
	Nathaniel Alridge, Jr., JD, Director Diversity and Equity, Title IX and Judicial Affairs	856-498-9948 Catherine J. Arpino Education and Humanities Center, *nalridge@rcsj.edu*
	Kellie W. Slade Executive Director Student Services, Student Life	856-200-4615 Student & Enrollment Services Center *kslade@rcsj.edu*
Confidential On-Campus Counseling and Support Services	Student Counseling and Wellness Center John Wojtowicz, LCSW	Academic Building – 1st floor 856-200-4760 *jwojtowi@rcsj.edu*
Confidential Off-Campus Full-Service Support	Center for Family Services – Services Empowering Rights of Victims (SERV)	24/7 Hotlines Cumberland Co. – 1-800-225-0196 *www.centerffs.org/serv*
Hospital Sexual Assault Nurse Examiner on Site	Inspira Medical Center Vineland	1505 W. Sherman Ave., Vineland, NJ 856-641-8000