



Science, Technology, Engineering, and Mathematics (Stem) Division
1400 Tanyard Road, Sewell, NJ 08080
856-468-5000

CSC 220: DATA STRUCTURES AND ALGORITHM

Syllabus

Lecture Hours/Credits: 3/3/4

Catalog Description

Prerequisite: CSC 205 – 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.

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 rcgc.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.

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 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.

CSC 220 CORE COMPETENCIES

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

- Technological Competency
- Information Literacy

Student Learning Outcomes: DATA STRUCTURES AND ALGORITHM

| Successful completion of CSC 220 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 – Dennis M. Cook, Director, Department of Special Services, ADA/504 Officer at 856-415-2265 or dcook@rcsj.edu; or Cumberland Campus – Meredith Vicente, Senior Director, Physical & Learning Disabilities, Center for Academic & Student Success (CASS) at 856-691-6900 ext. 1282 or mvicent1@rcsj.edu

Department of Special Services

The Department of Special Services is located in the Instructional Center, room 425A. The Special Services Department is committed to providing support services and ensuring equal access to eligible students with documented disabilities as outlined by the Americans with Disabilities Act (ADA) and the Americans with Disabilities Act with Amendments. If you are an eligible student with a documented disability please visit our website at RCSJ.edu/SpecialServices or call the office at 856-415-2265 or 856-415-2247 to speak to the Assistant Director Carol Weinhardt, cweinhar@rcsj.edu

Reporting Allegations of Sexual Assault and Resource Referrals (8/2020) Gloucester 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. Crimes that pose a threat to the campus community must be reported to 9-1-1, Security, the Sheriff's Office or the Deptford Township Police Department. All employees, including Security staff, must report incidents of discrimination, harassment or sexual misconduct to the Title IX Officer.

| Service | Resource | Phone Number/Location/Website |
|--|--|--|
| Non-Confidential Reporting Local Law Enforcement | Gloucester County Sheriff's Office Deptford Township Police Dept. Gloucester Co. Prosecutor's Office Sexual Assault Response Team | 856-681-2200 856-845-2220 856-384-5500 856-384-5555 |
| Non-Confidential Reporting 9-1-1 and Campus Security | 9-1-1 Gloucester County Emergency Management Dispatch Campus Security Blue Light Emergency Phones OR ext. 4444 from any campus desk phone | 9-1-1 or push RED button on Campus Blue Light Emergency Phones 856-681-6287 |
| Non-Confidential On-Campus Reporting Support Services | Almarie J. Jones Special Assistant to the President Diversity and Equity/Title IX and Compliance John F. Ryder Director Student and Veteran Affairs | 856-415-2154 College Center, Room 116 ajones@rcsj.edu 856-468-5000, ext. 6456 College Center, room 202 jryder@rcsj.edu |
| Confidential On-Campus Counseling and Support Services | Lois Y. Lawson-Bridgell, Ph.D. MSW, LSW, Director Counseling & Wellness Services Center William Leonard, Ph.D. Intervention Teams Consultant Crystal Noboa, LSW, MSW Director, The Center for People in Transition (PIT) Diane Mussoline, EdS, LMFT Director of Behavioral Services | 856-464-5236 llawsonb@rcsj.edu College Center, Room 206 856-415-2119 wleonard@rcsj.edu College Center, STEM Office C-168 856-415-2264 cnoboa@rcsj.edu Workforce Development Bldg., room 809 856-494-5665 dmussoli@rcsj.edu College Center, Room 200A |
| Confidential Off-Campus Full-Service Support | Center for Family Services/ Services Empowering Rights of Victims (SERV) | 1-866-295-7378 Camden and Gloucester counties centerffs.org/serv |
| Hospitals with Sexual Assault Nurse Examiners | Inspira Medical Center Jefferson Washington Township Hospital | 700 Mullica Hill Rd. Mullica Hill, NJ - 856-508-1000 435 Hurffville-Crosskeys Rd., Turnersville, NJ - 856-582-2500 |